LaMP UPDATE

LAKE ONTARIO • LAKEWIDE MANAGEMENT PLAN

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LAKE ONTARIO LAKEWIDE MANAGEMENT PLAN UPDATE '09

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The Lake Ontario LaMP:

Lighting the way for Lake Ontario

Working together to restore and protect the health of the large and complex ecosystem of Lake Ontario is the focus of the Lake Ontario Lakewide Management Plan (LaMP). This binational framework implemented by seven federal, provincial and state agencies, is a model of collaboration in environmental protection that celebrated its 20 year anniversary in 2007. It is part of the binational commitment to Great Lakes health under the Canada-United States Great Lakes Water Quality Agreement (GLWQA).

This special edition of the Lake Ontario LaMP Update, in celebration of the 100 year anniversary of binational stewardship under the Boundary Waters Treaty, provides an overview of the work of the LaMP partners in helping to restore and protect the health of Lake Ontario. The Update is a compilation of success stories and challenges from previous LaMP publications and is intended to provide both stakeholders and the public with information on the many successes the LaMP has achieved and further action that can be taken to restore and improve the health of the lake.

There are many tools the governments use to protect the Great Lakes, both individually and collectively. Both governments have formalized their commitments through the GLWQA. The agreement, renewed three times since 1972, has evolved from an original focus on nutrients (phosphorus) to more broadly address restoring and maintaining the chemical, physical and biological integrity of the waters of the Great Lakes ecosystem.

The last renewal of the GLWQA in 1987 set the stage for development of Remedial Action Plans for Areas of Concern (areas where there are higher concentrations of historical pollution) around the lakes. It also set the stage for creation of lakewide management plans to improve the quality of the open waters of the lakes. It was this action that gave birth to the Lake Ontario LaMP.

Together, the LaMP agencies share information, identify lakewide environmental issues through cooperative programs, set ecosystem objectives, coordinate activities and monitor

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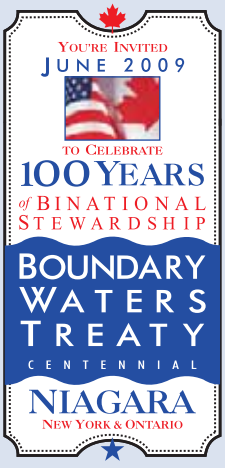
Celebrating 100 years of Binational Great Lakes Collaboration (1909-2009)



The Boundary Waters Treaty of 1909 is the origin of Great Lakes collaboration between Canada and the United States. It was created to help resolve disputes about water quantity and quality. The treaty established the International Joint Commission (IJC) (http://www.ijc.org/) as the binational body responsible for resolving disputes.

The Boundary Waters Treaty also gave rise to the Great Lakes Water Quality Agreement (GLWQA) (http://www.on.ec.gc.ca), which in turn gave rise to Remedial Action Plans (RAPs) for designated Areas of Concern (AOCs) on the Great Lakes, as well as Lakewide Management Plans (LaMPs).

On June 13, 2009 the IJC, the governments of the United States and Canada, along with Niagara-area municipalities hosted the centennial celebration of the 1909 Boundary Waters Treaty at Niagara Falls. The celebration was held during Boundary Waters Week, a regional initiative from June 5 - June 14, 2009.

For more information see: **www.oursharedwaters.com**

Ecosystem Indicators

The LaMP adopted a set of ecosystem goals, objectives and indicators in 2001 to help measure progress in restoring and maintaining the health of the Lake Ontario ecosystem.

The following selected indicators reflect lakewide conditions: concentrations of critical pollutants in water, young of the year fish, herring gull eggs and lake trout; nutrient levels, zooplankton and prey fish; herring gulls, lake trout, bald eagle, mink and otter populations. In 2008, the LaMP began work on a set of coastal wetland indicators. The LaMP and its partners are committed to supporting cooperative monitoring approaches needed to report on these indicators on a long-term basis.

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progress. Individually the partner agencies contribute by working domestically to control pollution, manage fisheries and wildlife, and deal with other environment and natural resource issues.

Through the efforts of the member agencies, either working individually or collaboratively, significant progress has been made in Lake Ontario. Levels of contaminants in the Lake Ontario ecosystem have decreased significantly over the last 20 years. The quality of the water has improved and populations of species under stress, such as lake trout, bald eagles, mink and otter are now recovering.

