LAKE SUPERIOR LAKEWIDE ACTION AND MANAGEMENT PLAN
Annual Report 2015

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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, which is led by the U.S. Environmental Protection Agency and Environment Canada and which facilitates information sharing, sets priorities, and assists in coordinating binational environmental protection and restoration activities. The next Lake Superior LAMP will be issued in 2015; in the interim, the Lake Superior Partnership will be assessing the state of the lake, measuring progress against existing LAMP goals and objectives, and promoting management actions to address identified problems.

This 2015 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

Lake Superior, the largest freshwater lake in the world by surface area, is the least populated and most unspoiled of the Great Lakes. Bounded by a rugged shoreline with towering cliffs on its north shore, and sandy beaches and colorful sandstone rocks on its south shore, Lake Superior is a prime destination for ecotourism.

The Lake Superior ecosystem continues to be in good to very good condition with a healthy lower food web, increasing populations of Lake Trout and Lake Sturgeon, protection of critical habitat areas, and good water quality with continued reductions in critical pollutants. Challenges to the ecosystem include invasive species such as sea lamprey, climate change, balancing resource development with environmental protection, and continued fish consumption advisories due to such legacy pollutants as mercury.

Developing New Tools for Lakewide Management

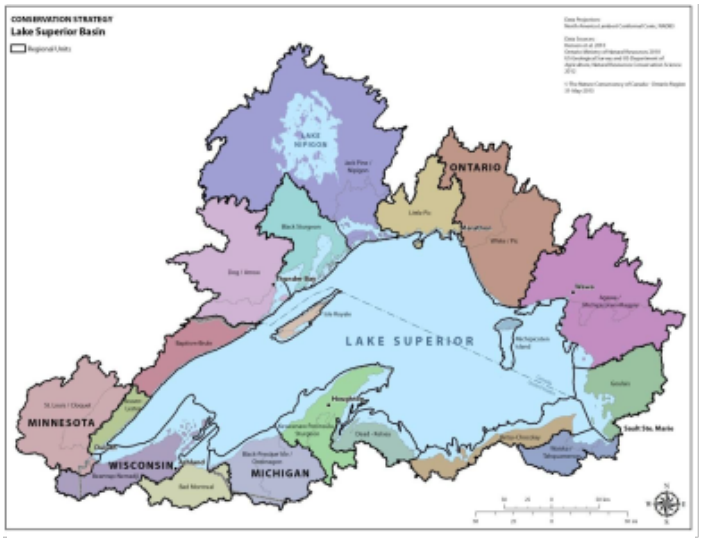
Under the Great Lakes Water Quality Agreement, the Lake Superior Partnership is developing two new lakewide management tools: 1) a five-year **Lakewide Action and Management Plan (LAMP)**, and 2) **Lake Ecosystem Objectives** to assess parameters such as water quality and lake ecosystem health. In addition, the **Nearshore Framework** will, in the future, identify areas near the shore that are of high ecological value and potentially vulnerable to high stress. More information on these tools can be found at binational.net.

Lake Superior is a prime destination for ecotourism and supports industries such as shipping and mining.
Photo: J. Schomberg, Minnesota Sea Grant.

Accomplishments

Conserving Biodiversity

In February 2015, the Lake Superior Partnership released its Biodiversity Conservation Strategy for Lake Superior (Strategy). The Strategy summarizes the health of and threats to the biodiversity of Lake Superior, and presents a guide to implementing effective lakewide and regional protection and restoration strategies. The Strategy contributes to the Great Lakes Water Quality Agreement's commitment to develop lakewide habitat and species protection and restoration conservation strategies.



The Lake Superior Biodiversity Conservation Strategy includes regional plans for 20 areas of the basin.

The Strategy builds on a biodiversity assessment, completed in 2013, which found that the overall health of most major habitat types is good, but the condition of tributaries and watersheds is only fair. In addition, the Strategy found that Lake Superior's biodiversity is at high risk from climate change, aquatic invasive species, and dams and barriers. Other threats, like coastal development, mining, and unsustainable forestry practices, ranked as medium-level threats.

Since local and regional actions are critical in protecting and restoring biodiversity, the Strategy includes 20 regional plans that highlight special features, issues and conservation needs important to the different areas of Lake Superior. These regional plans will include substantial stakeholder input, and are scheduled for completion by December 2015. For more information, visit natureconservancy.ca/superiorbca.

