



INDICATOR: ROAD LENGTH IN ONTARIO

STRATEGIC DIRECTION: Reduce threats

TARGET: N/A

THEME: Pressures on Ontario's Biodiversity – Habitat Loss

Background Information:

Roads are a ubiquitous feature of human-modified landscapes and Ontario is no exception. Ontario has a higher density of roads than any other region in the country, particularly in the densely populated southern portion of the province. Major roads in southern Ontario have increased fivefold from 1935 to 1995 (OBC 2010), and very few areas in the region are more than 1.5 km from a road (OMNR 2009). As well, traffic volume on Ontario roads has increased markedly over the last 30 years (OMTO 2010).

The environmental impacts of roads are numerous and their proliferation typically leads to negative impacts on biodiversity. Plant, insect, herptile, bird and mammal richness and community composition have all been shown to be affected by roads (Coffin 2007). Biodiversity loss may occur directly via road-kill events (Jaeger et al. 2005), disturbance or pollution (Sanzo and Hecnar 2006; Warren et al. 2006), or indirectly by stimulating and facilitating loss of habitat, and forming barriers to dispersal and gene flow (Jaeger et al. 2005; Keller and Largiader 2009). Roads may also affect biodiversity through reduction in habitat quality, facilitating human access to less developed landscapes, increasing the risk of the introduction of invasive species, increasing the risk of forest fires and the creation of edge effects at road-habitat boundaries (Forman and Alexander 1998; Gelbard and Belnap 2003; Jaeger et al. 2005; Fahrig and Rytwinski 2009).

The consideration of environmental impacts when roads are constructed or upgraded in Ontario has improved in recent decades. The Environmental Assessment Act sets up a thorough process for assessing the environmental impacts of various alternatives for road development prior to government approvals. This helps to protect the natural environment and mitigate the environmental impacts.

This indicator assesses changes in the length of roads in both southern and northern Ontario based on the Ontario Road Map as an index of habitat loss and landscape fragmentation.

Data Analysis:

The length of road in four different classes (earth/unimproved, two-lane loose, two-lane paved, multilane paved) in southern and northern Ontario was assessed in each decade from 1935-2005 based on the Ontario Road Map (ORM) that is updated by the Ontario Ministry of Transportation every 2 years. Road data from the southern Ontario portion of the ORM by decade for the period 1935-1995 were digitized and summarized by Fenech et al. (2000). The ORM for 2005 were digitized by the Ontario Ministry of Natural Resources and Forestry. Changes in the length of classes of roads for the southern Ontario portion of the ORM were assessed over the period 1935-2005 (Figures 1 and 2). Analyses of changes in the northern Ontario portion of the ORM are ongoing and will be added to this indicator when completed. A preliminary assessment showed that the total length of ORM roads in this part of the province increased from about 3,400 km in 1935 to more than 13,300 km in 2005.



It is important to note that due to limitations of scale, the ORM does not include all roads within the province. The ORM includes about 20% of the roads included in the digital Ontario Road Network (OMNRF 2014). For example thousands of kilometres of municipal streets and forest access roads do not show up on the map. However, using the ORM provides a consistent means of tracking changes in the road network in Ontario through time back to 1935, and provides a reliable index of pressures related to road density.

Results:

Trend: Mixed **Data Confidence:** Medium **Geographic Extent:** Mixedwood Plains/Southern portion of Ontario Shield

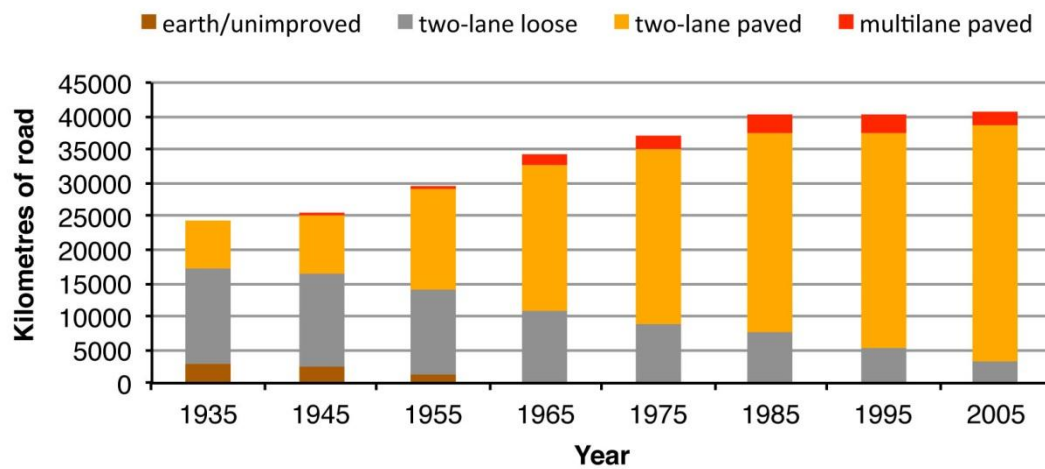


Figure 1. Road changes in southern Ontario based on the Ontario Road Map, 1935-2005.

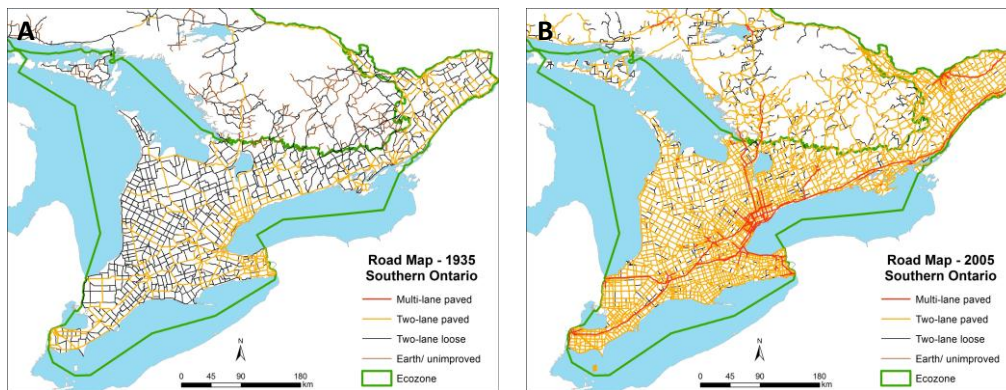


Figure 2A & B. Roads in southern Ontario 1935-2005 (Note: the maps are presented as an animated gif on the website that rolls through each decade).



Status:

- Based on the Ontario Road map, the length of roads in southern Ontario increased from 24,200 km in 1935 to 40,800 km in 2005, representing an increase of 69%.
- Although the rate of increase in total road length has slowed (> 2% increase between 1985 and 2005), the total length of paved roads in southern Ontario has continually increased from 7,000 km in 1935 to 37,400 km in 2005, including 2,300 km of multi-lane paved roads that did not exist in 1935.

Links:

Related Targets: N/A

Related Themes: N/A

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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)].