



LAKE ERIE LAKEWIDE ACTION AND MANAGEMENT PLAN

Annual Report 2016

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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. This 2016 annual report highlights accomplishments and progress in achieving LAMP goals during the past year and identifies LAMP-related activities including outreach, monitoring, and protection and restoration actions.

Overview

Lake Erie is the shallowest and warmest Great Lake, resulting in the highest algal and fish production and the greatest biological diversity. It is also the Great Lake most impacted by human activity. The Lake Erie watershed is highly agricultural, but is also home to over 11 million people and includes large urban centres and zones of intense industrial activity. Human activities have resulted in increased excess algal blooms, pollution and habitat loss and degradation.

Although Lake Erie faces many challenges, the Lake Erie Partnership’s top priority is to address excess algal blooms by better managing agricultural and urban sources of phosphorus to the lake. Excess phosphorus and other nutrients adversely affect Lake Erie’s water quality, fish and wildlife

populations, and habitat, and, in turn, can significantly impact recreational opportunities and economic health.



The First Nations Youth Engagement Program provided youth with both training and hands-on experience in ecosystem restoration. Credit: Antler River Guardians from the Four Directions.

Accomplishments

Addressing Nutrients and Reducing Phosphorus Loads to Lake Erie

Thames River

Due to localized cyanobacteria blooms at its mouth, the Thames River is considered a priority Canadian watershed for targeting phosphorus load reductions to Lake Erie. The Upper Thames River Conservation Authority is leading the development of a water management plan (WMP) for the Thames River that will recommend measures to reduce nutrients and flood damage potential, ensure sustainable water supplies and improve water quality.

In support of the WMP, the Upper Thames River and Lower Thames Valley Conservation Authorities are implementing initiatives such as on-farm best management practice (BMP) nutrient reduction demonstration projects; a water quality assessment to determine nutrient sources and loads within the Thames River; a program to address urban non-point source runoff; and the updating of flood frequency statistics and digital elevation models, which are 3D representations of the river and its floodplain. In addition,



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the Conservation Authorities are studying the benefits of targeted BMP implementation in Medway Creek and Jeanette's Creek with support from the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)'s Great Lakes Agricultural Stewardship Initiative.

These studies are contributing to the collective actions that will be needed across the Thames watershed to significantly reduce phosphorus loads. Ontario Ministry of Environment and Climate Change (OMOEC); OMAFRA; ECC, and other partners funded many of the projects supporting the WMP.

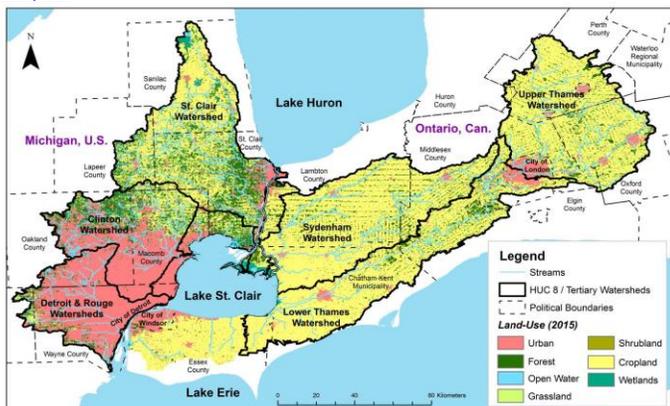


Landowners work with the Conservation Authority to reduce urban nutrient runoff. Credit: Upper Thames River Conservation Authority.

Detroit River

The University of Michigan Water Center is beginning a three-year project, *Assessing the Sources and Management Options for Detroit River Nutrient Loads to Lake Erie*, to model the nutrient dynamics within the watersheds that drain into the St. Clair and Detroit rivers. This binational watershed includes the Clinton, Rouge, Sydenham and Thames rivers, as well as discharges from the cities of Detroit and Windsor. The planned modeling approach is designed to characterize nutrient loads to the Detroit River and then compare the efficacy of different nutrient management options

(<http://graham.umich.edu/media/pubs/DetroitR-NutrientLoad-FS.pdf>).



The St. Clair-Detroit River System watershed is large and complex, with a variety of land cover. Credit: University of Michigan; data provided by National Agricultural Statistics Service, Agriculture and Agri-Food Canada.

Western Lake Erie Watershed

In Ohio and Michigan, the Nutrient Stewardship Council's voluntary 4R Nutrient Stewardship Certification Program has reached thousands of growers and now affects approximately 1.2 million acres across the Western Lake Erie watershed (<http://4rcertified.org/program-stats/>). Through the 4R program, agriculture retailers and independent crop advisors are collaborating with farmers to improve farm productivity and environmental stewardship at the same time.

