



LAKE SUPERIOR LAKEWIDE MANAGEMENT PLAN

Annual Report 2011

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What is the LaMP?

The 1987 amendment to the Great Lakes Water Quality Agreement required the development of Lakewide Management Plans (LaMPs) to “restore and maintain the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem .

The Lake Superior LaMP is an adaptive management plan for restoring and protecting the Lake Superior ecosystem. It is coordinated by Canadian and U.S. federal, state, provincial and tribal/First Nations governments. Public participation is achieved through the involvement of a Binational Forum.

The Lake Superior Binational Program, under which the LaMP is implemented, is a collaborative effort between Canada and the United States that identifies, addresses, and monitors progress on environmental issues affecting Lake Superior. It includes the LaMP as well as the Zero Discharge Demonstration Program that aims to virtually eliminate nine critical chemical pollutants in the basin.

Overview

Lake Superior is the deepest, the most northerly and the coldest of the five North American Great Lakes. The cold water of Lake Superior makes it unique – but also has profound effects on the ecology of the lake: fish grow more slowly; some contaminants remain available in the aquatic environment for longer periods of time; and, because of this, Lake Superior fish sometimes have higher levels of contaminants than similar fish from lakes with higher levels of contaminants. Lake Superior, however, remains overall the most pristine and unspoiled of all the Great Lakes.

Lake Superior’s cold climate is essential to maintaining its unique habitats and populations of plants and animals. Recent research, however, has shown that water temperatures in Lake Superior are rising. This rise in water temperature could greatly affect the ecosystem: native fish species could have difficulty reproducing in warmer waters, warmer water could reduce the habitats of native coldwater species, and non-native species could establish a foothold in warmer, more hospitable Lake Superior waters.

The Lake Superior LaMP and Binational Program participants continue to work together to protect Lake Superior’s unique coldwater ecosystem, and to address the stressors on the lake. This Annual Report summarizes some of the recent accomplishments, challenges and next steps. For more information, please visit www.binational.net or use the contacts listed on the back page. ♦



Lake Superior’s cold climate is home to many unique species, such as the Canada lynx. Photo: Natural Resources Research Institute, University of Minnesota Duluth.



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Accomplishments

Aquatic Invasive Species Plan Implementation Underway

Members of the Lake Superior LaMP are finalizing the Lake Superior Aquatic Invasive Species Complete Prevention Plan (the AIS Plan). Completion of the AIS Plan will represent a significant accomplishment for the Lake Superior LaMP, and it will be an example of binational cooperation on a critical ecosystem issue. The AIS Plan will be the first binational and lakewide effort in the Great Lakes to identify and address vectors and pathways that invasive species use to enter and become established on a lakewide scale. The AIS Plan will build upon a number of existing federal, state and provincial aquatic invasive species prevention and control plans, as well as regulatory programs that apply to the Great Lakes region. The AIS Plan is expected to be finalized this year.

Efforts are now focused on implementation of recommended actions in both Canada and the United States, including education and outreach and early detection surveys.

Education and Outreach

Over the past year, a series of education programs were delivered by the Ontario Ministry of Natural Resources (OMNR) and partners. These programs were delivered at over twenty recreation, boating and angling events. Participants represented lake associations, fishers, provincial parks, public schools and Lakehead University's Wildlife Management Program.

In addition, OMNR and the Ontario Federation of Anglers and Hunters provided summer youth employment opportunities for Invasive Species interns. The interns provided aquatic invasive species education and outreach materials to the public tailored to local watershed concerns, including signage at boat launches.

Early Detection Surveys - No New Species Detected!

In 2010, the three busiest shipping ports on Lake Superior were surveyed to search for newly-introduced aquatic invasive species. U.S. and Canadian federal, state, tribal and provincial agencies participated in the surveys. Bottom trawls, electrofishing, and nets were used to sample over 70 locations in the ports of: Duluth-Superior Harbor (Minnesota/Wisconsin); Sault Ste. Marie (Michigan/Ontario); and Thunder Bay Harbour (Ontario). A total of 44 fish species were captured. Six known aquatic invasive fish species were encountered, and while lab work continues for some samples, no new species have been detected thus far.

