



## Background

On April 19, 2022, the Maryland Department of the Environment (MDE) began monitoring Back River (Baltimore County) in the vicinity of where the Back River Wastewater Treatment Plant (WWTP) outfall discharges into the river. Bacterial (Enterococcus) sampling is conducted weekly at four sites (Figure 1).

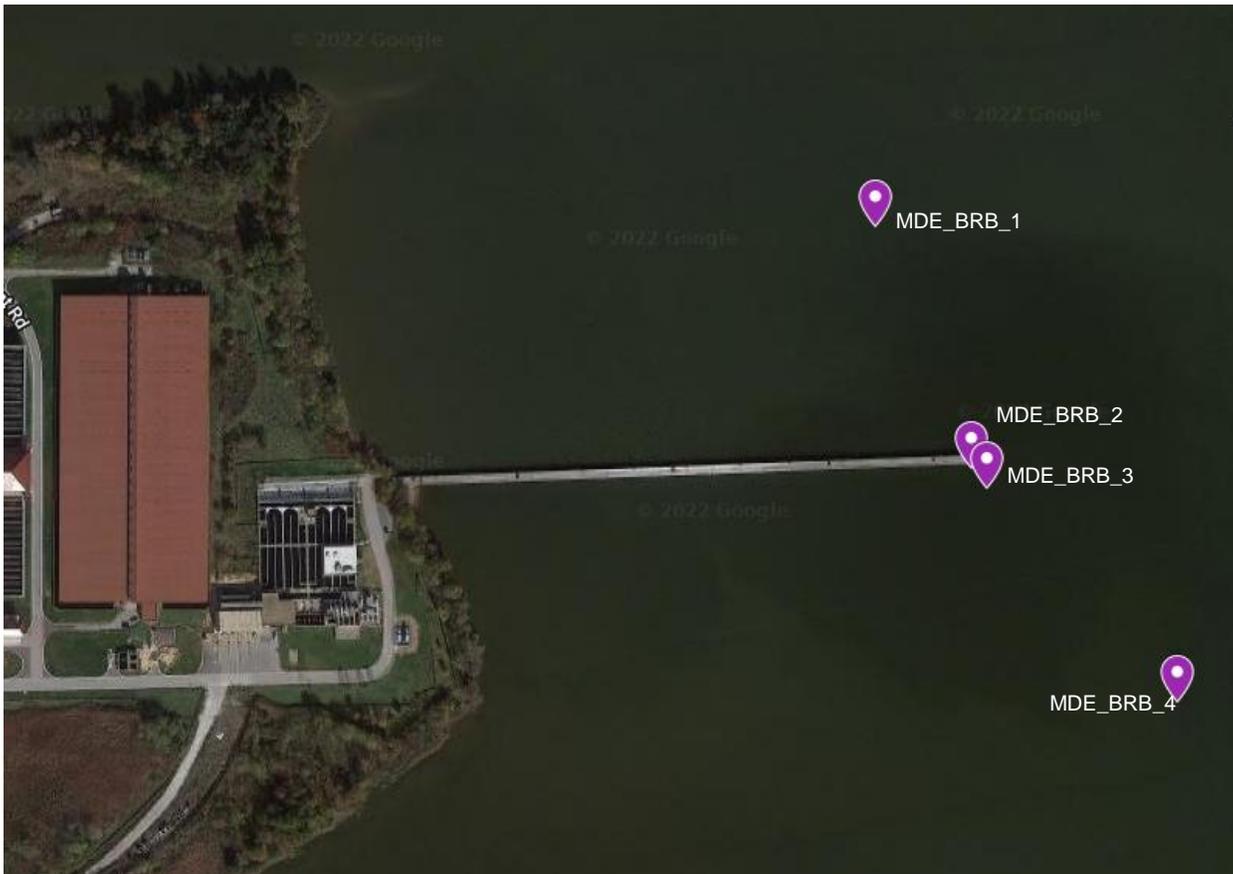


Figure 1: MDE\_BRB\_1 is 500 feet upriver from the outfall; MDE\_BRB\_2 is at the outfall; MDE\_BRB\_3 is 50 feet downriver from the outfall; and, MDE\_BRB\_4 is 600 downriver from the outfall.

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, Maryland 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 with fecal matter, 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 Beach Action Value for Enterococci is 104 Most Probable Number (MPN)/100 milliliters (mL), and the Beach Action Value 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**

All April 19, 2022 enterococcus results (Table 1) exceeded the Beach Action Value (BAV) of 104 MPN/100ml used to issue public health advisories for water contact recreation in Maryland. The results of the second sampling event on April 27, 2022 showed enterococcus concentrations much lower than found during the April 19 sampling event, none of which exceeded the BAV. The April 27 analytical results indicate that the concentrations of E. coli at all four sampling locations were below 126 MPN/100 ml. The data for the May 4, 2022 E. coli sampling event show concentration values at all sampling locations below the BAV for E. coli. The results of the May 9, 2022 sampling show high concentrations of E. coli and Enterococcus at all monitoring points exceeding the BAV for both indicator species. The elevated bacteria concentrations at all sampling locations, including upstream and downstream of the WWTP outfall, may have been caused by constant rainfall in the area on May 6, 2022 and May 7 resulting bacteria polluted runoff. The runoff from rainfall appears to be associated with the increases in concentrations of indicator bacteria.

*Table 1: Station and Bacterial indicator sampling results from Back River in the vicinity of the WWTP outfall.*

Monitoring Location	Enterococcus Results MPN/100 mL (4/19/22)	Enterococcus Results MPN/100 mL (4/27/22)	Escherichia coli Results MPN/100 mL (4/27/22)	Enterococcus Results MPN/100 mL (5/4/22)	Escherichia coli Results MPN/100 mL (5/4/22)	Enterococcus Results MPN/100 mL (5/9/22)	Escherichia coli Results MPN/100 mL (5/9/22)
MDE_BRB_1 (500 feet upriver)	690	33	9.6	34	140	2400	1600
MDE_BRB_2 (Outfall)	490	50	39	31	52	1300	1700
MDE_BRB_3 (50 feet downriver)	1000	42	26	36	26	1300	1000
MDE_BRB_4 (600 feet downriver)	120	66	29	7.5	1	1700	1400