LAKE ERIE LAKEWIDE ACTION AND MANAGEMENT PLAN
Annual Report 2015

In this Issue

What is a 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.

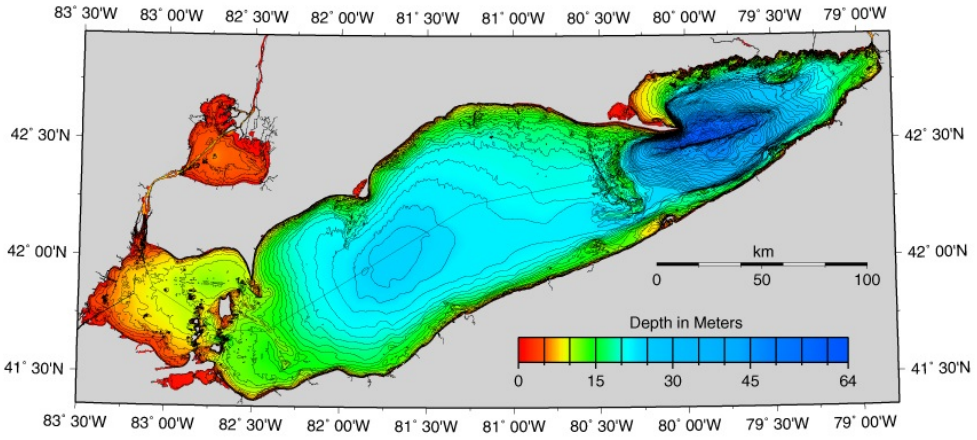
The Lake Erie Lakewide Action and Management Plan (LAMP) is a binational action plan for restoring and protecting the Lake Erie ecosystem. The LAMP is developed and implemented by the Lake Erie Partnership, which is led by the U.S. EPA and Environment Canada and which facilitates information sharing, 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 2015 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 primary production (i.e., algae growth), biological diversity and fish production of all the Great Lakes. Home to over 12 million people, the Lake Erie watershed is highly agricultural, and includes a number of large urban centres and zones of very intense industrial activity. These agricultural and industrial activities have resulted in increased nutrient concentrations, pollution, and habitat loss and degradation.

The top priority for members of the Lake Erie Partnership continues to be addressing the re-emergence of algal blooms by managing the amount and form of nutrients entering the lake from agricultural and urban sources. Excess nutrient inputs to the lake impact water quality, recreational opportunities, fish and wildlife populations, and habitat quality.



Bathymetric map illustrating the water depths and shapes of the underwater terrain of Lake Erie and Lake St. Clair. The distinct basins of Lake Erie - Western, Central, and Eastern - become deeper from the west to east direction. Credit: NOAA.

Accomplishments

Nutrients

The Lake Erie Partnership continues to implement projects that support the management, research and monitoring goals to reduce excess phosphorus loadings and algal blooms in Lake Erie. Highlights include:

Western Lake Erie Phosphorus Reduction

The 2015-19 Western Lake Erie Basin (WLEB) Phosphorus Reduction Initiative, funded under the U.S. Department of Agriculture's (USDA) WLEB Regional

Conservation Partnership Program, is a $17 million Michigan, Ohio, and Indiana public-private partnership to protect the WLEB by reducing phosphorus and sediment inputs and harmful algal blooms. Project partners use a targeted approach to identify high-priority subwatersheds for phosphorus reduction and assist farmers in those areas by identifying conservation practices that can be implemented to protect soil health, water quality and quantity, and prevent degradation.

Through the Ohio Clean Lakes Initiative, the Ohio Legislature appropriated more than $3.55 million for the implementation of best management practices (BMPs) to reduce nutrient runoff in the WLEB. State and local partners worked with more than 350 farmers to implement BMPs on more than 40,000 acres. Additional stream monitoring stations have also been installed to measure the effectiveness of these practices.

Ontario Water Management Plans
The new Water Management Plan for the Grand River watershed was endorsed in 2014 by 27 municipalities; Six Nations of the Grand River; Environment Canada; the Ontario Ministries of Environment and Climate Change (MOECC), Natural Resources and Forestry (OMNRF), and Agriculture, Food and Rural Affairs (OMAFRA); and the Grand River Conservation Authority. In 2015, stormwater managers continue to discuss and implement best practices; wastewater managers continue to optimize operations at wastewater treatment plants and share lessons learned; and work continues on developing nutrient source area maps using digital elevation models that pinpoint erosion-prone areas where BMPs could be implemented. Collectively, these actions will help reduce phosphorus loads to the eastern basin of Lake Erie.

A view of Lake Erie bluffs taken from the U.S. EPA R/V Lake Guardian. Over 335 km of bluffs occur along the Lake Erie shoreline. Many have narrow beaches at their toe and are an important source of sediment for beaches. Credit: B. Jones, U.S. EPA.