However, significant challenges remain. New and emerging chemicals may be having an effect on the health of the ecosystem; the full extent of the impact of invasive species has yet to be determined; and fish consumption advisories still exist as a result of legacy pollutants such as mercury, PCBs and dioxins. The work of the LaMP continues.

For more information on these and other projects, go to *www.binational.net.*

LaMP 2008 Binational Cooperative Monitoring

The Lake Ontario LaMP is a model of binational, multi-agency collaboration. The 2008 Binational Collaborative Research and Monitoring Initiative is one example of how this collaboration works to leverage resources and benefit lake managers on both sides of the border.

The Lake Ontario ecosystem is complex, and needs to be properly understood for effective management decisions to be made. Monitoring and scientific assessment on the scale needed for Lake Ontario is beyond the capacity of any one government agency. To overcome this challenge, the Lake Ontario LaMP partners pooled their resources, staff, expertise, time and equipment to develop and implement the Binational Collaborative Research and Monitoring Initiative.

The goal of the initiative was to collect information needed to help scientists and managers better understand the ecosystem dynamics and make informed decisions to improve the state of the lake. One focus of that study was the impact of invasive species on the health and abundance of native fish in the lake.

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2008 Binational Collaborative Research and Monitoring Partners

United States

United States Environmental Protection Agency

United States Fish and Wildlife Service

United States Geological Survey

National Oceanic and Atmospheric Administration

NY State Department of Environmental Conservation

SUNY Brockport

SUNY Buffalo

Buffalo State College

SUNY ESF

Rochester Institute of Technology

Clarkson University

Cornell University

Canada

Environment Canada

Department of Fisheries and Oceans

Ontario Ministry of the Environment

Ontario Ministry of Natural Resources

Lake Ontario Conservation Authorities

Lake Ontario Collaborative

University of Toronto

Trent University

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Another part of the study was a lakewide assessment of lake trout populations conducted by the Ontario Ministry of Natural Resources, United States Geological Survey and New York State Department of Environmental Conservation. This extensive survey will aid evaluation of the successes of efforts to establish self-sustaining populations of these long-lost native fish.

The study is also seeking to update the status of legacy pollutants (PCBs, DDT, dioxins and furans) and provide information on new and emerging chemicals. The near-shore zone of the lake will be studied in greater detail than ever before. One of the most critical issues facing Lake Ontario is the drastic changes in the near-shore waters caused by invasive zebra and quagga mussels. It is thought that dense beds of invasive mussels and algae that have become established around the lake are preventing the flow of nutrients into deeper water resulting in severe eutrophication and other near-shore water quality problems.

In 2008, scientists from Canada and the United States completed the sampling and data collection phase of this massive study for Lake Ontario.

Lake Ontario–St. Lawrence River Water Level Control Study

The International Joint Commission has undertaken an intensive effort to revise the current regulatory plan for managing Lake Ontario–St. Lawrence River water levels and outflows. The final plan will have crucial implications for future ecosystem restoration activities implemented through the LaMP and by many communities around Lake Ontario. The LaMP is following the possible change in water level control by the International Lake Ontario–St. Lawrence River Control Board and the adaptive management actions that will be needed to monitor and mitigate any potential adverse impacts to the ecosystem. For more information: *www.losl.org/about/about-e.html*.

Bald Eagles are Back!

Lake Ontario basin and Upper St. Lawrence River bald eagles have made a tremendous come back over the last three decades, thanks to hunting bans, habitat conservation efforts and declining levels of environmental contaminants. Today there are two Lake Ontario and three Upper St. Lawrence River shoreline nesting territories. More than two dozen inland nesting territories are now established within the Lake Ontario basin along tributaries and wetland areas, with new nests being established every year.

U.S. and Canadian bald eagle experts are helping the LaMP identify and conserve valuable shoreline nesting habitat for expanding bald eagle populations. The continued expansion of shoreline nesting territories would be an important sign of a healthy, diverse, and self-sustaining wildlife community that uses the lake habitat and/or food.

