



LAKE SUPERIOR LAKEWIDE ACTION AND MANAGEMENT PLAN

2017 Annual Report

Credit: S. Swart, Michigan DEQ

In this Issue

Overview.....	1
Accomplishments.....	2
Addressing Challenges.....	3
Contact Information.....	4

What is the Lake Superior LAMP?

Under the Great Lakes Water Quality Agreement, 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 a binational action plan for restoring and protecting the Lake Superior ecosystem. The LAMP is developed and implemented by the Lake Superior Partnership. This 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 binational environmental protection and restoration activities.

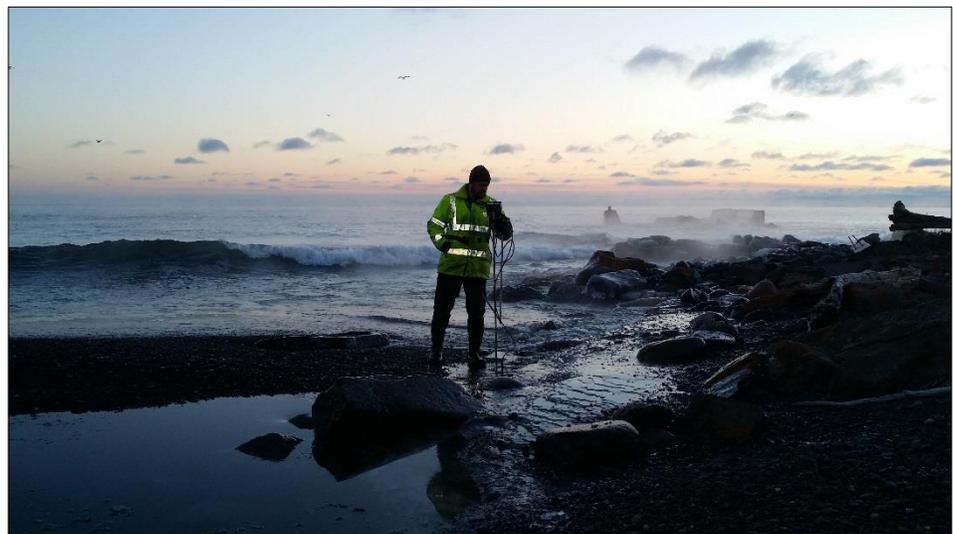
This annual report highlights accomplishments and progress in achieving LAMP goals during the past year and identifies LAMP-related activities including outreach, monitoring, and protection and restoration actions.

Overview

The Lake Superior ecosystem remains in good condition, primarily due to the hard work on the part of Lake Superior stakeholders working to restore and maintain water quality and ecosystem health. As part of that effort, the government agencies that make up the Lake Superior Partnership have been implementing the 2015-2019 Lake Superior Lakewide Action and Management Plan (LAMP).

Although the Lake Superior ecosystem is in good condition, there are serious threats 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 annual report highlights accomplishments within the Lake Superior ecosystem and explains how some challenges are being addressed. The report also presents scientific insights from the 2016 field-year of the Cooperative Science and Monitoring Initiative (CSMI). All Lake Superior stakeholders are encouraged to become locally involved in the environmental stewardship of the lake. One way to do this is to help implement parts of the Lake Superior LAMP.



Monitoring at the mouth of the Knife River near Two Harbors, MN. Credit: Russ Buesing, USGS.



LAKE SUPERIOR LAKEWIDE ACTION AND MANAGEMENT PLAN

2017 Annual Report

Accomplishments

Protecting Water Quality

In 2016, to help maintain Lake Superior as a high-quality source of water, government agencies updated the inventory of sources and emissions of nine pollutants under the binational Zero Discharge Demonstration Program. Preliminary results show an 83% reduction in mercury and an 88% reduction in dioxin emissions and discharges in the Lake Superior basin compared to 1990 levels. These reductions are due to national, state, and provincial controls and regulations (e.g., pulp and paper regulations), changing industrial practices (e.g., closure of an iron sintering facility in the 1990s), and many current non-regulatory efforts. Local actions include hazardous waste take-back events. In recent years, for example, the Keweenaw Bay Indian Community collected and properly disposed of 55 pounds (25 kilograms) of mercury through community collection events.

Numerous Lake Superior Partnership agencies are supporting public outreach and education efforts on using more environmentally-friendly products to prevent other chemicals from entering Lake Superior. Various monitoring programs have discovered many new and emerging chemicals, at very low concentrations, in the lake. These chemicals are found in commonly used personal care products (e.g., insect repellent), beautification products (e.g., musk fragrances), and pharmaceuticals (e.g., codeine).

