



# MERCURY DIVERSION IN THUNDER BAY

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## ABSTRACT

An assessment of the current status of mercury diversion outreach programs in Thunder Bay initiated by EcoSuperior 2010-2020, funded by the Ontario Ministry of Environment, Conservation & Parks as part of the Lakewide Management Plan activities for Lake Superior.

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## EXECUTIVE SUMMARY

In 1990, the International Joint Commission requested that the governments of Canada and the United States develop a program to virtually eliminate a group of persistent pollutants known as “the Nasty Nine,” leading to the creation of a binational program to restore and protect the Lake Superior Basin featuring Zero Discharge Demonstration Program. In 1999, a two-decade release reduction plan was developed for the nine pollutants (mercury, PCBs, dioxin, hexachlorobenzene, octachlorostyrene, dieldrin, chlordane, DDT and toxaphene). The plan identified reduction targets of all the pollutants, with 1990 as the baseline year and 2020 as the year where virtual elimination would be achieved. This report is to assess the current status of mercury reduction outreach programs as of 2019 for Thunder Bay and area.

EcoSuperior is a not-for-profit organization based in Thunder Bay, Ontario with a mandate to build a healthy future for people and the planet. Incorporated in 1995, the organization has a long history of delivering environmental education and stewardship programs in northwestern Ontario, including Thunder Bay and communities along the north shore of Lake Superior.

EcoSuperior delivered pollution prevention initiatives including mercury diversion initiatives as early as 1999 with support from Environment Canada and the Binational Forum. These initiatives included special waste collection events; fluorescent light recycling depots for both residential and industrial users; a vehicle switch-out program; button battery and thermostat collection sites and a clean-sweep collection of mercury from area school boards. Many of these programs have since been turned over to the private sector, or eliminated through legislation banning mercury in specific products.

In 2007, EcoSuperior signed a 3-year agreement with the Ontario Ministry of the Environment (now Ministry of Environment, Conservation and Parks) to carry out the coordination, support and implementation of priorities identified by the Chemical Committee Work plan contained in the Lakewide Management Plan for Lake Superior. Since then, EcoSuperior has annually contracted with the Ministry to coordinate LaMP activities for Thunder Bay and area. EcoSuperior committed to the following objective within the 2019-20 agreement with the MOECP:

*C.3.3.1 The Recipient will assess the status, and communicate the success of, City of Thunder Bay and area activities undertaken to remove mercury and other chemicals of concern from the Lake Superior Basin, by sharing summaries of the Recipient’s assessment reports in a media release and by making the reports available on the Recipient’s website.*

*b) The Recipient will prepare an assessment report on the current status of mercury diversion programs in the City of Thunder Bay including but not limited to thermostat, fluorescent light, vehicle switch, and button battery diversion programs.*

## BACKGROUND

Mercury is a bioaccumulative, toxic heavy metal that can have severe impacts on human and ecosystem health. Mercury is present in the environment in many different forms. Elemental mercury is commonly found in the Earth's crust, in raw materials such as coal, crude oil and other fossil fuels, and in minerals such as limestone, soils and metal ores (including copper, gold and zinc). Mercury also enters the environment as a result of natural processes such as forest fires and volcanic activity. Mercury can also be released into the environment as a result of human activities, such as the combustion of coal and petroleum products, mining, and the use and disposal of consumer products containing mercury such as electrical switches, thermostats and batteries.

Mercury is a potent neurotoxin when it affects the health of people and wildlife. Because it bioaccumulates, mercury is a key cause of fish consumption restrictions in Ontario. Just one gram of mercury can contaminate an eight-hectare lake to the point where the fish in that lake are not safe to eat.

## MERCURY-CONTAINING PRODUCTS

Releases of mercury attributable to the use and end-of-life disposal of products represented approximately 40% of total Canadian mercury air emissions in 2014, but since then, Canada has taken action to reduce this source of mercury contamination. The Products Containing Mercury Regulations came into force on November 8th, 2015. The regulations prohibit the manufacture and import of products containing mercury or any of its compounds, with some exemptions for essential products which have no technically or economically viable alternatives (e.g. certain medical and research applications). In the case of lamps, rather than introducing a prohibition, the regulations limit the amount of mercury contained in fluorescent and other types of lamps. The regulations are estimated to result in an annual reduction of approximately 4 tonnes of mercury used in products (EC, 2014).

