

Developing a strategy for tracing septic field contamination in the Saginaw Bay watershed



CORE QUESTION:

What tracing methods can help detect septic field contamination in surface and groundwater near Saginaw Bay?

A LEAKY ISSUE

In Michigan's Saginaw Bay region, many residents rely on septic systems to treat the waste water from their toilets and drains. These systems process microbes and contaminants from human activities, including pharmaceuticals, personal care products, antibiotics, and nutrients like nitrogen and phosphorus.

Contaminant runoff into Saginaw Bay has caused enough damage to this freshwater resource that the U.S. Environmental Protection Agency has designated the Saginaw Bay watershed an Area of Concern. Aging septic systems in the watershed can leak their contaminated loads into the ground and from there into groundwater and surface waters, contributing to issues like beach closures and algae blooms in Saginaw Bay.

Researchers in Michigan and elsewhere are finding ways to detect septic leaks by testing nearby soil and water. For example, finding genetic remnants from a suite of bacteria only found in the human gut would indicate that a septic tank is leaking in the area. But tests that help detect the location of the leak, or that capture a wider variety of indicators, could go a long way toward helping curb sources of contamination in the Saginaw Bay watershed.

CONTAMINATION DETECTIVE WORK

Matthew Schrenk is an assistant professor at the Michigan State University Department of Earth and Environmental Sciences and the Department of Microbiology and Molecular Genetics. He and a research team are partnering with state and local agencies to develop a system of tracking strategies that could identify septic system leaks.

Schrenk and his team will approach the challenge from multiple directions. They will sample septic tanks and nearby water bodies to determine whether unique blends of microbes, compounds, and nutrients might serve as contamination "fingerprints" – implying that finding those particular blends out in the watershed would point back to a specific septic tank leak. They'll also use water quality data to map existing contamination in the watershed, using groundwater fate and transport models to predict how the contaminants might move through the landscape. Finally, the team will use statistical models to look for tell-tale septic fingerprints in the watershed water quality data and try to determine where the leaks might have originated.

Coming up with a comprehensive system of microbial and geochemical tracers that detect septic leaks could be instrumental in helping local and state agencies restore the water quality and ecosystem health of Michigan's Saginaw Bay watershed.

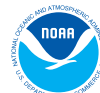
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