



LAKE ERIE LAKEWIDE ACTION AND MANAGEMENT PLAN

2017 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 action plan for restoring and protecting the Lake Erie ecosystem. 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 2018; 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 about eleven 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. To combat the growing threat of toxic and nuisance algal development in Lake Erie, the United States and Canada committed, through the 2012 Great Lakes Water Quality Agreement (GLWQA), to establish binational phosphorus load reduction targets. Binational strategies and actions are also being implemented to protect and conserve the native biodiversity of Lake Erie. The Lake Erie Partnership’s 2017 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 and deliverables.

Accomplishments

Nutrients

Great Lakes Restoration Initiative Nutrient Load Reductions

Through the Great Lakes Restorative Initiative (GLRI), U.S. federal agencies and partners are implementing focused conservation and watershed management activities to reduce sources of phosphorus loadings that threaten the Great Lakes nearshore regions. Projects undertaken in selected agricultural priority watersheds, including the Maumee River, are projected to prevent over 160,000 pounds (72,575 kg) of phosphorus from entering the Great Lakes annually. From 2010 through 2016, more than \$67 million in GLRI funding was invested in the Lake Erie Basin to reduce nutrient pollution and to support related science and monitoring. Together with agency base funding programs, a total cumulative reduction of over 2 million pounds (907,185 kg) of phosphorus from edge-of-field and watershed sources in the Lake Erie basin is expected to occur by 2020. To learn more, visit <https://www.glri.us/>.

Thames River, Ontario

The Upper Thames River and Lower Thames Valley Conservation Authorities (CAs) are implementing initiatives to reduce nutrient loading to local water courses, and ultimately to Lake Erie, in support of binational



Conservation authority working with rural landowners to install BMPs to prevent soil and nutrient runoff. Credit: Upper Thames River CA.



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nutrient reduction efforts and the [Canada-Ontario Agreement](#). These include on-farm nutrient reduction demonstration projects and low impact development projects which address urban non-point source runoff. As well, the CAs are studying the impact of best management practices (BMPs) on water quality in two sub-watersheds, Medway Creek and Jeanette's Creek. Recent results indicate that the majority of phosphorus loss occurs during the non-growing season, confirming the importance of BMPs that stabilize soil and sequester nutrients during the winter and early spring months.

Essex Region, Ontario

The Essex Region (CA) is participating in several projects related to phosphorus monitoring and reduction. Since 2012, their Kingsville Leamington Nutrient project has monitored temporal trends and quantified the difference in phosphorus concentrations between greenhouse and non-greenhouse influenced streams. The CA participates in the Great Lakes Agricultural Stewardship Initiative Priority Subwatershed Project by tracking improvements in water quality in Wigle Creek, a small watershed with intensive BMP implementation. The CA also works with academic partners to test the effectiveness of such BMPs as controlled drainage, cover crops and conservation tillage, with farmers and at the Essex County Demonstration Farm at Holiday Beach Conservation Area.

Western Lake Erie Basin CEAP Completed

The Conservation Effects Assessment Project (CEAP), sponsored by the Natural Resources Conservation Service (NRCS), assesses the effectiveness of agricultural conservation practices at reducing impacts on surrounding ecosystems.

In 2016, a 4-year CEAP Wildlife project was completed that focused on nutrient and sediment impacts on fishes in streams throughout the western Lake Erie basin (WLEB) watershed, which includes parts of Ohio, Michigan and Indiana. This project convened partners from The Nature Conservancy, USDA's Agricultural Research Service and NRCS, Ohio Sea Grant, The Ohio State University and Texas A&M University to develop a computer model that can assess in-stream ecological impacts of agriculture at spatial scales ranging from the entire WLEB down to small watersheds. The analysis also focused on the costs and benefits of conservation practices that reduce those ecological impacts. The research shows that many streams in the WLEB have high levels of sediment, phosphorus, and nitrogen, which negatively affect stream health. To manage agricultural water quality impacts, a suite of practices is needed to achieve measurable improvements to fish communities. The models can help pinpoint the small watersheds where future changes in land use practices would have the biggest impact on stream fish communities. The report is available at <http://lakeerieceap.com/resources/>.

Areas of Concern

River Raisin AOC (Michigan)

The sediment clean up at the River Raisin AOC on the southeast portion of Michigan's Lower Peninsula in Monroe County is complete. Since 2010, U.S. EPA has provided more than \$27 million in GLRI funding to accelerate implementation of actions to restore the AOC. The GLRI funds have leveraged an additional \$18 million in state and private funding for AOC work. The federal, state, local, and private partnership projects have remediated over 150,000 cubic yards of PCB-contaminated sediment, restored over 300 acres (1.2 km²) of aquatic habitat, and opened up an additional 23 miles (37 km) of the River Raisin to fish migration and spawning.



Rock arch ramp in the River Raisin providing fish passage throughout the River Raisin AOC and beyond. Credit: City of Monroe.

