



INDICATOR: EXTENT OF WETLAND COVER AND WETLAND LOSS

STRATEGIC DIRECTION: Enhance Resilience

TARGET: N/A

THEME: State of Ecosystems and Species – Wetlands

Background Information:

Wetlands are lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. Wetlands lie at the interface of terrestrial and aquatic habitats and as a result possess a unique mixture of species, conditions and interactions. This makes wetlands among the most dynamic, diverse and productive ecosystems on the planet. Wetlands provide habitat for a diverse array of species and provide a wide variety of ecosystem services that benefit people and the environment. These include shoreline stabilization, water purification and groundwater recharge and discharge, and flood control/attenuation. Wetlands help limit greenhouse gases in the atmosphere by acting as carbon sinks and they provide many recreational opportunities. When wetlands are lost or destroyed the important ecosystem services they provide are also lost.

Canada has approximately 20% of the world's remaining wetlands (Natural Resources Canada 2011). Ontario has particular responsibility for wetland resources because it contains approximately 22-29% of all Canadian wetlands and 6% of the world's wetlands. In Ontario, four major types of wetlands are recognized: marshes, swamps, fens and bogs (OMNR 2014). Shallow open water wetlands are recognized as an additional wetland type in the national wetland classification system. The majority of the province's wetlands are found in northern Ontario (Figure 1). The Hudson Bay Lowlands Ecozone has more than 17,000,000 ha of wetlands that account for 69% of the landscape. The Great Lakes are a globally significant ecosystem. Great Lakes coastal wetlands provide continentally significant migratory bird habitat and support many rare animals and vegetation communities.

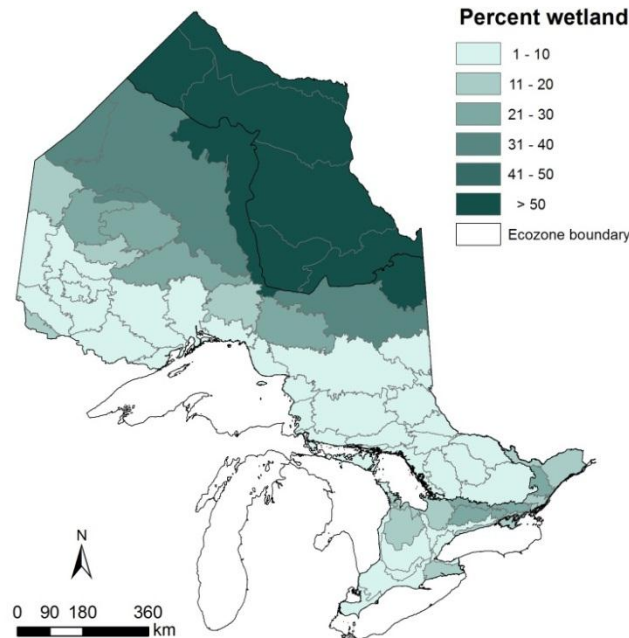


Figure 1. Percentage wetland in Ontario ecodeistricts based on 2011 land cover.

Despite their important values, wetlands continue to be lost. It is estimated that up to 70% of wetlands have been lost in settled areas of Canada (DUC 2006). Historically wetlands in southern parts of Ontario have been drained for agriculture, filled for development, polluted by toxic runoff and damaged by artificial changes in water levels (Environment Canada 2010). Despite some localized losses or alteration, the wetlands in the Hudson Bay Lowlands and Ontario Shield ecozones are largely intact. However, about two-thirds of wetlands in southern Ontario have been lost or severely degraded, and the health of those that remain is threatened (Environment Canada 2010). A recent assessment by Ducks Unlimited Canada showed that between 1982 and 2002 an additional 70,854 ha of wetlands (larger than 10 ha) in southern Ontario were lost (DUC 2010; OBC 2010). The loss of wetlands has been greatest in southwestern Ontario, parts of eastern Ontario, Niagara and the Toronto area, where over 85% of the original pre-settlement wetlands have been converted to other uses. Since 1992, significant wetlands (as determined by the Ontario Wetland Evaluation System) have been provided protection from development and site alteration by provincial policies issued under the Planning Act. These policies do not govern all activities that can potentially affect provincially significant wetlands. Regional land use plans for the Niagara Escarpment, Oak Ridges Moraine, the Greenbelt and Lake Simcoe, regulations under the Conservation Authorities Act, the Environmental Protection Act and guidelines used in forest management planning may also provide additional protection for wetlands.

