Coastal Wetland Area by Type

Indicator #4510

Overall Assessment

Status:	**Mixed**
Trend:	**Deteriorating**

Lake-by-Lake Assessment

Each lake was categorized with a not assessed *status and an* undetermined *trend, indicating that assessments were not made on an individual lake basis.*

Purpose

- To assess the periodic changes in area (particularly losses) of coastal wetland types, taking into account natural lake level variations

Ecosystem Objective

Maintain total areal extent of Great Lakes coastal wetlands, ensuring adequate representation of coastal wetland types across their historical range (Great Lakes Water Quality Agreement, Annexes 2 and 13, United States and Canada 1987).

State of the Ecosystem

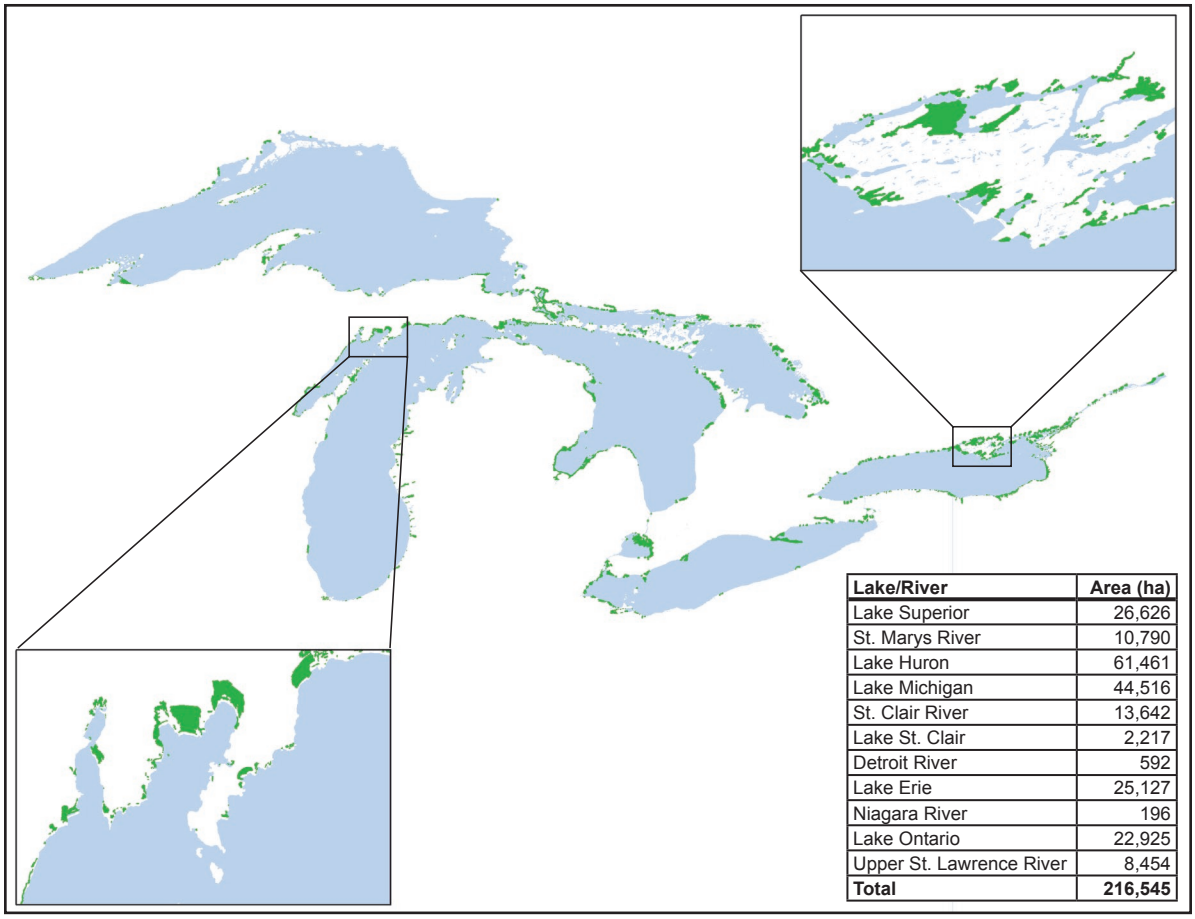
The status of this indicator has not been updated since the *State of the Great Lakes 2005* report. Future updates to the status of this indicator will require the repeated collection and analysis of remotely sensed information. Currently, technologies and methods are being assessed for an ability to estimate wetland extent. Next steps, including determination of funding and resource needs, as well as pilot investigations, must occur before an indicator status update can be made. The timeline for this is not yet determined. However, once a methodology is established, it will be applicable for long-term monitoring for this indicator, which is imperative for an improved understanding of wetland functional responses and adaptive management. The 2005 assessment of this indicator follows.

