LITTLE FALLS WATERSHED ALLIANCE

EDUCATION - ACTION - STEWARDSHIP

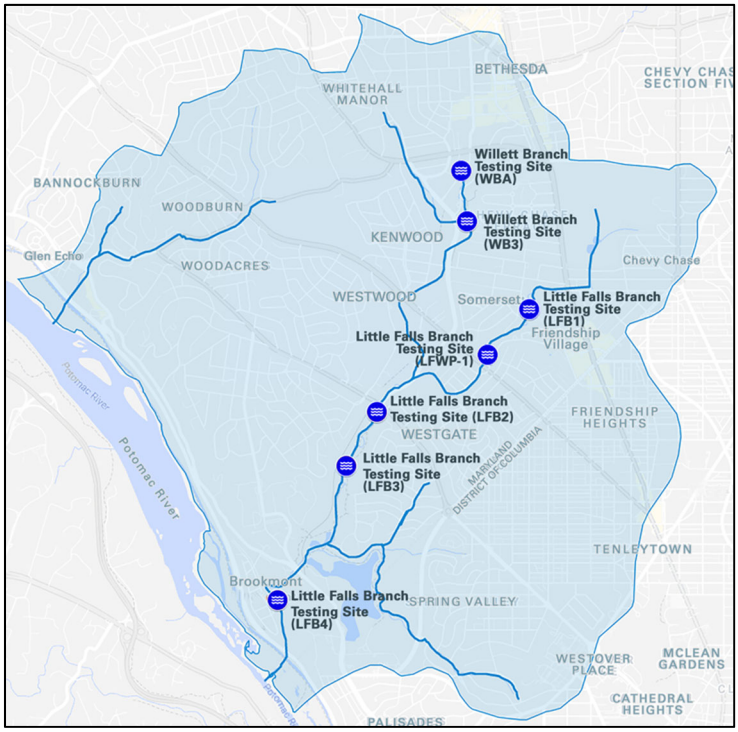
# 2023 Water Quality Report

## October 2023

### Overview

Volunteers collected water quality samples weekly in the Little Falls watershed basin from June 7th to September 13th. The samples were analyzed for fecal bacteria and reported as Most Probable Number (MPN) *E-Coli* per 100 milliliters (ml). *E. coli* levels were measured through an arrangement with Anacostia River Keepers using the EPA approved Colilert test.[1] When the samples were collected, volunteers directly measured pH, air and water temperatures, and nitrate/nitrite (ppm) levels.

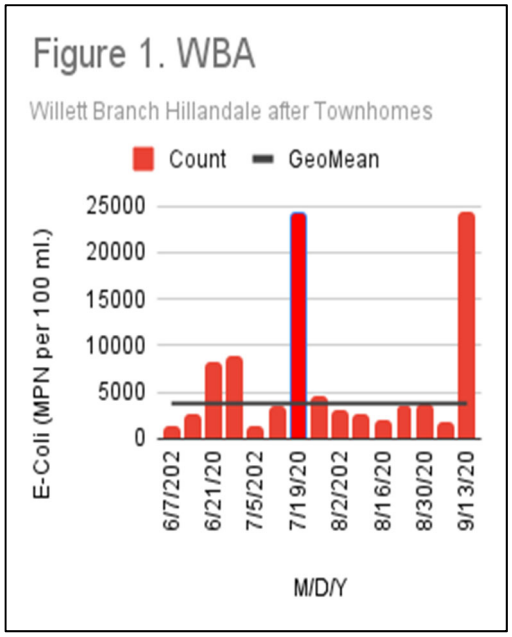
Samples were collected every Wednesday morning at seven locations - two in Willett Branch and five in Little Falls Branch. The station locations and IDs on the Willett Branch were below the Hillandale townhouses (WBA), and above Morgan Drive (WB3). The station locations and IDs on the Little Falls Branch were at Somerset Pool (LFB1), at Willard Park (LFWP-1), below Massachusetts Avenue (LFB2), at the first Pedestrian Bridge (LFB3), and at Brookmont (LFB4). The LFWP-1 site at Willard Park was added this year, due to anticipation of a dog park being constructed nearby.



