LAKE ONTARIO LAKEWIDE ACTION AND MANAGEMENT PLAN

Annual Report 2013

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What is the Lake Ontario LAMP?

The Lake Ontario Lakewide Action and Management Plan (LAMP) is a binational plan under the Great Lakes Water Quality Agreement (GLWQA) directed at restoring and protecting Lake Ontario by reducing the amount of pollutants entering the lake and addressing the chemical, biological and physical stressors impacting the lake. The LAMP guides activities of the participating U.S. and Canadian federal, state and provincial government agencies and other partners.

The LAMP includes ecosystem goals, objectives and indicators. Ecosystem objectives have been identified for aquatic communities, wildlife, human health, habitat, and stewardship. The twelve indicators track progress toward achieving the lake ecosystem objectives.

In 2012, a new GLWQA expanded the scope of the Lake Ontario LAMP to include both the Niagara and St. Lawrence rivers.

Overview

In 2012, the Lake Ontario LAMP partners continued working to restore and protect the lake's ecosystem through actions and programs that include: implementing the Lake Ontario Binational Biodiversity Conservation Strategy; planning for the 2013 binational Cooperative Science and Monitoring Initiative study; restoring fish species; and implementing programs to reduce nutrient runoff, which impacts nearshore water quality.

This 2013 annual report focuses on the following key activities:

- implementing the Biodiversity Conservation Strategy
- the 2013 binational Cooperative Science and Monitoring Initiative study
- understanding nutrient cycling in the lake and reducing nutrient runoff

In 2013, the LAMP agencies will also continue tracking stressors affecting the Lake Ontario ecosystem, such as newly recognized chemicals, invasive species, potential effects of climate change, and water level regulation.

Great Lakes Water Quality Agreement

On February 12, 2013, the governments of Canada and the United States ratified the Great Lakes Water Quality Agreement of 2012. The Agreement facilitates binational action on threats to water quality and ecosystem health. More information on the Agreement can be found on the following websites: http://www.epa.gov/glnpo/glwqa or www.ec.gc.ca/grandslacs-greatlakes/.

Accomplishments

Restoring Native Cisco Populations

Ciscos were stocked into Irondequoit Bay in December 2012. Image credit: USGS.

After years of international collaboration, a new program to restore native prey fish to Lake Ontario began in 2012. Until the mid-1950s, native fish including Lake Whitefish, Ciscos (formerly called Lake Herring) and Deepwater Ciscos (including Bloater) were an abundant and important food source for large sportfish (e.g. Lake Trout) in Lake Ontario. Since the decline of these native prey fish, sportfish have fed primarily on Alewife, an invasive species that is less nutritious and has led to reproductive failure from vitamin B deficiencies.

Re-establishing self-sustaining populations of Bloaters and Ciscos in Lake Ontario has been the focus of a binational effort involving the New York State Department of Environmental Conservation, Ontario Ministry of Natural Resources, U.S. Geological Survey, U.S. Fish and Wildlife Service, and Great Lakes Fishery Commission. In November 2012, Bloaters were re-introduced to Lake Ontario with the stocking of 1,200 yearlings near Oswego, NY. Ciscos were stocked into Irondequoit Bay (near Rochester, NY) in December 2012. Re-established populations of Bloaters and Ciscos will restore biodiversity in Lake Ontario, provide a quality food source for sportfish and contribute to a more stable and resilient fish community.

2008 Cooperative Science and Monitoring Results

Each year, one of the Great Lakes is the focus of an intensive U.S. and Canadian assessment called the Cooperative Science and Monitoring Initiative (CSMI). CSMI last came to Lake Ontario in 2008 and returns in 2013.

The 2008 study showed that phosphorus levels remained below the GLWQA's target of 10 parts per billion. Diatoms and phytoplankton, vital components of the aquatic food web, appear to be stable or increasing.

Invasive Quagga Mussels continued to be the dominant lake bottom organism in Lake Ontario in 2008, although their densities declined in the 30-90 meter depth range. Lake Ontario's former native dominant lake bottom species, the tiny shrimp-like crustacean *Diporeia*, was nearly eliminated from the lake following the arrival of Zebra and Quagga Mussels and continues to be very rare.

