LAKE ERIE

LAKEWIDE ACTION AND MANAGEMENT PLAN

2020 ANNUAL REPORT

American lotus in Lower Canard River. Source: L. Cargnelli.

In this Issue

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 an ecosystem-based 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 includes other federal, state, provincial, tribal, First Nation and local watershed management authorities. The Partnership facilitates information sharing, sets priorities and assists in coordinating environmental protection and restoration activities.

OVERVIEW

During 2020, the Lake Erie Partnership worked to finalize the 2019–2023 Lake Erie Lakewide Action and Management Plan (LAMP) and begin implementation actions to protect and restore water quality in Lake Erie and the St. Clair–Detroit River System. We encourage you to learn more at: 2019–2023 Lake Erie Lakewide Action and Management Plan.

We will also be participating in the 2022 Great Lakes Public Forum in September 2022 in Windsor, Ontario. The Forum is held every three years to engage the public on the state of the Great Lakes, progress achieved over the past three years, and priorities to guide the science and actions for the next three years.

Lake Erie continues to be a good source of high-quality drinking water for over 12.5 million people in Canada and the United States. It supports the highest species diversity and fish production of all the Great Lakes and toxic chemicals continue to decline. Despite this, harmful and nuisance algal blooms continue to be a problem, prey fish diversity and the proportion of native prey fish species have declined, and land-based stressors continue to impact native habitat and species.

Erieau, Ontario. Source: US EPA.

In the following sections of this annual report, the Lake Erie Partnership provides updates on activities to reduce chemical contamination, manage nutrients and algae, prevent and control invasive species, and restore and protect habitat and native species.

REDUCING CHEMICAL CONTAMINATION

Significant progress has been made in reducing toxic chemicals, but some legacy chemicals still pose a threat to human health and the environment. These chemicals accumulate in fish tissues and, as a result, fish consumption advisories continue to be in effect. Significant work continues in Lake Erie Areas of Concern to reduce legacy chemicals such as PCBs.

Buffalo River Area of Concern: Removal of Tainting of Fish and Wildlife Flavor BUI

The Buffalo River was designated a Great Lakes Area of Concern (AOC) in 1987. Tainting of Fish and Wildlife Flavor was one of nine Beneficial Use Impairments (BUIs) identified within the AOC. This BUI resulted from the presence of phenolic and chlorinated chemical compounds in the water column of the Buffalo River, a condition associated with contaminated bottom sediments and historical contaminant inputs from combined sewer overflows (CSOs) and industrial effluent discharges.

Through dredging of contaminated sediments, remediation of inactive hazardous waste sites, and regulation of wastewater and stormwater discharges, the root problems associated with this BUI have largely been addressed.

During the period of 2013–2015, the New York State Department of Environmental Conservation (NYSDEC) conducted a water quality assessment of phenolic compounds and chlorinated benzenes within, and immediately upstream of, the Buffalo River AOC. The results indicate that while some phenolic compounds are still present in the water at concentrations above state water quality standards, the concentrations in the Buffalo River were found to be statistically comparable to those at locations immediately upstream of the AOC and to those in similar urban rivers throughout New York State. Thus, current concentrations of phenolic compounds in the Buffalo River are not a condition unique to the AOC.

On June 25, 2020, EPA formally approved the removal of this BUI, making it the second BUI removed from the AOC (Degradation of Aesthetics was removed in 2018). The water quality of the Buffalo River will continue to be monitored through NYSDEC's statewide Watershed Assessment and Monitoring program, and the Buffalo Sewer Authority is implementing an innovative Long-Term Control Plan to significantly reduce CSOs.

Remediating Mercury Contaminated Sediments in the St. Clair River

The St. Clair Region Conservation Authority (SCRCA) is leading the development of a detailed engineering and design plan for managing mercury contaminated sediment in three areas of the St. Clair River. Project funding is being provided by Environment and Climate Change Canada, the Ontario Ministry of the Environment, Conservation and Parks, and Dow Canada. These funding parties are actively participating in oversight of the project through a Sediment Management Oversight Committee.

Following a competitive procurement process, the SCRCA retained Parsons Inc. in August 2019 to prepare the engineering and design plan. Field activities conducted in fall 2019 and summer and fall 2020 included water velocity measurements and sampling of surface sediment to assess sediment stability; collection of shallow sediment samples and deep core sediment samples to measure mercury concentrations at depths within the sediment; underwater camera to assess the condition of structures in certain areas; and a bathymetry survey. The project work continues to make progress and the completion of the engineering and design plan phase is expected in 2021.