Twenty high priority potential shoreline nesting areas were identified through computer modeling, small plane aerial surveys and field visits. The LaMP is working with bald eagle experts, local governments and landowners to promote conservation strategies for these priority habitats. Specific bald eagle population restoration goals and objectives in place to help measure progress towards fully restoring eagle populations are:

- 80 Percent of bald eagle nesting pairs should fledge 1 or more eaglets per year;
- 10 Shoreline nesting territories are established by 2016;
- Protect 5 Canadian and 5 U.S. priority sites totaling more than 12,400 acres by 2016.

Continued implementation of monitoring and public awareness programs, combined with effective local habitat conservation efforts will ensure the success of U.S.-Canadian bald eagle restoration efforts.

Restoring the Diversity of Lake Ontario Fishes

The biodiversity of the fish community in Lake Ontario today is dramatically different than at the time of European settlement. Since the late 1800s, a number of changes to the environment, such as habitat loss, degraded water quality, invasive species, and overfishing have affected many fish species. Twenty-two fish species have been lost from the Lake Ontario basin or are currently 'rare'.

A wide variety of public and private partners are working to restore the biological diversity of fish in Lake Ontario, including the LaMP's partnership with the Lake Ontario Fishery Commission's Lake Ontario Committee (LOC). Efforts to restore lake trout began in the 1970s with binational sea lamprey control and stocking programs. Naturally produced lake trout made a comeback in Lake Ontario in the early 1990s, after an absence of over 50 years. Naturally produced fish are still seen today, but their numbers are small, and low survival of stocked fish has slowed recovery.

The Atlantic salmon restoration program is focused on three "best bet" streams in western Lake Ontario. Stocking young Atlantic salmon and improving stream habitats are showing early signs of success with the recent appearance of maturing salmon. Recent efforts to restore American eel in Lake Ontario include closing fisheries, stocking of young eels, and providing eels safe passage around dams. In addition, restoration programs for deepwater cisco, lake sturgeon and redside dace are underway. These recovery efforts, together with work to improve the quality of the environment, will help restore the balance and diversity of the fish community in Lake Ontario.

Examples of fish restoration projects at locations around Lake Ontario: **1.** lake sturgeon stocking (©*Ontario Ministry of Natural Resources*), **2.** shoreline planting on an Atlantic salmon stream (©*Ontario Federation of Anglers and Hunters*), **3.** assessing the growth of stocked Atlantic salmon (©*Ontario Ministry of Natural Resources*), **4.** assessing the growth of young lake sturgeon in the lower Genesee River (©*US Fish and Wildlife Service*), **5.** monitoring natural reproduction of lake trout in Lake Ontario (©*US Geological Survey*), **6.** stocking Atlantic salmon (©*Ontario Ministry of Natural Resources*), **7.** stabilizing the banks of an Atlantic salmon stream (©*Ontario Federation of Anglers and Hunters*), **8.** electroshocking to assess survival of stocked Atlantic salmon (©*Ontario Ministry of Natural Resources*), **9.** school group helping to restore fish habitat in an Atlantic salmon stream (©*Ontario Federation of Anglers and Hunters*), **10.** American eel stocking (©*Ontario Ministry of Natural Resources*), **11.** American eel tagging (©*Ontario Ministry of Natural Resources*), **12.** lake trout stocking off barge in eastern Lake Ontario (©*New York State Department of Environmental Conservation*).

Lake Ontario Aquatic Invasive Species

The Great Lakes basin is a North American hot spot for the introduction of aquatic invasive species (AIS). More than 182 non-native aquatic invasive species have been reported in the Great Lakes, with an average of one new invader found about every seven months. Some of the key invasive species impacting the Lake Ontario ecosystem include zebra and quagga mussels, fishhook, spiny waterfleas and round goby.

The most effective approach to dealing with invasive species is to manage the pathways through which invasive species enter and spread through the Great Lakes. For aquatic species, these pathways include shipping, recreational and commercial boating, the use of live bait, the aquarium/water garden trade, live food fish, unauthorized introductions and transfers, and canals and water diversions. Shipping and unauthorized introduction have been the most important pathways for introduction into the Great Lakes.

