



# LAKE ERIE LAKEWIDE ACTION AND MANAGEMENT PLAN

## 2018 Annual Report

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### What is the Lake Erie LAMP?

Under the Great Lakes Water Quality Agreement (GLWQA), the governments of Canada and the United States have committed to restore and maintain the physical, biological and chemical integrity of the waters of the Great Lakes.

The Lake Erie Lakewide Action and Management Plan (LAMP) is a binational ecosystem-based management strategy for protecting and restoring the water quality of Lake Erie, the St. Clair River, Lake St. Clair and the Detroit River. The LAMP is developed and implemented by the Lake Erie Partnership, which is led by the U.S. Environmental Protection Agency (U.S. EPA) and Environment and Climate Change Canada (ECCC) and which facilitates information sharing, sets priorities, and assists in coordinating binational environmental protection and restoration activities.

The next Lake Erie LAMP will be issued in 2019; in the interim, the Lake Erie Partnership will be assessing the state of the lake, measuring progress against existing LAMP goals and objectives, and promoting management actions to address identified problems.

### Overview

Lake Erie's shallow, productive waters support the highest species diversity and fish production of all the Great Lakes. The lake also provides drinking water for over 12 million people in Canada and the United States. This highly valuable resource has suffered from nutrient and bacterial pollution, chemical contamination, and watershed impacts to critical habitats and species. Binational and domestic strategies and actions are being implemented to combat harmful and nuisance algal blooms, and to protect and conserve the native biodiversity of Lake Erie. This Lake Erie Partnership 2018 Annual Report provides information and updates on recent actions taken to restore Lake Erie, including watershed nutrient management initiatives; coastal habitats and species protection efforts; Lake Erie science and monitoring; and other Lake Erie Partnership activities. ♦

### Addressing Lake Erie Eutrophication

#### Domestic Action Plans to Achieve Phosphorus Reductions in Lake Erie

In 2016, the United States and Canada committed to reduce phosphorus loads to the western and central basins of Lake Erie by 40% from a 2008 baseline level. In 2018, the United States and Canada released domestic action plans that outline strategies for meeting these new phosphorus load reduction targets. The domestic action plans can be accessed here: <https://binational.net/annexes/a4/>.

The plans describe the specific measures each jurisdiction will implement with its partners to achieve binational phosphorus loading reduction targets for Lake Erie and ultimately, curb the growth of excess algae that threaten the ecosystem and human health.



Satellite image of the Microcystis cyanobacteria bloom in western Lake Erie on August 13, 2018. This date captures the largest extent of the bloom. The greenish area along southwest Lake Erie and northeast through the islands is the bloom. Sandusky Bay has a bloom of *Planktothrix*, another cyanobacteria, which produced a darker brownish green at this time. Photo: National Oceanic and Atmospheric Administration (NOAA) derived image from Copernicus Sentinel-3.