In the Thunder Bay area, outreach programs to reduce the release of mercury into the environment focused on specific consumer products: fluorescent lights, thermostats, button batteries and vehicle switches. In most cases, a combination of increased regulation and new technologies have resulted in the phasing out of mercury-containing products as consumers switch to less toxic alternatives.

### Fluorescent Lights

EcoSuperior helped to coordinate one of the first regional recycling programs for fluorescent lights along with industrial partners at Bombardier and Bowater paper mill. Later the program was expanded to collections of bulbs from residential sources with support from Ontario Hydro. The program was eventually handed over to the municipalities where residents can bring their spent bulbs to municipal hazardous waste depots or collection events.

In Thunder Bay, current options for safe disposal of fluorescent and compact fluorescent bulbs include:

- Hazardous Waste Depot at the Thunder Bay Solid Waste & Recycling Facility
- Westburne Electric Supply, 1231 Amber Drive. Accepts boxed/packaged tubes but not loose. Fees applicable.
- Gescan-A, 565 Dunlop Street. Call for applicable fees.

- MGM Electric, 724 MacDonnell Street, 345-7767 (PCB free ballasts are also accepted). Call ahead for applicable fees. Commercial only. Small fee for handling.

Thunder Bay Hydro has offered commercial lighting funding programs that have helped to encourage the switch to more efficient LED bulbs, and the use of fluorescents is rapidly declining.

The city of Thunder Bay special waste collection depot reports

**Tonnage of Waste Diverted by the City of Thunder Bay: 2010 – 2019**

Mercury Debris: 1,130 Kg

Fluorescent Lamps/Bulbs: 36, 735 Kg

Data from other fluorescent bulb collection sites is unavailable.

**Button Batteries**

Button cell batteries are commonly used in watches, hearing aids, calculators and various equipment with applications in medical, military and commercial facilities.

In Thunder Bay, consumers were directed to drop off used button cell batteries at two local retailers: Sears (closed in 2018) and WalMart. Canadian regulations phased out mercury in button batteries, except for implanted devices, in 2015, making the collection program obsolete. Data is no longer available.

**Thermostats**

Mercury thermostats contain bimetal coils that contract and expand with room temperature. When the coil contracts or expands, it activates the mercury switch, which opens or closes a circuit to make the furnace, heat pump, or air conditioner turn on or off. While the sale of mercury thermostats was banned in Canada in 2006, older heating and cooling systems are still being renovated and replaced, resulting in the need for a program to ensure the safe disposal of old thermostats containing mercury. While most homes and commercial buildings are now equipped with digital thermostats, a small number of the old mercury-powered thermostats continues to show up.

In Thunder Bay, a thermostat switch-out program was set up in 2005, and since 2016 has been managed by the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI) throughout the province. Local participants in the program currently include:

- Emco Corp.  
933 Tungsten St, Thunder Bay  
(807)346-6311
- ECCO Supply  
1131 Central Ave, Thunder Bay  
(807)346-4464



Heating contractors use these locations as drop off points, but the general public and DIY renovators can also drop off mercury thermostats at these locations.

Province-wide since 2006 the program has yielded the following results:

Electronic: 10,251  
Mercury: 101,740  
Total Metals = 2,161.21Kg  
Total Plastics= 6,093.36Kg  
Total Mercury diverted from landfill = 440Kg

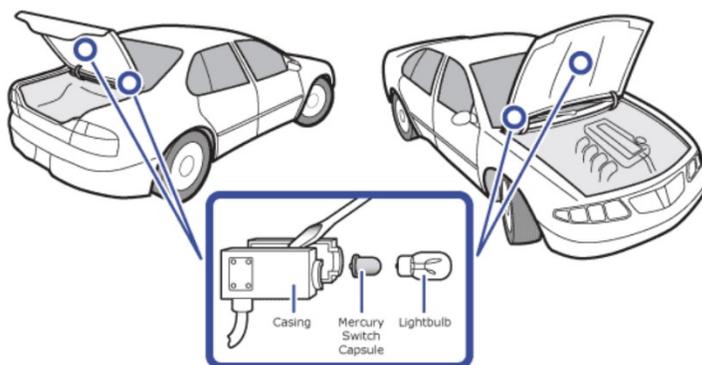
2019 data for all of Ontario:  
Electronic: 1,234  
Mercury: 5,908  
Total Metals = 127.46Kg  
Total Plastics= 420.84Kg  
Total Mercury diverted from landfill = 18.84Kg

2019 data for Thunder Bay:  
Electronic: 23  
Mercury: 253  
Total Metals = 4.77Kg  
Total Plastics= 14.16Kg  
Total Mercury diverted from landfill = 7.58Kg

### Vehicle Switches

In 2008, EcoSuperior launched a local initiative as part of a nation-wide program to remove mercury switches from end-of-life vehicles. The media launch was held at Thunder Bay Auto Parts. Auto manufacturers voluntarily phased out these switches in all vehicles since 2003, but because automobiles have a long lifespan, switches from older vehicles ending up at the wrecking yards still posed a significant problem.