Wetlands continue to be lost and degraded, yet the ability to track and determine the extent and rate of this loss in a standardized way is not yet feasible.

In an effort to estimate the extent of coastal wetlands in the basin, the Great Lakes Coastal Wetland Consortium (GLCWC) coordinated completion of a binational coastal wetland database. The project involved building from existing Canadian and U.S. coastal wetland databases (Environment Canada and Ontario Ministry of Natural Resources 2003; Herdendorf *et al.* 1981a-f) and incorporating additional auxiliary federal, provincial and state data to create a more complete, digital Geographic Information System (GIS) vector database. All coastal wetlands in the database were classified using a Great Lakes hydrogeomorphic coastal wetland classification system (Albert *et al.* 2005). The project was completed in 2004. The GIS database provides the first spatially explicit seamless binational summary of coastal wetland distribution in the Great Lakes system. Coastal wetlands totaling 216,743 ha (535,582 acres) have been identified within the Great Lakes and connecting rivers up to Cornwall, ON (Figure 1). However, due to existing data limitations, estimates of coastal wetland extent, particularly for the upper Great Lakes are acknowledged to be incomplete.

Despite significant loss of coastal wetland habitat in some regions of the Great Lakes, the lakes and connecting rivers still support a diversity of wetland types. Barrier protected coastal wetlands are a prominent feature in the upper Great Lakes, accounting for over 60,000 ha (150,000 acres) of the identified coastal wetland area in Lake Superior, Lake Huron and Lake Michigan (Figure 2). Lake Erie supports 22,000 ha (54,500 acres) of coastal wetland, with protected embayment wetlands accounting for over one third of the total area (Figure 2). In Lake Ontario, barrier protected and drowned rivermouth coastal wetlands account for 19,000 ha (47,000 acres), approximately three quarters of the total coastal wetland area.

Connecting rivers within the Great Lakes system also support a diverse and significant quantity of wetlands (Figure 3). The St. Clair River delta occurs where the St. Clair River outlets into Lake St. Clair, and it is the most prominent single wetland feature accounting for over 13,000 ha (32, 000 acres). The Upper St. Lawrence River also supports a large area of wetland habitats that are typically numerous small embayment and drowned rivermouth wetlands associated with the Thousand Island region and St. Lawrence River shoreline.



Lake/River	Area (ha)
Lake Superior	26,626
St. Marys River	10,790
Lake Huron	61,461
Lake Michigan	44,516
St. Clair River	13,642
Lake St. Clair	2,217
Detroit River	592
Lake Erie	25,127
Niagara River	196
Lake Ontario	22,925
Upper St. Lawrence River	8,454
Total	**216,545**

Figure 1. Great Lakes coastal wetland distribution and total area by lake and river.
Source: Great Lakes Coastal Wetlands Consortium

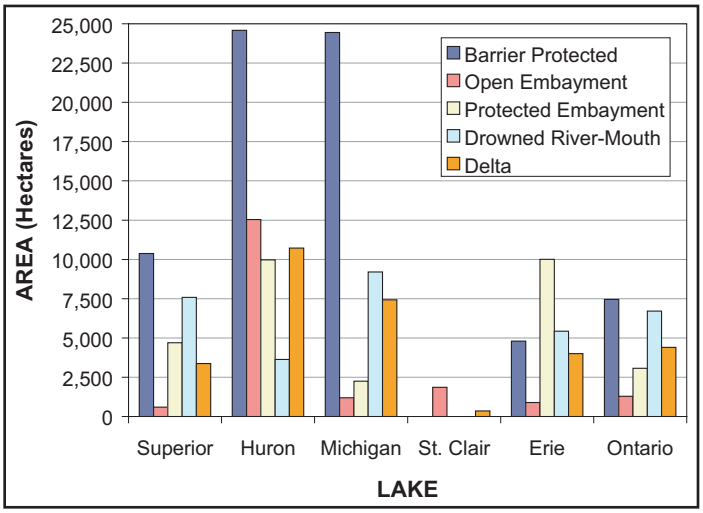


Figure 2. Coastal wetland area by geomorphic type within lakes of the Great Lakes system.
Source: Great Lakes Coastal Wetlands Consortium