This indicator assesses changes in wetland extent in southern Ontario from 2000-2002 to 2011 based on updated land cover information.

Data Analysis:

Land cover information from the Southern Ontario Land Resource Information System (SOLRIS; OMNR 2008b) was used to assess changes in the extent of southern Ontario wetlands between 2000-2002 and 2011. SOLRIS coverage includes all of the ecodeistricts in the Mixedwood Plains Ecozone with the exception of Manitoulin Island and includes wetlands as small as 0.5 ha in area. SOLRIS version 2.0 was developed using a LandSat based change detection analysis process applied to woodlands and wetlands identified in SOLRIS version 1.2. In this application, change detection analyzes the decreases in



vegetation greenness, focusing on loss, using full-leaf summer Landsat-5 TM imagery for three time periods from 2000 to 2011. Changes identified during change detection were verified using orthophotography available between 2000 and 2011. The modelling effectively mapped large and dramatic loss events with high certainty. In some cases, subtle and smaller change events could not be modelled with certainty. These events, when occurring in close proximity to high certainty events, were flagged for manual interpretive review. Additional high certainty events were then identified through detailed examination of multi-date digital orthophotos. Although attempts were made to capture all major events, some remain undetected.

The total wetland area was calculated for each time period (2000-2002 and 2011) using a Geographic Information System (GIS) and the area of wetlands lost was mapped for each ecodistrict (Figure 2). The wetland loss was also mapped as the percentage of wetland area from 2000-2002 that had been lost by 2011 (Figure 3).

It is important to note that previous assessments of changes in wetland cover excluded wetlands smaller than 10 ha and many Great Lakes coastal wetlands (DUC 2010). The current analysis addresses smaller wetlands, but could miss the incremental loss of small areas along the edge of larger wetlands (i.e., areas less than 0.5 ha over a 5-year period). For these reasons, the results of the current assessment of wetland loss since 2000-2002 cannot be directly compared to previous assessments of loss for earlier time periods.

While this indicator assesses changes in the extent of wetland coverage, there is no comprehensive, landscape-scale data available for assessment of trends in the quality and function of remaining wetlands. A recent assessment of the quality of Great Lakes coastal wetlands (U.S. and Canada) showed that more than 50% of marshes in lakes Erie and Ontario were degraded while more than 70 % of those in Lake Huron, Georgian Bay and Lake Superior were minimally impacted (Cvetkovic and Chow-Fraser 2011).

- [download wetland loss summary data](#)

Results:

Trend: Mixed

Data Confidence: Medium

Geographic Extent: Mixedwood Plains Ecozone

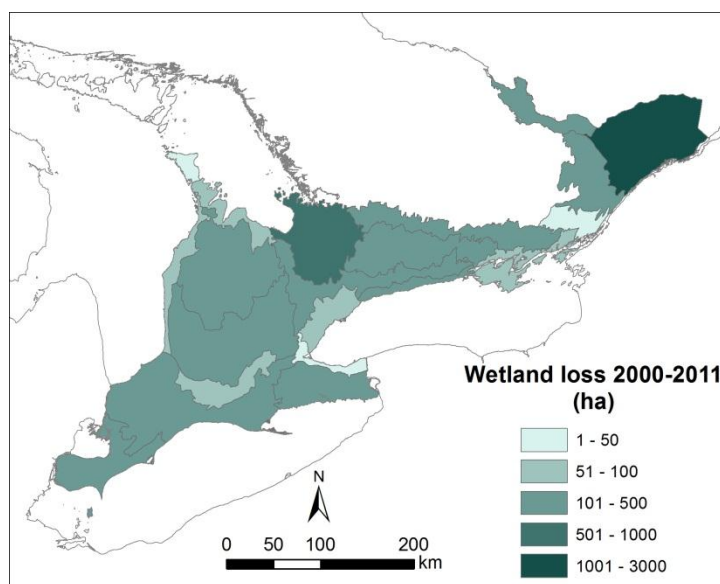


Figure 2. Area of wetlands lost in southern Ontario ecodistricts over the period 2000-2002 to 2011.