Lakewide Planning, Local Action

Members of the Lake Superior Partnership help connect lakewide planning to relevant local action on the ground. In Michigan, the Keweenaw Bay Indian Community Natural Resource Department is leading a Community Landscape Conservation Project to compile information on stream crossings and identify areas in need of restoration throughout the south-central Lake Superior basin.

Restoring Areas of Concern

Deer Lake

In October 2014, the Deer Lake Area of Concern (AOC), near Ishpeming, Michigan, was formally delisted. Historic mining and waste disposal practices resulted in the contamination of Deer Lake. The main source of mercury came from the now abandoned Cliffs Shaft Mine underneath the City of Ishpeming. Mercury concentrations were at excessive levels for decades, resulting in "Do Not Eat" restrictions for fish in Deer Lake. Algal blooms were a regular occurrence, and bald eagles had reproductive problems.

Upgrades to the wastewater treatment plant decreased algal blooms, and bans on certain pesticides allowed Deer Lake's bald eagles to once again successfully reproduce starting in the mid-1990s. As mining in the region tapered off, some mercury sources were reduced. Finally, from 2010–2013, a project was completed to divert Partridge Creek out of the underground mine, thus eliminating the last major source of mercury (~60 grams/year) to Deer Lake.

While concentrations of mercury in fish tissue are significantly lower and the fish consumption impairment has been removed for the AOC, Walleye and Northern Pike remain "catch and release" to help maintain a productive fish population.

Adapting to Climate Change

Many jurisdictions and agencies are beginning to implement activities identified in the *Lake Superior Climate Change Impacts and Adaptation Report*. The City of Thunder Bay, Ontario, is developing its own adaptation strategy to help increase the city's resilience to climate change and severe weather. In Minnesota, the Grand Portage Band of Lake Superior Chippewa has developed climate change adaptation strategies to guide natural resources management. Examples of such strategies include

Keweenaw Bay.
Photo: Erin Johnston, Keweenaw Bay Indian Community.

shifting from a cold water (Brook Trout) to a cool water fish community (Walleye, Yellow Perch) to maintain harvest, expanding agricultural practices to reduce reliance upon goods outside the region, and developing alternative energy methods.

Coordinating Science and Monitoring

The Lake Superior Partnership is currently preparing for the 2016 field season for the Coordinated Science and Monitoring Initiative. This initiative involves an intensive scientific examination of each Great Lake on a five-year rotational basis. Priorities include an examination of the following:

- Lower food-web health and stability
- Progress of Lake Sturgeon rehabilitation
- Achievement of the Zero Discharge Demonstration Program goals
- Chemicals of emerging concern for Lake Superior managers
- Baseline water quality conditions in areas of potential and significant land-use change
- Identification of various stressors, including climate change, to vulnerable cold-water tributaries to Lake Superior

Addressing Challenges

The next year of intensive monitoring on Lake Superior is 2016. Photo: J. Bailey.

Reducing Legacy and Emerging Chemicals

The Lake Superior Partnership continues to track and pursue reductions of the nine legacy pollutants under the Zero Discharge Demonstration Program. As emissions of these pollutants decline, the Lake Superior Partnership is increasing efforts to track and educate the public about chemicals of emerging concern that may affect human and wildlife health. For example, microplastics—tiny plastic fragments, fibers, and pellets—have been found throughout the Great Lakes.

Microplastics are a concern because they can be ingested by fish and other animals leading to blockages and, in turn, starvation. In addition, contaminants can adsorb to the microplastics, compounding the risks.

The Lake Superior Partnership supports actions to reduce these pollutants and is helping to educate the public about chemicals of emerging concern and microplastics. For example, EcoSuperior in Thunder Bay, Ontario, has produced a fact sheet on microplastics and is organizing a public science café to bring awareness to and foster discussion about the issue.