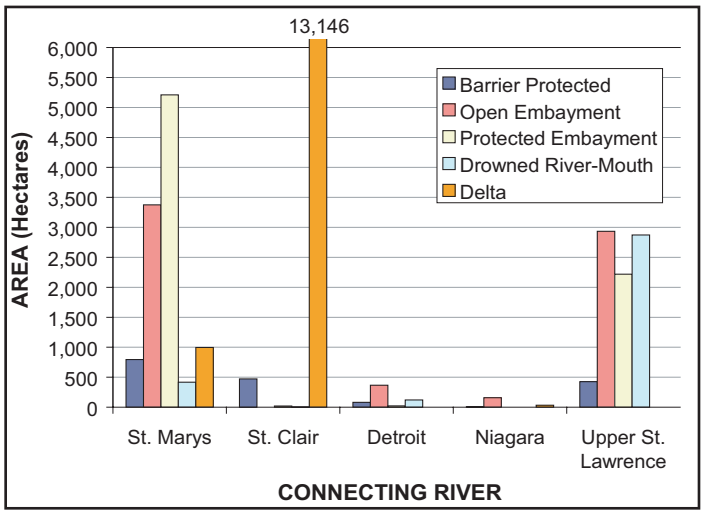


Figure 3. Coastal wetland area by geomorphic type within connecting rivers of the Great Lakes system.
Source: Great Lakes Coastal Wetlands Consortium

Pressures
There are many stressors which have and continue to contribute to the loss and degradation of coastal wetland area. These include: filling, dredging and draining for conversion to other uses such as urban, agricultural, marina, and cottage development; shoreline modification; water level regulation; sediment and nutrient loading from watersheds; adjacent land use; invasive species, particularly non-native species; and climate variability and change. The natural dynamics of wetlands must be considered in addressing coastal wetland stressors. Global climate variability and change have the potential to amplify the dynamics by reducing water levels in the system in addition to changing seasonal storm intensity and frequency, water level fluctuations and temperature.

Management Implications
Many of the pressures result from direct human actions, and thus, with proper consideration of the impacts, can be reduced. Several organizations have designed and implemented programs to help reduce the trend toward wetland loss and degradation.

Because of growing concerns around water quality and supply, which are key Great Lakes conservation issues, and the role of wetlands in flood attenuation, nutrient cycling and sediment trapping, wetland changes will continue to be monitored closely. Providing accurate useable information to decision-makers from government to private landowners is critical to successful stewardship of the wetland resource.

Comments from the author(s)
Development of improved, accessible, and affordable remote sensing technologies and information, along with concurrent monitoring of other Great Lakes indicators, will aid in implementation and continued monitoring and reporting of this indicator.

The GLCWC database represents an important step in establishing a baseline for monitoring and reporting on Great Lakes coastal wetlands including extent and other indicators. Affordable and accurate remote sensing methodologies are required to complete the baseline and begin monitoring change in wetland area by type in the future. Other GLCWC-guided research efforts are underway to assess the use of various remote sensing technologies in addressing this current limitation. Preliminary results from these efforts indicate the potential of using radar imagery and methods of hybrid change detection for monitoring changes in wetland type and conversion.

The difficult decisions on how to address human-induced stressors causing wetlands loss have been considered for some time. Several organizations and programs continue to work to reverse the trend, though much work remains. A better understanding of wetland functions, through additional research and implementation of biological monitoring within coastal wetlands, will help ensure that wetland quality is maintained in addition to areal extent. An educated public is critical to ensuring that wise decisions about the stewardship of the Great Lakes basin ecosystem are made.

Acknowledgments
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