

FECAL BACTERIA OVERVIEW

► Impacts On Water Quality And Human Health

OVERVIEW

There is a wide diversity of bacteria naturally occurring in the environment – living within organisms, soils and freshwater systems. However, increased concentrations of harmful bacteria in surface waters, such as fecal-associated bacteria, can increase the risk of illness during recreational activities (e.g., swimming). Consequently, this often leads to the restriction of recreational activities and beach closures.



Photo Credit: Wisconsin DNR

So, if bacteria are naturally occurring, why should we care?

Fecal bacteria, such as *E. coli* or fecal coliform, are found in warm-blooded hosts (e.g., humans, wildlife, etc.) and not naturally occurring in the environment. Therefore, if high levels of fecal bacteria are found, it is indicative of fecal-contaminated water and not a natural phenomenon. In fact, beachgoers may notice that beach closures often occur after a heavy rain event. This is most likely due to storm water runoff transporting fecal bacteria from various sources over impervious surfaces to waterways during rain events, or it could be due in part to sanitary sewer or combined sewer overflows (SSOs and CSOs).

Subsequently, high levels of fecal bacteria are estimated to cause 90 million cases of illness per year, affecting areas such as the Gastrointestinal (GI) tract, ears, eyes and skin. With alarming human health risks associated with high fecal bacteria contamination, it is imperative to reduce fecal bacteria loads in Wisconsin waterways.



What other fecal bacterial sources are there?

There are other sources of fecal contamination other than human waste, however, it may be difficult to identify the exact source. In urban areas, sources may include large congregations of wildlife and domestic animals, leaks from sanitary sewers, illicit connections, trash receptacles, failing septic systems and sanitary sewer or combined sewer overflows.

Understanding the source of contamination is important in identifying the best management practices for reducing fecal bacteria contamination. To learn more about identifying sources in your community, visit the “Identifying Sources” BMP within the MS4 BMP Menu under the Total Maximum Daily Load (TMDL) and Impaired Waters section.

Are there visual indicators of fecal bacteria pollution?

It’s not always apparent when a waterbody contains fecal contamination. This is because the



Photo Credit: Wisconsin DNR

size of fecal bacteria is so small that a microscope is needed to see them. As a result, testing water using bacterial indicators is highly recommended, and typically done on a routine basis at beaches.

Fecal coliforms have historically been a commonly used indicator of fecal contamination; however, *E. coli* is considered a more specific indicator test, and genetic testing for human-specific genetic markers is becoming more widely used. This is because genetic testing can

determine whether the source is human-related or not. For more information on fecal bacteria sampling and testing, please see the “Bacteria Testing” BMP within the MS4 BMP Menu under the Total Maximum Daily Load (TMDL) and Impaired Waters section.

Wisconsin's Water Quality Criteria

Wisconsin Administrative Code requires that waterbodies maintain a certain level of *E. coli* and fecal coliform. These standards are used to assess whether Wisconsin's waters are safe for recreational use (i.e., fishable and swimmable), but are also used for assessing Wisconsin's waters for water quality impairments ([Section 303d list](#)). One way to reduce pollutant loads, like fecal bacteria pollution, is to use a combination of BMPs. While no single practice is likely to achieve a large enough pollutant reduction, using a combination of practices can help restore and/or maintain Wisconsin's water for recreational usage.

Table 1. Summary of the state of Wisconsin's fecal bacteria water quality criteria. CFU means Colony Forming Units.

Current <i>E. coli</i> criteria (From Chapter NR 102 Wis. Adm. Code adopted May 2020)		Historical Fecal Coliform criteria (used in the development of the Milwaukee River Basin Total Maximum Daily Load (TMDL))	
126 CFU/100 mL	Geometric mean not to be exceeded in a 90-day period	200 CFU/100 mL	Geometric mean
410 CFU/100 mL	Not to be exceeded more than 10% of the time in a 90-day period	400 CFU/ 100 mL	Not to be exceeded more than 10% of the time in a 30-day period

SOURCES

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Wisconsin Department of Natural Resources. [Milwaukee River Basin Total Maximum Daily Load \(TMDL\)](#).

Disclaimer: This fact sheet is intended to be used for informational purposes only. These examples and references are not intended to be comprehensive and do not preclude the use of other technically sound practices.

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