



## INDICATOR: PERCENTAGE OF LAND COVER TYPES IN ONTARIO

**STRATEGIC DIRECTION:** Reduce Threats

**TARGET:** N/A

**THEME:** Pressures on Biodiversity – Habitat Loss

### **Background Information:**

Changes in land cover can provide critical information on broad-scale ecosystem changes and the causes and impacts of these changes. By using land cover mapping developed from satellite imagery, it is possible to track changes in land cover through time over broad areas. For this indicator, individual land cover classes were aggregated into broader land cover types with relevance to biodiversity: anthropogenic cover, aquatic cover, disturbance cover, natural disturbance cover and natural terrestrial cover. At the ecozone scale, anthropogenic cover reflects threats to biodiversity, under the assumption that human-modified landscapes experience greater habitat loss and fragmentation than more natural landscapes. While some disturbances are caused by human activities, it's important to note that disturbances are a natural part of any ecosystem and are necessary to maintain biodiversity. This indicator shows trends in the proportion of broad land cover types in each of Ontario's terrestrial ecozones over the period 2000-2011.

### **Data Analysis:**

Classes of land cover from digital provincial data sets for the years 2000 and 2011 were aggregated into five broad land cover categories (Table 1). In the Mixedwood Plains Ecozone of southern Ontario (with the exception of Manitoulin Island), land cover information from the Southern Ontario Land Resource Information System was used (SOLRIS; OMNR 2008). SOLRIS version 2.0 (2011 land cover) was developed using a LandSat based change detection analysis process applied to woodlands and wetlands identified in SOLRIS version 1.0 (2000-2002 land cover). For the rest of the province, data from Provincial Land Cover 2000 (PLC2000; Spectranalysis Inc. 2004) were used to assess land cover in the year 2000. The 2011 information for this large part of the province was assessed using two sources: Far North Land Cover 1.4 (FNL 2014; OMNRF 2014) includes the entire Hudson Bay Lowlands Ecozone and the northern portion of the Ontario Shield Ecozone; and an update to the rest of the PLC2000 that incorporated spatial information maintained by the Ontario Ministry of Natural Resources and Forestry on forest harvest, forest regeneration and burns. Among the various land cover products, the information for southern Ontario (SOLRIS) has the highest resolution (15 m versus 25-30 m).



Table 1. Broad land cover types used in analysis.

Broad land cover type	Land cover classes included
Anthropogenic cover	Built-up/settlement areas, roads, agriculture, and extraction (stone, sand and gravel, mines)
Aquatic cover	Open water of lakes and streams
Disturbance cover	Forest harvested within the previous 5-year period
Natural disturbance cover	Forest with recent burns, insect damage or blowdown
Natural terrestrial cover	alvars, mudflats, prairies, savannahs, wetlands, forests, rock and tundra

Comparing land cover information through time using different datasets presents challenges. It may be difficult to determine if observed changes are related to real changes on the landscape or are related to differences in the accuracy and classification methods used. The use of broad land cover categories in this indicator addresses this concern to some extent. For example, the same area might be assigned to a forest class or a treed wetland class using different classification methods – these two classifications would be considered natural terrestrial cover in this analysis. The 2011 information for southern Ontario and the southern portions of the Ontario Shield were developed by incorporating observed changes into the original 2000 data and so the observed changes will be real. However, the Far North Land Cover was developed using a more accurate classification method than the PLC2000, so distinguishing between real and methodological changes in this area is more problematic (OMNRF 2014).



**Results:**

**Trend:** Mixed      **Data Confidence:** Medium      **Geographic Extent:** Provincial

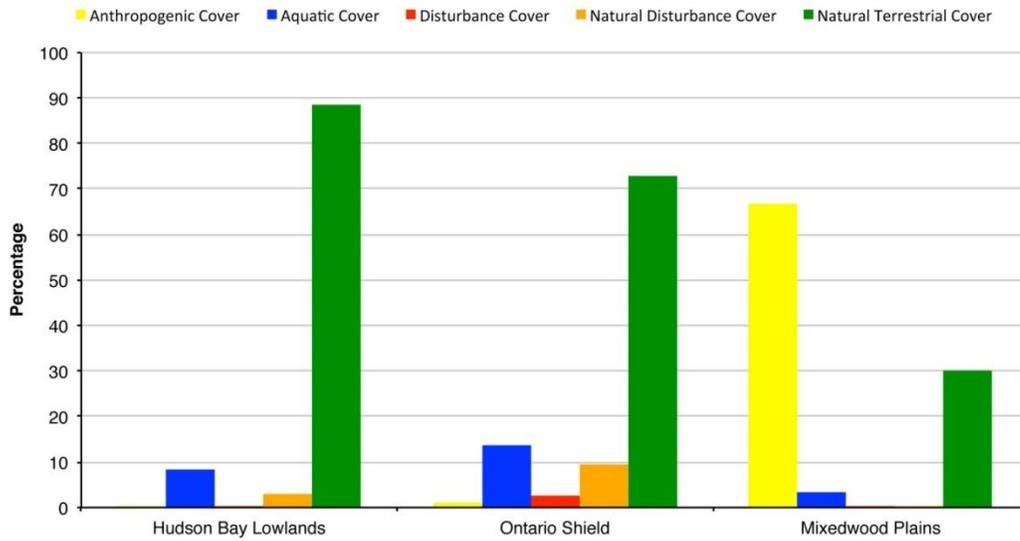


Figure 1. Percentage land cover composition for Ontario’s ecozones (based on land cover current to 2011, note: totals may not sum to 100% because of areas not classified due to cloud cover).