This survey establishes a baseline for the development of a binational, lake-by-lake aquatic invasive species monitoring effort for the Great Lakes region. This effort will begin in 2011 in Lake Superior, supported by the Lake Superior LaMP and the binational Coordinated Science and Monitoring Initiative.

The results will also help the Great Lakes Fishery Commission evaluate progress towards meeting several *Lake Superior Fish Community Objectives* for nuisance species.

To learn more about the AIS Plan, go to www.ec.gc.ca/publications and search for "Lake Superior invasive species".

LaMP Local Linkage: New Estuarine Research Reserve Created in Wisconsin



Owned by The Nature Conservancy, Clough Island is the largest island in the St. Louis River estuary. Credit: Lower St Louis River Habitat Plan Workgroup.

In October 2010, the U.S. National Oceanographic and Atmospheric Administration (NOAA) designated the St. Louis River Estuary as the 28th National Estuarine Research Reserve (NERR). The St. Louis River NERR is the second freshwater estuary in the NERR system (the first freshwater NERR was Old Woman Creek, Ohio on Lake Erie). The mission of the NERR program is to promote long-term research, education and stewardship through a system of reserves that represent the various biogeographic regions of the United States. The St. Louis River NERR will also help to advance research, education and stewardship goals of the Lake Superior LaMP.

This designation was the successful result of a lengthy nomination process, led by LaMP participants: the University of Wisconsin Extension and NOAA. As part of the designation, a five-year management plan has been approved that describes how the NERR will be managed by the University of Wisconsin Extension in cooperation with other state partners. For more information, please go to www.nerrs.noaa.gov.

Monitoring Water Quantity and Quality in Streams

Streams, precipitation and groundwater all help to replenish water in Lake Superior. Streams receive run-off and groundwater from the landscape, and carry substances such as nitrates and sediments to the lake. Streams also provide breeding habitat for fish and other aquatic life. The maintenance of water quality and quantity that enters the lake from streams is of critical importance to the lake ecosystem health.



Challenges

Reducing Persistent Toxic Substances

Long-term monitoring shows that certain persistent toxic substances in Lake Superior and the other Great Lakes have decreased significantly since the 1970s. However, even though Lake Superior is sometimes labeled “pristine”, there are many contaminants within its waters. Some chemicals, especially mercury and PCBs, accumulate in fish to levels high enough to trigger fish consumption advisories. Recently-published studies even show that sometimes fish and birds living in and around Lake Superior are more contaminated than the same species in the lower Great Lakes. Contaminants continue to enter the Lake Superior food chain from the air, runoff, and direct releases from sources in the watershed. Progress has been made toward the goal of zero discharge and zero emissions, but challenges remain.

Responding to Changing Temperatures

Water temperatures in Lake Superior are rising faster than scientists had once predicted. Lake Superior fish, wildlife and water quality are to a great extent temperature dependent. For example, the water temperature influences types and growth of fish in the waters. The LaMP partners are working across scientific disciplines to better understand what is most vulnerable to climate change and to incorporate climate change knowledge in environmental restoration and protection actions in the Lake Superior basin.

Next Steps

Future activities for the Lake Superior LaMP include the following:

- Preparation of the **2011 Critical Chemical Milestones Report and Factsheet**. These documents will report on 15 years of effort to virtually eliminate sources of nine persistent bioaccumulative pollutants to the Lake Superior basin.
- Canadian and U.S. partners will conduct intensive scientific research focused on Lake Superior in 2011, as part of the binational Great Lakes **Coordinated Science and Monitoring Initiative**. Planned activities include: studying bacteria, plankton and invertebrates; monitoring chemical contaminants in the water; and monitoring for arrivals of new aquatic invasive species. Results will be available in 2013 and will be reported in the 2014 LaMP Report.
- Implementation of the **Aquatic Invasive Species Complete Prevention Plan**.
- Preparation of **watershed factsheets** to educate communities about their ecosystem assets and services, and the value they provide at the local and lakewide environments.
- LaMP partners will continue to monitor **mining** activities within the basin, and to seek new opportunities to work with the mining sector on actions that promote the sustainable restoration and protection of the Lake Superior ecosystem.