Figure 2: Location of convenience light mercury switches in a vehicle (Source: [www.switchout.ca](http://www.switchout.ca))



Since 2008, The total number of switches collected and managed since 2008 is 543,502 (as of February 2017). Local numbers for the participating auto recyclers in Thunder Bay and area were not available. This is as a result of the dwindling numbers of switches appearing now. This downward trend was already apparent between 2009 and 2011 as noted in an Environment Canada report (2013).

The report noted that a forecast based on Statistics Canada through the Canadian Vehicle Survey information indicated that the on-road switch inventory would be exhausted by 2016.

The national mercury switch recovery program was delivered by Scout Environmental but has since been phased out and the website is no longer active.

## CONCLUSIONS

Thunder Bay and area was provided with access to a wide range of mercury diversion programs and significant progress has been made in reducing the environmental impacts of mercury-containing products. Legislation has also reduced access to such products, which have been widely replaced with newer technologies. Canada has also participated in many other mercury reduction strategies, such as being a signatory to the Minamata Convention on Mercury, a global treaty to protect human health and the environment from the adverse effects of mercury. The Minamata Convention includes a ban on new mercury mines, the phase-out of existing ones, the phase out of the manufacture, import, or export of listed manufactured products to which mercury is added and control measures on air emissions. In addition, the previously mentioned Products Containing Mercury Regulations, instituted in 2015, are estimated to have resulted in annual reduction of about 4 tonnes of mercury.

The Zero Discharge Demonstration Program for Lake Superior set ambitious goals for mercury reduction and efforts to determine how much progress was made toward those goals are ongoing. The most recent milestone summary report from 2015 is still in draft form and has yet to be publicly released.

It should also be noted that release of mercury from consumer products is only one of many contributing sources of mercury contamination. The elimination of coal-fired electricity generation in Ontario was a major step ahead in atmospheric mercury reduction, but there remain many mercury contaminated sediment sites in Lake Superior, including Thunder Bay's North Harbour site. Nearby taconite mines just across the U.S. border are also a major source of mercury.

The Lakewide Management Plan for Lake Superior provides an ongoing guide to ways that we can continue to improve and preserve water quality. <https://binational.net/wp-content/uploads/2016/09/Lake%20Superior%20LAMP%202015-2019.pdf>

The Lake Superior Binational Partnership also recommends the following actions for all who wish to protect our great lake and further support the Zero Discharge Demonstration Program:

1. Reduce unnecessary driving where possible to reduce dioxin and HCB emissions.
2. Use a rain barrel for watering the garden.
3. Install water-saving devices.
4. Reduce, reuse, repair, and recycle.
5. Never burn garbage.
6. Take household hazardous materials to hazardous waste collection depots.
7. Compost organic garbage and use natural pest-control methods.

8. Return unused medicines, including over-the-counter drugs, to pharmacies; never flush them down the toilet or dump them down the sink.
9. Promote corporate social responsibility and support businesses with sustainability initiatives.
10. Report suspicious fish die-offs immediately to authorities.
11. Support stewardship events and efforts in your community.

## SOURCES

<https://www.epa.gov/sites/production/files/2015-11/documents/lake-superior-zero-discharge-demonstration-program-2012-8pp.pdf>

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Telephone interview with Nazick Yassien  
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Lakewide Management Annex 2 <https://binational.net/annexes/a2/>

Draft Great Lakes Binational Strategy for Mercury Management [https://binational.net/wp-content/uploads/2018/05/Mercury\\_Strategy\\_Draft-Apr-25-2018.pdf](https://binational.net/wp-content/uploads/2018/05/Mercury_Strategy_Draft-Apr-25-2018.pdf)

Final Report: Pollution Prevention Planning in Respect to Mercury Releases from Mercury Switches in End-Of-Life Vehicles Processed by Steel Mills (PDF; 129 KB)

<https://www.ec.gc.ca/planp2-p2plan/default.asp?lang=En&n=8FE739D1> (archived page)

Canadian Vehicle Manufacturer's Association <http://www.cvma.ca/programs/mercury-switch-recovery/>