

# Lake monitoring differs by community

Study finds less data where people of color live

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DETROIT – U.S. lakes located in communities with larger populations of Black, Hispanic and other people of color are far less likely to receive water quality monitoring by federal and state environmental regulators, according to a review by Michigan State University involving more than 137,000 lakes.

Relative to lakes in more white and non-Hispanic communities, lakes in communities of color and Hispanic areas were three times less likely to be monitored for water quality once – and the numbers got worse as the researchers looked for long-term monitoring data of 15 years or more. Lakes in communities of color were seven times less likely to have long-term water quality monitoring, and Hispanic communities were 19 times less likely to have long-term monitoring than non-Hispanic lake communities.

The study, authored by Jessica Diaz Vázquez with university colleagues, was published online Monday in the peer-reviewed scientific journal *Frontiers in Ecology and the Environment*.

The study's revelations come as federal and state environmental regulators have placed more emphasis on issues of environmental justice, the historical legacy and continuing experience of minority populations and poor people facing disproportionate burdens from pollution and other environmental impacts. Previous research has found that marginalized populations are more likely than others to be burdened by poor-quality waters, said study co-author Patricia Soranno, a professor in the university's Department of Integrative Biology.

"The question we really want to ask is, is the quality, the health of the lakes, different depending on the race and ethnicity of the people living around them?" Soranno said.



**A new study found lakes in communities of color and Hispanic areas were three times less likely to be monitored for water quality.** GETTY IMAGES

"We didn't even get to that, because first you need to know, are there sufficient data to robustly answer that question? And the answer is no, there is not."

The researchers in Michigan State's Data Intensive Landscape Limnology Lab used the LAGOS-US research platform, an open-access database providing hundreds of different characteristics on the more than half-million lakes in the lower 48 U.S. states.

Diaz, then a Michigan State undergraduate student, proposed a novel new area of study: coupling the data of the lakes, including their geolocation, with U.S. Census data on race and ethnicity.

"For me, this looked like bringing an environmental justice approach to this national-scale limnology research," Diaz stated in a Q&A with Michigan State communications staff.

"I grew up in a predominantly Latinx, low-income community in Houston, Texas, where petrochemical facilities and their associated toxins, smells and sounds affected my daily life and the bayou ecosystem.

"I wanted to challenge myself to bring my full experiences to the lab's research."

Soranno said: "It was a great combination – we had this rich data resource that was funded through very traditional, basic science mechanisms. And then

we had a researcher, herself a person of color, interested in and asking questions about what are the environmental justice components to this research, thinking broadly about freshwaters at the national scale? And then we realized, hey, nobody's ever looked at this."

The study looked at lakes 4 hectares or larger in size, about 10 acres or more, as lakes smaller than that are rarely sampled for water quality. That left them with 137,072 lakes. The researchers analyzed at which lakes three basic water quality metrics were tested: Secchi disk depth tests for water clarity; chlorophyll concentrations; and total phosphorus concentrations. Separating the lower 48 states into six regions, they looked at whether and how many lake samples were done at each lake in each region from 1970 to 2016. Lakes that had 15 or more years of data-collecting were considered to have long-term records.

The researchers then coupled that information with U.S. Census data on race and ethnicity for block groups, which contain 600 to 3,000 people. They chose a threshold of 25% or greater populations of people of color or Hispanics to consider a block group as a community of those cohorts. People of color for purposes of the study included Black/African American, Native American and Alaskan and Hawaiian natives.

The 2010 U.S. Census overall found the national population at 73% white and 84% non-Hispanic.

Across all lakes, the percentage of lakes with long-term data was lower for lakes in people of color communities (0.3%) and Hispanic communities (0.08%) than for lakes in white (1.8%) and non-Hispanic (1.6%) communities. No region of the country was without a disparity.

"Although I expected there to be some differences based on past research on land and air, I was surprised by the extreme degree of disparities that exist in not only who lives around lakes but which lakes are sampled in the U.S.," said Diaz, who has since the initiation of this research graduated with a bachelor's degree from Michigan State, received a master's degree from the University of Maryland Baltimore County, and is now working with the National Oceanic and Atmospheric Administration's Maryland Sea Grant Program.

The Midwest East region in the study, including Michigan, Wisconsin, Illinois, Indiana and Ohio, "for people of color, the disparity was better than at the national scale. But for Hispanic (people), it was a little bit worse," Soranno said.

The U.S. Environmental Protection Agency, which administers the Clean Water Act through the states, did not immediately comment on the study's findings when contacted by the Detroit Free Press.

Michigan State's lab is already expanding on this research, with a student adding even more U.S. Census data to better examine urban versus rural disparities in lake monitoring, and another student is examining satellite data for insights on water quality for the less-monitored lakes, Soranno said.

"That helps us fill in the gaps so that we can actually look at the water quality and say, 'Is the water quality worse in communities of color than in white communities?'" she said. "We are already finding some areas where that is the case, that it does confirm our expectations that the water quality might be worse, but those data are still being worked on."