

Reducing Nutrient Pollution from Septic Leachate in Montana's Flathead Basin

Located in northwestern Montana, the Flathead Basin is known for its rugged mountains and clear lakes, rivers, and streams that support tourism and recreation as well as diverse ecosystems. Due to an increase in development, this picturesque area has experienced a decline in water quality since the late 1970s. Nonpoint source (NPS) pollution, such as stormwater runoff, is the leading cause of water quality issues in the state. NPS pollution can lead to elevated levels of the nutrients phosphorus and nitrogen, which can result in harmful algal blooms and other water quality impairments. To address this pollution, the State of Montana, in collaboration with the Confederated Salish and Kootenai Tribes and the U.S. EPA, developed nutrient total maximum daily load (TMDL) plans for the Flathead Basin.

Tracking the Problem

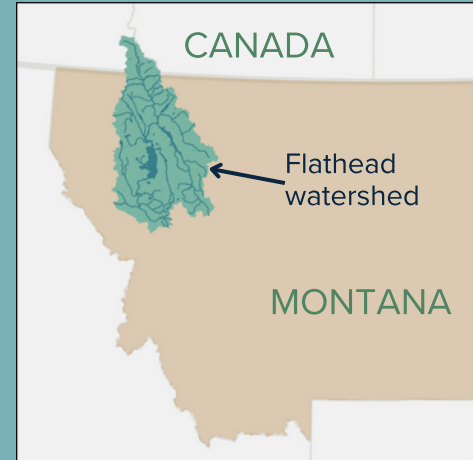
The Western Montana Conservation Commission (WMCC), formerly known as the Flathead Basin Commission (FBC) – a non-regulatory government agency created to protect the basin's water quality – identified septic leachate as a primary source of nutrient pollution, which had consistently shown up in studies dating back to the 1970s. In 2019, the FBC established an Onsite Wastewater Treatment Committee to address septic leachate concerns and make recommendations for improved treatment to support the TMDL.

Septic Leachate

Onsite wastewater systems, otherwise known as septic systems, collect, treat, and disperse wastewater into the ground. Pollution from septic leachate occurs when liquid wastewater leaks into the groundwater, often the result of improper management, installation, or operation of a septic system, or when the soil's capacity for treatment is exceeded. Leachate can contain elevated concentrations of nutrients from human waste, detergents and other household materials, which can seep into waterbodies via groundwater. This has been documented in the Flathead Basin through numerous studies.

On Flathead Lake, over half of the homes are on private septic systems. Since there are no state or local regulations requiring inspections and maintenance of septic systems after installation, regular maintenance and upkeep falls upon the homeowner's discretion.

To better understand the range of septic leachate impact, the FBC developed a risk model which highlights the areas of the basin that are most susceptible to the underperformance of septic tanks. The model is based on the physical characteristics of the landscape including the slope, soil suitability, and distance to surface and groundwater as well as

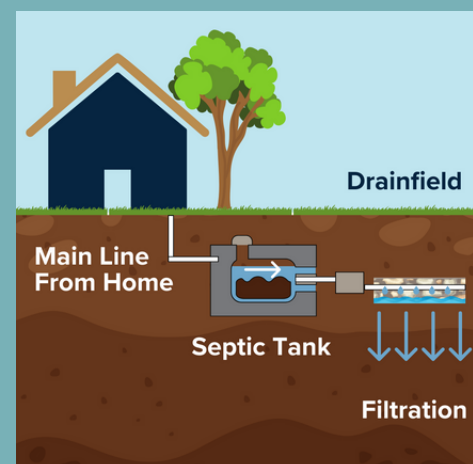


TOTAL MAXIMUM DAILY LOAD (TMDL)

A TMDL defines the maximum amount of a pollutant that a waterbody can receive while still meeting water quality standards.

SEPTIC LEACHATE

Septic leachate is liquid wastewater that can leak into groundwater from a septic system. Pollution from leachate is often the result of improper management, installation, or operation of a septic system or can occur in dense locations that exceed the soil's capacity for treatment.





the age and density of existing septic systems. The FBC presented this tool to the county commissioners and local policymakers to help inform the decision-making process for new development and identify opportunities to mitigate water pollution to support the TMDL.

Successful Partnerships for Solutions

Seeking to understand more about how septic leachate travels, the committee partnered with the Whitefish Lake Institute and Cornell University on a synthetic DNA tracer study. The study launched in 2022 at two high-risk lakes to determine if there is a clear indication that septic leachate is entering the surface water by flushing unique strands of lab-synthesized DNA down the toilets of participating lakeshore homeowners. The results show that all functioning tracers appeared in the surface water at both lakes during the study period. The WMCC plans to use the results of this study to learn more about the factors that impact how septic leachate travels and interacts with surface water locally.

Additionally, to bring attention to this complex issue and provide a forum for education and discussion, a three-day National Science Foundation-funded Septic Leachate Workshop convened federal, state, and tribal representatives, legislators, researchers and scholars, and partner organizations. The participants explored data, technology, policies, and educational programs that could be applied to holistically address septic leachate in the basin.

To tackle leachate from another angle, the Septic Maintenance Reimbursement Program helps eliminate barriers to proper septic care. Launched through a collaborative effort of conservation districts, the FBC, Montana Department of Environmental Quality, and Montana Association of Conservation Districts, the reimbursement program covers 50% or up to \$200 of the cost of a pumping.

No Longer "Out of Sight, Out of Mind"

Because septic systems are underground, they are often forgotten until there are catastrophic failures. Knowing that septic leachate is a real threat to water quality in the basin and a key component of the TMDL, a host of organizations worked together to identify solutions to this issue through public education campaigns, stakeholder outreach, and scientific studies. Their efforts continue to bring awareness to the importance of proper septic system upkeep to basin residents and stakeholders through collaborative and multi-pronged avenues. While it is too soon to measure success in terms of nutrient reductions to the lake, this approach can serve as a model for other watersheds seeking solutions to septic leachate pollution.



This document has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement 84039101 to NEIW PCC. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

