

Global study details microplastics contamination in lakes and reservoirs

July 13 2023



Rebecca Kessler samples water for microplastics in Clinton Lake, Lawrence.
Credit: Ted Harris.

Around 14 million tons of plastic end up in the ocean every year. But that is not the only water source where plastic represents a significant intrusion.

"We found microplastics in every [lake](#) we sampled," said Ted Harris, associate research professor for the Kansas Biological Survey & Center for Ecological Research at the University of Kansas.

"Some of these lakes you think of as clear, beautiful vacation spots. But we discovered such places to be perfect examples of the link between plastics and humans."

Harris is one of 79 researchers belonging to the international Global Lake Ecological Observatory Network (GLEON), which examines processes and phenomena occurring in freshwater environments. Their new paper, titled "Plastic debris in lakes and reservoirs," reveals that concentrations of [plastic](#) found in freshwater environments are actually higher than those found in so-called "garbage patches" in the ocean. The article is published in *Nature*.

For his role, Harris teamed with Rebecca Kessler, his former student and recent KU graduate, to test two Kansas lakes (Clinton and Perry) and the Cross Reservoir at the KU Field Station.

"That entailed us going out, tolling a net with tiny little holes in it, dragging it for about two minutes, then collecting those samples of microplastics and sending them off to (the lead researchers)," Kessler said.

The research project was designed and coordinated by the Inland Water Ecology and Management research group of the University of Milano-Bicocca, Italy (headed by Barbara Leoni and Veronica Nava). The team sampled [surface waters](#) of 38 lakes and reservoirs, distributed across

gradients of geographical position and limnological attributes. It detected plastic debris in all studied lakes and reservoirs.

"This paper essentially shows the more humans, the more plastics," Harris said. "Places like Clinton Lake are relatively low in microplastics because—while there are many animals and trees—there aren't a lot of humans, relative to somewhere like Lake Tahoe where people are living all around it. Some of these lakes are seemingly pristine and beautiful, yet that's where the microplastics come from."

Harris said that many of the plastics are from something as outwardly innocuous as T-shirts.

"The simple act of people getting in swimming and having clothing that has [microplastic](#) fibers in it leads to microplastics getting everywhere," he said.

The GLEON study cites two types of [water bodies](#) studied that are particularly vulnerable to plastic contamination: lakes and reservoirs in densely populated and urbanized areas; and those with elevated deposition areas, long water retention times and high levels of anthropogenic influence.

"When we started the study, I didn't know a lot about microplastics versus large plastics," Harris said.

"When this paper says 'concentrations as much or worse than the garbage patch,' you always think of the big bottles and stuff, but you're not thinking of all that smaller stuff. You don't see a huge garbage patch in Lake Tahoe, yet it's one of the most impacted lakes when it comes to microplastics. Those are plastics you can't really see with the [naked eye](#), and then you get underneath a scope at 40,000x, and you see these little jagged pieces and other particles that are the same size as algae or even

smaller."

Part of Harris and Kessler's enthusiasm for taking part in this project was to highlight a region of the U.S. that is often overlooked.

"In this study, there's one dot in the middle of the country, and that's our sample," he said. "In Iowa, Missouri and Colorado, there's this huge swath of area that has water bodies, but we often don't get them into those massive global studies. So it was really important for me to put Kansas on the map to see and contextualize what these differences are in our lakes."

Harris has worked at KU since 2013, where his research focuses on aquatic ecology. Kessler graduated KU in 2022 with a degree in ecology, evolutionary & organismal biology.

"The biggest takeaway from our study is that microplastics can be found in all lakes," Kessler said. "Obviously, there are different concentrations. But they are literally everywhere. And the biggest contributing factor to these microplastics is human interaction with the lakes."

More information: Veronica Nava et al, Plastic debris in lakes and reservoirs, *Nature* (2023). [DOI: 10.1038/s41586-023-06168-4](https://doi.org/10.1038/s41586-023-06168-4)

Provided by University of Kansas

Citation: Global study details microplastics contamination in lakes and reservoirs (2023, July 13) retrieved 2 May 2024 from <https://phys.org/news/2023-07-global-microplastics-contamination-lakes-reservoirs.html>

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