Lake Erie

2024-2028 Lakewide Action and Management Plan

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Lake Erie Partnership

- Agriculture and Agri-Food Canada (AAFC)
- Bureau of Indian Affairs (BIA)
- Canada Water Agency (CWA)
- Anishinabek Nation
- Caldwell First Nation
- Chippewas of the Thames First Nation
- Environment and Climate Change Canada (ECCC)
- Erie County, New York
- Essex Region Conservation Authority (ERCA)
- Fisheries and Oceans Canada (DFO)
- Grand River Conservation Authority (GRCA)
- Lower Thames River Conservation Authority (LTRCA)
- Michigan Department of Environment, Great Lakes, and Energy (EGLE)*
- Métis Nation of Ontario
- Mississaugas of the Credit First Nation
- National Oceanic and Atmospheric Administration (NOAA)
- New York State Department of Environmental Conservation (NYSDEC)
- Ohio Lake Erie Commission (OLEC)**
- Ohio Sea Grant

*The following agencies are working in coordination with EGLE:

- Michigan Department of Agriculture and Rural Development (MDARD)
- Michigan Department of Natural Resources (MDNR)
- Ontario Ministry of Agriculture, Food and Agribusiness (OMAFA)
- Ontario Ministry of Natural Resources (MNR)
- Ontario Ministry of the Environment, Conservation and Parks (MECP)
- Parks Canada Agency (PCA)
- Pennsylvania Department of Environmental Protection (PADEP)
- Six Nations of the Grand River
- Upper Thames River Conservation Authority (UTRCA)
- United States Army Corps of Engineers (USACE)
- United States Department of Agriculture – Forest Service (USFS)
- United States Department of Agriculture – Natural Resources Conservation Service (NRCS)
- United States Environmental Protection Agency (EPA)
- United States Fish and Wildlife Service (USFWS)
- United States Geological Survey (USGS)
- United States National Park Service (NPS)

**The following agencies are working in coordination with OLEC:

- Ohio Environmental Protection Agency (OEPA)
- Ohio Department of Agriculture (ODA)
- Ohio Department of Heath (ODH)
- Ohio Department of Natural Resources (ODNR)

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Executive Summary

Located between Lake Huron and Lake Ontario, Lake Erie is the southernmost of the Great Lakes, forming a link in the system's eastward flow from the upper to the lower lakes. While it is the smallest of the Laurentian Great Lakes, it is the 15th largest freshwater lake in the world. Straddling the international border, Lake Erie consists of three distinct, but interacting basins (Western Basin, Central Basin, and Eastern Basin). Water entering Lake Erie comes from numerous rivers and from Lake Huron. The Lake Erie Lakewide Action and Management Plant (LAMP) includes the St. Clair River, Lake St. Clair, and Detroit River.

Lake Erie is a social, economic, and environmental powerhouse for the Great Lakes region and for Canada and the United States (U.S.). It provides drinking water to more than 12 million people and feeds the Niagara River system, which supports major hydroelectric power generation, supplying energy to millions of homes. The lake supports the most productive fishery in the Great Lakes, including a major recreational fishery and one of the world's largest freshwater commercial fisheries. In 2020, recreational anglers spent an estimated US$1.83 billion on Lake Erie, while Ontario's Lake Erie commercial fishery generates about CA$200 million per year in economic benefit and supports around 1,000 jobs in fishing and fish processing.. As a critical link in the Great Lakes–St. Lawrence Seaway, Lake Erie and their ports handle more than 72 million metric tons of cargo annually, connecting the region to domestic and international markets. The Lake Erie watershed is predominantly rural with agricultural areas, but it also includes highly urbanized and forested areas. The basin supports a thriving agricultural economy, producing crops and specialty products, such as Concord grapes and greenhouse vegetables, that feed millions. Lake Erie also fuels a flourishing tourism and recreation economy, attracting millions of visitors to its beaches, parks, and wildlife refuges.

Lake Erie's ecosystem is home to a diverse array of wildlife, including hundreds of fish, birds, and plant species. Its warm and shallow waters sustain extensive aquatic vegetation, providing critical habitat for fish. The basin's coastal systems, including over 335 km of bluffs, 403 km of sand beaches, and four iconic sand spits – Point Pelee, Rondeau, Long Point, and Presque Isle – support sediment transport, dune formation, and unique ecological functions. These shores provide globally and continentally essential stopover sites for waterfowl, shorebirds, landbirds, and waterbirds, with many areas recognized as Important Bird Areas, UNESCO Biosphere Reserves, or Ramsar Wetlands of International Importance, including Long Point, Point Pelee, and the Detroit River International Wildlife Refuge, highlighting Lake Erie's critical role in regional and global biodiversity.

Indigenous Peoples have been the original caretakers of the Lake Erie basin. Indian Nations, First Nations, and Métis communities draw material sustenance, cultural identity, and spiritual strength from these waters and surrounding lands. Their stewardship and knowledge remain essential to understanding and protecting the lake today, and the Lake Erie LAMP affirms this continuity of responsibility and respect.

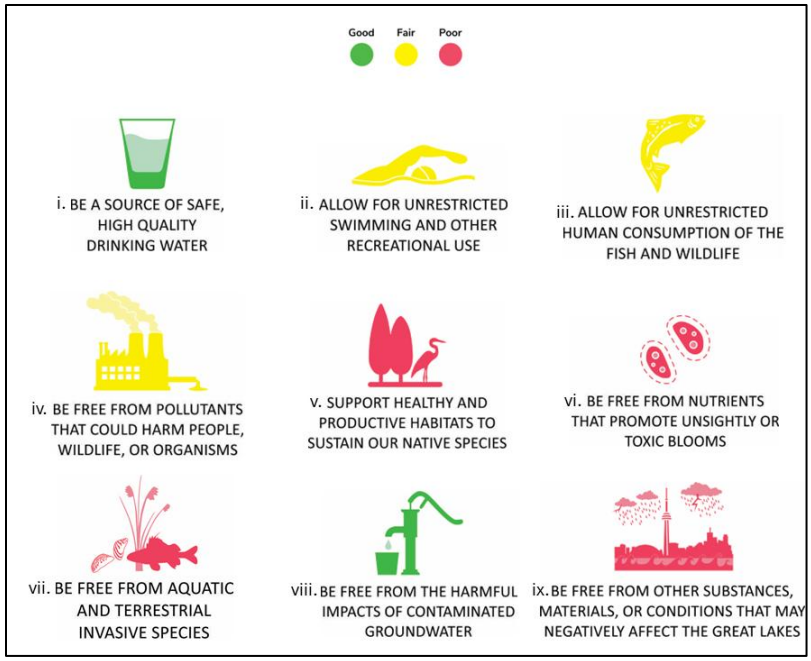

Figure ES-1. Status of Lake Erie in relation to the GLWQA Nine General Objectives (ECCC and EPA, 2022).

Binational efforts to safeguard Lake Erie and the connecting waters of the St. Clair River, Lake St. Clair, and Detroit River are outlined in the 2012 Great Lakes Water Quality Agreement (GLWQA), in which Canada and the U.S. pledged to restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes. The 2024-2028 Lake Erie LAMP fulfills this commitment by assessing the lake's condition, identifying key environmental threats, setting research and monitoring priorities, and outlining actions to restore and protect the ecosystem.

As assessed in the 2022 State of the Great Lakes (2022 SOGL), the overall status of the Lake Erie basin ecosystem is ***Poor,*** and the trend is ***Unchanging***. While two ecosystem indicators are ***Good***, three are classified as ***Fair*** and four remain in ***Poor*** condition reflecting persistent and emerging challenges.

To address these challenges, the Lake Erie Partnership – a binational coalition of federal, provincial, state, and local governments, alongside U.S. Tribes, First Nations, and Métis – has developed ***48 specific actions*** that align with the nine General Objectives of the GLWQA. They are designed to respond directly to the most pressing threats, including *reducing chemical and nutrient pollution*, *combating invasive species*, *conserving habitats*, and addressing *other threats*. Success depends not only on government programs and scientific interventions but also on meaningful collaboration with academic institutions, non-governmental organizations, and local communities.

The actions identified in this LAMP are designed to:

- Reduce legacy and emerging toxic chemicals that continue to drive fish consumption advisories in some areas, as well as land-based stressors from urban and agricultural runoff.
- Reduce excess nutrient inputs, which fuel toxic and nuisance algal blooms, including cyanobacteria, contributing to hypoxia, loss of aquatic biodiversity, and stress on fish and invertebrate communities.
- Reduce loss of habitat and species, which decreases ecosystem productivity and resiliency.
- Reduce impacts from invasive species that alter habitat and nutrient cycling.
- Reduce other substances, materials, and conditions that negatively impact the chemical, physical, or biological integrity of the lake and basin.

The Lake Erie Partnership will track and report on progress annually, adjust actions based on new science and Indigenous Knowledge, and continue to invite participation from communities across the basin.

The LAMP emphasizes that every sector of society has a role to play in safeguarding Lake Erie. Partnership agencies have committed to integrating LAMP actions into their programs and investments, and to tracking progress transparently to ensure accountability and continuous improvement. Beyond this institutional leadership, the plan recognizes the impact of grassroots and individual action. Residents, students, community groups, and advocates can support local conservation, reduce pollution, and champion stewardship in tangible ways.

Protecting Lake Erie requires the combined energy of governments, Indigenous partners, scientists, and public alike. Everyone has a role to play. Whether by restoring natural vegetation along streams, reducing road salt and plastic waste, participating in shoreline cleanups, or supporting local conservation and stewardship organizations, individual and community actions can have a positive impact. **The LAMP's actions to restore and protect ecosystems will ensure that water quality and social and economic prosperity go hand in hand.**

Table ES-1. 2024–2028 Lake Erie Partnership Management Actions (*Major Highlights - Examples*)

Note: This table highlights only selected flagship actions. Detailed action tables, with complete agency lists, are provided in Section 2.

Major Threat / Focus Area	2024–2028 Major Action Highlights	Lead / Co-lead Agencies	GLWQA General Objective
Chemical contaminant pollution	Complete or advance contaminated sediment remediation in Lake Erie Areas of Concern and other priority nearshore sites; implement Chemicals of Mutual Concern strategies to reduce releases to the lake.	CWA, ECCC, EGLE, EPA, MECP, NYSDEC, OEPA, PADEP, USACE	iii, iv, vi, viii, ix
Nutrient & bacterial pollution	Reduce phosphorus and bacterial loadings from priority tributaries and nearshore areas through targeted agricultural BMPs, wastewater upgrades, stormwater retrofits, and green infrastructure; strengthen lakewide monitoring of nutrients, HABs, hypoxia, and beach water quality to guide adaptive management.	Conservation Authorities, CWA, EGLE, EPA, MECP, NOAA, NYSDEC, OEPA, OMAFA, PADEP, USACE	ii, vi
Loss of habitat & species	Protect, restore, and reconnect high-value coastal wetlands, tributaries, and nearshore habitats; improve tributary connectivity for native fish while maintaining effective Sea Lamprey control; prioritize restoration in Areas of High Ecological Value and sites exposed to changing lake conditions.	Conservation Authorities, CWA, DFO, EGLE, EPA, MDNR, MNR, NOAA, NYSDEC, ODNR, OEPA, USACE, USFWS, USGS	v
Invasive species	Maintain Sea Lamprey at or below target levels; implement the binational Invasive Carp Action Plan; strengthen early detection and rapid response for aquatic and terrestrial invasive species at high-risk locations; reduce spread through improved pathway management and public reporting tools.	DFO, EGLE, EPA, MDNR, MNR, NOAA, NYSDEC, ODNR, OEPA, USACE, USFWS, USGS (with Annex 6 partners)	vii
Other threats	Advance science and source-reduction measures for plastics, microplastics, chloride, and other emerging contaminants; integrate adaptation to changing environmental conditions, nature-based solutions, coastal resilience, and flood-mitigation design into restoration projects to reduce cumulative nearshore stress and protect areas of high ecological value.	Conservation Authorities, CWA, ECCC, EGLE, EPA, MDNR, MECP, NYSDEC, NOAA, ODNR, OEPA, USGS	ix

1.0 Introduction

The 2024-2028 Lake Erie Lakewide Action and Management Plan (LAMP) is a binational, five-year, ecosystem-based strategy to restore and protect Lake Erie water quality. It follows the successful implementation of the 2019-2023 LAMP, where over 33 government agencies undertook actions in cooperation with over 300 other organizations, communities, and academic institutions.