Protecting Habitats and Species

Lake Superior habitats and species remain relatively healthy. However, many areas have been altered by human activity, and continue to be affected. Projects all around Lake Superior are contributing to the ongoing protection of habitats and species:

In Wisconsin, the Bark Bay Slough State Natural Area along Lake Superior's shoreline is truly a special place. With dark tannic open water, scattered islands draped in boreal forest, and



Strolling through the Bark Bay Slough State Natural Area in Wisconsin. Credit: Wisconsin Department of Natural Resources.

sedge meadows with shrubby margins, this coastal wetland offers people a glimpse of times past. To date, 646 acres (261 hectares) have been acquired in the area, with an overall acquisition goal of approximately 1,200 acres (486 hectares). Through the Great Lakes Restoration Initiative (GLRI), the Wisconsin Department of Natural Resources (WDNR) and the U.S. EPA partnered to acquire 59 acres (24 hectares) within this project area, including 17 acres (7 hectares) of coastal wetland. Protection projects like these can be an effective way to maintain water quality, recreational access and habitat.

In Michigan, the Michigan Department of Natural Resources (MDNR) and project partner Keweenaw Land Trust are working to preserve nearly 1,300 acres (526 hectares) and 3.5 miles (6 kilometers) of Pilgrim River corridor in Houghton County for public recreational use. The property will be managed as a working forest, thanks to a \$550,000 U.S. Forest Service Forest Legacy Program grant. The project includes the state acquisition of a conservation easement on prime forest land strategically positioned adjacent to the Pilgrim River Community Forest. This acquisition will help serve as a buffer zone for nonpoint source runoff.



Pilgrim River corridor in the Keweenaw Peninsula. Credit: Michigan Department of Natural Resources.

In Minnesota, Lake and Cook Counties have integrated LAMP goals and objectives into a new, ecologically-based watershed management plan called the Lake Superior North Comprehensive Water Plan. Many actions are now underway. The Lake County Soil and Water Conservation District (Lake County SWCD) has received a state Clean Water Fund grant to initiate stormwater inventory, assessment, and modeling in the communities of Silver Bay and Two Harbors. This grant will help improve the maps of municipal stormwater infrastructure and inform capital improvement project prioritization. The Lake County SWCD also used Minnesota Board of Water & Soil Resources Cooperative Weed Management Area funds to inventory and manage the invasive buckthorn and Japanese barberry which pose an enormous threat to the long-term health



LAKE SUPERIOR LAKEWIDE ACTION AND MANAGEMENT PLAN

2017 Annual Report

of the boreal forest and the Lake Superior basin. Managing these invasive species will meet the Lake Superior Biodiversity Conservation Strategy goal of managing the area in a manner that ensures diverse and self-sustaining plant populations.

In Ontario, wetlands, shorelines, and beaches of the Pays Plat First Nation are being protected and enhanced to improve cultural connections to Lake Superior. Since 2015, over 9 miles (15 kilometers) of interpretive trails have been constructed, and include floating boardwalks, elevated viewing platforms, nesting boxes and educational signs. Trees, grasses, shrubs, and wetland plants have been planted and litter removed from the Lake Superior shoreline. An ecological inventory has also been completed and water samples collected to establish a baseline for long-term monitoring.



Enhancements and protections are being made on the shoreline at the Pays Plat First Nation. Credit: Pays Plat First Nation.

Throughout multiple states, a number of activities contribute to the LAMP project of eliminating the non-native, invasive sub-species of a wetland plant called *Phragmites australis* from the Lake Superior basin. In Michigan's Upper Peninsula, the Upper Peninsula Resource Development and Conservation Council has been using GLRI funding to control non-native *Phragmites* in the Lake Superior, Michigan, and Huron basins. In the Chequamegon Bay area in Wisconsin, the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) detected approximately 35 small, non-native *Phragmites* sites and has been controlling them since 2014. GLIFWC also called attention to the likely source of these invasive plants, which is their use in the wastewater treatment plant (WWTP) process of three facilities along Lake Superior's south shore. The National Park Service and Red Cliff Tribe are taking the lead in pursuing funds to develop and implement alternative technologies to remove *Phragmites* from these WWTPs. In the St. Louis estuary on the Minnesota-Wisconsin border, approximately 70

small, non-native *Phragmites* sites have been identified. Several agencies are collaborating to control *Phragmites* at these sites.