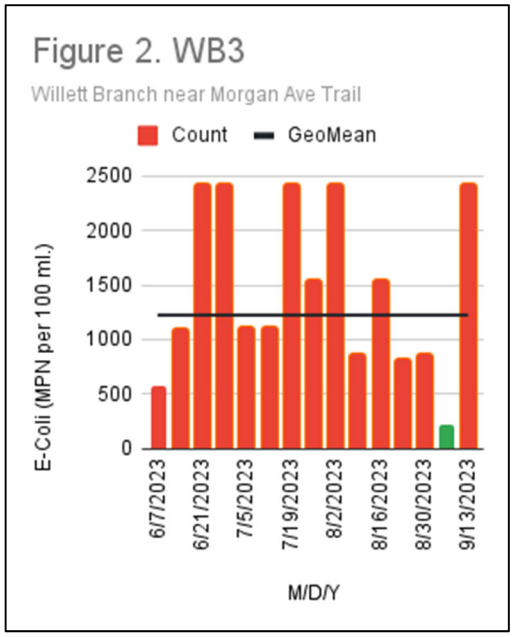

[1] See https://www.anacostiariverkeeper.org/programs/water-quality-monitoring/

## Summary

For the third consecutive summer, the fecal bacteria levels in Little Falls Watershed exceeded MD recommended standards for recreational water use, even for infrequent human contact.[2] Extremely high *E-Coli* counts (i.e. red) were observed on an intermittent basis particularly in the Willett Branch (WBA and WB3) stations. Samples collected at WBA were diluted to 10% in order to read high bacteria levels up to 25,000 MPN/ml. The normal limit for the test is 2,419 MPN/ml. On two occasions, samples at WBA approaching 25,000 MPN/ml were recorded. As shown in Figure 1, the WBA exceeded the standard in all 15 weekly samples. As shown in Figure 2, high E-coli levels that exceeded the limit of 2,419 MPN/ml were also observed in undiluted samples at WB3. While levels at WB3 were lower, they still exceeded 410 MPN/100 ml. every week except Sept. 6 (i.e., green).




The intermittent high counts continue a pattern found in 2021-22. The *E-coli* counts on July 19 and September 13 in WBA were extremely high. The surge may be related to the amount of rainfall occurring in the days before samples were collected. On two occasions when the counts exceeded 24,200 MPN/ml at WBA, and counts at WB3 also exceeded 2,419 MPN/ml., the amount of rainfall totaled 1.68 inches (July 15-19) and 2.92 inches (Sept. 9-19). However, the data are inconsistent. On three other occasions when the counts at WBA were above the median and exceeded 2,419 MPN/ml at WB3, the area received rainfall totaling 0.01 inches. (June 9-12), 0.09 inches. (June 15-19), and 2.03 inches. (July 28-August 2).[3]




The reason for the high *E-coli* counts is unclear but could be the result of cross-contamination from sewer pipes with storm drains feeding into Little Falls branch during heavy rains. Discharges from one or more point sources such as leaking or disconnected sewage pipes and/or overflowing sump pumps could be another source.

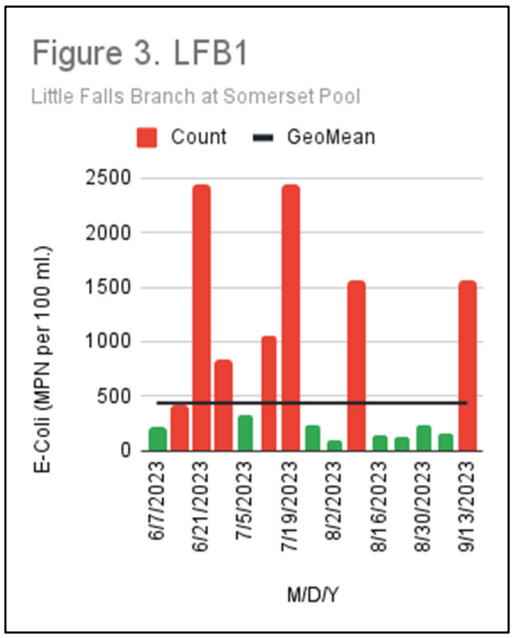
Based on LFWA volunteers' efforts in 2022-23, the Montgomery County Department of Environmental Protection (DEP) began sampling at many locations around Willard Branch due