Black River AOC (Ohio)

Originally called the "river of fish tumors", the Black River in Ohio now boasts sport fishing, kayaking and tour boats eager to view the Great Blue Heron rookery. Since 2010, more than \$23.5 million from the GLRI has been used to fund 20 projects to remediate and restore this AOC. In FY 2017, the Eutrophication and Restrictions on Fish and Wildlife Consumption Beneficial Use Impairments (BUIs) were removed.

St. Clair River (Michigan/Ontario)

In Michigan, all management actions required for delisting have been completed. The Deformities and Reproductive Problems BUI was recently removed, and recommendation for removal of the Loss of Fish and Wildlife BUI is pending. Seven of 10 BUIs have been removed. Continued monitoring will determine when the remaining impairments can be removed. In Ontario, the Degradation of Aesthetics BUI was removed in 2016. Three of 12 BUIs have been removed to date. BUI Assessment Reports for Bird or Animal Deformities or Reproductive Problems; Restrictions on Dredging; and Beach Closures have been completed, including consultation with First Nations. Significant progress on restoration and monitoring to assess the remaining impairments was made.



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Areas of Concern (Continued)

Detroit River (Michigan/Ontario)

In Michigan, major restoration projects at Stony Island, Belle Isle and Milliken State Park are well underway, and construction of Belle Isle reef is complete. A four-year effort to characterize contaminated sediment along the U.S. shoreline was completed, and a binational technical subcommittee has finalized the sites most likely to need remediation. In Ontario, five of 14 BUIs have been removed to date. Science assessment reports for Restrictions on Dredging and the Degradation of Benthos were completed. A report on Zooplankton assessments and phytoplankton surveys were completed. To encourage riverfront landowners to consider fish-friendly shoreline erosion protection techniques, a detailed guide including a decision-making spreadsheet was created.

Habitats and Species

Coastal Resilience Decision Support Tool

The Nature Conservancy in Michigan is developing the first Great Lakes application on the Conservancy's global CoastalResilience.org mapping platform. The tool will allow a user to select lake level and riparian flood level to display impacts on agricultural fields (acres inundated) and built infrastructure (value of loss, displaced population). The tool will also show Western Lake Erie Coastal Conservation Vision priority areas that may be affected by flooding and water level changes or that could – through planned conservation or restoration – provide options for reducing impacts to other values. The website describing the project is at <http://coastalresilience.org/project/western-lake-erie/>. The Conservancy expects this will be an important resource for WLEB coastal decision makers.

Detroit River-Western Lake Erie Cooperative Weed Management Area (CWMA)

The Detroit River-Western Lake Erie CWMA (Monroe and Wayne counties) was established in 2011 and currently has 16 members from local, state, and federal governments, land conservancies, academic institutions, and other entities. The goal of the CWMA is to manage invasive plants (primarily non-native *Phragmites*) in coastal wetlands from the Detroit River down to the Michigan-Ohio state line. During 2016, partners treated 550 acres (2.2 km²) of *Phragmites*, and surveyed 8,831 acres (36 km²) for a suite of 13 invasive plants, which resulted in 3,943 invasive locations for future action.

Ecosystem Services Valuation of Coastal Wetlands

The Upper Midwest and Great Lakes Landscape Conservation Cooperative – including many Lake Erie Partnership members – will estimate the value of various ecosystem services provided

by coastal wetlands in Saginaw Bay, the St. Clair-Detroit River System, and Western Lake Erie. Data from this project will be incorporated into existing decision support tools to estimate socioeconomic value of wetlands and restoration. Such information can be useful for guiding decisions on a range of topics such as wetlands restoration, recreation access, and protecting communities from storm damage.

Addressing Challenges

Nutrients and Algal Blooms

NOAA Analyzing Lake Erie Algal Toxins in Near Real-time

The National Oceanic and Atmospheric Administration's (NOAA) Great Lakes Environmental Research Laboratory deployed the first Environmental Sample Processor (ESP) in a freshwater system in FY2016, to provide drinking water managers with data on harmful-algal toxicity in near real-time before the water reaches municipal water intakes. An ESP is an autonomous robotic instrument that works as a 'lab in a can' in aquatic environments to collect water samples and analyze them for algal toxins. The ESPniagara is located near the

Toledo Water intake, allowing detection of concentrations of toxins as a drinking water early warning system. This toxicity data, coupled with NOAA's existing suite of Lake Erie HAB products (i.e. weekly Lake Erie HAB bulletin and the Experimental HAB Tracker), can provide water managers with more precise bloom location, projected direction, intensity, and toxicity.



A test deployment of the ESPniagara in June 2016. Credit: NOAA.