Biodiversity Conservation in Western Lake Erie

To sustain and improve coastal biodiversity, The Nature Conservancy (TNC) worked with partners to enhance 473 acres (191 hectares) of coastal marsh and restore 115 acres (46 hectares) of former cropland to wetland or forest. Most of their efforts were focused in the Maumee River Area of Concern (AOC).

Since 2009, the Lake Erie Cooperative Weed Management Area partners have treated 7,713 acres (3121 hectares) of *Phragmites* (1,188 acres or 480 hectares in 2015) resulting in a 70% decrease in live *Phragmites* in the Ohio portion of the Western Lake Erie watershed. GLRI, through the U.S. Forest Service, contributed funding to this effort.

At the Erie Marsh Preserve in North Maumee Bay, TNC is working with the U.S. Fish and Wildlife Service, Ducks Unlimited, Michigan Department of Natural Resources, Michigan Department of Environmental Quality, and the Erie Shooting and Fishing Club to restore and enhance 945 acres of managed coastal wetlands, through construction or improvement of dikes, creation of distribution canals, installation of water control structures and a new water supply system and fish passage structure. The improved infrastructure will restore a hydrologic and physical connection to Lake Erie, enable long-term, adaptive management of the restored wetland complex and help control invasive *Phragmites*.

First Nations Youth Environmental Stewardship

In 2015, a new First Nation Youth Engagement Program was piloted in the Thames River watershed in Ontario to engage youth from Aamjiwnaang, Chippewa of the Thames, and Walpole Island First Nations. The purpose was to help youth learn about and connect with the Thames as well as its communities, both First Nation and non-First-Nation. The project was organized by the Thames River Clear Water Revival's First Nations Engagement Committee, with funding from OMOEC and the Tides Canada Dragonfly Fund.

Over the summer, four high school students were trained in both Western Science and aboriginal Traditional Ecological Knowledge relevant to the Thames River. The team received training in wilderness first aid, canoeing, health and safety, geographic positioning systems, water quality monitoring, species at risk, social media and communications. Two post-secondary-level youth leaders planned and scheduled the



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group's training, travel, and activities under the guidance of the First Nations Engagement Committee.

The group's activities and accomplishments included going on two canoe trips down the Thames River, visiting nearby First Nations; rescuing plants and restoring wetlands; learning traditional drumming, medicinal plants and treaties; recording erosion sites and species at risk; and making presentations to students, organizations and businesses to promote the program and the need to provide long-term, community support for it to continue in future.

The students captured their experiences in a video posted online at <https://www.youtube.com/watch?v=hLCvYe44D3E>. This video has sparked momentum to engage and educate others about environmental stewardship and has created interest in their First Nations communities. The program has continued in 2016.

Areas of Concern Update

Progress continues to be made toward restoring the remaining Lake Erie AOCs. Milestones have been achieved for several AOCs.

St. Clair River (Michigan/Ontario)

In Michigan, all management actions required for delisting have been completed, and monitoring or ecological assessments of the recently completed actions will be conducted in 2016 to determine when the remaining impairments can be removed. The Beach Closings Beneficial Use Impairment (BUI) was removed in 2016. In Ontario, research has been completed at Walpole Island that relates to two BUIs: Fish Tumors and Bird or Animal Deformities or Reproductive Problems.

Clinton River (Michigan)

Eleven habitat projects will be completed in 2016 to support the removal of two BUIs: Loss of Fish and Wildlife Habitat and the Degradation of Fish and Wildlife Populations. It is anticipated that these efforts, along with additional work currently underway on the remaining six BUIs, will lead to the completion of all management actions for the Clinton River AOC by 2018.

River Raisin (Michigan)

The final management action necessary for delisting the AOC (a sediment remediation project) began in 2016. The Loss of Fish and Wildlife Habitat and Degradation of Fish and Wildlife Populations BUIs were removed in 2015. Monitoring of herring gulls and eagles will continue in 2016 for the Bird or Animal Deformities or Reproduction Problems BUI.

Detroit River (Michigan/Ontario)

In Michigan, major restoration projects at Stony Island, Belle Isle and Milliken State Park are being initiated in 2016. In Ontario, fish habitat restoration project sites have been prioritized after surveying fish community composition and habitat, and engineering and ecological feasibility studies are

underway to identify long- and short-term restoration targets. In 2015, the Degradation of Aesthetics and Beach Closings BUIs were officially re-designated to 'not impaired'.

Buffalo River (New York)

Habitat restoration is planned for 2016, including the planting of submerged aquatic vegetation to improve ecosystem function and fish habitat and other shoreline and upland habitat improvement. By 2017, over 20 projects valued at nearly US\$20 million will have been completed to restore the Buffalo River shoreline and upland areas.

