Vehicle Use

Indicator # 7064

Overall Assessment

Status:	**Poor**
Trend:	**Deteriorating**
Rationale:	**Population growth and urban sprawl in the Great Lakes Basin have led to an increase in the number of vehicles on roads, fuel consumption, and kilometers spent on the road by residents. Vehicle use is a driver of fossil fuel consumption, deteriorating road safety, and ecological impacts such as climate change and pollution.**

Lake-by-Lake Assessment

Individual lake basin assessments were not prepared for this report.

Purpose

- To assess the amount and trends in vehicle use in the Great Lakes basin
- To infer the societal response to the ecosystem stresses caused by vehicle use

Ecosystem Objective

This indicator supports Annex 15 of the Great Lakes Water Quality Agreement. An alternative objective is to reduce stress on the environmental integrity of the Great Lakes region caused by vehicle use.

State of the Ecosystem

A suite of indicators monitoring vehicle use, including the number of licensed registered vehicles and fuel consumption, is measured by governments in Canada and the United States to capture trends linked to fossil fuel consumption, road safety, and ecological impacts such as climate change and pollution. Figure 1 shows the estimated total distance traveled by vehicles on roads in Ontario during 1993-2005 and the number of licensed vehicles registered in Ontario (excluding trailers) for the same period. The number of licensed vehicles registered in Ontario rose from 6,329,052 in 1993 to 7,843,014 in 2005. Of greater significance is the estimated 125,102 million vehicle kilometers traveled (VKT) in Ontario in 2005, up 66% from 1993. The greatest increase in VKT occurred between 1999 and 2000 (an increase of 33%) followed by a 2% decrease in 2001. It is possible that recent record high prices for crude oil, which began climbing in late 2002, may be responsible for a slightly curbed VKT increase rate, and this may continue to affect VKT in the future. From these data, however, it is still evident that drivers in Ontario are increasingly spending more time on the road.

Figure 2 shows the estimated trends in registered vehicles, licensed drivers, and vehicle kilometers traveled in the Great Lakes states from 1994 to 2004. The number of registered vehicles increased approximately 11% during this time period, while the number of licensed drivers only increased 8%. These increasing trends are somewhat lower than national averages in

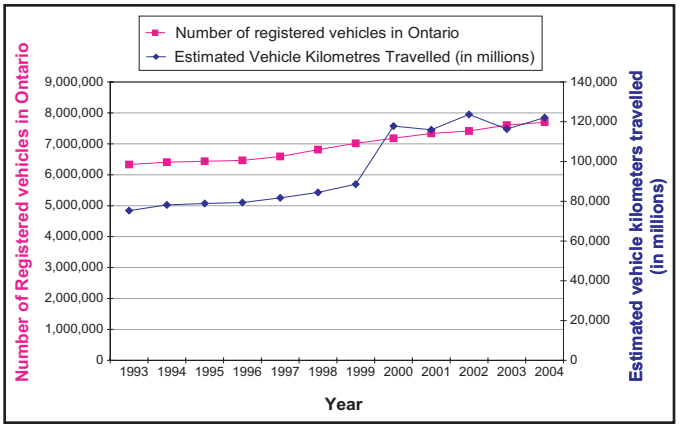

Figure 1. Number of Licensed Vehicles and Vehicle Kilometres Travelled in Ontario.

Source: Statistics Canada *Canadian Vehicle Survey.*

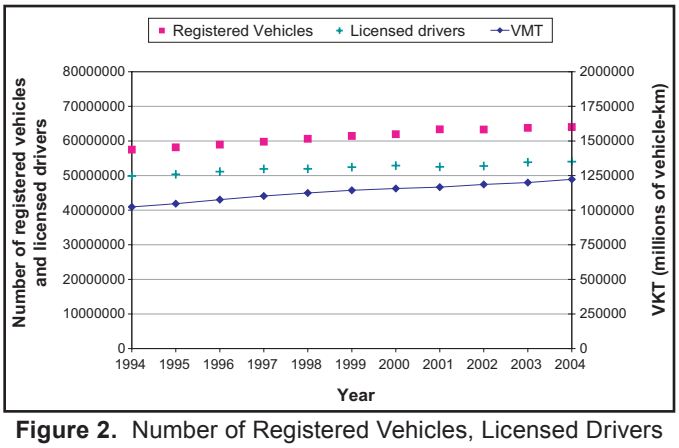

Figure 2. Number of Registered Vehicles, Licensed Drivers and Vehicle Kilometers Traveled in Great Lakes States.