Aquatic invasive species continue to have a significant impact on the Lake Ontario ecosystem, including causing food web disruptions, disease introduction, habitat alterations and declines in native diversity. For example, zebra and quagga mussels have impacted the lower food web by competing with important native species, such as the native amphipod *Diporeia*, which declined soon after dreissenids were introduced. *Diporeia* is an important food source for native bottom-feeding fish, and their decline has put some species, such as native lake whitefish at risk.

Lake Ontario LaMP partner agencies are working with many groups on international, national and local-level invasive species management activities to share information and new techniques for fighting invasive species. Prevention, detection and monitoring, and control and management are key components of the programs. Preventing introductions and the further spread of invasive species is addressed through legislative and regulatory actions, public outreach and education.

Niagara River Toxics Management Plan

The Niagara River, by providing as much as 200,000 cubic feet of water per second (~6000 m^3/sec) flowing over the falls, refreshes Lake Ontario with more than 80 percent of the lake's annual water supply. But this tremendous volume of water has also historically contributed significant amounts of pollutants into Lake Ontario.

The Niagara River Toxics Management Plan (NRTMP), adopted in 1987 by the four government agencies—Environment Canada, United States Environmental Protection Agency (USEPA), Ontario Ministry of Environment, and the New York State Department of Environmental Conservation (NYSDEC), has coordinated government and industry efforts to significantly reduce the concentrations of toxic pollutants in the Niagara River and Lake Ontario.

Waste water point source discharges and hazardous waste sites, once determined to be responsible for over 99 percent of the estimated toxics input into the Niagara River, have undergone remediation to virtually eliminate the migration of toxic pollutants. Currently, the number of direct point source discharges into the river has decreased to 21 U.S. and 13 Canadian, and generally, all are in compliance with New York or Ontario pollutant discharge regulations. Twenty-six hazardous waste sites will be fully remediated and closed within the next few years. Reduction targets for nearly all the 18 priority toxic chemicals have been surpassed, some achieving 80 percent reductions. This successful improvement in water quality is reflected by significant reductions of toxics found in small fish and mussels in the river and tributaries. Due to this substantial progress, the agencies are now working to chart the future course for the NRTMP.

Lake Ontario Sources and Loadings Strategy

The Lake Ontario Sources and Loadings Strategy aims to reduce the loadings of critical contaminants entering Lake Ontario from a range of sources including rivers, precipitation, point sources (such as sewage treatment plants and industrial facilities) and non-point sources (such as stormwater and agricultural runoff). Through this Strategy, LaMP agencies are targeting DDT and its metabolites, dieldrin, dioxins/furans, mercury, mirex and PCBs. Reductions in the loadings of these contaminants will help meet the LaMPs ecosystem objectives for Lake Ontario including the restoration of beneficial uses.

Due to the scale and complexity of pollutant sources within the basin, the LaMP uses a cooperative approach, working closely with regulatory programs, local governments, industry and individuals to develop and coordinate an effective critical pollutant reduction strategy. That strategy is to identify, assess and mitigate sources of critical pollutants throughout the Lake Ontario basin. The LaMP critical pollutant reduction strategy has three main elements: (1) data/information synthesis; (2) coordination with regulatory actions; and (3) promoting voluntary actions.

To meet the Great Lakes Water Quality Agreement goal to virtually eliminate the discharge of persistent organic pollutants, LaMP partners initiated complimentary efforts on both the Canadian and U.S. portions of the Lake Ontario basin to trackdown sources of these pollutants. These actions have been successful in identifying and abating sources of PCBs to the lake. Examples of these successes are the clean-up of PCB contaminated sediment in the Cataraqui and Twelve Mile Creek watersheds on the Canadian side; and the remediation of ground water in the Genessee River watershed and clean-up of PCB contaminated sediment below the village of Carthage on the Black River on the U.S. side.

The LaMP's strategy is integrated with the Niagara River Toxics Management Plan (NRTMP); the Great Lakes Binational Toxics Strategy; and Lake Ontario Mass Balance Models.

Binational Biodiversity Conservation Strategy for Lake Ontario

The LaMP, in collaboration with 25 agencies, universities, and non-profit organizations in the United States and Canada is developing a binational roadmap to protect and restore Lake Ontario's biological diversity.

The process involves selecting important conservation targets, ranking threats to them, and then identifying conservation and restoration actions that partners can undertake.