Sediment sampling in the St. Clair River priority area 2 (top) and priority area 1 (bottom). Source: Pollutech Environmental Ltd.

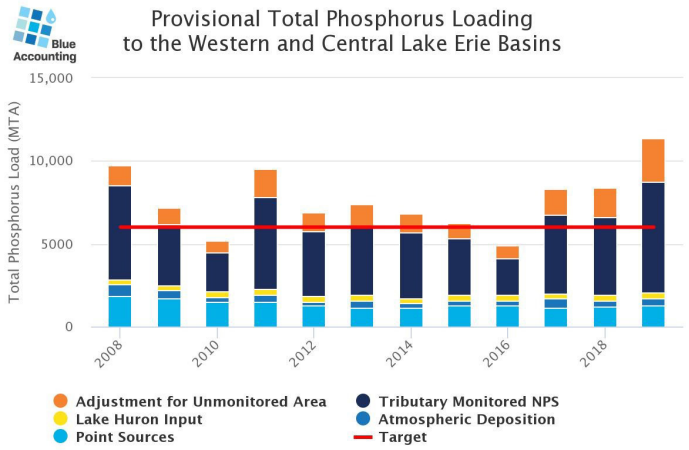
MANAGING NUTRIENT AND BACTERIAL POLLUTION

Lake Erie beaches and nearshore areas continue to provide good opportunities for swimming and recreational use. However, nutrient issues continue to be a challenge. During the summer months, harmful algal blooms occur regularly in Lake St. Clair and the Western Basin, excessive growth of *Cladophora* continues to be a problem in the Eastern Basin, and episodes of low dissolved oxygen, or hypoxia, are common in the bottom waters of the Central Basin.

Status of Lake Erie Phosphorus Loads

The total amount of phosphorus entering Lake Erie varies significantly each year, largely due to the variability in nonpoint source runoff from its major tributaries.

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. During the three years since the reduction goals were adopted, the total phosphorus load to the Western and Central Basins has exceeded the target level of 6,000 metric tons annually (MTA). That target was met in 2016 due to notably dry conditions.



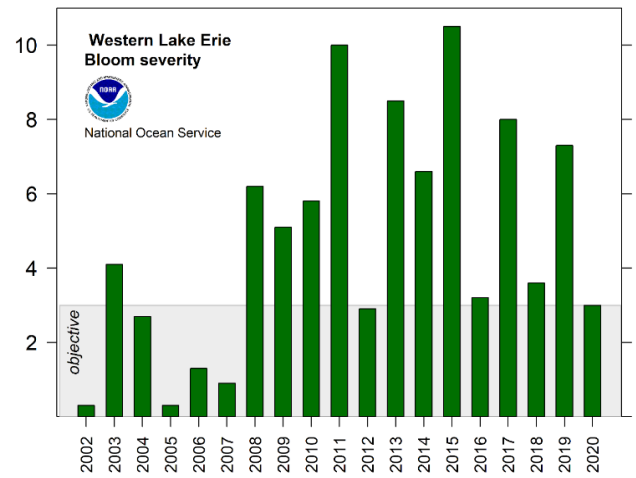
Total Phosphorus Loading to the Western and Central Basins of Lake Erie, 2008-2019. Source: ErieStat.

2019 was a record setting wet year and resulted in the highest loads delivered to the lake since 2008. However, the load from the Maumee River was not as high as predicted based on flow alone, which could indicate the start of a declining trend. Further analyses of long-term trends in the Maumee River and other tributaries are needed to determine how the system is responding to changes in the amount, timing and intensity of precipitation and to changes in land use. It will likely be several years before we can detect a change in phosphorus concentrations or loads in response to management actions on the ground.

Harmful Algal Bloom 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 of Lake Erie during the summer months.

The severity index is based on the amount of bloom biomass over the peak 30 days of the bloom on a scale of 1 to 10. The binational objective is 2.9 and a severity above 4 indicates a significant bloom.



Western Basin bloom severity index for 2002–2020. Source: NOAA.

The Microcystis cyanobacteria bloom in 2020 had a severity index of 3.0, indicating a mild bloom. Windy conditions likely shortened the duration of the bloom. The massive blooms of 2011 and 2015 still hold the record for the most severe at 10 and 10.5, respectively.

Partnerships Bring Green Infrastructure to Two Lake Erie Beaches in New York State

Lake Erie beaches in New York State provide significant recreational opportunities. However, some can be closed up to 40% of the season, often due to high bacteria counts.