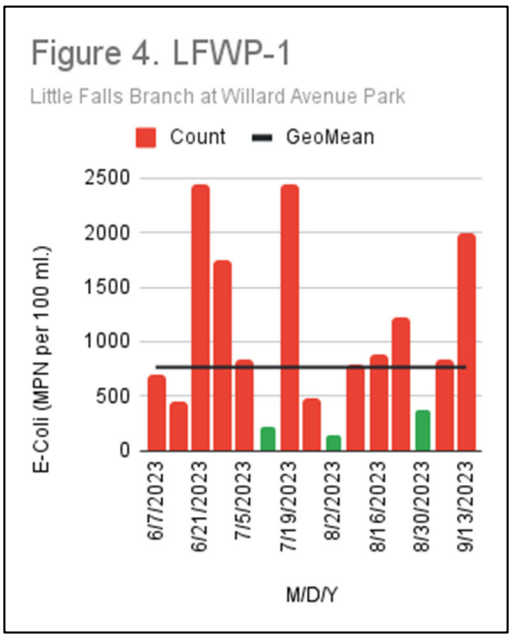
[2] See MD water quality standards at https://dsd.maryland.gov/regulations/Pages/26.08.02.03-3.aspx

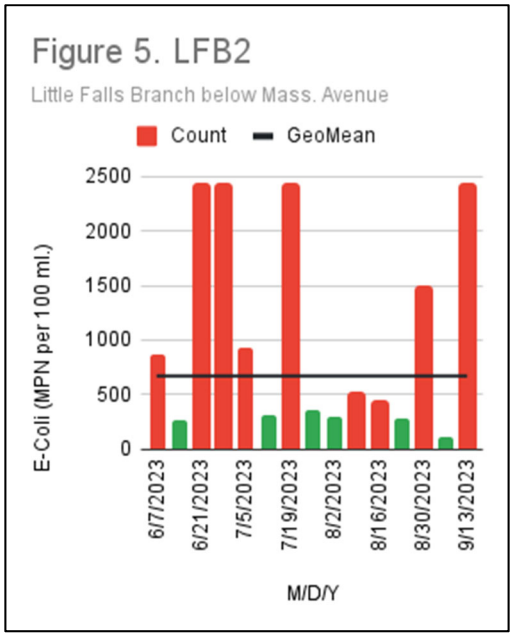
[3] Rainfall precipitation data at Chevy Chase station is available at https://www.ncei.noaa.gov/access/past-weather/bethesda%2C%20maryland. The total amount of rainfall was 21.1 inches between June 1 and September 15, 2022, compared to 12.26 inches during the same period in 2023.

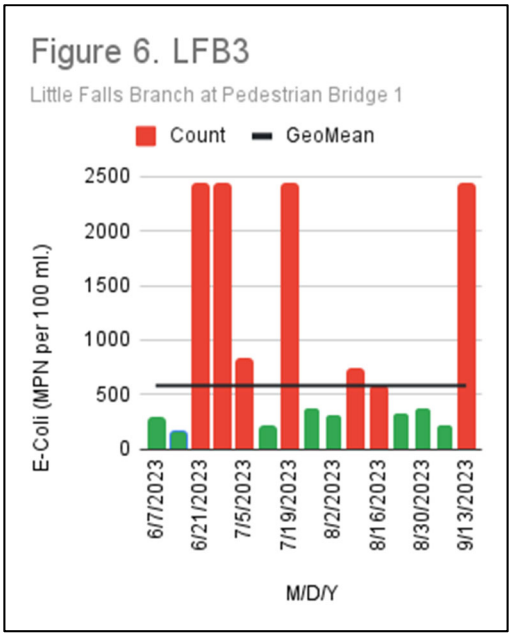
to somewhat frequent discoloration of the outfall pool. Recently, they reported finding at least one possible point source of contamination and are continuing their sampling. LFWA is also in continuing discussions with Washington Suburban Sanitary Commission (WSSC) about the high fecal counts.

As illustrated in Figures 3-7, there were also high counts at stations below Willet Branch. But the counts were lower than the upstream sites at WBA and WB3. Fecal bacteria levels routinely exceeded the single-sample standard of 410 MPN/100 ml. in all locations. Brookmont, LFB4, had the lowest counts suggesting that bacteria upstream were either flushed through the system or deposited in the stream bed further downstream.



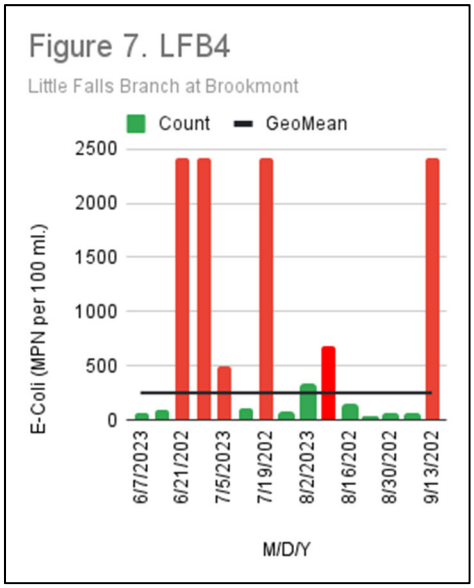



## Geometric Mean Results

Geometric mean refers to the average count over the entire sampling period. According to the Maryland Department of the Environment water quality standards for Class 1 waters, a stream is suitable for recreational use if the geometric mean of all *E. Coli* samples taken over a 90-day period does not exceed 125 MPN per 100 ml., while 10% of samples taken do not exceed the statistical threshold value of 410 MPN per 100 ml.[4]