A Water Management Plan is also being developed for the Thames River, a main source of nutrients from Ontario to Lake Erie. The plan is anticipated to reduce flood damage potential, ensure sustainable water supplies, and improve water quality. Current work includes: BMP demonstration projects to reduce nutrient runoff; a water quality assessment to determine nutrient sources and loads within the watershed; a Low Impact Design program to address urban non-point source runoff; and work to update flood frequency statistics, automate digital elevation models, and reliably estimate spatially-distributed precipitation. The MOECC, Environment Canada, local community foundations and other partners funded many of these Conservation Authority initiatives.

Ohio Rule Changes to Address Algal Blooms
In May 2014, the Governor of Ohio signed into law Senate Bill 150, which requires fertilizer applicators to undergo education and certification by the Ohio Department of Agriculture (ODA); encourages producers to adopt nutrient management plans; allows ODA to better track sales and distribution of fertilizer; and provides Ohio Department of Natural Resources the authority to re-purpose existing funding for BMP implementation. In April 2015, the Governor signed Senate Bill 1 to protect Lake Erie. Legislation highlights include: restrictions on fertilizer and manure application on frozen, snow-covered or saturated ground; prohibition of open lake disposal of dredge material by 2020; and additional phosphorus monitoring at wastewater treatment facilities.

Educating Farmers about the Benefits of Windbreaks
Agricultural windbreaks benefit crops and livestock productivity. The most noticeable benefits are financial and environmental; a windbreak increases crop yields by protecting crops from excessive winds and wind damage, and helps to prevent soil erosion. OMAFRA has developed a series of windbreak videos geared toward the farming community. Visit ontario.ca/farmstewardship and click on “Windbreaks”.

Biodiversity Conservation

The binational *Lake Erie Biodiversity Conservation Strategy* (BCS) was released in 2013. It proposes strategies and actions to protect and conserve the native biodiversity of Lake Erie. Lake Erie partners have been developing regional plans for implementation and implementing on-the-ground projects that support the BCS.

Western Lake Erie Basin Coastal Conservation
Incorporating biodiversity conservation targets and goals from the Lake Erie LAMP and BCS, The Nature Conservancy and partners have developed a Coastal Conservation Vision for Western Lake Erie, including the

Detroit River (nature.ly/WLEcoastalvision). The products include maps and data identifying optimal places where conservation investment and actions will help meet regional conservation goals and also benefit people.

Regional Priority Setting in Ontario
The Nature Conservancy of Canada and Environment Canada initiated a process to refine the selection of priority areas and develop regional objectives, strategies and place-based actions that support the implementation of the BCS in Ontario. Participants from Lake Erie basin Conservation Authorities and provincial government agencies are providing local knowledge that will guide the development of regional implementation plans that identify key issues and opportunities.

Restoring the Grand River Estuary
The Grand River is the largest Canadian tributary to Lake Erie. Its lower reaches constitute a unique environment due to the interaction of river and lake. A multi-partner initiative has focused on determining priority actions for restoring the ecological function of the lower Grand River and improving the connection with the lake, with a focus on migratory fish and reconnecting coastal wetlands. OMNRF and Environment Canada have supported studies to improve understanding of the lower Grand River, develop a new digital elevation model, and collect new river bathymetry data.

St. Clair-Detroit River System Update

- The 2015 St. Clair-Detroit River System Initiative workshop was held on February 4 in Ann Arbor, Michigan. The theme was “Establishing Priorities for Coordinated Action”. The workshop resulted in draft common objectives on which partners of the initiative could collaborate (http://scdrs.org/).
- The 2015 Lake St. Clair Binational Conference was held in Chatham, Ontario on October 21. This one-day conference focused on key activities for Lake St. Clair regarding water quality, fish and wildlife habitat and the changing ecosystem.
- The 2015 State of the Strait Conference was held at Eastern Michigan University on December 9. This year’s theme was “Coordinating Conservation in the St. Clair-Detroit River System.”

Lake Erie Areas of Concern

Progress continues to be made toward restoring the remaining Lake Erie Areas of Concern (AOCs). Milestones have been achieved for several AOCs:

Buffalo River (New York)
In 2015, dredging in the Buffalo River was completed, with nearly 1 million cubic yards of contaminated sediment removed since 2011. Habitat restoration will include planting submerged aquatic vegetation to improve ecosystem function and fish habitat as well as other shoreline and upland habitat improvements.

AOC actions have led to a reinvestment along Buffalo’s waterfront, offering new opportunities for economic development and public access, as shown here in this view down the Buffalo River and City Ship Canal. Credit: B. Jones, U.S. EPA.