The Lake Erie LAMP fulfills the commitments of the United States of America (U.S.) and Canada under the 2012 Great Lakes Water Quality Agreement (GLWQA, 2012) by assessing ecosystem conditions, identifying environmental threats, setting priorities for research and monitoring, and determining further actions for governments and the public. These commitments include integrating nearshore assessment information into lakewide management. Additionally, to combat the threat of toxic and nuisance algal development in Lake Erie, the U.S. and Canada established binational phosphorus load reduction targets for Lake Erie and developed domestic action plans that outline strategies for meeting targets.

The LAMP is a model for cooperation among governmental jurisdictions and their management agencies. As illustrated in Figure 1, the geographic scope of this LAMP includes activities in the waters of Lake Erie, the St. Clair – Detroit River System (or SCDRS, which encompasses St. Clair River, Lake St. Clair, and Detroit River), and in its tributaries and watersheds, so far as they impact the waters of Lake Erie. The LAMP is a resource for anyone interested in the Lake Erie basin ecosystem, its water quality, and actions to protect this extraordinary Great Lake.

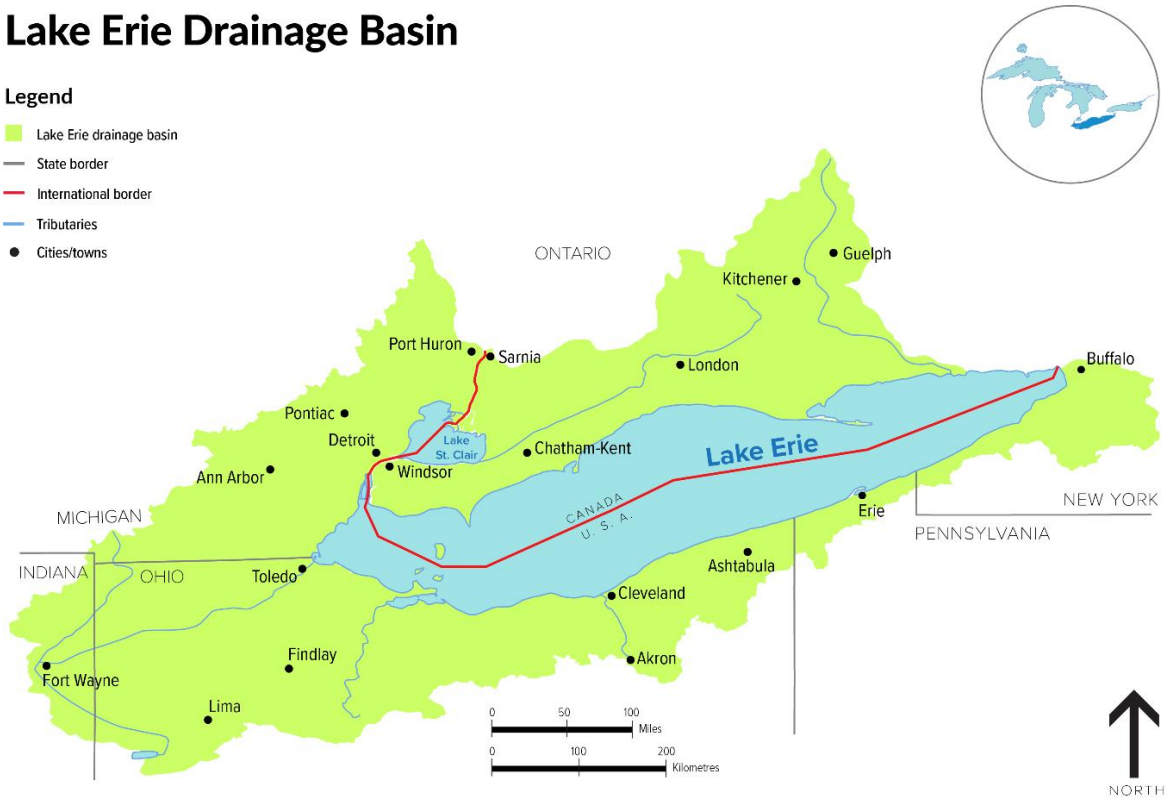

Figure 1. Map of Lake Erie and its watershed. Under the GLWQA, the waters of Lake Erie include Lake Erie, the St. Clair River, Lake St. Clair, and the Detroit River.

1.1 Lake Erie Partnership

The Lake Erie Partnership is a binational collaborative team of agencies and organizations working to protect and restore the lake. It is co-led by the Canada Water Agency (CWA) and the U.S. Environmental Protection Agency (EPA), in cooperation with provincial and state governments, Indian Nations, First Nations, and Métis governments and organizations, municipal governments, watershed management agencies, and other local public agencies (see Acknowledgments for a list of members).

The Partnership is guided by a Management Committee of senior leaders from Canadian and U.S. agencies who have decision-making authority over Great Lakes programs and investments. The Management Committee sets the overall direction for the LAMP and endorses priorities.

Coordination is undertaken by a binational Working Group, supported by technical work groups, science committees, and coordination teams focused on key themes such as water quality, habitat and species, coastal resilience, and public engagement. These teams coordinate efforts and engage stakeholders and the public to identify research, monitoring, and other science priorities for the assessment of current and future potential threats to water quality, and for the identification of priorities to support actions.

1.2 Engagement in LAMP Development

Engagement, collaboration, and active participation by all levels of government, Indian Nations, First Nations, Métis, non-governmental organizations, and members of the public are essential to the development and implementation of the Lake Erie LAMP. The Partnership member agencies funded or collaborated with more than 300 communities, organizations, and institutions to implement the 2019-2023 Lake Erie LAMP, and the results of these efforts inform this LAMP.

For the 2024-2028 Lake Erie LAMP, the Lake Erie Partnership coordinated the 2022 State of Lake Erie Conference, the 2022 Lake Erie Science and Monitoring Workshop, and ongoing public webinars. The Partnership issued a notice inviting early input on the new LAMP. U.S. and Canadian Governments conducted a review of the operation and effectiveness of the Agreement in 2024 and identified the development and publication of LAMP documents as an area for improvement. A shortened LAMP format is a result of those efforts. A public review of the draft 2024-2028 LAMP provided further opportunity for feedback and helped shape the final LAMP.

1.3 State of the Great Lakes Reporting

Canada and the United States assess the State of the Great Lakes (SOGL) using nine ecosystem indicators and 40 sub-indicators, updated every three years with input from hundreds of scientists and experts. For Lake Erie, the 2022 SOGL report concludes that the overall status of the lake was ***Poor***, with a trend of ***Unchanging***.

In relation to the nine General Objectives of the GLWQA, four Objectives for Lake Erie are currently assessed as ***Poor***, three as ***Fair***, and two as ***Good***. Major stresses on the lake include excess nutrients, the introduction and spread of invasive species, habitat degradation, and the impacts from changes in physical processes, such as warmer surface waters and reduced ice cover. Restoration efforts are needed to improve the status of Objectives assessed as **Fair** or **Poor**, while protection and conservation actions are essential to maintain those currently assessed as **Good**.

Detailed lakewide and indicator-specific results, including sub-indicator data and trends, are available on binational.net.

1.4 Indigenous Peoples

For over ten thousand years, Indigenous Peoples have lived in and travelled through the Lake Erie watershed, relying on its natural resources for food, materials, and cultural practices. Many sites around the lake have long served as gathering places. For example, the Aamjiwnaang First Nation, located on the St. Clair River, takes its name from an Ojibway word meaning "important gathering place." A network of trails once connected Lake Erie communities to distant settlements as far as the Mississippi River and Chesapeake Bay.

The name "Erie" is derived from the Iroquoian word *erielhonan*, meaning "long tail," reflecting the lake's shape. Historically, an Iroquoian group known as the Erie people occupied a large territory on the lake's south shore, from western New York through most of northern Ohio.

Four major Indigenous cultural groups are present within the Lake Erie watershed in Canada: the Anishinaabe, Haudenosaunee, Lenape, and the Métis. These are represented by nine First Nations in Ontario: Aamjiwnaang First Nation (St. Clair River); Bkejwanong (Walpole Island First Nation) (Lake St. Clair); Chippewas of the Thames First Nation (Thames River); Oneida Nation of the Thames (Thames River); Munsee-Delaware Nation (Thames River); Eelünaapéewi Lahkéewiit (Delaware Nation at Moraviantown) (Thames River); Caldwell First Nation (western Lake Erie); Six Nations of the Grand (Grand River); and the Mississaugas of the Credit (Grand River). Three Métis Nation of Ontario communities are located in the watershed: the Grand River Métis (centered in Kitchener), the Thames Bluewater Métis (centered in London), and the Windsor-Essex-Kent Métis (centered in Windsor). In the U.S., there are two federally recognized Tribes in the Lake Erie watershed – the Seneca Nation of Indians (eastern Lake Erie watershed) and the Tonawanda Band of Seneca Indians.

Indigenous knowledge, complex, place-based knowledge systems rooted in the worldviews and laws of Indian Nations, First Nations, and Métis, plays an essential role in understanding and caring for Lake Erie. Traditional Ecological Knowledge (TEK), as one expression of these systems, offers detailed insights into environmental change, species, and relationships among water, land, and all beings. TEK is an independent and sovereign knowledge system that may only be shared at the discretion of Indigenous knowledge holders and in accordance with their protocols.

The Lake Erie Partnership recognizes the importance of Indigenous-led stewardship and co-development of science and actions under the LAMP. Indigenous governments and organizations help assess lake status, identify priorities, and shape management actions, including through ongoing work under the GLWQA to support more effective and respectful engagement with TEK and Indigenous knowledge in Great Lakes research, monitoring, and decision-making.

2.0 Lakewide Action Plan

The actions included in the LAMP respond to, and are categorized by, the major threats that are affecting one or more of the Agreement's General Objectives, specifically: chemical contaminant pollution; nutrient and bacterial pollution; invasive species; loss of habitat and species; and other potential threats. Government agencies, Indigenous Peoples, stakeholders, and the public all play an important role in implementing the actions identified in the LAMP.

2.1 Chemical Contaminant Pollution

This section summarizes the scientific information about Lake Erie's water quality related to chemical concentrations, current chemical contaminant threats, and corresponding actions to be taken by Lake Erie Partnership agencies in the 2024-2028 timeframe, and actions that everyone can take. Information is aligned to assess the related General Objectives of the GLWQA, specifically addressing drinking water, human consumption of fish and wildlife, pollutants that could harm people and wildlife, and the impacts of contaminated groundwater.

Decades of government action, remediation of contaminated sites and Areas of Concern, and changes in industrial practices have led to significant declines in many legacy toxic chemicals in air, water, sediment, fish, and wildlife. However, challenges remain, including legacy contaminants that persist in sediments and food webs, chemicals of mutual concern (CMCs), and contaminants of emerging concern (CECs).

Chemical contaminants in water, fish, wildlife, and sediments pose risks to Indian Nations, First Nations, and Métis, whose rights, cultures, and ways of life are closely tied to harvesting from the land and waters. Contamination can affect not only physical health but also cultural continuity, language, and spiritual practices. There is no complete cultural or nutritional substitute for traditional foods, and fish consumption advisories cannot fully address these impacts. Some groups, including people who are pregnant or may become pregnant, infants, and young children, may be affected by contaminants at lower exposure levels than the general population. This underscores the need for clear, accessible, and culturally responsive communication about advisories and practical risk-reduction options.