In Table A below, the geometric mean and percent of samples exceeding the threshold is shown with the descriptions for each station location. None of the sites met the criteria for the geometric mean calculation. Counts for samples that exceeded the limits of the test methodology (>2420 MPN/100 ml.) were included in calculation as 2420. As a result, the geometric mean is likely to be higher than reported where test results were limited.

Table A. Geometric Means by Station ID, 2023.

| Station Location | Station ID | Geometric Mean | % Exceeding Threshold |
|---|---|---|---|
| Willet Branch below Hillandale Townhouses | WBA | 3810 | 100% |
| Willet Branch above Morgan Dr. | WB3 | 1224 | 93% |
| Little Falls at Somerset Pool | LFB1 | 435 | 47% |
| Little Falls at Willard Park | LFWP-1 | 764 | 80% |
| Little Falls Branch below Massachusetts Avenue | LFB2 | 670 | 67% |
| Little Falls Branch at first Pedestrian Bridge | LFB3 | 581 | 47% |
| Little Falls Branch at Brookmont | LFB4 | 248 | 40% |

The geometric means for all Station locations collected between 2021 and 2023 in shown in Table B. The results illustrate that the highest concentrations were found in Willet Branch for three consecutive years. The mean values at LFB2, LFB3, and LFB4 were higher in 2022 than in 2021 and 2023. The lowest mean values were at the Brookmont station (LFB4).

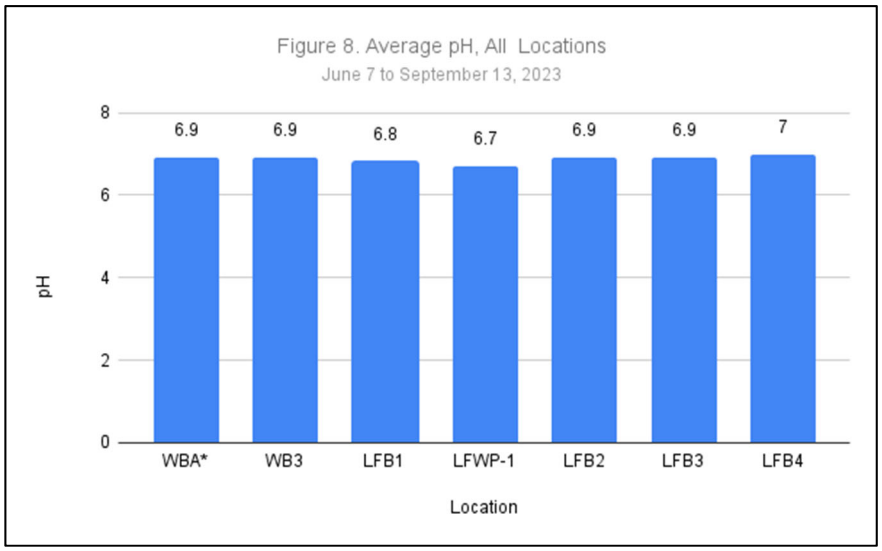
[4] See MD water quality standards at https://dsd.maryland.gov/regulations/Pages/26.08.02.03-3.aspx

Table B. Comparison of Geometric Means at all Sample Locations, 2021-2023

| Station Location | Station ID | 2021 | 2022 | 2023 |
|---|---|---|---|---|
| Willet Branch below Hillandale Townhouses (Bethesda Pool in 2022) | WBA | --- | 2686 | 3810 |
| Willet Branch at Hillandale (Norwood Park in 2021) | WB-1 | 1082 | 1574 | --- |
| Willet Branch above Morgan Dr. | WB3 | --- | 1347 | 1224 |
| Little Falls at Somerset Pool | LFB1 | 266 | 380 | 435 |
| Little Falls at Willard Park | LFWP-1 | --- | --- | 764 |
| Little Falls Branch below Massachusetts Avenue | LFB2 | 586 | 850 | 670 |
| Little Falls Branch at first Pedestrian Bridge | LFB3 | 548 | 989 | 581 |
| Little Falls Branch at Brookmont | LFB4 | 435 | 526 | 248 |