Source: U.S. Department of Transportation, Federal Highway Administration. Office of Highway Policy Information. Highway Statistics Publications.

the U.S., which showed increases of 20% and 13%, respectively. Just as in Ontario, VKT increased at a greater rate than the number of registered vehicles or licensed drivers. VKT increased in the Great Lakes States approximately 20% from 1994 to 2004, as compared to a 24% national U.S. increase. In 2004, U.S. residents in the Great Lakes States were driving about 7% more kilometers per vehicle than in 1994.

In Canada, the amount of energy used by the transportation sector between 1990 and 2004 increased 31%, from 1877.9 petajoules to 2465.1 petajoules. As a result, energy-related greenhouse gases (GHG) rose by 31%, from 135.0 megatonnes to 176.4 megatonnes. In that same time period, the number of vehicles rose 6% faster than the number of people (Government of Canada 2005).

In Ontario, sale of motor gasoline increased by approximately 23% between 1994 and 2004 (Figure 3), on par with the national average. Gasoline sales rose from more than 12 billion liters to more than 15 billion liters between 1990 and 2003, and diesel fuel sales in Ontario alone doubled during the same period, from more than 2 billion to almost 5 billion liters. This trend is driven by a rise in number of vehicles on Ontario highways, increased power of automobile engines, and the growing popularity of sports utility vehicles and large-engine cars (Ménard 2005**).**

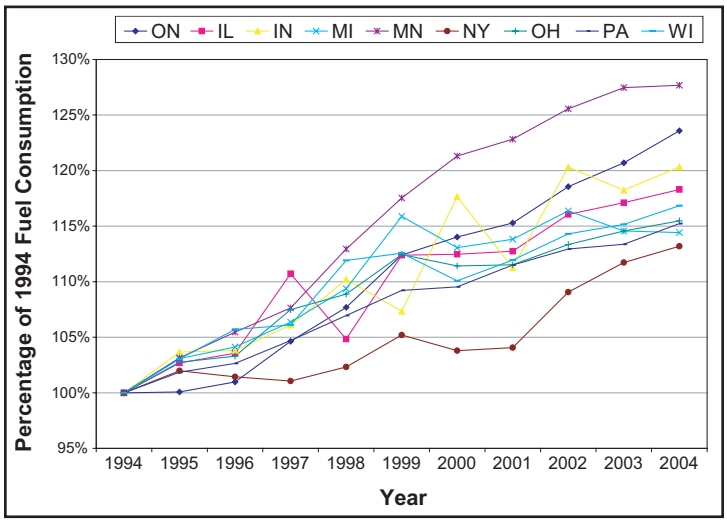

Figure 3. Fuel Consumption as a Percentage of 1994 Levels*

*The data increase is based on initial 1994 Consumption Levels which differ across the areas studied.

Sources: Statistics Canada's Energy Statistics Handbook (2006) and U.S. Department of Transportation, Federal Highway Administration. Office of Highway Policy Information. Highway Statistics Publications.

In the Great Lakes states, fuel (gasoline and gasohol) consumption for vehicles increased by 17% on average from 1994 to 2004 (Figure 3), as compared to a 24% increase nationally in the U.S. Use of ethanol blended fuels (gasohol) in the Great Lakes states increased 160% over this time period to comprise approximately 39% of fuel consumption in the Great Lakes states.