Natural reproduction of Lake Trout was confirmed again in 2008 and continued through 2012 for the 18th consecutive year. Naturally reproducing Lake Trout are in good physical condition, but populations remain low. The number of Sea Lamprey wounds on large Lake Trout is under the LAMP's target of two wounds per 100 large Lake Trout. Restoring native prey fish (e.g. Ciscos), a priority of the Lake Ontario Biodiversity Conservation Strategy, may be the key to restoring self-sustaining populations of Lake Trout and Atlantic Salmon.

EPA's research vessel, the Lake Guardian, is participating in the 2013 CSMI study of Lake Ontario. Image credit: USEPA.

Implementing the Lake Ontario Binational Biodiversity Conservation Strategy 2012-2013

The Lake Ontario Binational Biodiversity Conservation Strategy is being implemented by LAMP partners in Canada and the United States.

- **Restoring Connections and Natural Hydrology:** With Great Lakes Restoration Initiative funding through the National Oceanic and Atmospheric Administration, Ducks Unlimited partnered with U.S. federal and state agencies to restore coastal wetlands at French Creek and Vivian Marsh in New York. These wetlands had been overtaken by dense stands of cattails, decreasing their ability to serve as habitat for plants and animals. This project opened over a mile of channels for fish passage, created seven acres of pools for waterbird and amphibian habitat, and installed water level control structures (including fish passage devices) that will help diversify vegetation in over 100 acres of wetlands. Now that the restoration work is complete, the monitoring and outreach phase of the project will begin. Wetland restoration work is also planned for the Braddocks Bay area in New York.
- **Restoring Native Fish Communities and Native Fish Species:** Lake Trout and Atlantic Salmon continue to be stocked into the lake and its tributaries in Ontario and New York. Populations of these native fish species are monitored annually by federal, state, and provincial agencies. The Toronto and Region Conservation Authority and Ontario Ministry of Natural Resources, with funding from the Great Lakes Fishery Commission, are installing a resistance weir to count salmon on Duffin's Creek in Ajax, Ontario. Work to restore Lake Sturgeon achieved success in 2012: Improvements in egg collection techniques and hatchery technology led to the successful raising of sturgeon fingerlings for the first time in nine years, and the young sturgeon were released in November 2012 in a New York tributary of the St. Lawrence River. Female Sturgeon carrying eggs were found in the Oneida Lake system in New York for the first time in nearly twenty years.
- **Restoring the Quality of Nearshore Waters:** In the Duffin's Creek watershed in Ontario, the Ontario Ministry of the Environment and the Toronto and Region Conservation Authority started a social marketing program to educate landowners about land-management practices that protect and improve water quality. In New York, the Department of Environmental Conservation's *Be Green in the Great Lakes* program kicked off in 2012 with outreach to landowners about environmentally friendly yard-care practices and the new statewide restriction on phosphorus lawn fertilizer use.

Challenges

Reducing the Impact of Aquatic Invasive Species

Because the Great Lakes ecosystem has about 180 different invasive species, reducing their impact remains a challenge for the LAMP partners.

During the summer of 2012, NY Sea Grant, Paul Smith's College and The Finger Lakes Institute placed Boat Launch Stewards at waterbodies in New York's Lake Ontario watershed to remove plant and animal material from boats and trailers, document invasive species, and educate people about preventing the spread of invasive species. Ongoing work by The Nature Conservancy is aimed at developing and implementing an early detection and rapid response protocol to prevent new infestations of aquatic invasive species in coastal wetlands and at developing models and using targeted surveys to predict and prevent the spread of the invasive weed *Hydrilla*.

Managing Nutrients to Improve Nearshore Water Quality

The LAMP partners are working to understand nutrient cycling (particularly phosphorus) in Lake Ontario in order to better manage nutrient inputs. Nutrients are vital to the food webs of the lake, but nutrient levels that are too high can lead to excessive algae, including nuisance algae and potentially toxic blue-green algae.