Many Lake Superior streams are already monitored for water quantity (flow). In some cases, water quality parameters such as dissolved oxygen, pH, water temperature, sediments and barriers to fish passage are also tracked. A binational dataset has been created that includes stream gauge information such as location, type of data collected, dams and other barriers to fish passage, current mines and land use in the watershed. The information has been mapped and will be used to select streams that are representative of the Lake Superior basin.

In 2011, LaMP participants will be evaluating trends in water quantity and quality in the selected streams to identify impacts of climate changes and land use. This information may lead to improved policies and management decisions related to groundwater extraction, surface water diversion or use, and land use within the Lake Superior watershed.

Making Progress in Areas of Concern

Under the Great Lakes Water Quality Agreement, the governments of Canada and the United States committed to develop Remedial Action Plans (RAPs) to restore 43 Areas of Concern (AOCs) in the Great Lakes region. Progress is being made in all AOCs. Recently, two AOCs on Lake Superior have reached significant milestones: Jackfish Bay in Canada and the St. Louis River in the United States.

Jackfish Bay AOC (Canada): Jackfish Bay was designated as an AOC in 1987 due to the impacts from a local pulp and paper mill. In the 1990s, Canada and Ontario set new limits for pulp and paper wastewater, and as a result, the once severely impaired waters are no longer toxic to fish, and the health of the local fish population has improved. With the major concerns addressed, the parties involved in implementing the Remedial Action Plan have recognized Jackfish Bay as an Area in Recovery.

St. Louis River AOC (U.S.): Recent activities in the St. Louis River include sediment characterization (completed for about 3000 acres /1214 hectares in Superior and St. Louis Bays); making progress on the top two Remediation to Restoration (R2R) sites (by gathering baseline chemical, physical and biological data); and implementing restoration activities at Hog Island and Radio Tower Bay (a five-year, \$80M remediation and mitigation project was completed in association with the Superfund site at Stryker Bay and Tallas Island). Work with harbor partners is underway to initiate prioritizing activities aimed at removing beneficial use impairments.

For more information, please visit www.epa.gov/glnpo/aoc and www.ec.gc.ca/raps-pas.



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Special Events

20th Anniversary of the Binational Program

2011 is the 20th anniversary of the Lake Superior Binational Program. Keep an eye on www.superiorforum.info for more information and events.

International Association of Great Lakes Research Conference

Duluth, MN - May 30-June 3, 2011

In recognition of the 20th anniversary of the Lake Superior Binational Program, a special session looking at lake research will be held. For more information, go to: www.iaglr.org/conference.



Get Ready for Lake Superior Day!

On Sunday July 17, 2011, the Lake Superior Binational Forum will celebrate the eighth annual Lake Superior Day, a special day established for people to connect to and enjoy the world's largest freshwater lake.

For information about the Lake Superior Binational Forum, upcoming events, an annual environmental stewardship awards program, and news and information about the Lake Superior ecosystem visit www.superiorforum.info, or look for them on Facebook and Twitter!

Watershed Map

Lake Superior and its drainage basin span over 209,000 square kilometres (81,000 square miles), and includes portions of the province of Ontario and the states of Minnesota, Wisconsin and Michigan.

Lake Superior Watershed



Lake Superior Facts

- Lake Superior's maximum depth (406 metres/1 332 feet) is almost equal to the height of the Sears Tower in Chicago, Illinois.
- With a volume of 12 100 cubic metres/2 900 cubic miles, Lake Superior can hold as much water as the other four Great Lakes combined, plus three more Lake Eries.
- Lake Superior is the largest freshwater lake in the world, by surface area.
- The length of the Lake Superior shoreline including islands (4385 km/2726 miles) is approximately equal to the driving distance from Quebec City, Quebec to Vancouver, British Columbia; or from Los Angeles California, to Miami, Florida.

Sources: *The Great Lakes: An Environmental Atlas and Resource Book, Factsheet #1*; *Google Maps*; and *Minnesota Sea Grant*.

For More Information:

Visit one of the Lake Superior Lakewide Management Plan web sites www.binational.net or www.epa.gov/glnpo or contact:

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