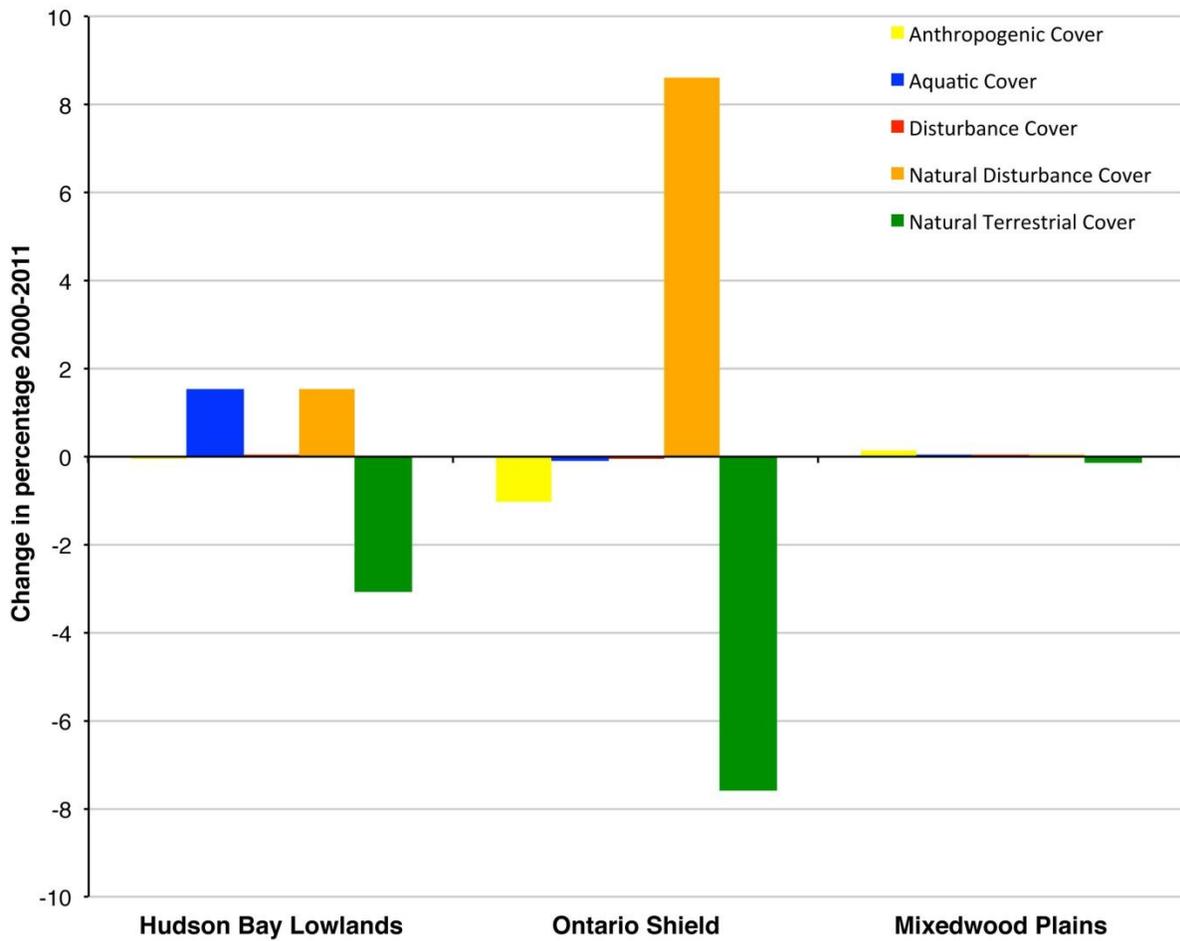


Figure 2. Changes in the percentage of land cover composition for Ontario ecozones between 2000 and 2011.

**Status:**

- Anthropogenic cover is highest in the Mixedwood Plains (67%), but is very low in the Ontario Shield (1%) and the Hudson Bay Lowlands (< 1%). Agriculture accounts for more than 91% of the anthropogenic cover in the Mixedwood Plains. These agricultural landscapes are an important source of food for Ontarians and provide food, fuel, and fibre to consumers beyond Ontario.
- In the Mixedwood Plains of southern Ontario, there was a very small increase in anthropogenic cover with a corresponding loss of natural terrestrial cover between 2000 and 2011. The amount of natural disturbance (burns) and disturbance from forest harvest remained extremely low in this ecozone.



- The vast majority of the Ontario Shield (96%) and Hudson Bay Lowlands (> 99%) ecozones remained in natural land cover types (aquatic, natural terrestrial and natural disturbance). Observed changes within these cover types are likely the result of improved information associated with the Far North Land Cover 1.4. The increases in natural disturbance cover in 2011 are related to the longer time frames considered when developing the disturbance classes in this dataset (up to 20 years).
- There is significant habitat loss and fragmentation in the human-dominated south and relatively little in the north.

**Links:**

**Related Targets:** N/A

**Related Themes:** N/A

**References:**

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 and Forestry (OMNRF). 2014. Far North Land Cover – Data Specifications Version 1.4. Ontario Ministry of Natural Resources and Forestry, Peterborough, ON.

Spectranalysis Inc. 2004. Introduction to the Ontario land cover data base, second edition (2000): outline of production methodology and description of 27 land cover classes. Inventory, Monitoring and Assessment Section, Science and Information Branch, Ontario Ministry of Natural Resources, Peterborough, ON.

**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)].