



Background

On April 19, 2022, the Maryland Department of the Environment (MDE) began monitoring Back River (located in Baltimore County) in the vicinity of where the Back River Wastewater Treatment Plant (WWTP) outfall discharges into the river. The purpose of the sampling is to understand how WWTP performance problems may be impacting water quality. Bacterial (*Enterococcus* and *E. Coli*) sampling is conducted weekly at four sites (Figure 1).

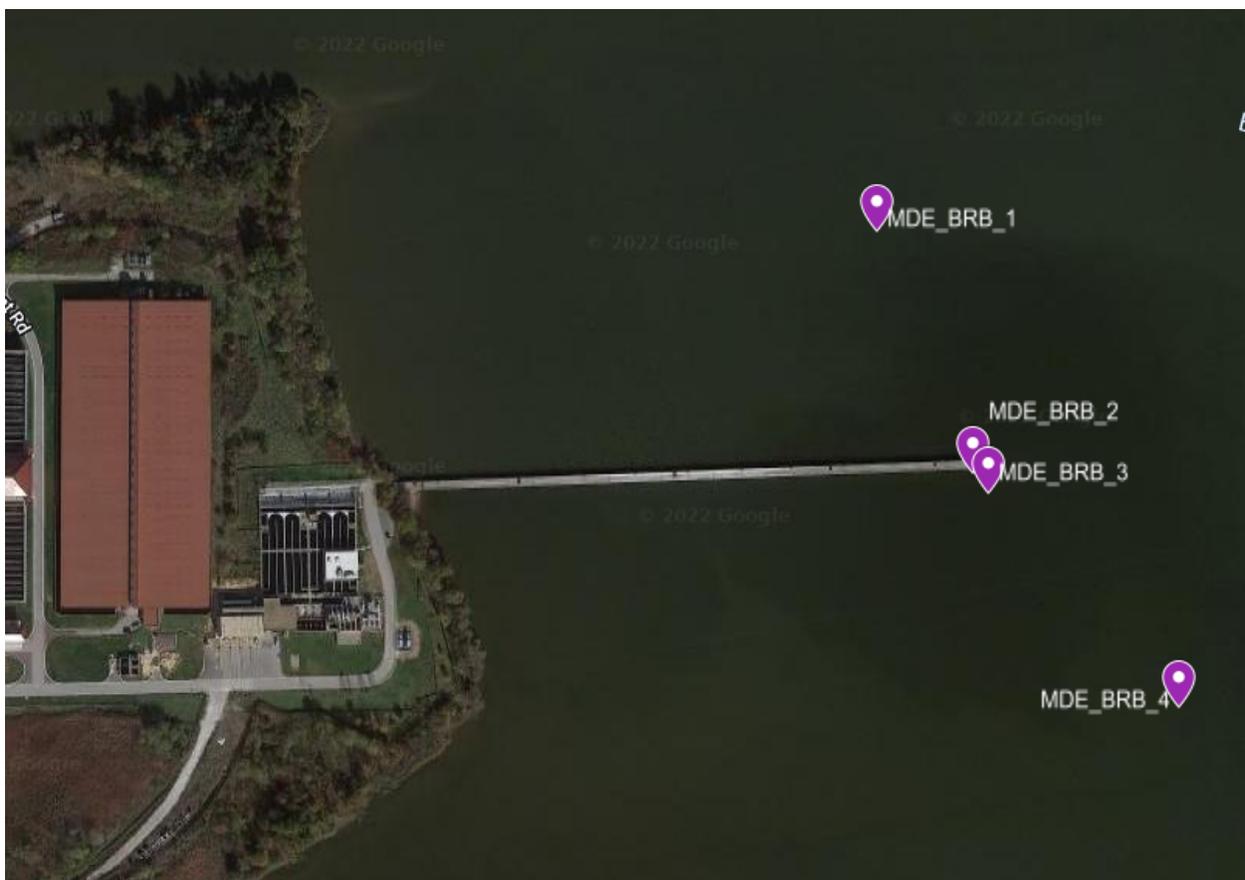


Figure 1: MDE_BRB_1 is 500 feet upriver from the outfall; MDE_BRB_2 is at the outfall; MDE_BRB_3 is 50 feet downriver from the outfall; and, MDE_BRB_4 is 600 downriver from the outfall.

The analytical method used can detect the following species of *Enterococci*.

- a) faecalis
- b) faecium
- c) avium
- d) gallinarum
- e) casseliflavus

f) *durans*

MDE provides guidance for the [County Recreational Water Quality Monitoring and Notification Program](#), which is adapted from the U.S. Environmental Protection Agency (EPA) National Beach Guidance. While this sampling area is not a designated beach, state guidance for beaches can assist in the interpretation of the monitoring results.