Since 2006, there were four workshops held by The Nature Conservancy in conjunction with The Nature Conservancy of Canada, in Buffalo, Niagara-on-the-Lake, and two in Kingston. Participants identified conservation targets such as nearshore waters, coastal wetlands, native fish and tributaries, while also identifying threats such as dams on tributaries, aquatic invasive species, and residential and commercial development.

The LaMP's strategy, including prioritized watersheds for action, will be as geographically specific and action-oriented as possible by answering such questions as:

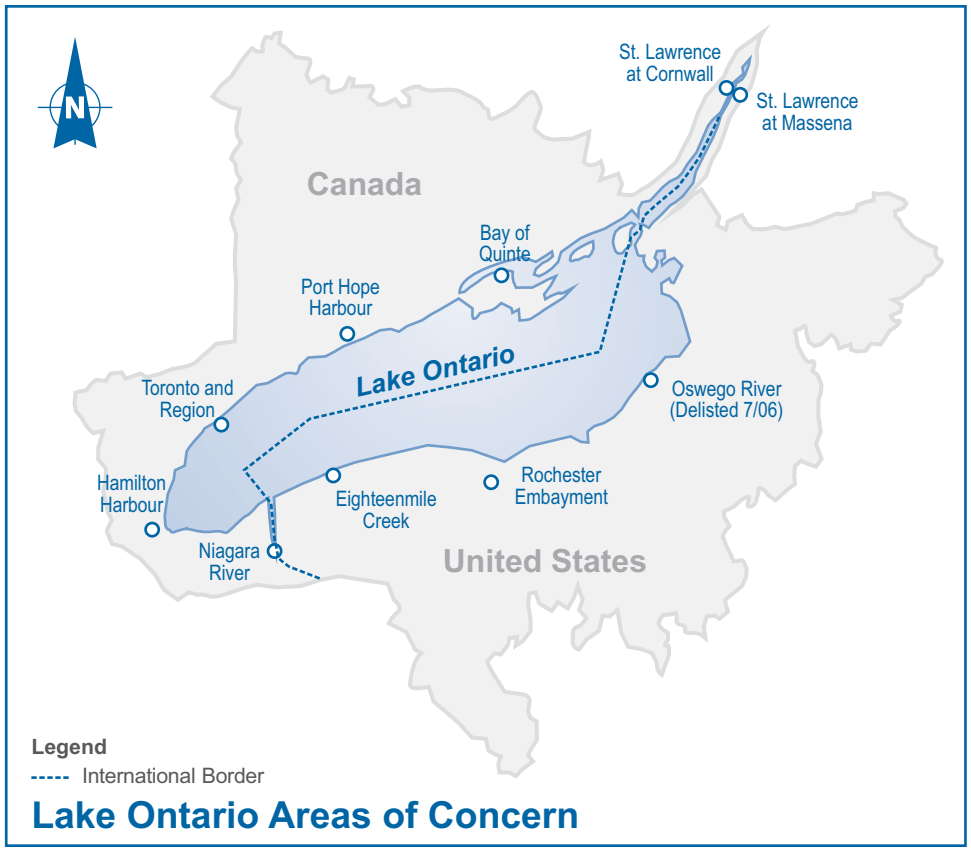
- Which watersheds most need forested buffers around tributaries to reduce sediment run-off?
- Where are the spawning beds of lake trout that need to be preserved? and
- How can we allow fish access to important habitats that are currently blocked by dams?

The strategy is intended to be a scientifically grounded, common vision of priority strategies that partner organizations can pursue. By engaging a binational network of partners in developing this action agenda, this project will enhance collaboration and integration of efforts toward achieving the habitat restoration goals of the LaMP.

Great Lakes Areas of Concern (AOCs) Make Progress

Dealing with historically contaminated "hotspots" around the Great Lakes is a key priority under the Great Lakes Water Quality Agreement. There are nine of these "hotspots" or Areas of Concern (AOCs) around Lake Ontario alone. Two binational AOCs exist within the Lake Ontario basin; the Niagara River and the St. Lawrence River in the Cornwall/Massena area AOCs.

The AOCs were identified based on their potential to be significant sources of critical pollutants to the lake and on the extent of the impact of contaminated sediment and water on fish, wildlife and people. These effects are formally called Beneficial Use Impairments (BUIs).