In an effort to pilot green infrastructure approaches that reduce the amount of non-point source pollution reaching beaches, NYSDEC commissioned green infrastructure engineering and design studies at two of the state's most impacted Lake Erie beaches: Point Gratiot Beach in Dunkirk and Lake Erie Beach in Evans. The designs included a series of rain gardens, bioswales and porous pavement areas to help remove sediment, bacteria and nutrients from stormwater runoff before it enters the beach areas.

Implementation of the projects was made possible by EPA's Great Lakes Restoration Initiative funding to the Lake Erie Watershed Protection Alliance (LEWPA), an alliance of municipal officials and concerned stakeholders from the three counties within the New York State's Lake Erie watershed. The LEWPA oversaw the implementation of these projects.

This collaborative process between federal, state and local governments (planning and funding), and private entities (engineering design and construction) led to successful projects that leveraged the assets and expertise of multiple organizations. The projects are expected to remove 25–50% of total suspended solids, 40–60% of nitrogen and more than 75% of fecal coliform bacteria to help reduce beach closures and improve aesthetics.

The design plan for Lake Erie Beach, illustrating features that will help stop sediment, bacteria and nutrients from entering the beach areas. Source: Ecology & Environment, Inc.

PREVENTING AND CONTROLLING INVASIVE SPECIES

Invasive species, including the Sea Lamprey, Dreisenid mussels and *Phragmites australis* subsp. *australis* have significantly altered the habitat and food web in Lake Erie. Lake Trout populations have shown improvement, due in part to successful Sea Lamprey control.

Collaboration Achieves Large-Scale Lake Erie Wetland Restoration

The Nature Conservancy of Canada (NCC) and the Ontario Ministry of Natural Resources and Forestry (MNRF), with the support of more than 25 partners are leading Canada's largest invasive Phragmites control program to restore vast areas of coastal wetlands at Long Point and Rondeau Bay on Lake Erie.

Since 2015, over 1,260 hectares (3,110 acres) of

invasive Phragmites stands have been returned to diverse wetland, shoreline and stream habitat. The restoration of wetland plant communities has resulted in the return of fish and wildlife, including species at risk.

Each year, new areas are added as the work expands further into watersheds draining to Long Point Bay. Special permission has been received annually from Health Canada's Pest Management Regulatory Agency to use an aquatic herbicide not normally available in Canada.

Phragmites extent at Long Point in 2019 (top). Successful Phragmites control efforts (bottom). Source: NCC.

In 2019, ECCC's Canadian Wildlife Service (CWS) formally joined the project team with an aim to control the last remaining invasive Phragmites stands at the Long Point and Big Creek National Wildlife Areas, making this restoration initiative in the Long Point region a landscape-scale effort. This highly successful project now serves as a model for other jurisdictions looking to deliver coordinated landscape-scale control programs for invasive species. Learn more about how to identify the invasive Phragmites and what you can do to help.

Adaptive Grass Carp Response and Monitoring in Lake Erie

U.S. and Canadian resource agencies in the Lake Erie Basin have identified the growing threat of invasive Grass Carp as a high priority. Grass Carp are undesirable due to their potential to damage habitats, alter fish communities and degrade native ecosystems.

The Ohio Department of Natural Resources (DNR) Division of Wildlife developed a Lake Erie Grass Carp Response Strategy (2019–2023), which describes a suite of actions with the goal of population suppression or eradication. Partners include Ohio DNR, Michigan DNR, Great Lakes Fishery Commission, U.S. Fish and Wildlife Service, University of Toledo, and U.S. Geological Survey (USGS).

Collecting blood samples from Grass Carp in 2020. Source: Ohio DNR.

The Adaptive Response Strategy involves collaborating with these partners to prioritize targeted removal of Grass Carp in western Lake Erie; evaluate the feasibility of a seasonal barrier to disrupt spawning success in the Sandusky River; and improve removal strategies by better understanding reproductive capacity, origins of spawning, habitat use, movement and capture techniques. Additional information can be found in the Lake Erie Grass Carp Response Strategy (2019–2023).

If you find or catch a Grass Carp in the Great Lakes or its tributaries, freeze the fish in a sealed plastic bag, note the date and location and call

your state or provincial natural resource agency. Additional information can be found on the Asian Carp FAQ page.