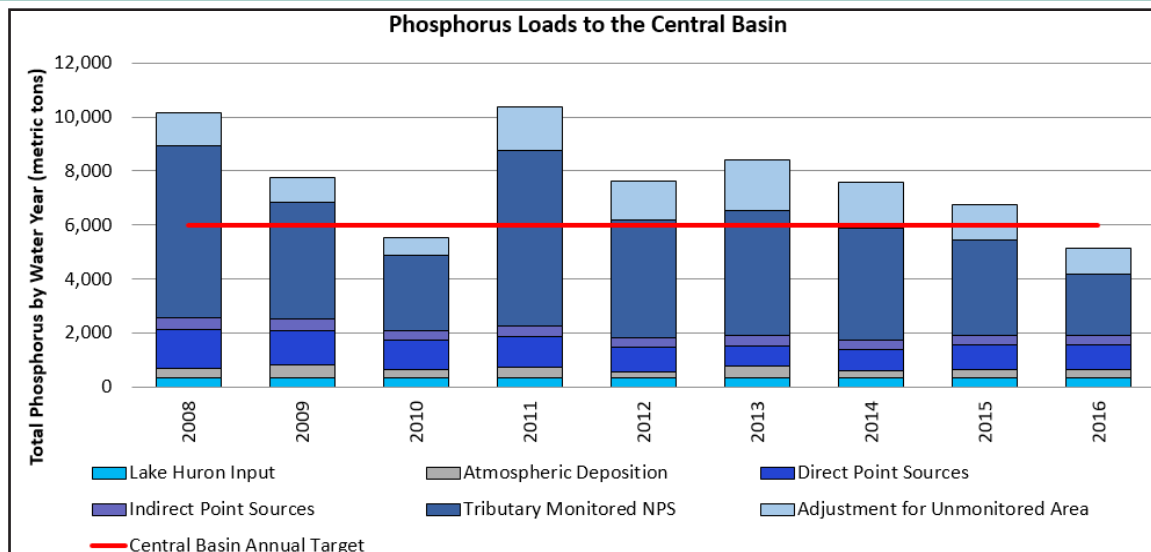


Figure 1. Total phosphorus loads (metric tons per water year) to the central basin of Lake Erie by source type (2008–2016). Red line indicates central basin total phosphorus load target of 6,000 metric tons. Image: U.S. EPA.

The domestic action plans are rooted in robust science and are the result of extensive collaboration with the many partners around the Lake Erie basin. The final domestic action plans incorporate the feedback received during the public comment periods held in 2017 and through online and in-person engagement sessions held on both sides of the border.

While the United States and Canada are committed to implementing the domestic action plans and are optimistic that the load reductions will be achieved, the implementation of measures necessary to achieve reductions of this magnitude will take significant time and collective action by all levels of government, agricultural, industrial and municipal sectors, indigenous communities, interest groups and the public. Further, the predictions made today may not hold true in future years, for example, if the frequency of large rainfall events continues to increase. Many variables can impact the rate at which load reductions occur and how quickly the lake responds to those reductions. As a result, an adaptive management approach is being used in which the phosphorus reduction strategies will be updated in the future as new environmental data become available and knowledge gaps are filled.

### Phosphorus Loads

The historic record of annual phosphorus loads since 1967 indicates that the total annual amount of phosphorus entering Lake Erie varies significantly each year, largely due to the variability in nonpoint source runoff. The amount of nonpoint source runoff is directly related to the amount, timing and intensity of precipitation.

There was a resurgence of algal blooms in Lake Erie in the late 1990s. Monitoring has shown that at the same time there has been a significant increase in the proportion of the phosphorus loading to Lake Erie that is in dissolved form, as opposed to

particulate form. Dissolved phosphorus is readily taken up by algae and contributes to increased growth of cyanobacteria and *Cladophora*. ECCO, U.S. EPA, and the U.S. Geological Survey are working to improve the accuracy of measuring and tracking phosphorus loads to Lake Erie. Starting in 2018, they will report annually on the status of loads and achievement of targets. Using loadings data through 2016, the central basin target load of 6,000 metric tons total phosphorus was met in 2 of 8 years since the 2008 baseline (Figure 1). Spring phosphorus targets for the Maumee River, which drives the western basin algae bloom, were not met.

### Harmful Algal Bloom 2018 Seasonal Assessment

The National Oceanic and Atmospheric Administration (NOAA) and its partners use remote sensing, multiple models and daily monitoring of the Maumee River to predict and track the formation and movement of harmful algal blooms in the western basin during the summer months. The *Microcystis* cyanobacteria bloom in 2018 had a severity index of 3.6, indicating a relatively mild bloom (Figure 2). The severity index

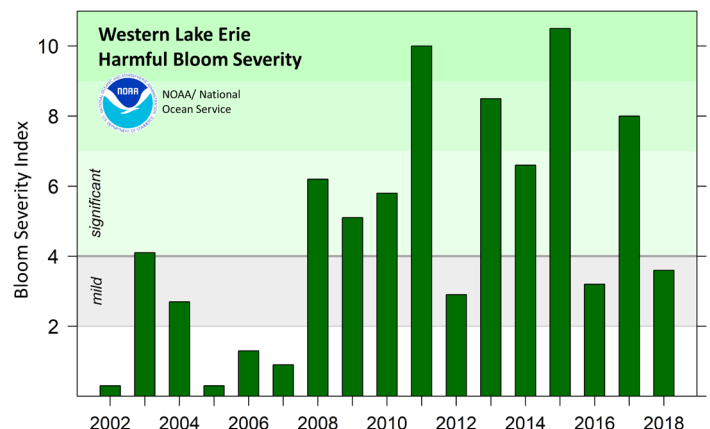


Figure 2. Western basin bloom severity index for 2002-2018. Image: NOAA.



is based on a bloom's biomass – the amount of its harmful algae – over a sustained period and is on a scale of 1 to 10.5. The largest blooms, 2011 and 2015, had severities of 10 and 10.5, respectively.

