

Tracking Bacterial Contamination in the Lamprey River Watershed: Findings from 2023.
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Recreational (beaches, boating) fresh and saltwater areas in the Lamprey River watershed are subject to varying levels of water pollution that contains fecal-borne microorganisms. If microorganisms (bacteria, viruses, protozoa) are present that can make people sick, then exposure to the water can be a public health threat. The State of New Hampshire has set standard bacterial indicator level criteria for posting advisories in recreational waters, yet little is known about this potential public health threat in the Lamprey River watershed because few measurements are made. Because the indicator bacteria show where pollution levels exceed safe levels yet provide no information about the pollution source(s), we included use of microbial source tracking (MST) as a strategy for identifying fecal pollution sources in surface waters, which allows for improving water quality by eliminating identified sources.

A recent study (2023- LRAC supported) conducted by UNH-JEL provided new information for an overall synthesis of the status of bacterial pollution in the watershed. As in past years, the area at the mouth of Moonlight Brook at Schanda Park (Site MBO) remained consistently polluted with fecal-borne bacteria at levels that exceeded State water quality thresholds. A significant change observed this past year is that all other sites had more frequent high pollution levels that also exceeded State thresholds. The high levels of fecal-borne bacteria at sites other than Site MBO occurred mostly during June and July, when rainfall was abundant and probably caused substantial runoff that carried these contaminants into the river. These findings confirm that rainfall associated runoff from land and other surfaces can cause higher levels of pollution in the Lamprey River that are a concern because of the higher probability that the water quality may be risky for recreational activities.

One other finding was the more frequent and quite elevated levels of bacteria detected at the Carroll Beach area in Raymond in September and October, even though the amount of rainfall was minimal before sample collections. The decision was made to add resources to the project to enable more sampling in the Moonlight Brook upstream of the Schanda Park site and in several sites in the Carroll Beach area. These efforts were intended to see if there are sources in the areas that cause the elevated bacterial levels we observed. In Raymond, the findings did not indicate any obvious source for the Carroll Beach site, however, in the Moonlight Brook watershed, samples from 5 extra sites indicated that elevated levels of fecal-borne bacteria were often present, even though the bacterial levels were still higher at Site MBO.

The microbial source tracking (MST) analysis of the DNA in the water samples showed that the fecal-borne bacteria were from several different types of sources. This work is important because it helps managers to know what sources to look for to enable them to eliminate sources to improve water quality. Some of the identified sources, like humans, dogs, cows, and horses, can be managed, theoretically, while other identified sources like gulls, Canada geese and other birds are much more difficult to manage. The presence of human sources is a significance concern because it implies that untreated human sewage, which can contain disease-causing microorganisms, is getting into the river. This occurred at numerous sites in 2023 and was also common during the rainy months of June and July, raising concerns about where and why this occurs.

The LRAC will be able to use the findings to help communicate to recreational users about potential water quality issues and precautions to be taken, based on NH Dept. of Health and Human Services/Division of Public Health Services and US CDC fact sheets and information. Municipal public works departments can also use the results to investigate potential sewage leaks, while dog contamination can be addressed with additional communications about the reason for removing dog waste from areas near the river.