



Michigan Tech

PCBs IN TORCH LAKE: WHAT'S THE STORY?

PCBs AND TORCH LAKE – ARE THEY A CONCERN?

Yes. Polychlorinated biphenyl (PCB) concentrations in Torch Lake sediments, water, and fish are higher than PCBs in nearby lakes. Locations with high PCB concentrations are found near the western shore of the lake.

Note: Swimming and boating are safe and do not expose you to unsafe levels of PCBs. The local municipal drinking water is not contaminated with PCBs.

WHAT ARE PCBs?

PCB compounds were produced as mixtures of dozens of individual chemicals. Individual PCBs differ according to the number of chlorine atoms and their effects on humans and the aquatic food web. PCBs were widely used in transformers, capacitors, inks, carbon paper, and hydraulic and lubricating oils. PCB production was banned in the U.S. in 1979 and internationally in 2001 due to concerns over adverse effects on humans and wildlife.

WHY ARE PCBs OF CONCERN?

Exposure to PCBs may contribute to high levels of the chemicals in adults and children, potentially leading to various health problems such as cancer, neurological disorders, skin lesions, and liver problems. Additionally, PCBs affect reproduction and can be passed from mothers to children during pregnancy and through breast feeding. Children are more vulnerable to the effects of PCBs than adults.

HOW AM I EXPOSED TO PCBs?

You likely come into contact with PCBs through:

- Eating fish with high levels of PCBs in their fatty tissue.
- Contact with contaminated soils.

People are exposed to PCBs primarily by eating contaminated fish. Fish obtain PCBs both directly from lake water and from eating smaller organisms. Older and bigger fish generally contain higher concentrations of PCBs due to bioaccumulation, a process where concentrations of a substance increase up the food chain.

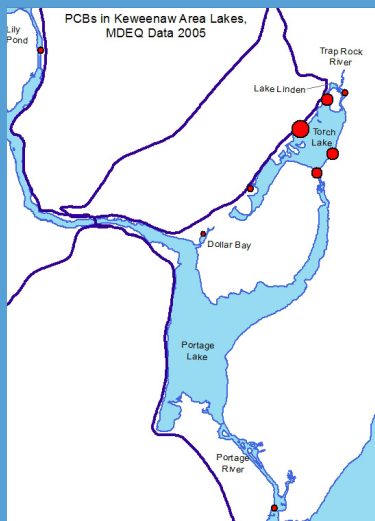
ARE THE FISH IN TORCH LAKE SAFE TO EAT?

The *2016 Michigan Eat Safe Fish Guide* gives instructions on how to choose safe fish and how to clean and cook fish to minimize exposure to PCBs and other harmful chemicals.

The guide suggests people limit consumption of walleye to 6 to 12 servings per year, smallmouth bass and largemouth bass to 1 to 2 servings per month, northern pike to 2 servings per month, and suckers to 4 to 12 servings per month — all depending upon the size of the fish. A serving for a typical adult is about 8 ounces of fish. A serving for a child ranges from 2 to 4 ounces.

See: www.michigan.gov/eatsafefish





Concentrations of PCBs in Torch Lake and surrounding areas in 2005. The size of the dots is proportional to the aqueous concentration of PCBs at the locations shown.



WHY ARE PCBs HERE?

There are two sources of the PCBs in Torch Lake. Most of the PCBs remain from local usage by the mining industry as part of their operations, but some traveled long distances through the air and were deposited in the lake.

Copper milling and reclamation along the western shoreline of Torch Lake used large amounts of electricity. That electricity was supplied by four power plants along the lake as well as smaller generators in other buildings.

PCBs were widely used in electrical transformers and capacitors between 1930 and 1977, and many of the ore processing buildings had transformers or capacitors containing PCBs. Those devices may have leaked onsite, or they may have been improperly disposed of onsite or in the lake. Transformers and other copper-containing machinery that were brought to the shore-based operations on Torch Lake to reclaim the copper may also have been a source of PCB releases in the area.

As of fall 2013, PCBs have been found specifically in the Calumet & Hecla coal dock area and basement of the Calumet & Hecla Powerhouse, near the sites of the Calumet Stamp Mill and Calumet & Hecla Smelter, as well as more generally in the water, fish, and sediment of Torch Lake.

The figure above shows that concentrations of PCBs in Torch Lake water were much higher than in nearby waterways.

THE BOTTOM LINE

- A local source of PCBs exists as shown by the higher concentrations in this lake and the chemical difference in the mixture of PCBs in Torch Lake as compared to other local lakes. The PCBs in Torch Lake are more highly chlorinated than PCBs in nearby lakes and are typical of the mixtures used in the 1940s and 1950s in transformers and capacitors.
- To be delisted from the Area of Concern Program, the Beneficial Use Impairment (BUI) caused by high PCB concentrations in fish must be lifted. The BUI can only be delisted if PCB levels in fish decline so that fish are safe for consumption.



ABOUT THIS PROJECT

Intensive copper mining took place on the Keweenaw Peninsula from 1845 through 1968. Mining shaped the people and the environment of the Copper Country, as it is known, and continues to influence the region today.

On the social side, mining influenced individual lives. Where and how people lived, their social status, their health, and their longevity were all influenced by mining activity. Mining also affected community population and dynamics, dictating the locations of towns, social structures, and transportation systems.

On the environmental side, mining influenced the shape of the land surface and waterways, the quality of the air as well as surface and ground water. It also exposed humans and ecosystems to a variety of pollutants.

Torch Lake, one hub of mining-related activities, has become the center of efforts by regulatory agencies to mitigate harmful impacts from mining activities. This project was conducted by researchers at Michigan Technological University and funded by Michigan Sea Grant. Researchers assembled and evaluated available information, identified critical information gaps, and, by working with local stakeholders and government agencies, helped determine possible pathways for improving conditions in and around Torch Lake.



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