Over the last decade, consumers have shown a strong preference for high-performance vehicles. Since 1999, the production of Sport Utility Vehicles (SUVs) has dominated the automotive industry, surpassing the output of both minivans and pickup trucks nation-wide. For the period of January to September 2004, SUVs accounted for 18% of total light-duty vehicle manufacturing, which includes passenger cars, vans, minivans, pickup trucks and SUVs in Canada (Magnusson 2005**).** In the Great Lakes states, the registrations of private and commercially owned trucks, which include personal passenger vans, passenger minivans, and sport-utility vehicles, have increased approximately 50% from 1994 to 2004. Private and commercially owned trucks now comprise about 37% of all registered vehicles in the Great Lakes states.

Pressures

Suburban development has become the predominant form of growth in the Great Lakes basin. The "mixed" assessment for the Air Quality indicator (#4202) can be directly linked to the increase in traffic congestion. As a major driver of ecological stress, vehicles are the single largest Canadian source of the smog-causing GHG emissions. These emissions include nitrogen oxides (NOx) and volatile organic compounds (VOCs) as well as carbon monoxide (CO), all which contribute contaminants to air and water systems **(**Ministry of Environment 2005). Such pollutants have been connected to respiratory problems and premature death. There is strong evidence that atmospheric deposition is a source of pollutants in storm water runoff and that this runoff reaches streams, rivers and other aquatic resources (International Joint Commission 2004). Congestion caused by automobiles and vehicle-related development also degrades the livability of urban environments by contributing noise, pollution, and fatalities. Positive trends in road use may also lead to further fragmentation of natural areas in the basin.

Management Implications

There is a need to reduce the volume and congestion of traffic in the Great Lakes basin. While progress has been made through less polluting fuels, emission reduction technologies, and economic tools such as the tax incentives that encourage the purchase of fuel-efficient vehicles (e.g., the American Tax for Fuel Conservation and the Canadian ecoAUTO Rebate Program), issues of urban

sprawl must also be managed. Recent studies by the U.S. EPA found that infill development and re-development of older suburbs could reduce VKT per capita by 39% to 52%, depending on the metropolitan area studied (Chiotti 2004). The success of current strategies will assist managers and municipalities to protect natural areas, conserve valuable resources (such as agriculture and fossil fuels), ensure the stability of ecosystem services, and prevent pollution. Under the Kyoto Protocol, Canada is committed to reducing its GHG emissions by 6% below 1990 levels by the year 2010, even though the government may consider new targets.

Over the next 25 years, the number of people living in Ontario is expected to grow by approximately 3.8 million, the majority of which are expected to reside in the Great Lakes basin. In the Golden Horseshoe Area alone, forecasts predict that the population of this area will to grow by 3.7 million, from 2001 to 2031.

Improving urban transportation is the first investment priority. However, there is an acknowledgment that improving population growth forecasts, intensifying land use, revitalizing urban spaces, diversifying employment opportunities, curbing sprawl, protecting rural areas, and improving infrastructure are all part of the solution. Urban development strategies must be supported by positive policy and financial frameworks that allow municipalities to remain profitable, while creating affordable housing and encouraging higher density growth in the right locations. Further research, investment and action are needed in these areas.

Comments from the author(s)
For the purposes of this indicator, the total number of registered vehicles in Ontario excludes trailers, which are technically registered as vehicles in the province.

Canadian Vehicle Kilometers Traveled (VKT) data are based on a voluntary vehicle-based survey conducted by Transport Canada. The measure of vehicle-kilometers traveled does not take into account occupancy rates, which affect the sustainability of travel. The records of state agencies that administer state taxes on motor fuel are the underlying source for most of the U.S. data presented in this report. Over the last several years, there have been numerous changes in state fuel tax laws and procedures that have resulted in improved fuel tax compliance, especially for diesel fuel. The improved compliance has resulted in increased fuel volumes being reported by the states to Federal Highway Administration.

United States VKT data are derived from the Highway Performance Monitoring System (HPMS). The HPMS is a combination of sample data on the condition, use, performance and physical characteristics of facilities functionally classified as arterials and collectors (except rural minor collectors) and system-level data for all public roads within each state.

Although data about VKT, registered vehicles, and fuel consumption was only available up to 2003 and 2004, the authors feel this indicator should be updated in future to examine potential shifts in vehicle-use behaviors based on the recent rise in gasoline prices.

Acknowledgments
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Other Resources
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