Addressing Challenges

Nutrients Update: Final Targets and Domestic Action Plans



Satellite image of an algal bloom on Lake Erie, taken on September 6, 2015. Credit: NASA Worldview.

To combat the growing threat of toxic and nuisance algal development in Lake Erie, the United States and Canada committed, through the 2012 GLWQA, to establish binational phosphorus load reduction targets for Lake Erie by February, 2016.

In July and August 2015, draft targets were presented for public consultation in both countries. Input was received online and in face-to-face meetings with interested stakeholders including agricultural commodity groups, municipalities, conservation authorities, First Nations, non-government organizations and others. The governments of Canada and the United States considered the input received and adopted the targets.

Following this robust binational science-based process and extensive public consultation, Canada and the United States adopted the following phosphorus reduction targets (compared to a 2008 baseline) for Lake Erie:

- A 40% reduction in total phosphorus (TP) entering the western and central basins to minimize the extent of the central basin hypoxic zones. This equates to a reduction of 3,316 metric tons from the United States, and 212 metric tons from Canada.
- A 40% reduction in spring TP and soluble reactive phosphorus (SRP) loads from priority watersheds in Canada and the United States to maintain algal species consistent with healthy aquatic ecosystems in the nearshore waters of the western and central basins.



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- A 40% reduction in spring TP and SRP loads from the Maumee River. This will maintain cyanobacteria biomass at levels that do not produce concentrations of toxins that pose a threat to human or ecosystem health in the waters of the Western basin.
- An additional target to address nuisance algae in the nearshore of the eastern basin will be established after ongoing research is completed.

Now that binational targets for Lake Erie have been set, the governments of Canada and the United States will shift their attention to the development of Domestic Action Plans by 2018. These plans will coordinate efforts to collectively achieve the phosphorus load reduction goals, and provide a mechanism for progress assessment within each country. The domestic plans will also include priority watersheds, and consider relevant feedback from public consultation. To learn more, visit www.binational.net/annexes/a4.

Monitoring Lake Erie Tributaries

Tributaries to Lake Erie include small streams, large rivers, and major connecting channels. Some tributaries are significant sources of nutrients and contaminants to Lake Erie, and therefore can have a significant influence on the overall health of the lake.

Lake Erie tributaries are repeatedly monitored to assess

compliance with laws and regulations and to document loading trends to downstream waters. In the past 20 years, more frequent monitoring of some tributaries has been used to support modelling and decision-making, and has led to the development of best management practices in urban and agricultural areas.

In the United States, all five States bordering on Lake Erie conduct routine sampling and surveys in support of water quality standards and the determination of Total Maximum



Improving understanding of nutrients and algae blooms is a major focus of work in Lake Erie. Credit: OMOECC.

Daily Loads (TMDLs), as required by the Clean Water Act. In Ontario, OMOECC, conservation authorities and provincial parks have monitored water quality and biological and habitat changes at over 400 locations over the past 50 years. Since 2013, ECCC and OMOECC have been assessing the impacts of agricultural land use and nutrient runoff in six Lake Erie watersheds.

Since the mid-1970s, Heidelberg University in Ohio has kept a continuous record of loadings information from sites in Ohio and Michigan. This record has been important for identifying trends in nutrient loads to Lake Erie and linking them to improvements in urban infrastructure or agricultural practices.

Recently, the Great Lakes Restoration Initiative (GLRI) in the United States and the Great Lakes Nutrient Initiative (GLNI) in Canada have provided financial resources to monitor priority tributaries. Under GLNI, ECCC completed a project to better measure nutrient loads to Lake Erie. Through GLRI, U.S. federal and state partners increased monitoring in the Maumee River watershed to better understand nutrient sources and loads, and their timing.

Both ongoing and new tributary monitoring activities are the focus of collaborative efforts in all jurisdictions within the Lake Erie watershed. Moving forward, the knowledge gained will be used to implement final phosphorus load targets, and determine the influence of nutrient loadings on toxic and excessive algal blooms.

Lake Ecosystem Objectives: Status Update

The 2012 GLWQA commits the governments of Canada and the United States to establish Lake Ecosystem Objectives (LEOs) for Lake Erie and the St. Clair-Detroit River System. A binational task team is developing the suite of LEOs that will specify an ecological condition necessary to achieve the General Objectives of the 2012 GLWQA. When completed, the LEOs will serve as benchmarks for assessing status and trends in water quality and lake ecosystem health, and will be used to track progress in implementing the Lake Erie LAMP.

Contact Information

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