### Tracking Progress Toward a Healthier Lake Erie

ErieStat is an online tool that shares information from jurisdictions on the status of phosphorus reduction strategies and investments and the resulting outcomes in Lake Erie ([www.blueaccounting.org/issue/eriestat](http://www.blueaccounting.org/issue/eriestat)). It is being developed through the Great Lakes Commission's Blue Accounting initiative to assist the Lake Erie states of Ohio, Michigan, Indiana, Pennsylvania, and New York, the Province of Ontario, the U.S. and Canadian federal governments, and the public with tracking progress toward achieving the goals of a 40% phosphorus loading reduction to the western and central basins of the lake.

### University of Michigan Detroit River Nutrient Project

The University of Michigan's Water Center is currently working with binational partners on "Assessing the Sources and Management Options for Detroit River Nutrient Loads to Lake Erie," which is a binational, 3-year project that started in 2016 to model the nutrient dynamics within the watersheds that drain into the St. Clair and Detroit Rivers. The project is characterizing agricultural and urban nutrient loads to the Detroit River and assessing nutrient retention potential within Lake St. Clair. Watershed models will be used to compare the effectiveness of different management options. This collaborative research project is designed to inform regional partners on the planning and the selection of nutrient reduction strategies. Project results will be released in 2019.

### Thames River Forum (Ontario)

With funding support from ECCC, the Upper Thames River Conservation Authority (UTRCA) recently spearheaded two projects that support actions under the 2018 Canada-Ontario Lake Erie Action Plan for reducing phosphorus loading to Lake Erie.

The UTRCA compiled the Nutrient Reduction Project Catalogue 2018, an inventory of programs and projects underway in the western portion of the Canadian Lake Erie Watershed that are aimed at reducing phosphorus loads entering Lake Erie ([www.thamesriver.on.ca/nutrient-project-catalogue/](http://www.thamesriver.on.ca/nutrient-project-catalogue/)). The second project, led by the Upper and Lower Thames Conservation Authorities, was the 2-day *Focus on the Thames Forum*, which highlighted a range of projects and programs underway within the Thames River Watershed designed to reduce nutrient loading to the Thames River, Lake St. Clair and to western Lake Erie. The *Forum* was held in London, Ontario on March 27-28, 2018 and attracted over 130 participants per day.

The projects provide a means for communicating and promoting the implementation of best management practices

required to achieve load reductions and will help identify opportunities for collaboration. ♦

## Restoring Habitats

### Areas of Concern (AOCs) Update

#### Buffalo River AOC (New York)

By end of 2019, 10 habitat restoration projects will be completed in support of removal of the *Loss of Fish Habitat* and *Degraded Fish and Wildlife Populations* Beneficial Use Impairments (BUIs). Buffalo Niagara Waterkeeper, Erie County Department of Environment and Planning, U.S. Army Corps of Engineers (USACE), and U.S. EPA have led the habitat restoration efforts. The restoration of these sites will result in: over 21,000 linear feet (6,400 metres) of Buffalo River shoreline restored; 71 upland acres (29 hectares) adjacent to the Buffalo River restored; fish habitat structures and turtle nesting areas installed; removal of invasive plants; and planting of 15,000 native plants and 681 trees.

#### Niagara River AOC (New York)

Times Beach, located within the Niagara River AOC and immediately adjacent to the Buffalo River AOC, is considered to be the western gateway to the Niagara River "globally significant" Important Bird Area. The 56-acre (23-hectare) site is composed of open water, emergent marsh, forested wetlands, and upland habitat. The project was designed to test 3 herbicide regimes to control invasive *Phragmites australis* (European Common Reed). The *Phragmites* biomass removed from the site decreased in each successive year during 2012-2016; cover and frequency dramatically decreased for *Phragmites* and increased for other plant species; and species richness increased in the vegetation and avian communities. The project results will guide adaptive



Top: Times Beach overlook in 2012 prior to AIS control activities. *Phragmites* dominates the landscape. Bottom: Times Beach overlook in 2016, post-restoration, without *Phragmites*. Photos: USACE.



