

# Mitchell Creek Source Tracking Project Summary Report – July 2024



## Background

Mitchell Creek is currently on the State's Impaired Waters List due to elevated levels of *E. coli* bacteria that exceed Michigan water quality standards. Mitchell Creek outlets into the east arm of Grand Traverse Bay next to Traverse City State Park Beach and there is a concern for public health, especially if the bacterial contamination is coming from human sources such as improperly functioning septic systems.

The Watershed Center (TWC) recently completed a Department of Environment, Great Lakes and Energy (EGLE) Nonpoint Source Program grant working with Michigan State University (MSU) to conduct a bacteria monitoring and source tracking study at select locations on Mitchell Creek and its tributaries to identify the potential sources of contamination. The main objective was to determine if septic systems are impacting Mitchell Creek and are adding to the impairment. Additionally, the project team wanted to determine if other sources of bacteria from canines, cows, pigs, or gulls are potentially affecting the watershed as well.

**Project Partners**  
Michigan State University  
Grand Traverse County  
Health Department  
East Bay Township  
Garfield Township  
City of Traverse City

Monitoring activities wrapped up in late 2023 and a final report and addendum to the Coastal Grand Traverse Bay Watershed Plan was issued June 2024.

## Sampling Program

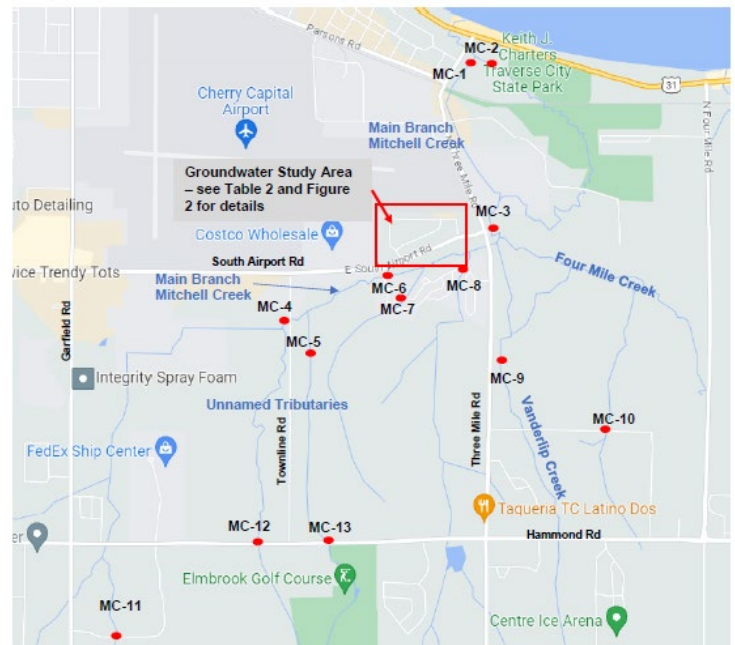
Surface water samples were collected between 2021-2023 during both wet and dry weather and analyzed for fecal indicators: Coliphages (Somatic and F-specific), *Clostridium perfringens*, and *E. coli*. If a sample exceeded a certain threshold for *E. coli*, it was also analyzed for Microbial Source Tracking (MST) markers from human, cow, pig, canine, and gull sources.

## Results and Conclusions

This study found elevated levels of *E. coli* throughout the watershed during both wet and dry weather sampling events. This was expected as previous studies found similar results that led to the creek getting placed on the State's Impaired Water's List. However, bacteria results were rainfall driven with higher and more widespread levels during rain events. Results also indicate a mix of fresh and old/aged bacterial contamination sources. It is possible that *E. coli* bacteria has accumulated in creek sediment over time and is being continually released, especially during rain events, and adding to the impairment.

Most of the bacterial contamination is occurring in the western portion of the creek's watershed, with little to no bacteria, fecal indicators, or MST markers found in the eastern tributaries of Vanderlip and Four Mile creeks. Additionally, the headwater areas of the western tributaries (south of Hammond Road) do not appear to have consistent bacterial contamination issues.

While this study did not find any conclusive evidence and specific locations of bacterial sources that need immediate remedy to reduce bacteria input to the creek, several bacterial sources are of concern in differing general areas. The western tributaries had more samples containing the pig marker, while the human marker was found more in the central main branch. And the canine marker was widespread in all tributaries.



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*Fecal indicator and microbial source tracking (MST) analysis conducted in this study has not led to any obvious or consistent sources or locations of bacterial contamination, and it is difficult to determine remediation steps to reduce the impairment.*

Specific MST results are as follows:

- Human – Human markers were occasionally found in the western and central main branches of Mitchell Creek. However, due to the sporadic and inconsistent findings of the human marker, combined with the fact that no human markers were found in 2023 sampling events, we cannot conclusively say that leaking or failing septic systems are a consistent, major problem causing widespread impairment in the watershed. However, improperly installed or maintained septic systems may be adding to the bacterial contamination since human markers were found occasionally.
- Pig – The pig marker was found throughout the Mitchell Creek watershed, but most often in the unnamed western tributaries. While one rain event in 2021 indicated a fresh source of contamination, results show that most of the time the pig marker was found it was from older sources, perhaps a release from sediments or the land application of pig waste that had been properly aged/composted in storage prior to being land applied. The pig marker was found at nearly all the sites tested during dry and wet weather events in 2021, though little to no pig marker was found in these sites in 2022 and 2023, suggesting a reduction in bacterial contamination from pig manure towards the end of the study.
- Canine – The canine marker was widespread throughout the watershed and found in almost all samples tested. In addition to domesticated dogs, the marker may have also detected wild canines including coyote and fox. Therefore, we cannot confirm that fecal material from domestic dogs is a widespread concern for Mitchell Creek. If bacterial impairment is attributed to coyotes and foxes, remedying the issue will be difficult.
- Cow/Gull – Both cow and gull markers were virtually non-existent in this study and are not considered a threat at this time.

**The project team recommends the following general Best Management Practices (BMPs) be implemented to reduce additional or existing input of bacterial sources in Mitchell Creek:**

- Ensure all farms are following “Generally Accepted Agricultural Management Practices” (GAAMPs) and implement new agricultural BMPs to reduce fecal input to creek where needed.
- Provide septic system education, including maintenance, right-sizing, replacing aged systems, and proper use.
- Conduct continual maintenance of the City of Traverse City’s sanitary system and extend service to new homes or developments, when possible.
- Provide education regarding the importance of picking up and properly disposing of dog waste.
- Preserve existing forested and vegetated wetlands that have the ability to reduce bacteria in the watershed and restore forested wetlands when possible.