2.1.1 Objectives and Condition Overview

Four of the nine GLWQA General Objectives apply to the management of chemical contaminant pollution such that the Waters of Lake Erie should:

> **i.** ***be a source of safe, high-quality drinking water.***
>
> ***iii. allow for human consumption of fish and wildlife, unrestricted by concerns due to harmful pollutants.***
>
> ***iv. be free from pollutants in quantities or concentrations that could be harmful to human health, wildlife, or aquatic organisms, through direct exposure or indirect exposure through the food chain.***
>
> ***viii. be free from the harmful impact of contaminated groundwater.***

2022 SOGL assessments for Lake Erie indicate that:

- Treated drinking water and groundwater quality, and toxic chemicals in herring gull eggs are in ***Good*** condition.
- Contaminants in edible fish, sediment, open water, whole fish, and atmospheric deposition are in ***Fair*** condition.
- Most sub-indicators show ***Unchanging*** or ***Improving*** trends.

Lake Erie continues to be a reliable source of high-quality treated drinking water, while fish remain a nutritious food source when eaten in accordance with advisories. Likewise, groundwater quality does not negatively impact the water quality of the lake***.***

2.1.2 Drinking Water

Municipal drinking water systems that draw from Lake Erie and the St. Clair–Detroit River System (SCDRS) routinely monitor source and treated water for a wide range of inorganic, organic, microbial, and radiological contaminants.

Authorities such as the U.S. Safe Drinking Water Act and the Ontario Safe Drinking Water Act set the basis for health-based limits and require corrective action when those limits are exceeded.

According to the 2022 SOGL assessment, treated drinking water from Lake Erie is assessed as **Good**. Potential threats include over-application of fertilizers and pesticides, runoff and combined sewer overflows during heavy rain events, malfunctioning septic systems, spills of industrial or hazardous materials, and atmospheric deposition.

2.1.3 Fish and Wildlife Consumption

Partners monitor persistent, bioaccumulative, and toxic substances in fish and wildlife to assess risks to people who consume them. Consumption advisories are issued to protect human health.

Contaminants in edible fish are assessed as ***Fair*** with ***Improving*** trends in the 2022 SOGL. PCBs and mercury, the primary pollutants driving consumption advisories, have declined markedly since the 1970s. However, contaminants in fish tissue still warrant fish consumption advisories for some species and locations. Lake Erie fish remain a valuable food source when consumed in accordance with the appropriate advisories.

The contaminants in fish and wildlife can disproportionately affect Indigenous communities and other subsistence fishers who rely on these resources for cultural, spiritual, and nutritional reasons, as well as sensitive populations. However, Lake Erie fish remain a valuable food source when consumed in accordance with the appropriate advisories.

2.1.4 Chemical Contaminants

Long-term monitoring supporting SOGL 2022 shows toxic chemicals monitored in Lake Erie are assessed as ***Fair***. Chemical contaminants in Lake Erie are present throughout the SCDRS and the western, central, and eastern basins, entering the lake from multiple sources and pathways.

Key sources and pathways of chemical contaminants include:

- Atmospheric deposition.
- Agricultural and urban runoff, including stormwater runoff
- Sanitary and combined sewer overflows.
- Discharges or legacy releases from industrial, commercial and transportation corridors along the shoreline.

2.1.5 Contaminated Groundwater

Groundwater monitoring programs in multiple levels of government track groundwater quality in monitoring wells across the basin. The **Groundwater Quality** sub-indicator for Lake Erie is currently assessed as **Good**, with **Undetermined** trends. Most monitored wells show water quality that meets or approaches applicable guidelines and known contaminated groundwater plumes are localized and actively managed under existing environmental programs. There is no evidence of significant lakewide impacts from contaminated groundwater on Lake Erie.

Many of the same pressures that affect surface water also influence groundwater. Leaking septic systems, landfills, and other sources are pathways for nutrients, salts, metals, and pesticides to contaminate groundwater. Given groundwater connections to streams, wetlands, and nearshore areas, the contamination of groundwater is a potential pathway for pollutant loadings over long periods, which can mask improvements from surface-water management efforts.

2.1.6 Actions Table

The following actions will be taken and/or continued in the Lake Erie basin to further prevent and reduce chemical contaminant pollution and to track progress through science and monitoring, as listed in Table 1.

Table 1: Actions to Prevent and Reduce Chemical Contaminant Pollution and Track Progress.

Note: Bulleted items under the main actions in this table are not necessarily inclusive of all actions that the Lake Erie Partnership could implement. Partner agencies are listed in alphabetical order.

#	2024-2028 Lake Erie Partnership Management Actions	Agencies Involved	General Objective
1	Monitor and assess sources, fate, transport, distribution, and effects of contaminants in various media (air, water, sediment, fish, and wildlife). a. Continue long-term monitoring and surveillance programs to examine CMCs, legacy organics, PAHs, trace metals, and contaminants of emerging concern. b. Investigate mercury exposure pathways and bioaccumulation trends.	CWA, ECCC, EGLE, EPA, MECP, NOAA, NYSDEC, OEPA, PADEP, USFWS, USGS	iv
2	Implement actions identified in the binational strategies for the CMCs within the Lake Erie basin.	CWA, ECCC, EGLE, EPA, MECP, NYSDEC, OEPA	iv
3	Update and, where needed, develop fish consumption guidance and conduct public outreach and education on the impacts of chemical contaminants in fish with a focus on mercury, PCBs, PFAS, and pesticides.	ECCC, EGLE, MECP, NYSDEC, ODH, OEPA, PADEP	iii, iv
4	Undertake, support, and/or promote innovative approaches and technologies to reduce releases of harmful chemicals from sources such as wastewater effluents.	CWA, MECP, NYSDEC	iv, vi
5	Advance remediation and support management of contaminated sediment in Lake Erie's Areas of Concern: a. St. Clair River Area of Concern in Canada. b. Detroit River, Rouge River, Cuyahoga River, Clinton River, and Maumee River Areas of Concern in the U.S.	CWA, DFO, EGLE, EPA, MECP, OEPA, USACE	iv
6	Reduce the impacts of road salts. a. Work with road organizations, municipalities, conservation authorities, the private sector, and other partners to promote salt application best management practices, certification, and alternatives for both public and private salt applicators, including on private roads, sidewalks, and parking lots.	ECCC, EGLE, MECP, NYSDEC, OEPA, USGS	iv, viii

#	2024-2028 Lake Erie Partnership Management Actions	Agencies Involved	General Objective
	b. Assess pathways for road salt into groundwater, impacts of road salt use on groundwater, and groundwater as a source for salt contamination to surface water bodies and aquatic ecosystems. c. Investigate technologies or processes for preventing chloride from road salt from entering groundwater and surface water.		
7	Improve understanding of groundwater impacts on physical, chemical, and biological processes in specific ecological zones of Lake Erie to inform future management actions.	ECCC, MECP, OEPA	viii, ix
8	Continue developing and implementing beneficial-use dredged-material projects to maximize environmental benefits and promote sustainable sediment management throughout Lake Erie.	EPA, NYSDEC, ODNR, OEPA, USACE	iv, ix

2.1.7 Actions Everyone Can Take

Everyone in the Lake Erie basin can help reduce chemical contaminant pollution by:

- **Choosing environmentally friendly household cleaning and personal care products**.
- **Choosing products and practices that use fewer harmful chemicals**.
- **Using natural, non-toxic pest-control methods** whenever possible.
- **Safely disposing of chemicals and medicines** at household hazardous waste and pharmaceutical take-back programs; never pouring them down drains or storm sewers.
- **Avoiding the open burning of household waste**.
- **Reducing winter salt use on driveways and sidewalks** by using only what is needed and considering alternatives where appropriate.
- **Following local fish consumption advisories** and sharing this information with family and community members, especially those who fish frequently.
- **Supporting local source-water protection, AOC remediation, and stewardship initiatives.**

These collective actions, alongside the regulatory and program commitments of governments and partners, will help to reduce chemical contaminants further and protect Lake Erie as a source of safe drinking water, healthy fish and wildlife, and vibrant communities.

2.2 Nutrient and Bacterial Pollution

This section summarizes the scientific information on Lake Erie's nutrient and bacterial pollution, current threats, and corresponding actions to be taken by Lake Erie Partnership agencies within the 2024-2028 timeframe, as well as actions that everyone can take. Information is aligned to assess two related GLWQA General Objectives.

2.2.1 Objectives and Condition Overview

Two of the nine General Objectives of the GLWQA are addressed in this section. The waters of Lake Erie should:

- ***ii. allow for swimming and other recreational use, unrestricted by environmental quality concerns;*** and
- ***vi. be free from nutrients that directly or indirectly enter the water as a result of human activity, in amounts that promote growth of algae and cyanobacteria that interfere with aquatic ecosystem health, or human use of the ecosystem***

The 2022 SOGL assessments indicate that current conditions in Lake Erie are ***Poor*** for nutrients and harmful algal blooms (HABs), and ***Poor*** for *Cladophora*, with ***Unchanging*** trends for nutrients and *Cladophora* and an ***Improving*** trend for HABs. Beaches are assessed as ***Fair***, with an ***Unchanging*** trend.

In practical terms, these ratings reflect recurring cyanobacterial blooms in the western basin, seasonal low-oxygen conditions (hypoxia) in the central basin, and nuisance *Cladophora* growth that fouls nearshore areas in parts of the eastern basin. At the same time, some beaches continue to experience bacterial contamination during or after heavy rain events, even as most monitored beaches remain open for most of the swimming season.

Taken together, these conditions confirm that nutrient and bacterial pollution remain among the most significant and persistent stresses on Lake Erie, affecting ecosystem health, drinking water, and recreation. They also underscore the importance of fully implementing **Annex 4 phosphorus reduction targets** and associated actions in this LAMP to move conditions from ***Poor*** toward ***Fair*** and ***Good***.

2.2.2 Nutrient Pollution

Excess phosphorus and nitrogen enter Lake Erie through multiple pathways, particularly tributaries draining intensive agricultural and urban areas. Key sources include:

- Runoff and tile drainage from croplands carrying fertilizers and manure.
- Municipal wastewater effluents and combined sewer overflows.
- Urban stormwater from roads, roofs, and other hard surfaces.

The loss of wetlands and riparian vegetation that once trapped and processed nutrients exacerbates the effects of nutrient pollution.

Binational monitoring programs led by ECCC, EPA, and partners track nutrient concentrations, phytoplankton communities, and hypoxia in offshore and nearshore waters. The 2022 SOGL uses these long-term datasets to assess the status and trends of nutrient and algal indicators. Canada's Phosphorus Loading to Lake Erie indicator and Lake Erie Water Quality Data track phosphorus loads on an annual basis.

Satellite remote sensing, such as ECCC's EOLakeWatch, as well as in-lake sensors and field sampling provide information on HAB extent and severity. Operational tools such as NOAA's Lake Erie Harmful Algal Bloom Forecast and Lake Erie Hypoxia Forecast translate science and monitoring into near-term forecasts for managers and the public. Targeted monitoring of *Cladophora* biomass in the eastern basin helps track nuisance benthic algal growth; related methods and findings are summarized in the SOGL *Cladophora* Sub-indicator Technical Report.

Under Annex 4, Canada and the United States adopted a 40% reduction target (relative to 2008 loads) for total phosphorus entering the western and central basins and for key tributaries, including the Maumee River and other priority watersheds. Implementation pathways and implementation actions are outlined in the Canada–Ontario Lake Erie Action Plan and U.S. domestic action-planning documents. Many actions are underway, but most lakewide and tributary phosphorus load targets have not yet been consistently achieved, especially in years with high runoff. The estimated average annual phosphorus loading to Lake Erie for 2015 to 2024 is shown in Figure 2.