Canada and the United States have been working with government agencies, non-governmental environmental organizations, industries, communities and others to implement individual Remedial Action Plans (RAPs) for each of these areas to restore and protect beneficial uses.

On the United States side, the Great Lakes Regional Collaboration (GLRC) strategy was issued in 2005. At that time the Great Lakes governors, congressional delegations, mayors and tribal leaders met to forge a partnership to further protect and restore the Great Lakes. The GLRC includes objectives to enhance contaminated sediment remediation and program implementation for AOCs. The Oswego River AOC was the first AOC in the United States to be formally delisted in 2006. This set the stage for achieving progress with other AOCs in the United States. In 2008, the RAPs finalized approved delisting targets for beneficial use impairments. For more detail on the GLRC see *www.epa.gov/glnpo/collaboration/*.

On the Canadian side, the federal and provincial governments work together to deal with AOCs under the Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA). The 2007 COA identifies the actions to be completed in all Canadian AOCs, including those in Lake Ontario, over the duration of the agreement (2007-2010). For more detail on actions in the Canadian AOCs refer to the 2007 COA at:

www.on.ec.gc.ca/greatlakes/default.asp?lang=En&n=D11109CB-1 or
www.ene.gov.on.ca/envision/water/greatlakes/coa/1359COA_annex.pdf

Upcoming LaMP Activities

The Lake Ontario LaMP continues efforts to restore and protect Lake Ontario and its biological resources. The LaMP's current five-year workplan, which became effective in January 2007, outlines how this goal will be achieved.

Reduction of critical pollutants is of primary importance to the LaMP, and contaminant trackdown efforts in the United States and Canada will continue to identify and control sources of persistent organic pollutants.

Coordination of binational monitoring efforts, particularly those related to the LaMP's ecosystem indicators will continue. The LaMP will add to its suite of 11 ecosystem indicators with the development of a coastal wetlands indicator. The LaMP has completed its 2008 Binational Collaborative Research and Monitoring Initiative. This was the second comprehensive cooperative effort to assess the changing lower food web with emphasis on the nearshore and emerging chemicals of concern. The LaMP agencies will analyze the data, disseminate the new information and evaluate the management implications that will evolve from these findings.

The Lake Ontario LaMP plans to continue and expand collaborative efforts in the areas of bald eagle and lake trout conservation and restoration. The Binational Biodiversity Conservation Strategy that began in 2006 will set the stage for coordinating future actions. The LaMP partners will finalize the strategy so that restoration or protection projects can be selected and initiated. The LaMP also plans to expand links with local watershed activities, and continue to coordinate with the LOC. The LaMP will continue to work with the Binational Executive Committee in setting priorities, strategic direction and coordination for basin programs.

Providing the public with a sound understanding of the complex problems facing the lake is the first step in gaining public support and participation in achieving the LaMP's goals. Ongoing and planned activities include initiating opportunities to meet with environmental groups, academics and others, while forming partnerships locally and providing information through the LaMP website and mailings. We will continue to participate in meetings such as the State of the Lakes Ecosystem Conference (SOLEC) and the International Joint Commission (IJC) biennial sessions and events such as the annual Fishery Events and the special 100th Anniversary of the Boundary Treaty Waters events in 2009.

Binational Executive Committee

The Binational Executive Committee (BEC) is composed of senior-level representatives of Canadian and U.S. federal, state, provincial, and tribal agencies who are accountable for delivering major programs and activities that respond to the terms of the Great Lakes Water Quality Agreement. Several NGOs have been given observer status as well. BEC aims to meet twice a year or as required to:

- Set priorities and strategic direction for binational programming in the basin;
- Coordinate binational programs and activities;
- Respond to new and emerging issues on the Great Lakes including tasking existing or creating new working groups to undertake designated activities;
- Evaluate progress under the Great Lakes Water Quality Agreement; and,
- Provide advice, comment or other input for the preparation of various binational reports and presentations

For More Information

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The Lake Ontario Management Plan is a binational partnership among Environment Canada, Fisheries and Oceans Canada, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Ontario Ministry of Environment, Ontario Ministry of Natural Resources, and New York State Department of Environmental Conservation.

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