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management regarding the timing, frequencies, and types of Aquatic Invasive Species (AIS) treatments and species selection and locations for native restoration plantings at other AOC sites.

### Ashtabula River AOC (Ohio)

With the completion of 2 dredging projects and a large habitat restoration project in 2013, all management actions at the AOC have been completed. In 2018, the *Degradation of Benthos* BUI was removed.

### Detroit River AOC (Michigan and Ontario)

The Canadian Detroit River Cleanup Committee continues to work toward removing BUIs to achieve delisting. An on-line, interactive “story map” that documents the cleanup in the Canadian Detroit River AOC is available at [www.detroitriver.ca/storymap](http://www.detroitriver.ca/storymap). Fourteen habitat restoration projects were targeted by the U.S. Detroit River Public Advisory Committee to address BUIs in the U.S. Detroit River AOC. As of 2018, 8 of the 14 required projects are complete, 2 are currently under construction and 4 are in the design process.

### St. Clair River AOC (Michigan and Ontario)

In the Canadian St. Clair AOC, 2 BUI assessment reports recommending re-designation to a “Not Impaired” status have undergone community consultation and First Nations review and as a result have been redesignated: *Restrictions on Dredging* and *Beach Closures*. In the U.S. St. Clair AOC, the Loss of Fish and Wildlife BUI was removed, leaving only 2 remaining BUIs on the U.S. side of the St. Clair River: *Restrictions on Fish and Wildlife Consumption*, and *Restrictions on Drinking Water Consumption or Taste and Odour Problems*.

### Niagara Coastal Community Collaborative (Ontario)

Local citizens interested in the health of the Lake Erie coast in the Niagara Region (Ontario) have come together as the Niagara Coastal Community Collaborative. The Collaborative is supported by ECCC and the Ontario Ministries of the Environment, Conservation and Parks and Natural Resources and Forestry, with the goal of a healthy and resilient Lake Erie coastal ecosystem. It provides a venue for collaboration, ensures that actions of local stakeholders are mutually reinforcing, and ensures the activities of local groups are aligned with broader



Niagara Coastal Community Collaborative members monitor *Cladophora* at Rees Bay. Photo: ECCC.

Lake Erie ecosystem management initiatives such as the LAMP. The Collaborative has identified healthy beaches, nature-based shorelines and habitat and species as its ecological priorities, and in 2018 launched a volunteer *Cladophora* monitoring program covering 10 beaches in the eastern end of Lake Erie. ♦

## GLWQA Science Annex and Lakewide Management Annex Updates

### Lake Erie Cooperative Science and Monitoring Initiative 2019 Priorities

Each year, one of the Great Lakes is the focus of a binational cooperative science effort called the Cooperative Science and Monitoring Initiative (CSMI). In 2019, Lake Erie will be the focus of the CSMI field year. The priority science and information needs identified for this intensive field year include understanding of: drivers of eutrophication and harmful and nuisance algal blooms; distribution of critical habitats for species; distribution of contaminants in air, water, sediment and the food web; and the role of storm events on beach water quality. These priorities were developed during a series of meetings and workshops held in 2017 that brought together U.S. and Canadian Lake Erie experts from research and management organizations.

### Development of the 2019-2023 Lake Erie LAMP

The Lake Erie Partnership is now developing the 2019-2023 Lake Erie LAMP (see *What is the Lake Erie LAMP?* section on page 1). Interested agencies, organizations, and individuals were invited to provide their perspective on the environmental conditions, issues, or concerns that should be considered during the Lake Erie LAMP drafting process in May 2018. Notification of the LAMP public review period will be posted on [Binational.net](http://Binational.net) and the Great Lakes Commission's [GLIN-Announce](http://GLIN-Announce) in 2019.

### Outreach and Engagement

You can keep up to date on GLWQA engagement opportunities in the [Engagement](http://Engagement) section of [Binational.net](http://Binational.net). Information on many of our partner organizations' upcoming outreach and engagement opportunities can also be found at the Great Lakes Commission's [Great Lakes Calendar](http://Great Lakes Calendar). ♦

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