PROTECTING AND RESTORING HABITAT AND NATIVE SPECIES

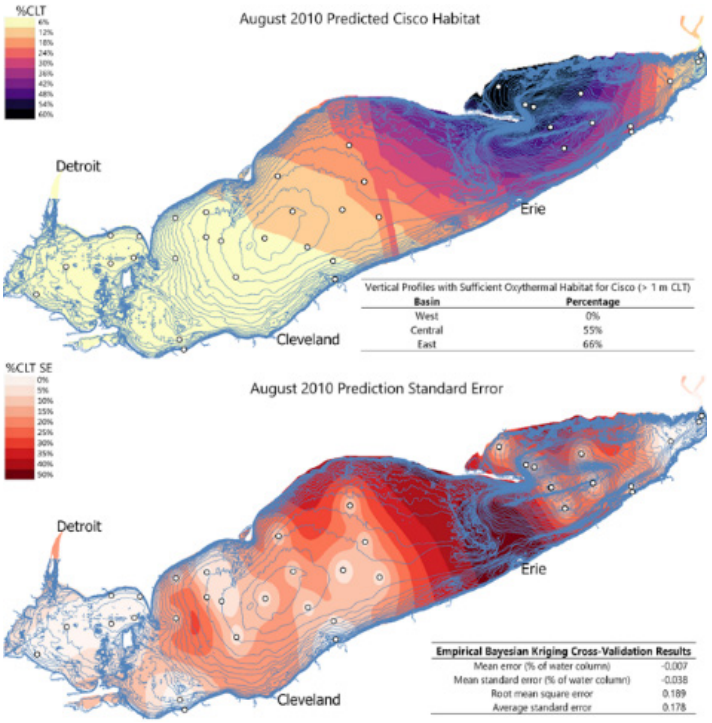
Coastal wetlands have been impacted by development, water levels and invasive species such as Phragmites. Impaired habitat connectivity between tributaries and the lake are impacting some native species. However, some native fish species, such as Lake Sturgeon, are showing signs of recovery.

Quantifying Habitat Availability for Native Lake Erie Fish Species

Fish biologists from the USGS are using vertical profiles of dissolved oxygen and temperature to quantify habitat availability for native species like Burbot (*Lota lota*), Lake Trout (*Salvelinus namaycush*), Lake Whitefish (*Coregonus clupeaiformis*) and Cisco (*Coregonus artedi*) across Lake Erie. This research will help us understand how the intensity and duration of seasonal hypoxia may respond as lake temperatures are expected to rise in the future.

Analysis of Cisco habitat in Lake Erie, a fishery that once supported one of the largest freshwater commercial fisheries on earth, has recently been completed. Despite increasing surface temperatures and seasonal hypoxia in recent years, significant areas of cool-water refuge still exist for Cisco in Lake Erie, particularly along the eastern edge of the Central Basin and the deep portions of the Eastern Basin.

The study has resulted in a forthcoming complimentary tagging study to further investigate the possibility of Cisco rehabilitation and restoration in Lake Erie. USGS and partner agencies will release 100 hatchery-reared, tagged Cisco into Lake Erie and monitor their habitat preferences, movement and survival using existing Great Lakes Acoustic Telemetry Observation System (GLATOS) infrastructure within the lake. Similar analyses for Burbot, Whitefish and Lake Trout will be completed by 2022. This forthcoming research will also model the relationship between suitable habitat and surface temperatures, so that resource managers can predict how habitat will change with warming lake surface temperatures.



Researchers at USGS used existing vertical profiles of oxygen and temperature to model habitat availability for Cisco. Darker colors (blue) represent greater habitat availability (expressed as a percentage of the water column with suitable habitat).

Sandhill Crane Wetlands Restoration

In 2019, The Nature Conservancy (TNC) acquired 280 acres (113 hectares) adjacent to Kitty Todd Nature Preserve as part of an ambitious effort to restore 23,000 acres (9,300 hectares) of marginal agriculture land in northwest Ohio. With funding from Ohio EPA, TNC will restore hydrology—altered by tile drainage for decades—and small-scale surface features of this rare Oak Openings ecosystem.

The project, to be called the Sandhill Crane Wetlands, will provide 900 acre-feet of additional stormwater storage capacity and enable groundwater recharge. Kitty Todd Preserve is managed as part of a larger complex within the Oak Openings region in coordination with Metroparks of the Toledo Area, The Olander Park System, Black Swamp Conservancy and many others. Restoring this large tract provides

an opportunity to welcome back native plants and wildlife while providing valuable ecosystem services such as flood retention, nutrient storage, and improved water quality in Lake Erie.

The project supports Lake Erie LAMP coastal wetlands actions and contributes to the restoration of the Wildlife Habitat BUI of the Maumee River AOC.

Agricultural land that will one day become the Sandhill Crane Wetlands. Source: TNC.

OUTREACH AND ENGAGEMENT

GLWQA Engagement Opportunities

You can keep up to date on GLWQA engagement opportunities in the Engagement section of 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".

CONTACT INFORMATION

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