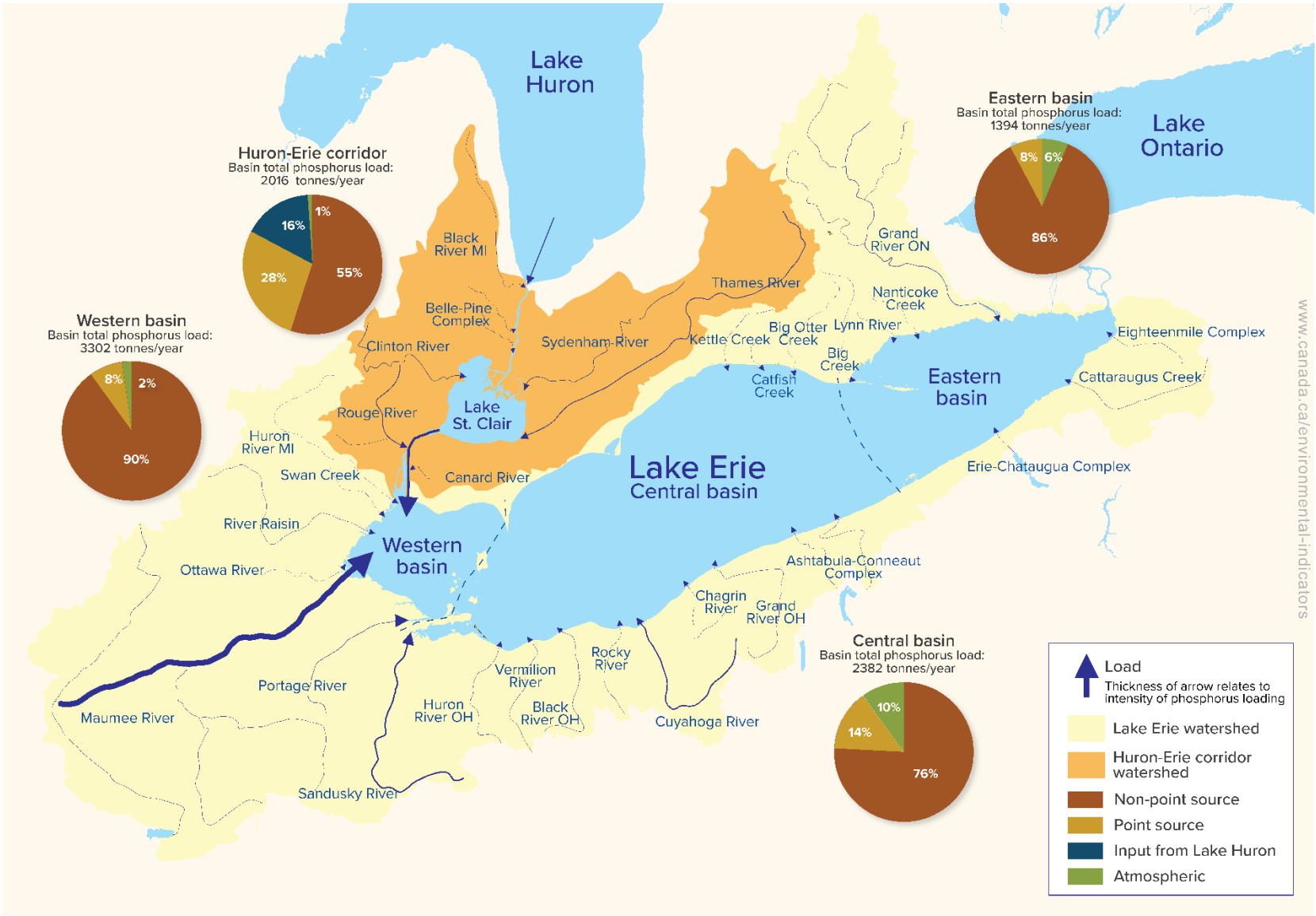

Figure 2. Estimated annual average phosphorus loading over 10 years to Lake Erie, 2015 to 2024.

Nutrients and algae interact differently across Lake Erie's three basins and connecting systems:

- In the **western basin**, shallow depths, warm summer temperatures, and high phosphorus loads from the Detroit and Maumee rivers contribute to recurring cyanobacterial blooms that can affect drinking water, recreation, and fisheries. Bloom severity varies from year to year and is closely linked to spring nutrient loads and rainfall, as demonstrated in analyses of the record 2011 bloom.
- In the **central basin**, blooms originating in the west and local inputs contribute to seasonal hypoxia in deeper waters. Hypoxic conditions can reduce suitable fish habitat, alter nutrient cycling, and affect water chemistry. Phosphorus loads, hypoxia extent, and dissolved oxygen trends are tracked through annual monitoring and summarized in EPA's Lake Erie water quality updates and associated technical reports (and the Lake Erie dissolved oxygen monitoring program reports) as well as ECCC's Great Lakes Water Quality Monitoring and Surveillance Data and Phosphorous loading to Lake Erie indicator reporting.
- In the **eastern basin**, phosphorus levels are generally lower. Still, light and substrate conditions support nuisance *Cladophora* growth on rocky nearshore bottoms, leading to beach fouling and aesthetic and ecological impacts along portions of the shoreline. 2022 SOGL and Annex 4 technical materials rate *Cladophora* status in Lake Erie as ***Poor*** and ***Unchanging***, and highlight the role of dreissenid mussels and chronic nutrient loading in promoting excessive growth (see the *Cladophora* sub-indicator report)

Nearshore waters are where many of these pressures converge. Drinking water intakes, beaches, wetlands, and coastal communities are often located in areas that also receive tributary inputs, runoff, and wastewater discharges. Invasive dreissenid mussels further complicate nutrient dynamics by filtering water, increasing clarity, and "shunting" nutrients to the bottom, thereby enhancing *Cladophora* growth and altering food webs. These effects are still being studied through research and monitoring by some member agencies of Annex 4.

More frequent heavy rains, warmer surface waters, and changes in how lake water separates into layers and then mixes are expected to intensify nutrient-related problems by increasing runoff, extending algal growing seasons, and influencing hypoxia and nearshore conditions. Projected increases in spring rainfall and extreme precipitation events are likely to increase non-point phosphorus loads and the frequency of severe bloom years unless additional controls are implemented.

2.2.3 Bacterial Pollution

Bacterial pollution is closely linked to nutrient and runoff dynamics and affects people's ability to swim and enjoy beaches safely. During the swimming season, provincial, state, and local agencies monitor selected beaches for fecal indicator bacteria, such as Escherichia coli and enterococci, and issue advisories or temporary closures when concentrations exceed health-based thresholds. Monitoring is typically conducted weekly through the summer, and results are communicated via local health units and beach reporting systems.

The 2022 SOGL assesses Lake Erie's **Beach Advisories** sub-indicator as ***Fair***, with an ***Unchanging*** trend, based on the frequency of beach postings and closures relative to jurisdiction-specific standards for fecal indicator bacteria. On average, monitored beaches in both Canada and the United States are open and safe for swimming for most of the season, but some locations experience frequent postings during or after heavy rain events, often in the same nearshore areas affected by nutrient-driven algal growth and other cumulative stresses.

Key sources and pathways of bacterial contamination include:

- Failing or poorly maintained septic systems and private sewage systems.

- Sanitary and combined sewer overflows and bypasses during storm events.
- Urban stormwater from roads, roofs, construction sites, and parking lots.
- Fecal inputs from wildlife and pets on or near beaches.
- Algal mats and decaying vegetation that can harbour bacteria in nearshore sands and waters.

People swimming in water contaminated with pathogens can contract illnesses affecting the gastrointestinal tract, eyes, ears, skin, and upper respiratory system.

Addressing bacterial contamination requires a combination of infrastructure upgrades, green infrastructure and stormwater management, improved septic system performance, targeted agricultural best management practices, and public education on sources and risks.

2.2.4 Actions Table

The actions in Table 2 summarize how Lake Erie Partnership members will address nutrient and bacterial pollution pressures during the 2024–2028 LAMP period. These binational and domestic commitments focus on priority areas, watershed sources, and weather-driven vulnerabilities and are designed to complement existing regulatory programs and local initiatives.

Table 2: Actions to Prevent Nutrient and Bacterial Pollution and Track Progress.

Note: Bulleted items under the main actions in this table are not necessarily inclusive of all actions that the Lake Erie Partnership could implement. Partner agencies are listed in alphabetical order.

#	2024-2028 Lake Erie Partnership Management Actions	Agencies Involved	General Objective
9	Implement binational phosphorus reduction strategies and domestic action plans to reduce phosphorus loads to Lake Erie. a. Continue to work with the agriculture community to encourage and incentivize the adoption of on-farm best management practices to reduce phosphorus loadings from agricultural sources. b. Implement municipal wastewater program improvements, emphasizing optimization of the operation of wastewater treatment facilities to reduce phosphorus discharge levels. c. Target watershed restoration efforts to areas most prone to phosphorus losses. d. Establish or expand buffers for rivers, streams, and wetlands to intercept and infiltrate runoff and prevent streambank erosion.	AAFC, Conservation Authorities, CWA, ECCC, EGLE, EPA, MDARD, MECP, MNR, NRCS, NYSDEC, ODA, ODNR, OEPA, OMAFA, PADEP, USACE, USFS, USFWS	i, vi
10	Monitor and assess sources, fate, transport, distribution, and effects of excess nutrient loads. a. Enhance in-lake monitoring of algae and hypoxic conditions. b. Maintain existing networks of surface water quality monitoring sites to track contributions from various streams and river locations. c. Improve monitoring of nutrient loads, transport and cycling in priority tributaries and watersheds. d. Invest in research and demonstration initiatives to improve knowledge and understanding of the effectiveness of BMPs in mitigating phosphorus loads	AAFC, CWA, Conservation Authorities, ECCC, EGLE, EPA, MDARD, MECP, NOAA, NRCS, ODHE, OEPA, OMAFA, USACE, USGS	vi
11	Investigate nutrient sources, sinks and recycling within the Lake (e.g., release from sediments, decaying *Cladophora*, and dying mussels). Improve understanding of: a. Lakewide physical and biological processes that translocate nutrients/energy from the nearshore to offshore and from the offshore to nearshore, with consideration of the influence of invasive species (e.g., Dreissenid mussels). b. How the food web responds to changes in nutrient inputs and cycling.	ECCC, MECP, NOAA, NYSDEC, USFWS, USGS	vi

12	Identify management techniques and perform a demonstration project to minimize the impact of *Microseira wollei* (taxonomically accepted name for *Lyngbya wollei*) along shorelines in Lake St. Clair.	EGLE, USACE	vi
13	Support the development and implementation of long-term control plans, low-impact development, green infrastructure, nature-based solutions, and other efforts to reduce combined sewer overflows (CSOs) and stormwater discharge to Lake Erie.	Conservation Authorities, ECCC, EGLE, EPA, , MECP, NYSDEC, OEPA, PADEP	vi
14	Work with local partners to conduct source tracking and monitor beach health. a. Develop and assist local health departments, universities, and other partners to implement rapid response methods for *Escherichia coli (E. coli)* and HABs monitoring and public notification at beaches. b. Quantify the health risk of *E. coli* and other bacteria pathogens associated with water, sand, and benthic algae at Lake Erie beaches.	ECCC, EGLE, EPA, MECP NYSDEC, ODH, PADEP, USGS	ii
15	Undertake outreach and education to stakeholders on local and regional scales to increase the understanding of water quality conditions and management challenges pertaining to nutrients and bacteria, nearshore algae, and beach health.	AAFC, Conservation Authorities, CWA, ECCC, EGLE, EPA, MDARD, MDNR, MECP, NRCS, NYSDEC, ODHE, OLEC, OMAFA, PADEP	ii, vi

2.2.5 Actions Everyone Can Take

Everyone who lives, works, or recreates in the Lake Erie and SCDRS basin can help reduce nutrient and bacterial pollution. Practical actions include:

- **Maintain your septic system** through regular inspection and pumping, repairing failing systems, and ensuring systems are properly designed, correctly sized, and maintained to prevent surface overflow or subsurface bypass that can impact nearby waterways.
- **Use less fertilizer** by testing soil, avoiding fertilizers containing phosphorus unless needed, following application instructions carefully, applying only what is necessary, avoiding spreading before heavy rain, and keeping fertilizers off driveways and sidewalks.
- **Plant and protect vegetated buffers** along shorelines, ditches, and streams to absorb runoff, stabilize soils, and filter nutrients and bacteria.
- **Reduce stormwater runoff** by directing downspouts to rain gardens planted with native vegetation, using rain barrels, minimizing hard surfaces, and allowing water to soak into the ground.
- **Pick up pet waste** and dispose of it properly so that bacteria and nutrients do not wash into storm drains and waterways.
- **Avoid feeding gulls and geese** at beaches and waterfronts, properly discard food waste, and support humane waterfowl management efforts.
- **Stay informed about beach advisories and algal blooms**, follow public health guidance, and report suspected blooms or sewage spills to local authorities.
- **For agricultural lands, incorporate best management practices** such as nutrient management planning, grassed swales, filter or buffer strips, cover crops, keeping livestock out of streams, and planting windbreaks. Producers can consult local BMP programs for further guidance.

