

# Lake Superior Biodiversity Conservation Assessment Executive Summary

## Lake of the Great Waters

Lake Superior is unique among the world's freshwater lakes. Situated at the top of the chain of the Great Lakes, it is the world's largest freshwater lake by area. It is also the coldest and deepest of the Great Lakes, with a maximum depth of 406 metres. Because of its massive size, Lake Superior has a retention period of 191 years. Despite its northern location, the enormous mass of water prevents full ice cover, even in the coldest winters. It is also a lake of extraordinary biodiversity, supporting endemic and disjunct fishes, a unique deepwater form of Lake Trout, diverse coastal wetlands, extensive sandy beaches and the cool coastlines and islands harbor arctic-alpine plants and Woodland Caribou.



Lake Superior Coast (photo by Ethan Meleg)

## Developing a Biodiversity Assessment for Lake Superior

Developing the Lake Superior Biodiversity Assessment was identified by the bi-national Lake Superior Lakewide Action and Management Plan (LAMP) as an important tool to better integrate biodiversity objectives into current lake management, and to support implementation of the Great Lakes Water Quality Agreement.

A project team from the Lake Superior LAMP first developed a draft report based on a review of existing information. The assessment of biodiversity target health and the ranking of threats were done through the Conservation Action Planning framework. This framework has also been used to develop biodiversity conservation strategies for Lake Ontario (2009), Lake Huron (2010), Lake Michigan (2012) and Lake Erie (2012).



*The project scope for LSBA will include the **watersheds of tributaries to the extent that they affect the biodiversity of the lake.***

The draft biodiversity conservation assessment (biodiversity targets, threats, regional summaries) was shared with experts for their review and comment. This included webinars that provided an introduction to the project, and series of webinars that were based on the biodiversity targets, and on the regional summaries. In total over 400 Lake Superior experts were contacted about the project and provided an opportunity to review and contribute to the document.

## The Health of Lake Superior

Seven conservation targets were selected that encompass the biodiversity of Lake Superior. These include aquatic coastal, tributary and watershed based habitats that have many species nested within them. The health of these biodiversity targets was assessed based on SOLEC indicators, with some modifications. The overall viability assessment for Lake Superior is “good” - the lake is in a state of health that is within the natural range of variation, but some management intervention may be required for some elements. The biodiversity conservation targets that had the lowest viability included watersheds and tributaries. While nearshore and embayments are in “good” health, they are approaching the threshold for “fair”. For many of the coastal habitats (aquatic and terrestrial), and watersheds there is a high degree of regional variation in target condition. To better illustrate these regional differences, stress indices were mapped for watersheds (GLEI 2013), lake waters (GLEAM 2013) and coastal areas (analysis done for this project). Information on biodiversity, threats and priority areas is provided in 20 regional summaries for the lake.

Biodiversity Conservation Targets	Overall Health
<b>Deepwater and Offshore Waters:</b> Benthic and pelagic waters that are >80 m in depth.	GOOD
<b>Nearshore Zone and Reefs:</b> Coastal areas that are between 15-80 m in depth, and shallow reefs.	GOOD
<b>Embayments (Inshore):</b> Embayments and the inshore zone at depths of 0 to 15m.	GOOD
<b>Coastal Wetlands:</b> Wetlands within 2 km of Lake Superior’s coast, with an emphasis on wetlands that have historic and current hydrologic connectivity to, and are directly influenced by the lake.	GOOD
<b>Islands:</b> All land masses that are surrounded by water, including both natural and artificial islands.	GOOD
<b>Coastal Terrestrial Habitats:</b> Habitats within 2 km from the coast or to the extent of delineation.	GOOD
<b>Tributaries and Watersheds:</b> All rivers, streams and inland lakes that are flow into Lake Superior and their associated watersheds	FAIR

## Threats and Conservation Issues

The overall threat rank for Lake Superior is VERY HIGH. This is driven by a very high rating for climate change (Table 3.1). High ranking threats are aquatic invasive species and dams and barriers. These threats rank the highest because they impact many targets over a wide area and, in some cases, are very difficult to reverse. These high ranking threats generally reflect SOLEC “pressure” indicators that have been assessed poor and declining including climate change (i.e. ice duration) and aquatic invasive species.

The biodiversity conservation targets with the highest threat ratings are: the nearshore and embayment targets, coastal wetlands, and tributaries and watersheds. These systems generally have the highest numbers of threats and are susceptible to invasive species, climate change and dams and barriers.

### Ranked Threats to Lake Superior’s Biodiversity

Climate Change	Very High
Aquatic Invasive Species	High
Dams and Barriers	High
Atmospheric Deposition	Medium
Coastal Development	Medium
Incompatible Forestry	Medium
Mining	Medium
Non-point Source Pollution	Medium
Terrestrial Invasive Species	Medium

## Next Steps

This biodiversity conservation assessment is intended to summarize the best available information on Lake Superior’s biodiversity and provide an analysis on health and threats. This information will be used by the Lake Superior LAMP to develop ecosystem objectives and strategies to support both lake-wide and place-based conservation in 2013.