Tracking Results

The collaborative approach to managing Lake Superior is exemplified by efforts to monitor conditions and trends. For example, since 2011, 20 federal, provincial, state, and tribal agencies as well as two academic institutions have partnered to adopt standardized monitoring protocols, data sharing agreements and collaborative reporting for a number of fishery-related lakewide efforts. Some preliminary findings from 2016 include:

- Declines in the amount of many prey fish species such as Cisco, Bloater, Kiyi, Rainbow Smelt, and sculpin, when compared to results from 2011. These declines are thought to be related to poor survival of very young Cisco, Bloater, and Kiyi and predation on Rainbow Smelt and sculpin by Lake Trout. Researchers from the Lakewide Lower Trophic Food-Web and Energy Transfer Monitoring group are currently determining the factors underlying the decline in Cisco, Bloater, and Kiyi.
- The Lakewide Lake Sturgeon Index Survey used 275 net sets to capture Lake Sturgeon from all around Lake Superior in the summer of 2016. Although fewer fish were caught compared to 2011, overall the ones that were caught had a range of ages, indicating continued improvement in the Lake Sturgeon population.
- Aquatic Invasive Species early detection efforts collected 312 samples from 7 locations across Lake Superior in 2016. From these samples, 18,962 individual fish were captured with 15 non-native species being observed. No new aquatic invasive fish species were discovered.

Addressing Challenges

Rehabilitating Aging Dams

Black Bay, Ontario once had the largest population of Walleye in Lake Superior and supported a sizable commercial and recreational fishery prior to the fisheries' collapse in 1968. The construction of the Camp 43 Dam on the Black Sturgeon River in 1959 is considered as one of the factors contributing to the collapse of the Walleye population. The Dam currently blocks access to spawning and nursery habitat formerly available to migratory Walleye and other native fish species, including Lake Sturgeon. The Camp 43 Dam is also a component of a binational Sea Lamprey control program. Removing the dam would necessitate increasing the frequency and magnitude of lampricide treatments to control Sea Lamprey numbers in Lake Superior. The Ontario Ministry of Natural Resources and Forestry is recommending partial removal of the Camp 43 Dam and construction of a new multipurpose barrier further



LAKE SUPERIOR LAKEWIDE ACTION AND MANAGEMENT PLAN

2017 Annual Report

upstream. An environmental study report was posted in January 2017 for public review and comment. A decision on how to proceed with this project is pending.



Due to age and risk of failure, a decision must be made about the future of Camp 43 Dam on the Black Sturgeon River. Credit: Ontario Ministry of Natural Resources and Forestry.

Baseline Monitoring for Resource Activity

The potential effects of mineral resource exploration on the Lake Superior basin has been an issue for the Lake Superior Partnership since 2013. To help meet this challenge in Minnesota, Wisconsin and Michigan, the collection and interpretation of environmental data across a wide range of geologic settings and mineral resources are being undertaken. Understanding water-quality and water-quantity is especially important prior to mineral resource extraction to monitor potential future impacts. Current activities and next steps include:

- Continuation of streamflow and water chemistry monitoring under different flow conditions;
- Interpretive studies of streamflow, water-quality, and streambed-sediment chemistry data; and
- Determination of background streamflow and chemical loads under different flow conditions.

To date, a significant amount of data has been collected by the U.S. Geological Survey (USGS), Tribal entities, and by State and local partners through LAMP and CSMI funding. Descriptions of the projects and data in the U.S. are available in the “Science in the Great Lakes” mapper: <https://sigl.wim.usgs.gov/sigl/>.

Remediation of Buffalo Reef Stamp Sands

The remediation of Buffalo Reef on the Keweenaw Peninsula is a project identified in the LAMP as a habitat restoration project. Buffalo Reef is a critically- important Lake Whitefish and Lake



2016 baseline water sampling in the UP Michigan. Credit: J. Hoffmann, U.S. Geological Survey.

Trout spawning area located in Grand Traverse Bay of Keweenaw County, Michigan. About 23% of the total annual Lake Trout yield in the Michigan waters of Lake Superior comes from within 50 miles (80 kilometers) of Buffalo Reef. The migration of legacy stamp sands (waste rock from mining operations from over 100 years of copper mining) has partially covered this important reef and is impacting fish spawning habitat. Furthermore, areas contaminated with stamp sands have high concentrations of mercury and copper in sediments, and have been found to be nearly devoid of benthic animals and aquatic vegetation. The U.S. EPA is working in cooperation with the MDNR, the Michigan Department of Environmental Quality, US Army Corps of Engineers, USGS, US Fish and Wildlife Service, GLIFWC, Keweenaw Bay Indian Community, and other Tribes to work to address this issue.

Contact Information

For more information, please visit our website at binational.net or contact:

In Canada:

Rob Hyde
Environment and Climate Change Canada
Phone: (905) 336-4453
Email: ec.grandslacs-greatlakes.ec@canada.ca

In the United States:

Elizabeth LaPlante
U.S. Environmental Protection Agency
Phone: (312) 353-2694
Email: laplante.elizabeth@epa.gov