LAKE SUPERIOR

LAKEWIDE ACTION AND MANAGEMENT PLAN

2019 Annual Report

Lake Superior. Source: ECCC.

In this issue

What is the Lake Superior 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 Superior Lakewide Action and Management Plan (LAMP) is an ecosystem-based strategy for protecting and restoring Lake Superior water quality. The LAMP is developed and implemented by 28 government agencies around the lake, together known as the Lake Superior Partnership.

The Partnership is led by the U.S. Environmental Protection Agency (U.S. EPA) and Environment and Climate Change Canada (ECCC) to facilitate information sharing, set priorities, and assist in coordinating environmental protection and restoration activities.

OVERVIEW

Lake Superior is experiencing record high water levels in 2019, following near-record low water levels twelve years ago. This physical change is dramatic, but ecologically Lake Superior continues to be in good condition. Lake Superior's lower-food web (invertebrate and prey fish communities) remains healthy with native top predator fish (e.g., Lake Trout) continuing to dominate the open waters. The lake is also a safe, high-quality source of drinking water.

While the lake is doing well, it faces many stressors, including aquatic invasive species, climate change, reduced habitat connectivity between the open lake and tributaries, chemical contaminants, substances of emerging concern, and habitat destruction.

This table summarizes overall Lake Superior conditions in relation to the Great Lakes Water Quality Agreement General Objectives, based on information from the State of the Great Lakes 2019 Highlights Report and other sources.

GLWQA GENERAL OBJECTIVES	STATUS FOR LAKE SUPERIOR
Drinking water	Good
Swimming	Good
Fish and wildlife consumption	Fair
Chemical pollutants	Fair
Habitats and native species	Good
Nutrients and algae	Good
Invasive species	Fair
Groundwater impacts	Undetermined
Other	Good

ACCOMPLISHMENTS

Eliminating Use and Storage of Toxic PCBs

Polychlorinated biphenyls (PCBs) are a mixture of human-made chemicals once commonly used as coolants and lubricants in electrical equipment. PCBs can accumulate in fish, wildlife and the human body. The manufacturing and import of PCBs were banned in the 1970s, but PCBs are still found in Lake Superior fish at levels high enough to pose a health threat. Advisories have been developed to inform people how much fish is safe to eat. Substantial progress has been made on eliminating sources of PCBs in the basin.

In the U.S., less than 4% of electrical transformers in the Lake Superior basin still contain PCBs. Utility companies are working toward virtual elimination of these transformers. Eight of the 31 utilities have already fully phased-out their PCB transformer stock, and nine are nearing a complete phase-out.

In Canada, Environment and Climate Change Canada is tracking the effectiveness of its 2008 PCB regulation to accelerate phase out of PCBs. A recent detailed inventory of PCBs, in a Great Lakes basin location, indicates that regulations have helped reduce the amount of pure PCBs 99.9% in 10 years.

Protecting Lake Superior Habitat and Species

Lake Superior habitats are relatively healthy compared to the other Great Lakes. To help ensure continuing good conditions, many high-quality habitats are being purchased for conservation, public access, and sustainable use purposes.

In Canada, Lake Superior has new protected areas on its northern shores with the acquisition of land along Black Bay and Big Trout Bay by the Nature Conservancy of Canada. These protected areas include coastal wetlands, upland forests, rivers, creeks, cliffs and 26 kilometers (16 miles) of Lake Superior shoreline. Other land acquisitions include those of the Thunder Bay Field Naturalists, who recently secured two pieces of land on Michipicoten Island with funding from the government of Canada and other partners.

Black Bay Peninsula, Lake Superior, Ontario. Source: Nature Conservancy of Canada.

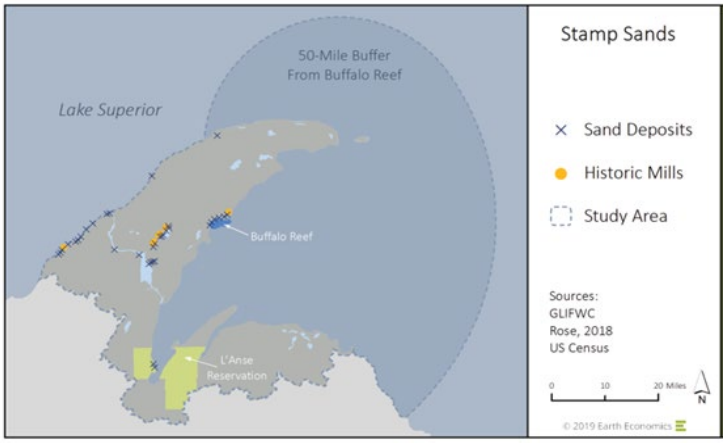
In the U.S., the Minnesota Department of Natural Resources is maintaining a permanent conservation easement of over 17 miles (27 kms) of trout stream and riparian areas. This easement ensures both habitat protection and public fishing access to Minnesota's trout streams. Other entities which helped facilitate significant conservation easement programs include the Minnesota Land Trust. In Wisconsin, the Bad River Band of Lake Superior Chippewa has recently acquired additional parcels of Lakes Superior's Kakagon Sloughs, a Wetland of International Importance under the Ramsar Convention. In Michigan, another 240 acres (97 hectares) of permanently protected land was recently added to the 2,300 acre (930 hectares) Yellow Dog Watershed Preserve.