As described in the MDE guidance, the purpose of recreational water quality monitoring for bacteria contamination is to inform management actions that reduce the incidence of human illness that arises from contamination of recreational water areas, in particular waters where water contact includes full submersion (swimming). The purpose of water quality indicator testing is to measure the concentration of a bacterial indicator species that are not necessarily a pathogen but whose levels are associated with fecal indicator bacteria and human illness derived from EPA epidemiological studies at beaches. High levels of fecal indicator bacteria suggest water contamination with human or animal fecal matter and resulting potential risk to human health due to the potential for human pathogens to be present.

The guidance includes a Beach Action Level (BAL) that is used to inform beach notifications (also see [COMAR 26.08.09.01](#)). For example, with designated beaches, if sample results report an indicator organism density above the BAL, then the county should issue a public notification for a beach advisory. If subsequent sampling results in indicator densities below the BAL, then advisories can be lifted. The BAL for *Enterococci* is 104 Most Probable Number (MPN)/100 milliliters (mL), and the BAL for *E. Coli* is 235 MPN/100 mL.

The Back River WWTP National Pollutant Discharge Elimination System (NPDES) Permit has a monthly geometric mean permit limit of 126 MPN/100 ml for *E. coli*, which is consistent with Maryland Surface Water Quality Criteria ([26.08.02.03-3](#)). The monthly geometric mean permit limit is assessed using multiple samples collected over a 30-day monitoring period.

Monitoring Results

Bacterial indicator monitoring results for both *Enterococci* (Figure 1) and *E. Coli* (Figure 2) show wide fluctuation in values, with the highest values observed when monitoring occurs within 48 hours of a significant rain event. Rain events were determined from the [National Atmospheric Administration Data](#) at Baltimore Washington International Airport.

Sampling events on April 19, May 9, and May 24 all occurred after rain events of 1.22-inches, 2.32-inches, and 0.91-inches, respectively. Data at every station sampled after these rain events exceeded both the BAL for *Enterococci* and the WWTP permit limit for *E. Coli*.

The June 15 sampling occurred after 0.26-inches of rain within the prior 48 hours; however, there were a total of 2.19-inches of rain over the course of the week preceding the June 15 sampling. Despite the precipitation, both the BAL for *Enterococci* and the WWTP permit limit for *E. Coli* were generally not exceeded. The two exceptions were the outfall station MDE_BRB_2, which exceeded both the WWTP permit limit and the BAL for *E. Coli*, and station MDE_BRB_3, just downriver of the outfall, which exceeded the WWTP permit limit only.

Sampling dates (April 27, May 4, May 9, June 1, June 8, June 22, and June 29) that were not preceded by significant rain showed lower *Enterococci* and *E. Coli* values, and generally do not exceed either the BAL or WWTP permit limit, respectively. Outside of wet and dry weather influence on bacteria indicator concentrations, there are no other clear trends either at or between sampling stations. This may be due to multiple bacterial sources in the larger Back River watershed, tidal influences on water quality, and natural variability in bacteria concentrations.

The most recent sampling on July 6 showed relatively high *E. Coli* values. Rainfall amounts preceding that sampling event have not been published yet by NOAA, but anecdotally the July 6 sampling appears to be preceded by dry weather. Staff will cross check this in-river data with WWTP compliance, when available, to see if the plant could have been influencing in-river water quality.