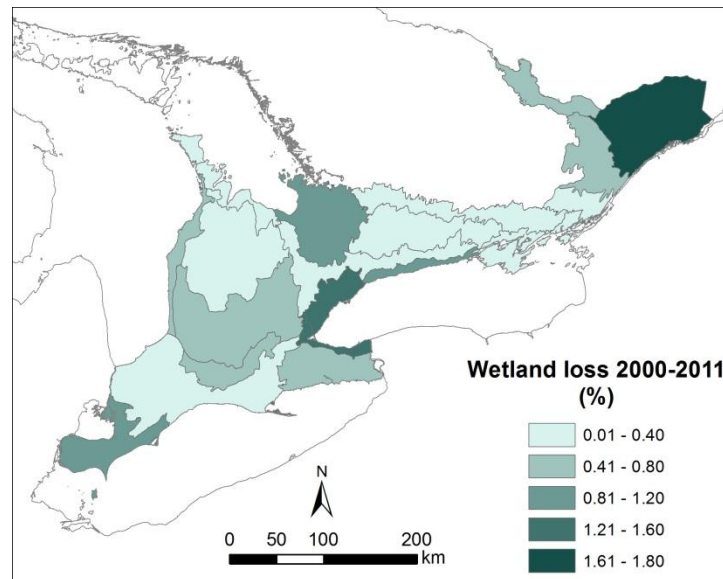


Figure 3. Percentage of wetland area lost in southern Ontario ecodistricts over the period 2000-2002 to 2011.

Status:

- Between 2000-2002 and 2011, a total of 6,152 ha of wetlands were lost representing 0.6% of the wetland area in southern Ontario. The rate of wetland loss over this decade (615 ha per year) is considerably less than the rate of 3,543 ha per year over the previous 20-year period. Due to differing methodologies, these rates of wetland loss cannot be directly compared, but the assessments suggest that the rate of wetland loss may have decreased.
- Wetland losses in the Kemptville Ecodistrict (6E-12) of eastern Ontario accounted for 40% of the total area of wetland losses over the last decade (2,285 ha). This ecodistrict also had the highest percentage of wetland loss (1.8%) followed by the Grimsby (7E-3, 1.6%) and Toronto (7E-4, 1.5%) ecodistricts in the Golden Horseshoe area.

Links:

Related Targets: N/A

Related Themes: Pressures on Biodiversity – Habitat Loss

Web Links:

Ontario Ministry of Natural Resources and Forestry – wetland conservation

<https://www.ontario.ca/environment-and-energy/wetland-conservation>

Ontario Ministry of Municipal Affairs and Housing – Provincial Policy Statement

<http://www.mah.gov.on.ca/Page215.aspx>

Environment Canada – wetlands of Ontario <http://www.ec.gc.ca/tho->

[ulo/default.asp?lang=En&n=06269065-1](http://www.ec.gc.ca/tho-ulo/default.asp?lang=En&n=06269065-1)

Ducks Unlimited Canada – Ontario wetlands <http://www.ducks.ca/>



Great Lakes Wetland Conservation Action Plan <http://glwcap.ca/>

References:

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- Environment Canada. 2010. Why wetlands? Environment Canada, Ottawa, ON [Available at: <https://www.ec.gc.ca/nature/default.asp?lang=En&n=B4669525-1>]
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- Ontario Ministry of Natural Resources (OMNR). 2008. Southern Ontario Land Resource Information System (SOLRIS) phase 2 – data specifications version 1.2. Ontario Ministry of Natural Resources, Peterborough, ON.
- Ontario Ministry of Natural Resources (OMNR). 2014. Wetland conservation. [Available at: <https://www.ontario.ca/environment-and-energy/wetland-conservation>]

Citation

Ontario Biodiversity Council. 2015. State of Ontario's Biodiversity [web application]. Ontario Biodiversity Council, Peterborough, Ontario. [Available at: <http://ontariobiodiversitycouncil.ca/sobr> (Date Accessed: May 19, 2015)].