Domestic Action Plans

The Nutrients Annex (Annex 4) of the GLWQA is coordinating actions to manage phosphorus loadings and concentrations within the Great Lakes. Federal, state and provincial commitments under the Nutrients Annex include development of Domestic Action Plans (DAPs) for Lake Erie by 2018. The DAPs will provide focus for allocation of resources, identify actions and potential policy/program needs, and identify metrics for measuring and tracking progress needed to meet phosphorus reduction targets and lake ecosystem objectives. DAPs will be finalized in 2018, following stakeholder



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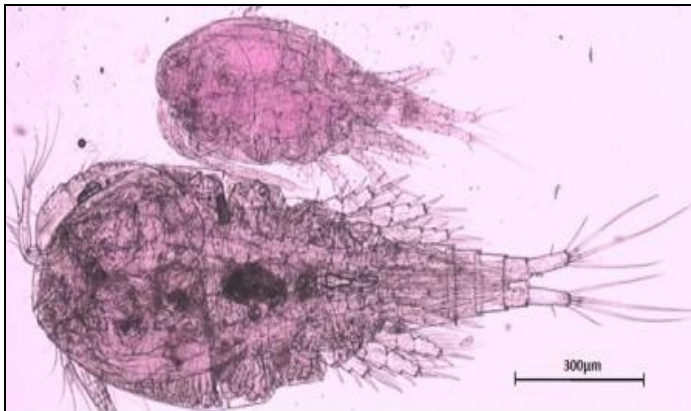
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engagement through 2017. The draft DAPs are available on binational.net.

Non-native species

Non-native Invertebrate Zooplankton Species Confirmed in Lake Erie

In Fall 2016, U.S. EPA GLNPO and Cornell University confirmed the presence of a non-native invertebrate zooplankton species in the western basin of Lake Erie. The copepod *Thermocyclops crassus*, present throughout Europe, Asia, Africa and Australia, was found in EPA's Great Lakes Biology Monitoring Program samples collected in Lake Erie from 2014 through 2016. This is the first finding of an exotic species introduced into the Laurentian Great Lakes since the discovery of *Hemimysis anomala* in Lake Michigan in 2006. *Thermocyclops crassus* prefers warm waters that are rich in nutrients. It is still relatively rare in the lake, and it is currently unknown how important *T. crassus* could become in Lake Erie and elsewhere. Researchers are continuing to monitor the extent of the population and to look for this species in archived samples, including samples from the 2014 CSMI field year.



Non-native female *Thermocyclops crassus* (above), native *Mesocyclops edax* (below). Credit: Joe Connolly, Cornell University.

Lake Ecosystem Objectives

The Canadian and U.S. governmental agencies are exploring the development of "Lake Ecosystem Objectives" to guide and assess progress toward restoring Lake Erie. These could be used as a benchmark against which to assess status and trends in water quality and lake ecosystem health. As called for in the 2012 Great Lakes Water Quality Agreement, the Lake Ecosystem Objectives can help guide lakewide management actions needed to address current and potential threats to water quality.

Science 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). The last CSMI field year on Lake Erie occurred in 2014, and the focus was on issues related to phosphorus in the nearshore of the lake's western basin, how that phosphorus is linked to the land and tributaries of the western basin, and the determination of specific management actions to curtail the development of algal blooms in the western basin. Results of the 2014 CSMI research were presented at the 8th binational meeting of the Lake Erie Millennium Network (<http://www.lemn.org/LEMN2017-presentations.htm>). Science priorities for the next Lake Erie CSMI in 2019 will be finalized by early 2018.

2018 LAMP in Development

The Lake Erie Partnership will be spending the next year developing the Lakewide Action and Management Plan (LAMP), scheduled for completion in December, 2018. The priorities of the Partnership are to continue to study, report out on, and address key issues such as excess nutrients, algal blooms, beach closings, contaminants in fish and wildlife, biodiversity and ecosystem change, and fish and wildlife habitat. Opportunities for interested agencies, organizations, and individuals to provide their perspective on the environmental conditions, issues, or concerns that should be considered during the Lake Erie LAMP drafting process and to offer suggestions on the prioritization of those issues or approaches for addressing them will be posted on binational.net and the Great Lakes Commission's GLIN-Announce.

Outreach and Engagement

You can keep up to date on Great Lakes Water Quality engagement opportunities in the [Engagement Opportunities Happening Now](http://binational.net/Engagement-Opportunities-Happening-Now) section of binational.net. Information on many of our partner organization's upcoming outreach and engagement opportunities can also be found at the Great Lakes Information Network [Regional Calendar of Events](http://Regional-Calendar-of-Events).

Contact Information

For more information, please visit www.binational.net or contact:

In Canada:

Luca Cargnelli
Environment and Climate
Change Canada
Phone: (905) 336-4476
ec.grandslacs-greatlakes.ec@canada.ca

In the United States:

Elizabeth Hinchey Malloy
U.S. Environmental
Protection Agency
Phone: (312) 886-3451
hinchey.elizabeth@epa.gov