2.3 Loss of Habitat and Species

Lake Erie water quality depends on the health of the basin's ecosystem. This section summarizes scientific information about Lake Erie's habitat and species, current threats, and corresponding actions to be taken by Lake Erie Partnership agencies in the 2024-2028 timeframe, as well as actions everyone can take. Information is aligned to the habitat and species General Objective of the GLWQA.

2.3.1 Objective and Condition Overview

One of the nine General Objectives of the GLWQA is addressed in this section. The waters of Lake Erie should:

> *v. **support healthy and productive wetlands and other habitats to sustain resilient populations of native species.***

The 2022 SOGL uses multiple sub-indicators to assess habitat condition, connectivity, and the aquatic food web in Lake Erie, as well as key watershed pressures (forest cover, land cover change, hardened shorelines, and tributary water quality). Conditions range from ***Good*** to ***Poor***, with many indicators showing ***Unchanging*** or ***Deteriorating*** trends for Lake Erie. Notably, Lake Erie is the only Great Lake where coastal wetland fish condition is rated ***Poor***, and it shows ***Poor*** status for coastal wetland plants, several benthic and lower food-web indicators, and multiple watershed pressure indicators, including forest cover, land cover, hardened shorelines, and tributary water quality.

These results underscore three key messages for habitat and species in Lake Erie:

- The globally significant coastal wetlands are highly altered and vulnerable.
- Tributary and shoreline fragmentation, invasive species, and nutrient enrichment continue to impact the aquatic food web.
- Land-use change, shoreline hardening, and changes in water levels, ice cover, and storms increase cumulative stress on nearshore habitats.

Together, these trends illustrate why habitat protection, restoration, connectivity, and resilience are foundational to achieving the LAMP's water quality and ecosystem objectives.

2.3.2 Loss of Habitat and Species

Coastal Wetlands and nearshore habitats

Coastal wetlands are some of Lake Erie's most productive and culturally significant habitats. They provide breeding, nursery, and migratory habitat for fish, birds, amphibians, reptiles, and invertebrates; buffer shorelines from erosion and storm surges; and help retain nutrients and sediments. The Canadian shore supports large, diverse sandspit systems (e.g., Long Point, Rondeau Bay, Point Pelee, St. Clair River Delta). At the same time, extensive wetland complexes also occur in the western basin and connecting channels in the United States. The Lake Erie Biodiversity Conservation Strategy identifies these areas as core priorities for biodiversity conservation and restoration.

Many coastal wetlands have been historically lost or degraded, particularly in the western basin and connecting channels, where wetland losses exceed 90% in some reaches. SOGL 2022 reports that:

- Coastal Wetland Fish – ***Poor***, trend ***Undetermined***
- Coastal Wetland Plants – ***Poor***, trend ***Unchanging***
- Coastal Wetland Amphibians and Birds – generally ***Fair***, trends ***Unchanging***, with lower condition scores in parts of the western basin.

Two binational programs provide the primary science base for these assessments:

The EPA's Great Lakes Coastal Wetland Monitoring Program (CWMP) monitors fish, birds, calling anurans, vegetation, macroinvertebrates, and water quality across hundreds of wetlands using standardized protocols.

The Canadian Baseline Coastal Habitat Survey for Lake Erie provides a spatially explicit picture of habitat extent, diversity, function, fragmentation, and restoration opportunities along the Canadian coastal margin.

Key threats to coastal wetlands include:

- Wetland loss and infill, particularly in river mouths and deltas.
- Invasive plants such as *Phragmites* and hybrid cattails, which displace native vegetation and alter habitat structure.
- Shoreline hardening, diking, and water-level controls, which alter hydrologic regimes, reduce connectivity, and constrain wetland migration.
- Nutrient and sediment inputs that can drive eutrophication, turbidity, and algal blooms in and around wetlands.

More frequent high-water levels and storm surges are intensifying these pressures, eroding barrier beaches and shorelines, reducing wetland extent, and damaging critical breeding and nursery habitats. Declining ice cover

leaves shorelines more exposed to winter storm energy, accelerating erosion and driving demand for further hardening. CWA's recent vulnerability assessment for Great Lakes coastal wetlands shows that many of Lake Erie's highest-value wetland systems (e.g., Long Point, Rondeau Bay, eastern Lake St. Clair) face high vulnerability to changing water levels, storm surges, and limited room to migrate landward under current land uses.

These findings underscore the need for coastal wetland protection and restoration that account for future water levels, wave conditions, and migration space when designing projects.

Tributaries and aquatic connectivity

Tributaries and connecting channels provide critical pathways for migratory fish and link coastal wetlands, nearshore, and upland habitats. The 2022 SOGL **Aquatic Habitat Connectivity** sub-indicator rates Lake Erie as ***Fair***, with an ***Improving*** trend: roughly one-third of historically connected tributaries remain accessible to migratory fish, and ongoing efforts are underway to remove or reconfigure barriers.

Barriers such as dams, weirs, undersized culverts, and control structures fragment habitat, alter flows and sediment transport, and can change temperature regimes. At the same time, some barriers are essential to Sea Lamprey control and require careful, selective approaches to dam removal and fish passage. The Canadian Baseline Coastal Habitat Survey and emerging tools such as the Canadian Aquatic Barriers Database are helping partners catalogue impediments, prioritize barrier removals, and identify corridors with high restoration potential along the Lake Erie coast and its tributaries.

Increases in heavy rainfall events and more variable stream flows can:

- Increase scouring, bank erosion, and sediment delivery to river mouths and deltas.
- Stress fish and invertebrate communities that depend on predictable flow regimes and temperature patterns.
- Interact with existing barriers to create more frequent or prolonged low-flow conditions upstream, and higher energy, erosive flows downstream.

Dam removals and fish passage projects, such as work on the Sandusky and Cuyahoga rivers, habitat restoration in the SCDRS, and planned work on the Gorge Dam in the Cuyahoga River AOC—illustrate how connectivity restoration can also improve resilience to hydrologic changes by re-establishing more natural flow, sediment, and temperature regimes.

Aquatic food web condition

Lake Erie's food web has undergone profound change, driven by nutrient enrichment, invasive species, and changing physical conditions. Dreissenid mussels (Zebra and Quagga), Round Goby, and other non-native species have altered energy pathways, water clarity, and predator–prey interactions. The Lake Erie Biodiversity Conservation Strategy identifies food-web integrity as one of the central conservation targets for the lake.

The 2022 SOGL reports the following for Lake Erie's aquatic food web:

- Phytoplankton – ***Poor, Deteriorating***: high biomass supports productive fisheries, but re-eutrophication and HAB proliferation, especially in the western basin, are a concern.
- Zooplankton – ***Good, Improving***: high diversity and increasing biomass of key herbivorous species in central and eastern basins.

- Benthos and Diporeia – ***Poor, Unchanging***: benthic communities reflect eutrophic conditions; *Diporeia*, once dominant, has virtually disappeared from Lake Erie.
- Lake Sturgeon – ***Poor, Improving***: populations remain far below historic levels but show signs of recovery where spawning habitat has been restored.
- Native Prey Fish Diversity – ***Fair, Deteriorating***: native prey species constitute less than half of the prey fish community, with shifts linked to invasive species and habitat pressures.
- Lake Trout and Walleye – ***Fair*** and ***Good***, both ***Improving****:* rehabilitation efforts, stocking, and habitat measures have contributed to improved status, particularly for Walleye.

Warmer waters and longer ice-free seasons favour warm- and cool-water species. They can shift fish communities northward and into deeper or more offshore habitats, while reducing suitable habitat for cold-water species. Earlier stratification and more extended periods of hypoxia in the central basin can further constrain habitat for sensitive species. Changes in the timing and intensity of spring runoff can alter nutrient pulses and primary production, with knock-on effects through zooplankton, prey fish, and top predators.

These trends underscore the importance of integrated management across nutrients, habitat, invasive species, and fisheries—an emphasis reflected in the Lake Erie Fish Community Goals and Objectives and in the Great Lakes Fishery Commission's (GLFC) related environmental objectives.

Watershed impacts, shoreline change, and cumulative nearshore stress

The condition of Lake Erie's habitats is closely linked to land use in the watershed and to how shorelines are managed. The 2022 SOGL reports ***Poor*** and/or ***Deteriorating*** trends for:

- Forest Cover and Land Cover – low riparian and watershed forest cover, continued net loss of natural cover to developed and agricultural land
- Hardened Shorelines – increasing armouring and shoreline modification around the lake and along connecting channels
- Water Quality in Tributaries – ***Poor*** and ***Unchanging***, reflecting nutrient, chloride, and sediment pressures

Rising population, expanding urban areas, intensive agriculture, and shoreline armouring collectively increase runoff, fragment habitats, and constrain the natural dynamics of beaches, dunes, and coastal wetlands. The Canadian Baseline Coastal Habitat Survey and nearshore assessments show some reaches where nearly half or more of the shoreline is hardened, and where littoral barriers disrupt sediment supply to barrier beaches that protect high-value coastal wetlands (e.g., Long Point, Rondeau, Point Pelee).

More variable water levels, reduced ice cover, and more frequent or intense storms increase wave energy at the shore, accelerate erosion, and can damage barrier systems and coastal infrastructure. In many locations, the typical response has been to install more hard infrastructure (e.g., walls, revetments, groynes), which may protect specific properties but can:

- Interrupt alongshore sediment transport and starve down-drift beaches and spits of sand.
- Increase erosion or scour at unprotected adjacent reaches.
- Further constrain the ability of wetlands and beaches to migrate landward as water levels and shorelines adjust.

Nearshore assessments on the Canadian side of Lake Erie show that areas of **high ecological value**—such as eastern Lake St. Clair marshes, Point Pelee, Rondeau Bay, and Long Point—are also under **moderate to high stress from impaired coastal processes, shoreline hardening, and limited adaptive capacity**. In combination with nutrient and bacterial pressures already described in Section 2.2, these cumulative stresses pose a significant risk to the long-term stability and function of nearshore habitats.