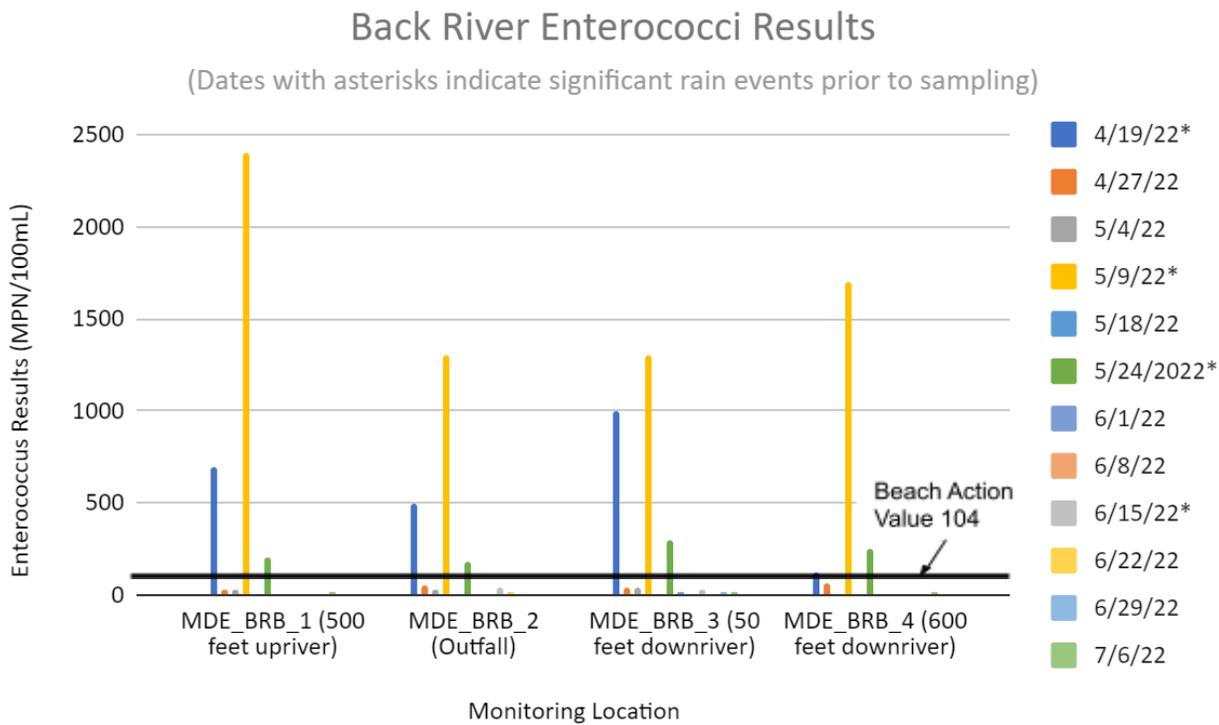


Figure 1: *Enterococci* sampling results from Back River in the vicinity of the WWTP outfall.

Back River E. Coli Results

(Dates with asterisks indicate significant rain events prior to sampling)

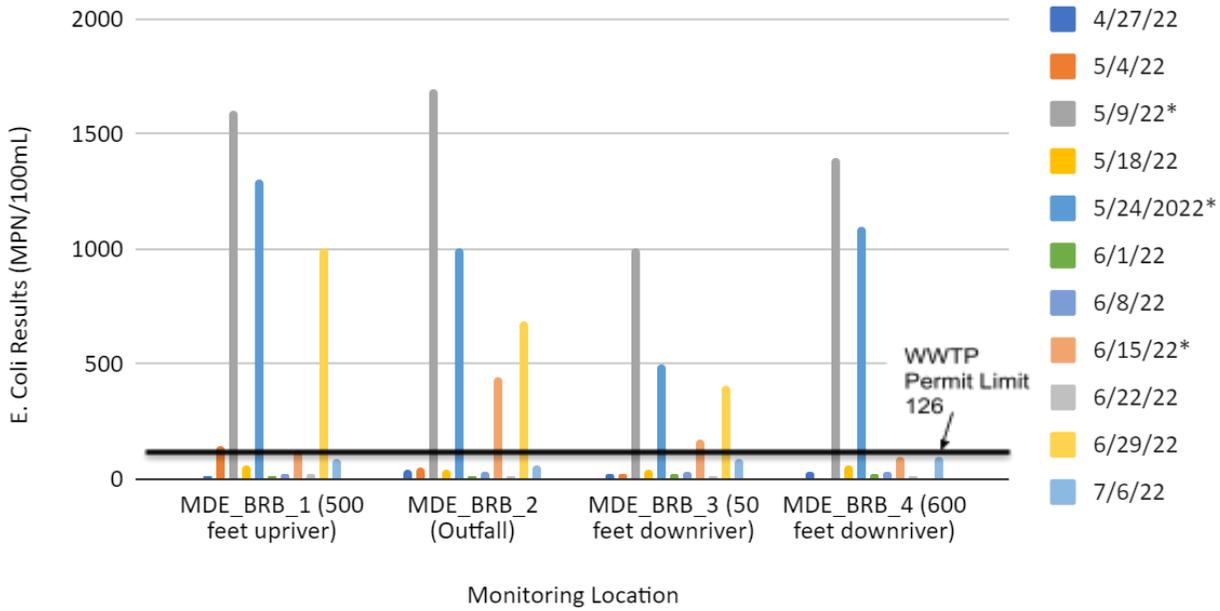


Figure 2: *E. Coli* sampling results from Back River in the vicinity of the WWTP outfall.