

# Contaminants of emerging concern impact fish health in Minnesota waters

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A University of Minnesota and Grand Portage Band of Lake Superior Chippewa team of researchers led by former doctoral student, Dr. Jessica Deere (far left), process fish samples for contaminant screening. Credit: University of Minnesota

Researchers from the University of Minnesota and the Grand Portage

Band of Lake Superior Chippewa discovered fish from 18 out of 19 testing sites in northern Minnesota contained contaminants of emerging concern (CECs) such as pharmaceuticals, hormones and personal care products.

This research illustrates the ubiquity of pharmaceuticals in the environment and their potential impacts on [fish](#)—both in expected environments like wastewater but also in more surprising places, like undeveloped lakes.

Because of the limitations of existing methods, little is known about health-related declines and population-level effects of CEC exposure for fish in real-world settings. U of M researchers compared how three different approaches could evaluate the health of fish exposed to CECs.

"Combining approaches to evaluate fish health created the opportunity to connect gross observations to a diagnosis," said Jessica Deere, a recent doctoral graduate in the College of Veterinary Medicine.

Results of the study, recently published in *Integrated Environmental Assessment and Management*, include:

- Fish from 18 of 19 sites in northern Minnesota contained CECs such as pharmaceuticals, hormones and personal care products. The fish exposed to CECs had tissue and organ abnormalities, although a direct causal link could not be established.
- The researchers identified 24 different CECs in fish tested across the northern Minnesota sites.
- Researchers found at least one CEC in fish tissues from every type of water body sampled—including remote, undeveloped wilderness, lakes with some shoreline development, and lakes

directly impacted by wastewater effluent.

- Indicators measured in this study revealed potentially concerning [health effects](#) at the organism level and the presence of some CECs that could lead to potential population-level effects.
- Unexpectedly, the health of fish in undeveloped sites was sometimes as poor, or sometimes poorer, than fish in developed and wastewater effluent-impacted sites.

"Understanding the impacts of chronic, low concentrations of chemical mixtures, such as those we are detecting in our Minnesota ecosystems, is greatly needed," Tiffany Wolf, a professor in the College of Veterinary Medicine. "This research lays the groundwork for future, long-term monitoring studies that can help us better understand how these and other emerging environmental contaminants are impacting fish and other populations on which we depend."

While studies like this will help inform policy and legislation to manage environmental pollutants that can harm people or biota, understanding the impact that CECs have on fish health in northeastern Minnesota has important cultural significance as well.

The Grand Portage Band of Lake Superior Chippewa relies heavily on [fish species](#) found in Lake Superior and its surrounding water bodies. However, the potential impact these contaminants have on the health of fish populations and people who consume them raises questions about the safety and security of these fish as subsistence foods. Assessing the health of this ecosystem is crucial for the Anishinaabeg culture and way of life.

"Indigenous people have rights to harvest non-toxic foods and waters for subsistence," said Seth Moore, Director of Natural Resources, Grand

Portage Band of Lake Superior Chippewa. "As the natural environment becomes more degraded through pollution and other [human impacts](#), projects like this can provide [factual information](#) to [community members](#) and [policy-makers](#) on the risks to human and biological health from contaminants."

**More information:** Jessica R. Deere et al, Health of wild fish exposed to contaminants of emerging concern in freshwater ecosystems utilized by a Minnesota Tribal community, *Integrated Environmental Assessment and Management* (2023). [DOI: 10.1002/ieam.4822](https://doi.org/10.1002/ieam.4822)

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