Since the mid-1980s, phosphorus levels in the offshore waters of the lake have remained at, or below, the target level of 10 parts per billion set in the GLWQA. Phosphorus levels less than 10 parts per billion contribute to lower productivity in the offshore water waters.

In the nearshore area of the lake, which is naturally more productive and is the part of the lake that people have the most contact with, phosphorus levels are much higher. The 2003 and 2008 CSMI studies began to uncover the complexity of nearshore nutrient cycling and the interactions between tributary inflows, lake currents, seasonal changes, waves, and invasive Quagga and Zebra Mussels. This work will continue with the 2013 CSMI study.

As the LAMP partners work to understand nutrients in nearshore areas, efforts are underway on both sides of the lake to reduce the amount of nutrients entering the lake through its tributaries. Projects include implementation of agricultural best management practices in the Genesee River watershed in New York and the Duffin's Creek watershed in Ontario; implementation of the New York State Dishwasher Detergent and Nutrient Runoff Law; and stormwater runoff monitoring in the Ajax-Pickering area in Ontario.

Next Steps

Moving the Binational Biodiversity Conservation Strategy Forward

Support for long-term monitoring programs is a key piece of the Binational Biodiversity Conservation Strategy. Information gathered by monitoring serves as an early warning for changes in the ecosystem, guides management actions and establishes baselines for parts of the ecosystem, such as coastal wetlands, that have not been consistently monitored. The Nature Conservancy and Nature Conservancy Canada are developing a monitoring program and establishing baselines for coastal wetlands on both sides of the lake by tracking changes in plant communities and muskrat populations.

Government and non-government organizations will continue working to achieve the goals and objectives of the Binational Biodiversity Conservation Strategy and the LAMP partners will continue to promote these actions, report on progress, identify resource needs, and recommend additional actions to conserve Lake Ontario's biodiversity.

Connecting 2008 CSMI Results to 2013 CSMI Priorities

The 2013 CSMI study expands on partnerships developed in 2003 and 2008 to improve understanding of nutrient loading, transport and cycling in Lake Ontario. Coastal wetland monitoring will support an adaptive management approach to water level regulation, recognized by the LAMP partners as the most significant stressor on coastal wetlands. The Great Lakes Water Quality Agreement of 2012 calls for the development of a plan to manage nutrients in nearshore areas and the reconsideration of nutrient water quality criteria. The 2013 CSMI study will help the LAMP partners meet these requirements.

The Canadian Coast Guard Ship Limnos is participating in the 2013 CSMI study of Lake Ontario. Image credit: Fisheries & Oceans Canada.

Niagara River Update

The Niagara River is the connection between Lake Erie and Lake Ontario. Historically, the Niagara River and its watershed have been polluted by human activities. Remediation efforts are completed or underway at known hazardous waste sites in both the U.S. and Canadian Areas of Concern. In addition, the agencies participating in the binational Niagara River Toxics Management Plan continue to monitor contaminant levels in the river.

On the U.S. side, the New York State Department of Environmental Conservation is reassessing cumulative inputs of toxic substances from historical sources along the Niagara River. This assessment of groundwater and surface water discharging to the river will also indicate if more work to identify pollution sources is necessary.

On the Canadian side, no further action is required under the Canadian Niagara River Remedial Action Plan (RAP) to identify or remediate contaminants in the Canadian AOC. The known point sources to the Niagara River were addressed through other programs in the early 1990s. Areas of contaminated sediment in the Canadian AOC were assessed and management actions taken. The Canadian RAP is entering its final phase and is working to delist the AOC. Future contaminant issues will be addressed through routine federal, provincial and municipal abatement and enforcement programs.

Lake Ontario Basin

Lake Ontario is the lowermost of the five Great Lakes that straddle the Canada/U.S. border and is bordered by the Province of Ontario to the north and New York State to the south. With a surface area of 7,340 square miles (18,960 square kilometers), Lake Ontario is the smallest of the Great Lakes, but has the highest ratio of watershed area to lake surface area.

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