Fishing Access Sign. Source: Minnesota Department of Natural Resources.

Innovating and Cooperating to Conserve Lake Superior

Valuing the Ecosystem: "Keweenaw Peninsula"

There is growing recognition that high-quality habitats provide people with valuable goods and services. Understanding the economic value of the natural ecosystems can help managers make better informed decisions about remediation and conservation. In 2018, with support from the U.S. EPA, the Great Lakes Indian Fish and Wildlife Commission contracted with Earth Economics to undertake an ecosystem valuation of the Keweenaw Peninsula region of Michigan's Upper Peninsula. The report provides the current, non-market economic values of some of the ecosystem services of this region, with an emphasis on the areas impacted by the encroachment of stamp sands originating from the Gay, Michigan stamp sand pile to a fish spawning location called Buffalo Reef. The report finds that the value of Buffalo Reef habitat over the next 100 years is between $170 million (USD) and $488 million (USD), that the loss of property values over 100 years due to encroaching stamp sands is between $64 million (USD) and $189 million (USD), and that the total ecosystem services value provided by ecosystems within the study region is between $613 million (USD) and $1.5 billion (USD) each year.



Keweenaw Peninsula Ecosystem Valuation study area. Source: Earth Economics.

Developing Geomatic Products to Prioritize Investments in Habitat Protection and Rehabilitation

Effective conservation efforts will respond to current, cumulative, and future stressors, including the impacts of climate change. A number of initiatives are underway to help guide future conservation investments. For example, a recent effort led by Minnesota Department of Natural Resources is helping land and water use managers identify climate adaptation needs by developing models and outreach material on the future response of Minnesota streams to climate and land use change. Results have found that some streams are more resilient to future changes, while others may need adaptive management or a reassessment of management priorities. The Nature Conservancy has been using these results to help develop forest management recommendations for Minnesota's Lake Superior watersheds. The findings are also being used by the U.S. Fish and Wildlife Service as criteria for the National Fish Passage Program's aquatic habitat restoration grants in Minnesota.

ADDRESSING CHALLENGES

Understanding Coastal Wetland Resilience to Climate Change

Environment and Climate Change Canada is mid-way through a five-year study that examines the vulnerability of Great Lakes coastal wetlands to projected climate changes, including water levels. ECCC is studying twenty-six coastal wetlands across the Canadian portion of the Great Lakes, including Lake Superior's Mission March and Hurkett Cove. The data will be used in modelling efforts to identify how future climate scenarios will impact each coastal wetland. In addition to model development, engagement with stakeholders and rights holders is helping to identify best practices and adaptive measures required to enhance wetland resilience.

Preventing Aquatic Invasive Species

Fewer new non-native species are finding their way to Lake Superior, in large part due to the implementation of regulations on ballast water from trans-oceanic ships. Unfortunately, some new non-native species have been detected in recent years, and many already established invasive species continue to spread. For example, monitoring in recent years has found; seven non-native zooplankton, including bloody red shrimp, in the Duluth-Superior harbor. Early detection and preventative measures remain a priority for Lake Superior.

Many government agencies are actively working with tens of thousands of lake users - boaters, anglers, aquarists, water gardeners, teachers and students - to let them know how they can prevent the spread of invasive species which harm the waters they love. Follow-up assessments show that over 90% of the people engaged will take individual actions to help prevent the spread of invasive species. For some invasive species that are established and causing harm, such as sea lamprey and European common reed (*Phragmites australis subsp. australis*), government agencies around the lake are continuing and coordinating control efforts. For example, the Wisconsin Department of Natural Resources, Parks Canada and other agencies are actively monitoring thousands of acres of coastal wetlands to detect pioneer populations of invasive aquatic plants. These coastal wetlands are mostly free of invasives; catching and treating new invasive species early can help protect these high-quality habitats.

Preventing Nuisance Algal Blooms

Despite the lake's predominantly clear, cold waters, algal blooms have unexpectedly emerged along parts of western Lake Superior's south shore in recent years. Such blooms have occurred episodically since 2012, with the most notable and widespread bloom occurring in August of 2018. This bloom stretched from the twin port cities of Duluth and Superior to the Apostle Islands and lasted for a week or more. To date, all blooms have been dominated by a filamentous species of cyanobacteria known as *Dolichospermum lemmermannii*. In addition to affecting beach aesthetics and recreational use, blooms of this species are concerning because it is a potential toxin producer. To date, samples of blooms and nearshore waters have not contained harmful levels of known toxins. Partners from the National Park Service, U.S. Geological Survey, Wisconsin Department of Natural Resources, University of Minnesota-Duluth, University of Wisconsin-Milwaukee, Northland College and the National Estuarine Research Reserve are collaborating to enhance monitoring of nearshore conditions and understand bloom drivers in this unique environment, with special attention to the role of more frequent extreme precipitation, flooding events and warming waters.

Cornucopia ("Corny") Beach, August 9, 2018. Source: Brenda Lafrancois.

OUTREACH AND ENGAGEMENT

You can keep up to date on GLWQA engagement opportunities in the Engagement section of Binational.net. Information on many of our partner organizations' upcoming outreach and engagement opportunities can also be found at the Great Lakes Commission's "Great Lakes Calendar".

CONTACT INFORMATION

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