Ashtabula River (Ohio)
In 2014, all management actions were completed for the Ashtabula River AOC, including a large habitat restoration project at the 5½ Slip in 2013 and a final Great Lakes Legacy Act project in 2014. The fish community has recovered rapidly and in May 2014 three Beneficial Use Impairments (BUIs) were removed (Restrictions on Fish Consumption, Degradation of Fish Populations, Loss of Fish Habitat). The river continues to recover, and delisting may be possible by 2017 or 2018.

Detroit River (Michigan/Ontario)
The Detroit River AOC groups continue to work toward removing BUIs to achieve eventual delisting of the AOC. Tainting of Fish Flavour was designated “not impaired” on both sides of the Detroit River. On the Canadian side, monitoring is being conducted to determine the status of several BUIs, including liver tumors in Brown Bullhead, the degradation of benthos, and restrictions on fish consumption. Two of ten planned habitat projects have been completed and action has begun at four others.

St. Clair River (Michigan/Ontario)
On the U.S. side of the AOC, the Degradation of Benthos BUI was removed and eight of the ten planned habitat projects have been completed and the remaining two projects are under construction. On the Canadian side, a recommendation to remove the Degradation of Aesthetics BUI is in the final stages of approval by Canada and

Ontario. U.S. EPA expects that all management actions required for delisting will be completed by 2016.

Addressing Challenges

Nutrients and Harmful Algal Blooms

In the mid-1990s large, late-summer algal blooms began to reappear in western Lake Erie, increasing in frequency and magnitude through the 2000s. As a result, the 2012 *Great Lakes Water Quality Agreement* (GLWQA) includes a major focus on algae blooms in Lake Erie, and Canada and the U.S. have committed to develop new phosphorus loading targets and a new phosphorus reduction strategy for Lake Erie. In 2015 draft targets were made available for public consultation. Achieving the targets will require collaboration and action by all levels of government and stakeholders to change phosphorus use and management practices.

Michigan Tech Research Institute scientist collects a water sample from a 2013 harmful algal bloom in the Western Basin of Lake Erie. Credit: MTRI staff member.

The Great Lakes Restoration Initiative (GLRI) has funded over 410 nutrient reduction projects in the Maumee River watershed. These projects, administered by USDA and other partners, will reduce sediment and nutrients entering Lake Erie, and will reduce human health risks and ecosystem degradation posed by harmful algal blooms and other nuisance algae. After the 2014 Toledo drinking water crisis, the U.S. EPA provided an additional $11.8 million in GLRI funds to federal and state agencies to: expand monitoring and forecasting to help drinking water treatment plant operators and beach managers minimize health impacts associated with harmful algal blooms; increase incentives for farmers in western Lake Erie watersheds to reduce phosphorus runoff that contributes to harmful algal blooms; and improve measurement of phosphorus loads in Lake Erie tributaries.

Using these funds, Ohio EPA is expanding monitoring efforts in the Maumee River to improve measurement of phosphorus loads to Lake Erie at 14 sites and USGS is installing continuous discharge flow gages within five targeted watersheds (Blanchard River, Swan Creek, Turkeyfoot Creek, Auglaize River, Lower Sandusky River and direct lake tributaries). Ohio EPA is also continuing its Lake Erie water quality monitoring program initiated in 2011.

As part of its Great Lakes Nutrient Initiative, Environment Canada has been monitoring priority nearshore areas and Lake Erie tributaries. Over 1800 tributary water quality samples have been collected since 2011, and nutrient loadings have been calculated for the 2012, 2013 and 2014 water years for the Grand, Thames and Sydenham Rivers, Kettle and Big Otter Creeks, and other selected tributaries. The initiative included sampling winter and spring freshet, as well as runoff events and baseflow. In the nearshore, water quality sampling has been conducted to measure and assess the current state of water quality and to support modeling, and biological sampling has been conducted to assess condition and develop ecosystem health indicators.

Lake Ecosystem Objectives

The 2012 GLWQA includes a commitment to establish Lake Ecosystem Objectives (LEOs) for each Great Lake. New LEOs for Lake Erie will be developed in 2015-2016 and will form a central part of the ecosystem-based management framework for Lake Erie going forward. The Lake Erie LEOs will be used to track and report on progress; as articulated in the GLWQA, LEOs are to be used "*as a benchmark against which to assess status and trends in water quality and lake ecosystem health*".

New York's Great Lakes Action Agenda

In July 2014, the New York Department of Environmental Conservation released *New York's Great Lakes Basin: Interim Action Agenda (GLAA)*, a guide to promote successful ecosystem-based management involving state and federal agencies, municipalities, academic institutions, non-profits, and other stakeholders. The GLAA identifies actions to protect natural resources, environmental quality and resilient communities. It is a tool that agencies, communities and organizations can use to help plan, fund and track projects that help achieve a shared vision for the conservation, restoration and protection of New York's Great Lakes basin. More information can be found at dec.ny.gov/lands/91881.html.

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