

TOXIC POLLUTION

What Are Some Examples of Toxic Chemicals?

While our waters may appear clear and pristine, toxic chemicals can be present in both the water and the many organisms, particularly fish, that live in it.

Toxic contaminants include:

- Heavy metals like mercury, cadmium and lead
- Polychlorinated biphenyls (PCBs), which were banned in the late 1970s but persist in sediments and fish
- Pesticides, including many that have long been banned which continue to leach from old dumps, etc.
- Dioxins, which are discharged from industrial sources, such as incinerators
- Automotive chemicals – motor oil, gas, antifreeze, coolants, etc.

How Do Toxic Substances Get Into Our Water?

Toxics can come from both point and non-point sources. Many industrial processes create waste products that are toxic to living organisms and contaminate our water. In addition, we have created products that contain toxic substances such as cleaning products, insecticides, pesticides, fungicides and herbicides.

At any given moment, somewhere in the watershed is a leaking radiator, a landowner spraying herbicides or someone spilling gas while filling up their car. When it rains, these toxic pollutants are washed into the nearest storm drain or ditch, eventually reaching a nearby waterway. Each winter, hundreds of pounds of road salt and sand are spread on area roadways; when spring rolls



around, it all gets washed into the nearest waterway. Additionally, farms, businesses and homes throughout the watershed are potential sites of groundwater contamination from improperly disposed and stored pesticides, solvents, oils and chemicals.

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Currently, point sources for toxics in the Grand Traverse Bay region are limited, but, we do have a number of “legacy” sites that are still having an impact on water quality. Many of the larger contaminated industrial sites have either been cleaned up or are in the process of being cleaned up. For example,

cleanup is underway at the Dura Automotive trichlorethylene (TCE) plume in Mancelona and remediation measures in place at the Cone Drive Operations site are successfully removing contaminants there.

Additionally, toxic substances that have been buried in the sediment at the bottom of some lakes and rivers are sometimes reintroduced by dredging, storms, and ships as they travel on the lakes, particularly in nearshore areas. Substances from other parts of the world are carried by air currents and deposited in the Great Lakes Watershed.

There is also widespread air deposition of toxic substances into Michigan's waters, particularly mercury. These chemicals travel on the wind from Chicago, Milwaukee and other points west and then are deposited here through precipitation.

How Do Toxic Chemicals Affect Us?

Toxic contaminants impact humans and the environment in several ways:

- Toxics accumulate in fish, which are then consumed by humans. Potential and known hazardous effects include cancer, neurological problems and birth defects.
- Toxics harm aquatic life, potentially causing all plant animal life in entire streams or lakes to be killed off if contamination is high enough.

QUICK FACTS

- √ More than **70,000** commercial and industrial compounds are now in use.
- √ An estimated **1,000** new chemicals are introduced each year.
- √ More than **30,000** chemicals are produced or used in the Great Lakes Region.
- √ Over **1,000** chemicals are in the Great Lakes ecosystem
- √ **362** toxic substances have been identified in quantifiable amounts in the Great Lakes.

How Do Such Small Amounts Become Toxic?

Once many of these toxic substances enter the Great Lakes Watershed, they do not disappear. Toxic substances tend to have *persistence*, because they do not break down easily into harmless substances.

As organisms ingest these substances, either with sediment, water or by eating other species, the toxins accumulate in their tissues. This process is called **bioaccumulation**. They also increase in quantity and become more concentrated. This process is called **biomagnification**. Humans are exposed to toxic chemicals when they eat contaminated fish. Many of these substances are poisonous or **carcinogenic** in very small quantities.

How Are Contaminants and Toxic Substances Classified?

The U. S. Toxic Substances Control Act was passed in 1979 and the U. S. Environmental Protection Agency sets standards for toxic substances in water.

The EPA has categorized toxic substances and contaminants into three levels based on existing information about the impacts on Lake Michigan and its watershed. Limits have been placed on some substances in the United States and Canada, but many of these substances are exported to other countries which lack such standards.

Level 1 Critical Pollutants

Criteria:

- Violate the most stringent federal or state water quality standards in nearshore and/or open waters of lake Michigan
- Exceed a U.S. Department of Agriculture: Food & Drug Administration action level in Lake Michigan fish
- Impair the use of Lake Michigan waters

Contaminants:

- Total PCBs (polychlorinated biphenols) and 209 related chemicals – widely used from 1929-1978 in hydraulic fluids, lubricants, and inks.
- Chlordane – widely used in pesticides, now limited to fire ant control in power transformers
- Dioxins, PCDDs (Polychlorinated dibenzo-paradioxins) (family of 75 compounds) – present in fungicides and herbicides, byproduct of chlorine bleaching in pulp and paper manufacture and burning organic materials containing chlorine
- Mercury – widely used in pulp and paper industry and in manufacture of chlorine and caustic soda, byproduct of coal-burning power plants and waste incinerators
- Dieldrin – insecticide used on fruits from 1946-1974, banned in Michigan in 1968
- DDT/DDD/DDE – widely used insecticides
- Furans, PCDFs (polychlorinated dibenzofurans) (135 types of furans) – used in herbicides and a byproduct of chlorine bleaching in pulp and paper manufacturing

Level 2 Pollutants of Concern

Criteria:

- Cause or contribute to use impairments on a local or regional level
- Show evidence that loadings to or ambient concentration in the Lake Michigan Watershed are increasing

Contaminants:

- Hexachlorobenzene
- Toxaphene
- Cadmium
- Copper
- Arsenic
- PAHs
- Chromium
- Zinc
- Cyanide

Level 3 Emerging Pollutants

Criteria:

- Not presently known to contribute to impairments or to show increasing loading or concentrations
- Have characteristics indicating a potential impact to the physical or biological integrity of Lake Michigan

Contaminants:

- Atrazine
- PCB substitute compounds
- Selenium

Websites for More Information:

- Environmental Protection Agency: www.epa.gov
- Great Lakes National Program Office: www.epa.gov/glnpo/about.html
- Lake Michigan Lake Wide Management Plan: www.epa.gov/glnpo/lakemich/
- International Joint Commission (Canada and United States): www.ijc.org/