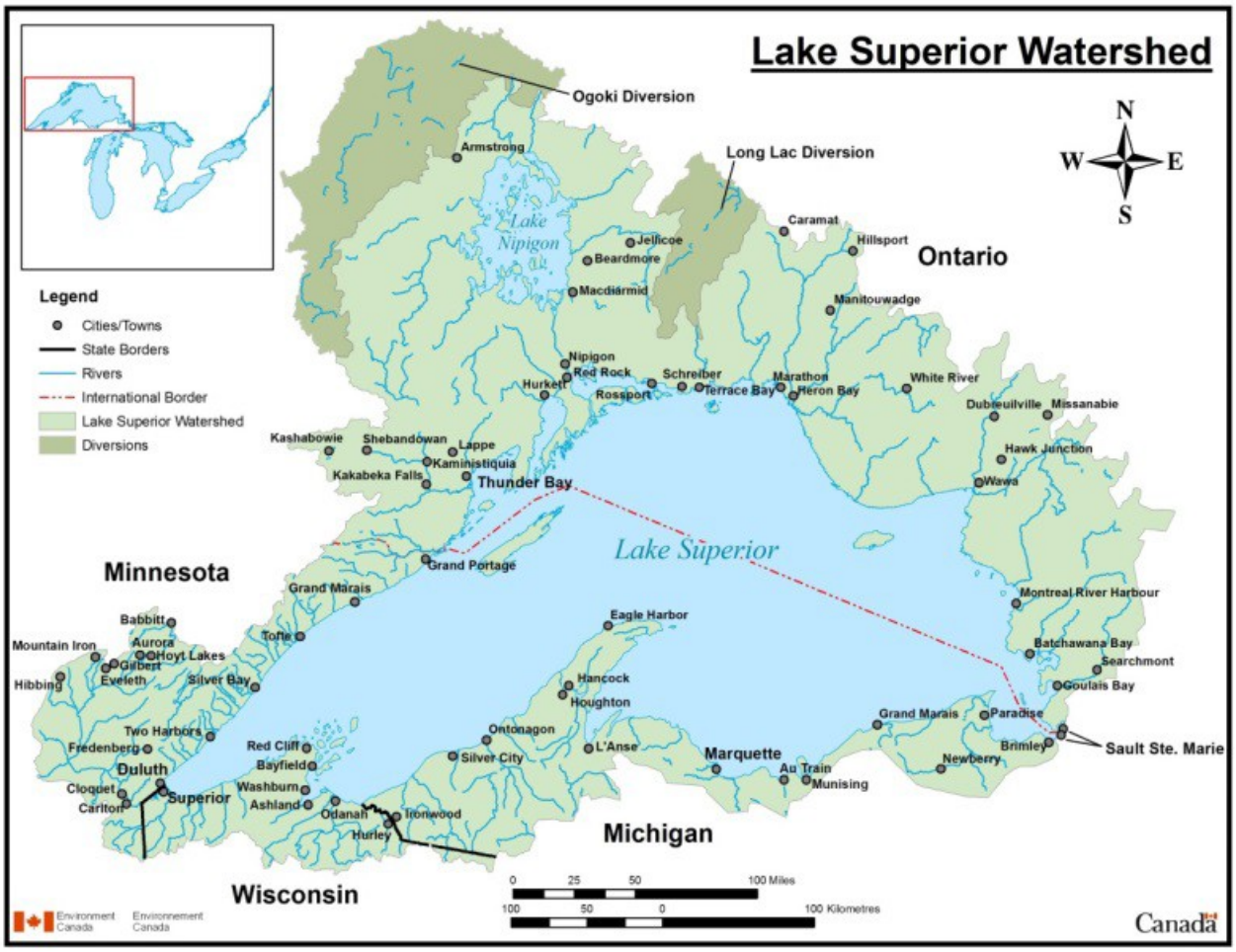
Example of microplastics found in the Great Lakes. Photo: S. Mason.

Preventing the Spread of Invasive Species

Of all the Great Lakes, Lake Superior is the least affected by non-native or invasive species because of its cold water and geography. However, the fish community has been permanently altered by invasive species and remains at risk from further introductions. Sea lamprey continue to kill thousands of Lake Trout each year, and Rainbow Smelt comprise a significant portion of the nearshore forage. Ruffe (*Gymnocephalus cernuus*) and Round Gobies (*Neogobius melanostomus*) have colonized some areas and have the potential to negatively impact the nearshore cool-water fish community. Sixteen non-native fish species are currently found in Lake Superior, although no new invasives have been detected since 2009.

In 2014, the Lake Superior Partnership, in collaboration with the Great Lakes Panel on Aquatic Nuisance Species, released *The Lake Superior Aquatic Invasive Species Guide* as a resource for recreational lake users. The guide provides information on potential invaders and steps on how to report a sighting. The guide is available under Resources at invadingspecies.com.

Lake Superior Watershed Map



Contact Information

For more information, please visit www.binational.net or contact:

In Canada:
Laurie Wood
Environment Canada
Phone: 905-336-6457
greatlakes-grandslacs@ec.gc.ca

In the United States:
Elizabeth LaPlante
U.S. Environmental Protection Agency
Phone: 312-353-2694
laplante.elizabeth@epa.gov