Key threats to habitat and species

Drawing on the Lake Erie Biodiversity Conservation Strategy, the Canadian Baseline Coastal Habitat Survey, nearshore assessments, and long-term binational monitoring, the main stressors affecting habitats and species in Lake Erie include:

- **Habitat loss and shoreline alteration:** extensive loss and fragmentation of coastal wetlands, river mouth deltas, and riparian forests—especially in the western basin and connecting channels—along with widespread shoreline hardening that disrupts natural sediment dynamics and constrains wetland migration.
- **Invasive species:** Dreissenid mussels, Round Goby, *Phragmites*, hybrid cattails, and other non-native species that reshape food webs, displace native vegetation, alter habitat structure, and reduce the quality of coastal wetlands and nearshore habitats.
- **Dams and barriers:** thousands of barriers across the watershed that limit tributary connectivity, block migration routes for species such as Lake Sturgeon and Walleye, and alter flow, sediment, and temperature regimes throughout river systems.
- **Watershed and nonpoint source pollution:** nutrient, chloride, and sediment inputs from agricultural lands, urban areas, and eroding tributaries that degrade coastal wetlands, river mouth deltas, and nearshore ecosystems, and interact with invasive species to stress native communities.
- **Shoreline development and altered coastal processes:** jetties, groynes, breakwalls, and other shoreline structures that interrupt littoral drift, starve barrier beaches of sand, and reduce the resilience of high-value features such as Long Point, Point Pelee, Rondeau Bay, and the St. Clair River Delta.
- **Large-scale environmental change:** more variable water levels, declining ice cover, increasing air and water temperatures, and more frequent or intense storms that amplify erosion, damage coastal habitats, and interact with land-use pressures and invasive species to produce cumulative nearshore stress.

Addressing these threats will require coordinated protection, restoration, and management across the watershed, with a focus on high-value systems such as the Long Point–Rondeau sandspits, the St. Clair River Delta, key tributary corridors, and areas identified as ecologically significant or vulnerable through Canada's nearshore assessments and the Lake Erie Biodiversity Conservation Strategy. By focusing on these places—and the coastal and tributary processes that sustain them—the Lake Erie Partnership can help maintain and rebuild a resilient, native-dominated ecosystem.

2.3.3 Actions Table

Multiple binational and domestic strategies provide the foundation for habitat and species work under this LAMP, including the **Lake Erie Biodiversity Conservation Strategy**, coastal wetland adaptation initiatives, and federal, provincial, state, and Indigenous-led species at risk and habitat programs (e.g., Great Lakes Restoration Initiative

projects, Great Lakes Freshwater Ecosystem Initiative projects, Canada's Nature Fund, Ontario's Great Lakes Strategy, U.S. Endangered Species recovery plans).

The **Habitat and Species Action Table** that follows outlines how Lake Erie partners will:

- Protect and restore high-value coastal wetlands, river mouth deltas, and nearshore habitats, with explicit consideration of future water levels, storm regimes, and migration space;
- Improve aquatic and coastal connectivity while maintaining effective Sea Lamprey control, so native species can complete their life cycles under changing flow and temperature regimes;
- Reduce shoreline hardening and promote nature-based shoreline and flood protection solutions that maintain or restore sediment transport and habitat complexity;
- Integrate resilience and nearshore cumulative stress information into habitat planning, land-use decisions, and restoration design; and
- Support recovery of priority native species and food-web components through targeted restoration, invasive species management, and monitoring.

These actions are designed to translate the best available science into on-the-ground improvements in Lake Erie's habitat condition and resilience.

Figure 3. Maumee Bay State Park is a 1,336-acre public recreation area on the shores of Lake Erie. In 2022, construction began and was completed on a wildlife habitat management action project aimed at enhancing the park's wetlands.

Table 3: Actions to Prevent and Restore Habitat and Species and Track Progress.

Note: Bulleted items under the main actions in this table are not necessarily inclusive of all actions that the Lake Erie Partnership could implement. Partner agencies are listed in alphabetical order.

#	2024-2028 Lake Erie Partnership Management Actions	Agencies Involved	General Objective
16	Implement the habitat restoration projects on approved management lists to remove relevant habitat and species BUIs for the Cuyahoga River and Maumee AOCs, Rouge River (U.S.) and Detroit River AOC (U.S.)	EGLE, EPA, OEPA, OLEC, USACE, USFS	v
17	Assess streams, estuaries, spawning reefs and shoals to determine aquatic habitat significance, stressors, and limitations to fish spawning and migration, and identify protection and restoration priorities. a. Assess influence of seasonal and significant weather events on recruitment of fishes in Lake Erie's Western Basin. b. Increase functional river spawning habitat for native species in the main channels and tributaries of the Detroit and St. Clair Rivers. c. Assess spawning and nursery habitat effects on northern pike recruitment in Lake St. Clair. d. Support initial cisco rehabilitation efforts in eastern Lake Erie.	EGLE, EPA, MNR, NYSDEC, ODNR, PADEP, USACE, USFWS, USGS	v
18	Restore stream connectivity and function through dam removal, the construction of fish passage alternatives (e.g., ladders), stream culvert improvements, and other techniques to increase accessible riverine habitat for migrating fish. a. Install two aquatic organism passage structures within the Western Lake Erie/Lake St. Clair Focus Area (Great Lakes Coastal Program 5-year Target).	EGLE, EPA, MDNR, NOAA, NYSDEC, USACE USFWS,	v
19	Preserve habitat and species through land use and conservation planning. Protect significant terrestrial habitats through conservation easements, land acquisition.	Conservation Authorities, ECCC, MDARD, MDNR, MECP, MNR, NOAA, NRCS, NYSDEC, ODA, ODNR, PADEP, PCA, USFS	v

20	Restore habitats around streams, wetlands, forests, and on farms. Promote the use of natural and nature-based features such as native plantings to restore ecological function and better protect species and habitat.	AAFC, Conservation Authorities, DFO, ECCC, EPA, MDNR, MECP, MNR, NOAA, NRCS, NYSDEC, ODNR, OMAFA, PADEP, PCA, USACE, USFS	v
21	Support initiatives, projects, and planning that increase the resilience of the Lake Erie ecosystem's habitats and native species.	ECCC, EGLE, EPA, MDARD, MECP, MNR, NYSDEC, PADEP, PCA	v
22	Inventory and map important native habitat sites in the Lake Erie basin. Identify areas of ecological significance and areas facing environmental threats and stressors, such as unique habitats and globally rare and endemic species on Lake Erie Islands.	Conservation Authorities, DFO, ECCC, EGLE, MECP, MNR, NYSDEC, PCA, USFWS	v
23	Protect and restore native fish species, such as Lake Sturgeon, Lake Trout, Coregonids, and Walleye. a. Implement projects identified by the GLFCs Lake Erie Committee as environmental priorities to address fish production constraints for species of common concern. b. Monitor and track effectiveness of projects to assess, protect, or rehabilitate state, federal, and provincially listed fishes and native freshwater mussels.	DFO, MDNR, MNR, NOAA, NYSDEC, ODNR, USFWS, USGS	v
24	Monitor coastal wetlands to assess water quality, species diversity, impacts of human activities, and flora and fauna conditions to: a. Improve understanding of wetland vulnerability. b. Promote protection, restoration, and enhancement efforts. c. Support nature-based solutions to improve the resilience of Great Lakes shorelines. d. Evaluate and support opportunities to convert agricultural land back to coastal and riparian wetlands.	Conservation Authorities, ECCC, EGLE, EPA, NYSDEC, ODNR, OLEC, PADEP, PCA, USACE	v
25	Develop and apply new decision support tools to help identify and prioritize coastal wetland restoration projects. a. Great Lakes Coastal Wetland Framework in Lake Erie. b. Conduct risk-based Great Lakes Coastal Resiliency Study.	ECCC, EGLE, EPA, MDNR, MECP, MNR, NOAA, NYSDEC, ODNR, PADEP, PCA, USACE, USFWS, USGS	v

26	Protect, enhance and restore coastal wetlands in priority areas and increase hydrologic connectivity between coastal wetlands and Lake Erie. a. Restore/enhance 45 acres of coastal wetland and 5 acres of upland habitat within the Western Lake Erie/Lake St. Clair Focus Area (Great Lakes Coastal Program 5-year Target).	Conservation Authorities, EGLE, EPA, MDNR, MECP, MNR, NOAA, NYSDEC, ODNR, OEPA, PCA, PADEP, USACE, USFS, USFWS, USGS	v
27	Engage with the public and landowners on the importance of the Lake Erie ecosystem's habitats and species, including restoring degraded areas, protecting high-quality areas, and mitigating the effects of changing environmental conditions. a. Create an "Important Habitat" map for outreach, engagement, protection, restoration, monitoring, and assessment efforts. b. Support citizen science opportunities. c. Promote living shorelines and coastal/riparian stewardship on public and private lands to improve aquatic habitat and enhance coastal resiliency. d. Complete and promote a decision-support tool and technical guidance for natural and nature-based features for shoreline management along NY's Great Lakes.	Conservation Authorities, ECCC, MECP, MNR, NYSDEC, USACE	v

2.3.4 Actions Everyone Can Take

- **Protect and restore natural shorelines** by choosing soft-shore solutions such as plantings and bioengineering instead of hard structures where possible. Maintain natural vegetation along the water's edge, streams, and wetlands.
- **Support wetland protection and restoration** by avoiding filling or draining wetlands. Collaborate with land trusts, Conservation Authorities, and community groups to conserve wetland and floodplain areas and to support projects that reconnect wetlands to lakes and tributaries.
- **Plant native species and control invasives** by following local planting guides for best results, help remove invasive plants such as *Phragmites* where safe and appropriate, and avoid planting invasive species.
- **Reduce runoff and erosion** by managing stormwater with rain gardens, permeable surfaces, and vegetated buffers. Minimize soil disturbance near watercourses and consider installing sand fencing and planting dune grasses to restore beach and dune health.
- **Prevent the spread of aquatic invasive species** by cleaning, draining, and drying boats and equipment, and never releasing baitfish, aquarium species, or unwanted pets into local waters.
- **Respect sensitive habitats and species** by keeping pets out of nesting and spawning areas, observing signs and restrictions in protected areas, and staying on designated trails. Stay on constructed beach and dune paths and avoid trampling fragile vegetation.
- **Participate in stewardship and citizen science** by joining local habitat restoration days, shoreline clean-ups, wetland planting events, and community monitoring programs.

Collectively, these actions help maintain and restore the habitats and species that make Lake Erie a healthy, resilient ecosystem and support the water quality, recreation, and cultural values that communities depend on.

2.4 Invasive Species

This section summarizes the scientific information about Lake Erie's invasive species, current threats, and corresponding actions to be taken by Lake Erie Partnership agencies in the 2024-2028 timeframe, as well as actions that everyone can take. Information is aligned to address the General Objective on invasive species of the GLWQA.

Lake Erie's ecosystem has been reshaped by non-native plants, animals, and pathogens introduced over the past century. Some of these non-native species have become invasive, spreading rapidly, displacing native species, altering food webs, and imposing significant economic and cultural costs.

2.4.1 Objective and Condition Overview

One of the nine General Objectives of the GLWQA is addressed in this section. The waters of Lake Erie should:

> ***vii. be free from the introduction and spread of aquatic invasive species and free from the introduction and spread of terrestrial invasive species that adversely impact the quality of the waters of the Great Lakes.***

The 2022 SOGL assessments show that invasive species remain a significant and growing stressor:

- The **rate of new aquatic non-indigenous species establishment** is assessed as ***Fair***, with an ***Undetermined*** 10-year trend. New non-native species continue to arrive or spread within the basin, although at a slower rate than in previous decades.

- The **impacts of aquatic invasive species** are ***Poor*** and ***Deteriorating***, reflecting the cumulative effects of more than 50 established aquatic invaders on habitats, food webs, and ecosystem processes.
- **Sea Lamprey** status is ***Good*** and ***Improving***, demonstrating the effectiveness of long-term control programs, although sustained effort is required to maintain this progress.
- **Dreissenid mussels** **(Zebra and Quagga)** are assessed as ***Fair*** and ***Unchanging****:* densities have declined from peak levels, but mussels continue to dominate much of the benthic habitat and strongly influence nutrient and energy flows.
- **Terrestrial invasive species** status is ***Undetermined****,* reflecting the lack of a basin-wide method to quantify their specific effects on Great Lakes water quality, despite widespread and growing impacts on forests, wetlands, and coastal systems.

Taken together, these results show that while control programs can be effective for some high-impact species (such as Sea Lamprey), invasive species remain a basin-wide driver of ecological change in Lake Erie, underscoring the importance of prevention, early detection and rapid response, and long-term control. More detailed information on indicator methods, status, and trends for Lake Erie is available in the 2022 SOGL assessment

2.4.2 Invasive Species

In Lake Erie, invasive species have contributed to declines in native fish, zooplankton, benthic invertebrates, and plants, and have altered habitat structure, water quality, and food-web dynamics across the basin.

Aquatic invasive species (AIS) such as Zebra and Quagga Mussels, Round Goby, Sea Lamprey, Rainbow Smelt, and a range of other non-native invertebrates and plants have reshaped Lake Erie's ecosystems. Dreissenid mussels filter large volumes of water, increase water clarity, and concentrate nutrients and contaminants near the lakebed. This shift in nutrient pathways contributes to nuisance *Cladophora* growth, can influence the severity and distribution of harmful and nuisance algal blooms, and affects habitat quality for native species. Round Goby and other invaders have become key prey for native predators such as Walleye and Lake Trout, partially compensating for the loss of native prey species while further altering food webs.

Emerging AIS concerns include Invasive Carp (particularly Grass Carp), highly aggressive aquatic plants such as *Hydrilla*, and invasive invertebrates such as red swamp crayfish. Targeted surveillance and removal programs, guided by adaptive response strategies, are underway to prevent these species from establishing self-sustaining populations or expanding their range.

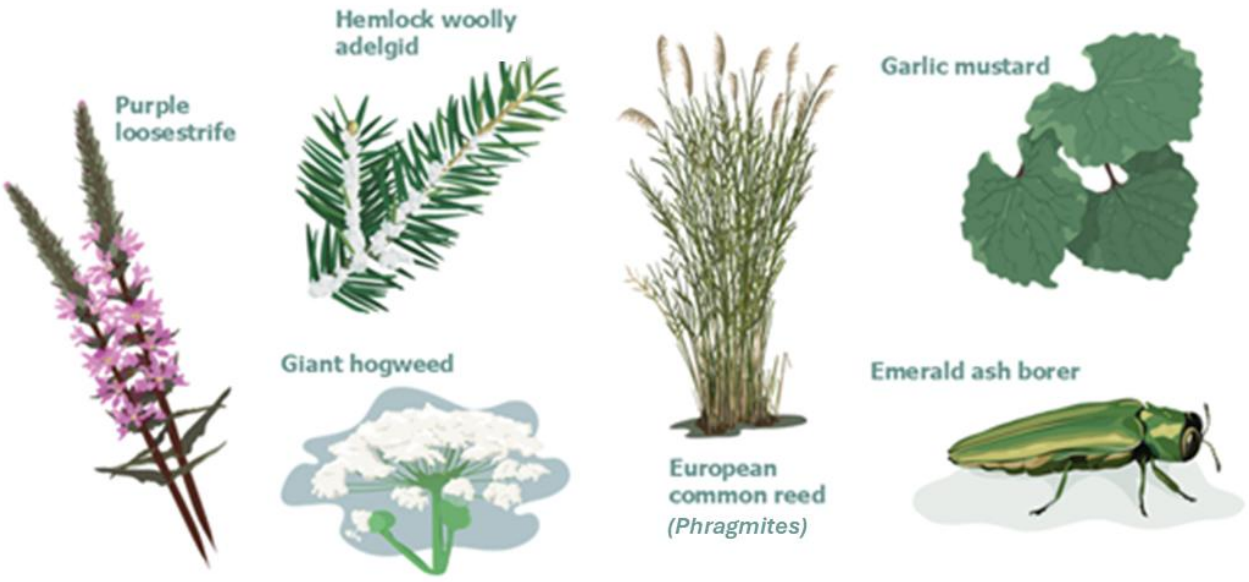

Figure 4. Examples of invasive species found in the Great Lakes basin.

Terrestrial invasive species such as European common reed (*Phragmites)*, Purple Loosestrife, Garlic Mustard, Emerald Ash Borer, Hemlock Woolly Adelgid, and others are widespread in the Lake Erie watershed. *Phragmites*, in particular, has been identified as a key threat to Lake Erie biodiversity, forming dense monocultures in wetlands, along shorelines, and in roadside ditches. These invasions reduce native plant diversity, degrade habitats for birds, amphibians, and other wildlife, and can alter hydrology, fire regimes, and recreational access. Forest pests such as the Emerald Ash Borer and the Hemlock Woolly Adelgid cause tree mortality, which can increase erosion, runoff, and water temperature in tributaries and nearshore areas.

Monitoring and surveillance of invasive species in Lake Erie rely on a combination of:

- Early Detection and Rapid Response programs under the GLWQA Aquatic Invasive Species Annex;
- Agency monitoring by federal, state, provincial, Tribal, First Nations, and Métis partners;
- Databases such as GLANSIS, the USGS Nonindigenous Aquatic Species database, MISIN, and Ontario's Invasive Species Awareness Program;
- Increasing use of environmental DNA (eDNA) tools and citizen science reporting platforms.

These monitoring networks are essential for detecting new invaders, tracking the spread of established species, and evaluating the effectiveness of management actions. However, resource constraints and the size and complexity of the Lake Erie basin mean that assessments are still incomplete for many species and pathways.

Perspectives on invasive species vary among communities. Some Indigenous partners may describe these organisms as "non-local beings", emphasizing the need for respectful, relationship-based approaches to management and recognizing that complete eradication is often neither feasible nor desirable. For example, some Anishinaabe knowledge holders view newly arriving species as non-local beings whose roles and relationships require understanding rather than judgment, and do not inherently consider them good or bad. This perspective

is increasingly informing discussions on how to manage non-local species in ways that support cultural values, ecosystem health, and shared stewardship.

Change in physical conditions may increase invasive species presence by expanding suitable habitat for some invaders.

2.4.3 Actions Table

The following actions will be taken and/or continued in the Lake Erie basin to address invasive species in and to track progress through science and monitoring, as listed in Table 4.

Table 4: Actions to Prevent and Control Invasive Species and Track Progress.

Note: Bulleted items under the main actions in this table are not necessarily inclusive of all actions that the Lake Erie Partnership could implement. Partner agencies are listed in alphabetical order.

#	2024-2028 Lake Erie Partnership Management Actions	Agencies Involved	General Objective
28	Conduct surveillance, compliance inspections, and enforcement actions to identify and minimize the risk of transporting and introducing invasive species associated with key industries and pathways (e.g., bait, fish market, aquarium, recreational boating).	MDNR, MNR, NYSDEC, USFS, USFWS, USDA Animal and Plant Health Inspection Service	viii
29	Establish and implement programs and measures that protect the Great Lakes basin ecosystem from the discharge of AIS in ballast water, pursuant to commitments made by the Parties through Annex 5 of the GLWQA.	EGLE, EPA, OEPA, Transport Canada, USCG	viii
30	Implement coordinated, prioritized invasive species control efforts using an adaptive management framework to ensure support of multiple uses (e.g., recreational boating, hunting, water intake, non-motorized vehicles). a. Limit the spread of invasive species to new areas. b. Mitigate impacts of AIS to aquatic ecosystems. c. Implement strategies in active management and post-management locations to promote resiliency to re-invasion.	EGLE, EPA, MDNR, NYSDEC, OEPA	viii
31	Maintain and enhance early detection, surveillance, and monitoring of non-native species (e.g., Invasive Carp) to find new invaders and prevent them from establishing self-sustaining populations.	DFO, EGLE, EPA, MNR, NOAA, NYSDEC, OEPA, USFS, USFWS, USGS	viii
32	Through the development and implementation of the annual Invasive Carp Regional Coordinating Committee Action Plans, prevent the establishment and spread of Bighead and Silver Carp in the Great Lakes.	DFO, EPA, MDNR, MNR, NYSDEC, ODNR, USACE, USFWS	viii
33	Implement the Lake Erie Committee 2024-2028 Grass Carp Adaptive Response Strategy. a. Partner with commercial fishers to remove fish and gain biological data from those captures. b. Conduct targeted removal efforts with traditional fishing gears. c. Determine the seasonal habitat use and movements to inform response actions. d. Evaluate novel removal approaches.	MDNR, MNR, NYSDEC, ODNR, USFWS, USGS	viii

34	Sea Lamprey Control: a. Control the larval Sea Lamprey population in (Grand River (OH), Big Otter Creek (ON), Big Creek (ON), Youngs Creek (ON), Conneaut Creek (PA), Crooked Creek (PA), Raccoon Creek (PA), Canadaway Creek (NY), Buffalo Creek (NY), Cattaraugus Creek (NY), and Big Sister Creek (NY)) with selective lampricides. b. Support GLFC's supplemental Sea Lamprey control program.	DFO, USACE, USFWS	viii
35	Actively respond to the Red Swamp Crayfish invasion in Southeast Michigan. Use collaborative measures to implement and evaluate response/control actions at infested locations using novel approaches. Conduct inspections at known sources of introduction (e.g., live food markets, biological supply, etc.) in states within the basin where the species is prohibited.	EGLE, MDNR	viii
36	Continue collaborating with partners to implement appropriate controls for *Phragmites* and other invasive species, guided by science-based BMPs. a. Develop implementable control strategies for invasive *Phragmites,* including new control treatments. b. Implement the *Phragmites* Adaptive Management Framework to reduce uncertainty about what *Phragmites* treatment works best under differing site conditions. c. Support Great Lakes *Phragmites* Collaborative to facilitate communication among stakeholders across the region and serve as a resource center for information on *Phragmites* biology, management, and research.	ECCC, MNR, NPS, NYSDEC, ODNR, PCA, USACE, USFWS, USGS	viii
37	Pilot experimental control strategies for dreissenid mussels that could apply to Lake Erie.	NOAA, USACE, USGS	viii
38	Improve understanding of invasive species impacts to inform management. a. Assess population growth of dreissenid mussels in Lake Erie and impacts on HAB and nuisance algal bloom formation. b. Study the impacts of Round Goby on the food web via enhanced assessment methods to better understand Round Goby population density/distribution. c. Research the links between mussels, Round Goby, and Botulism outbreaks in waterfowl.	EPA, NOAA, OEPA, USACE, USGS	viii
39	Use invasive species databases and mapping tools to support invasive species management, survey, and outreach efforts.	EGLE, MNR, NYSDEC, ODNR, USACE, USDA, USFWS	vii
40	Undertake outreach and education on aquatic invasive species, including discussions with recreational boaters and signage at lake access sites.	Conservation Authorities, DFO, EGLE, MNR, NYSDEC, ODNR, PADEP, USFS	vii

2.4.4 Actions Everyone Can Take

Everyone in the Lake Erie basin can help reduce the risk and impacts of invasive species. Practical actions include:

- **Clean, drain, and dry** boats, trailers, fishing gear, and other equipment before moving between waterbodies, including draining water from bilges and live wells, following guidance from the Clean Drain Dry program in Canada and the U.S. and Ontario's General Regulation of the Invasive Species Act.
- **Never release live bait, aquarium fish, plants, or other exotic animals** into lakes, rivers, wetlands, or storm drains, and return unused bait to land or dispose of it properly.
- **Use native or non-invasive plants** for gardens and shoreline plantings.
- **Do not move firewood:** Buy and burn local firewood to reduce the spread of forest pests such as Emerald Ash Borer and Asian Longhorned Beetle.
- **Clean boots and outdoor gear** before entering a new area to prevent the spread of weeds, seeds, and pathogens.
- **Learn how to identify priority invasive species** and report sightings through tools such as EDDMapS, iMapInvasives, local hotlines, or stewardship organizations.
- **Support local control and restoration efforts** led by Conservation Authorities, PRISMs, and Indigenous and community partners.
- **Follow posted requirements** for boat decontamination, trail or site closures, and restricted areas where invasive species control work is underway.
- **Help educate others** about the threats posed by invasive species and support public awareness initiatives.

Taken together, these actions help protect Lake Erie from new invasions and limit the spread and impact of existing invasive species, supporting healthier, more resilient ecosystems and communities.

2.5 Other Threats

Microplastics, land-use change across the watershed, increasingly variable temperature and water-level patterns, and cumulative stress in the nearshore all interact with the lake's chemical, physical, and biological integrity.

This section summarizes scientific information on other threats specific to Lake Erie and the corresponding actions to be taken by Lake Erie Partnership agencies in the 2024-2028 timeframe, as well as actions everyone can take. This section responds to the other substances, materials, or conditions-related General Objective of the GLWQA.

2.5.1 Objective and Condition Overview

One of the nine General Objectives of the GLWQA is addressed in this section. It states that the waters of Lake Erie should:

> ***ix. Be free from other substances, materials or conditions that may negatively impact the chemical, physical or biological integrity of the Waters of the Great Lakes***.

Other substances, materials and conditions that may impact Lake Erie include plastic and microplastic pollution, watershed impacts from land use and shoreline alteration, changes in physical conditions including temperature, precipitation, ice cover, and water levels, and cumulative effects causing stress in nearshore waters.

Most threats described here are already considered under existing GLWQA Annexes, the binational State of the Great Lakes (SOGL) indicators, and other sections of the LAMP (e.g., nutrients, habitat and species, contaminants). The 2022 SOGL characterizes these threats as:

- land cover in the basin is assessed as ***Poor-Deteriorating***,
- hardened shorelines as ***Poor – Deteriorating***,
- water quality in tributaries and forest cover as ***Poor – Unchanging***, and
- The human population is increasing.

The Canadian Nearshore Assessment and the U.S. National Coastal Condition Assessment both indicate stressors are negatively affecting localized areas and also that there are areas of high ecological value which warrant protection. Together, these findings reflect ***Poor*** conditions.

2.5.2 Other Threats

Multiple pressures are impacting how Lake Erie functions. Plastic and microplastic particles have been detected in tributaries, nearshore sediments, and fish. Shifts in temperature, precipitation, ice cover, and water-level patterns interact with these land-based and in-lake pressures. Heavier downpours and more variable runoff can increase erosion, nutrient and chloride pulses. At the same time, changes in ice cover and water levels affect shoreline stability, coastal wetland extent, and habitat availability. In many places, these shifts coincide with already hardened shorelines and fragmented habitats, leaving fewer natural features available to absorb and adapt to rapidly changing conditions. Understanding how these pressures interact is essential to designing actions, as outlined in Section 2.5.3 and the associated actions table.

2.5.3 Actions to Address Other Threats

The Lake Erie Partnership agencies will implement the 2024-2028 LAMP within the context of existing laws and regulations. There is other federal, state, and provincial legislation that addresses other threats including Canada's Impact Assessment Act (2019) and the United States' Protecting our Infrastructure of Pipelines and Enhancing Safety Act (2016). Spill prevention and contingency plans are in place in Ontario, Michigan, New York, Pennsylvania, and Ohio, where applicable. In addition, the Canada-United States Joint Inland Pollution Contingency Plan is in place, should there be a significant accidental and unauthorized release of pollutants along the Canada-U.S. border. The Joint Marine Pollution Contingency Plan is a mechanism for Canada and the U.S. to coordinate planning and response to spills in shared waters. This plan covers all potential sources of marine pollution in contiguous waters (e.g., ships, offshore platforms, mystery spills).

2.5.4 Actions Table

The following actions will be taken and/or continued in the Lake Erie basin to address other threats and to track progress through science and monitoring, as listed in Table 5.

Table 5: Actions to Address Other Threats

Note: Bulleted items under the main actions in this table are not necessarily inclusive of all actions that the Lake Erie Partnership could implement. Partner agencies are listed in alphabetical order.

#	2024-2028 Lake Erie Partnership Management Actions	Agencies Involved	General Objective
41	Improve critical community infrastructure to reduce vulnerability to flooding, drought, and other extreme weather events. a. Encourage municipalities and landowners to implement flood mitigation actions (e.g., soil health practices, natural infrastructure, wetland restoration/protection, etc.) to reduce peak flows in high-risk streams. b. Promote and implement resilient farming methods. Improve soil health and in-field infiltration practices to enhance soil resilience and reduce runoff from agricultural fields. c. Plan and implement Low Impact Development (LID) initiatives to preserve green space and reduce urban runoff.	AAFC, Conservation Authorities, EGLE, EPA, MECP, MDARD, NRCS, NYSDEC, ODNR, OLEC, OMAFA, USFS	ix
42	Adapt existing restoration, surveillance, and monitoring programs to ensure they remain effective in responding to and characterizing changes to physical conditions of the lake. a. Identify the expected range of future Great Lakes water levels, wave heights, and ice conditions. b. Assess on a lakewide basis, changes in chemical contaminants, nutrients, invasive species, and habitat and native species as it relates to the physical (e.g., substrate, bathymetry, sediment transport), chemical, and biological (e.g., food web) processes of Lake Erie.	Conservation Authorities, EPA, MNR, NOAA, NYSDEC, USACE, USGS	ix
43	Support local initiatives to help communities develop and/or implement watershed plans.	Conservation Authorities, ECCC, EGLE, EPA, MDARD, , MECP, MNR, NRCS, NYSDEC, ODA, ODNR, OEPA, PADEP, PCA, USACE, USFS	ix
44	Undertake and support outreach and education for stakeholders and the public on the impacts of changes in physical conditions and resulting impacts on the Lake Erie ecosystem.	AAFC, Conservation Authorities, ECCC, EGLE, MECP, NOAA, NYSDEC, ODNR, OMAFA, PADEP, USFS	ix

#	2024-2028 Lake Erie Partnership Management Actions	Agencies Involved	General Objective
45	Engage landowners and the public to protect and enhance the function and resilience of watershed headwater features, streams, forests, and wetlands.	AAFC, Conservation Authorities, EGLE, MECP, MNR, NRCS, NYSDEC, USDA, USFS	ix
46	Assess cumulative stress on Lake Erie's nearshore waters and share tools and approaches to minimize it.	ECCC, MECP, NYSDEC, OEPA	ix
47	Characterize the presence and distribution of microplastics in Lake Erie and analyze their effects on the physical, chemical, and biological (e.g., food web) processes of Lake Erie.	CWA, ECCC, MECP, PADEP, USACE, USFWS, USGS	ix
48	Continue public outreach and engagement on the impacts of plastic pollution and ways to reduce plastic in the Lake Erie basin. Organize, participate in, or support capture and cleanup projects to prevent and remove plastic pollution from Lake Erie.	ECCC, MECP, NYSDEC, PADEP, USACE, USFWS,	ix
49	Support the St. Clair–Detroit River System (SCDRS) Initiative and its connecting waters priorities for managing nutrients, emerging pollutants, aquatic invasive species, restoring habitats, and ecosystems. Engage and coordinate with stakeholders to evaluate, develop, advance, and implement SCDRS priorities.	Conservation Authorities, CWA, DFO, EGLE, EPA, MECP, NOAA, ODNR, USACE, USGS, USFWS	iv, v, vi, vii, ix
50	Collaborate on priority issues, for example through the HABs Collaborative, Great Lakes Coastal Wetlands Framework, Great Lakes Stormwater Collaborative, and Plastic Pollution Committee.	Conservation Authorities, DFO, ECCC, EGLE, EPA, MDARD, MDNR, NOAA, NYSDEC, OLEC, USACE, USFWS	iv, v, vi, vii, ix

2.5.5 Actions Everyone Can Take

Everyone who lives, works, or recreates in the Lake Erie basin can help reduce other threats, land-use impacts on watersheds, and stress on nearshore waters. Individual choices, when scaled across millions of people, can reduce the amount of debris, contaminants, and runoff entering the lake and its tributaries, and can increase the resilience of shorelines and communities.

Reduce plastic waste and microplastics.

- Consider reusable bags, bottles, and food containers instead of single-use plastics.
- Avoid products with unnecessary plastic packaging, and seek out repair, refill, or bulk options.
- Dispose of waste properly, ensuring recycling and garbage do not escape into streets, ditches, or waterways.
- Consider using a lint filter, external microfibre filter, or fiber capture trap on washing machines to reduce fibers entering wastewater.
- Participate in or organize local litter cleanups along shorelines, rivers, and in urban neighborhoods, including programs like Adopt-a-Beach or the International Coastal Cleanup.

Protect watersheds and nearshore areas.

- Keep streets and storm drains clear of litter, leaves, and debris so they are not washed into streams and the lake.
- Limit the use of de-icing salt on driveways and walkways by shoveling early and often, using sand where appropriate, and following “just enough” salt guidance from local municipalities.
- Maintain natural vegetation along shorelines and streambanks and avoid hardening banks with walls or rock where softer, more natural approaches are feasible.
- Plant native trees, shrubs, and deep-rooted plants to stabilize soils, filter runoff, and support biodiversity in yards, along fencelines, and in community spaces.

Support resilient communities and stewardship.

- Stay informed about local watershed and shoreline plans and support municipal and community initiatives that protect green spaces, wetlands, and natural shorelines.
- Consider nature-based solutions (such as rain gardens, permeable paving, or rain barrels) at home or at work to reduce runoff and pressure on stormwater systems.
- Volunteer with local conservation authorities, Indigenous communities, watershed groups, or environmental organizations working on tree planting, wetland restoration, shoreline projects, and monitoring.
- Share information about plastic pollution, watershed health, and nearshore stressors within your community, schools, workplaces, and social networks to help build a culture of protection and care for Lake Erie.

By combining these everyday actions with the Lake Erie Partnership’s commitments for 2024–2028, residents and communities across the basin can help reduce other threats, strengthen the resilience of nearshore and watershed ecosystems, and support a healthier future for the lake.

3.0 Lakewide Management

Achieving the General Objectives of the Great Lakes Water Quality Agreement (GLWQA) for Lake Erie requires collective action by many partners throughout the basin. The 2024–2028 LAMP presents current ecosystem conditions and threats, sets research and monitoring priorities, and identifies actions for governments and the public. The LAMP is a resource for anyone interested in the Lake Erie basin ecosystem, its water quality, and the actions necessary to help protect this Great Lake.

Lakewide management is an adaptive, long-term effort. As new information emerges and conditions change, the Lake Erie Partnership will refine priorities and actions.

3.1 Engagement and Reporting

The Lake Erie Partnership will report on progress through concise annual updates to the public.

The Partnership complements these annual updates with periodic webinars which may include updates on science, threats and actions.

Indigenous governments and organizations are essential partners. The Partnership will continue to seek respectful, distinctions-based engagement that recognizes Indigenous rights, responsibilities, and knowledge systems, including opportunities to co-develop priorities, contribute Indigenous Knowledge alongside western science where appropriate, and participate directly in LAMP actions.

The public also has a crucial role. The LAMP will point to opportunities for residents and communities to participate in shoreline clean-ups, tree planting and wetland restoration, community-based monitoring, invasive species reporting, and responsible recreation.

Together, these engagement and reporting measures meet GLWQA Annex 2 expectations for regular reporting and public involvement.

3.2 Collective Action for a Healthy Lake Erie

Protecting Lake Erie requires the combined energy of governments, Indigenous partners, scientists, and public alike. Everyone has a role to play. Whether by restoring natural vegetation along streams, reducing road salt and plastic waste, participating in shoreline cleanups, or supporting local conservation and stewardship organizations, individual and community actions. **The LAMP's actions to restore and protect ecosystems will ensure that water quality and economic prosperity go hand in hand.**