**pH Results**

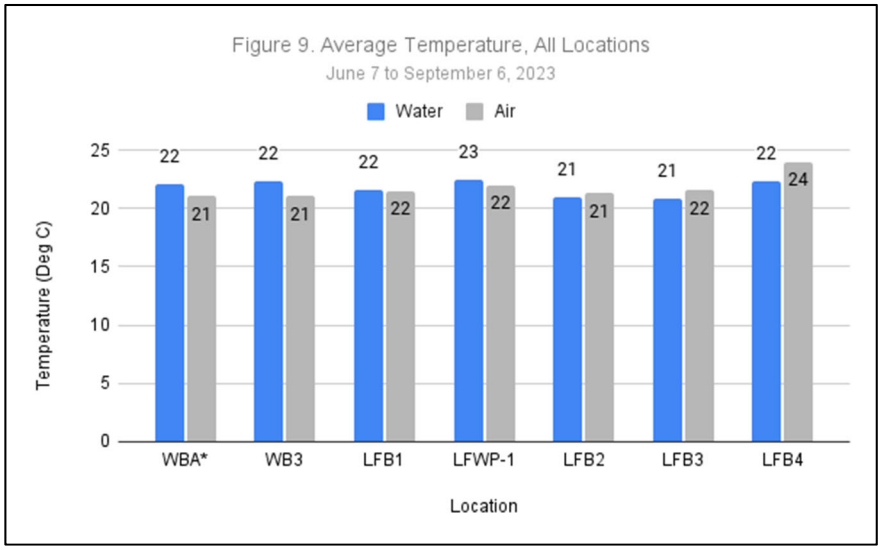
Normal pH values for Class I waters should not be less than 6.5 or greater than 8.5. As illustrated in Figure 8, average pH values were slightly on acidic, i.e., below 7, yet still within the accepted range. By comparison, three stations in the Willet Branch were more acidic in 2022 and outside the acceptable range. [5]




[5] See pH measurements in 2022 Water Quality report.

**Temperature Results (Water and Air)**

The maximum temperature outside the mixing zone for Class I waters should not exceed 32°C (90°F) or the ambient temperature of the surface waters, whichever is greater. As shown in Figure 9, average water temperatures never exceeded the 32°C threshold. The highest single day reading was 27°C at Brookmont (LFB4) on August 16. Brookmont (LFB4) recorded the highest air temperature on average, while Little Falls at Willard Park (LFWP-1) recorded the highest overall water temperature.

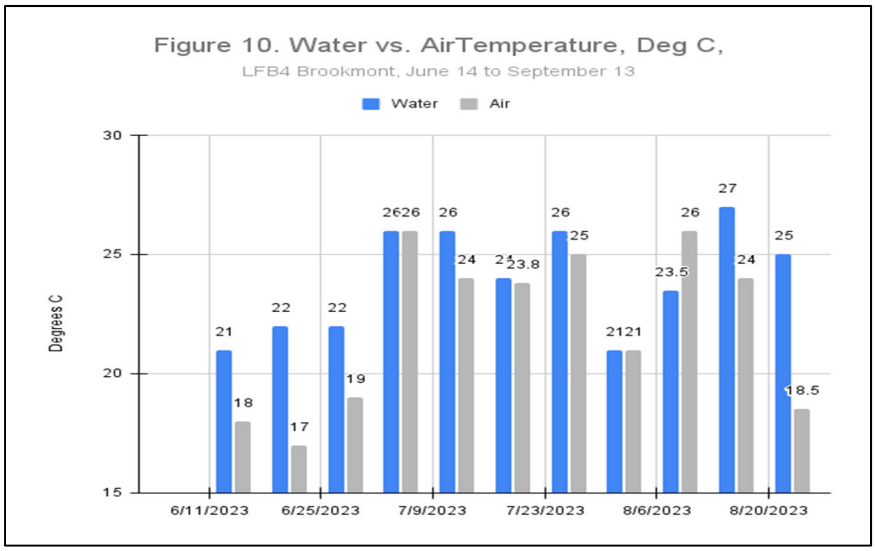



However, as illustrated in Table C, the water temperature exceeded air temperature on a number of occasions and more so at some locations than others. While all water temperature readings were below the threshold, the data suggests that the water temperature takes longer to change than air temperature particularly at LFB4 and other sites WBA, LFB2, and LFB3, and LFB4.

Table C. Percent of Samples, Water Temperature exceeded Air Temperature by Station 2023.

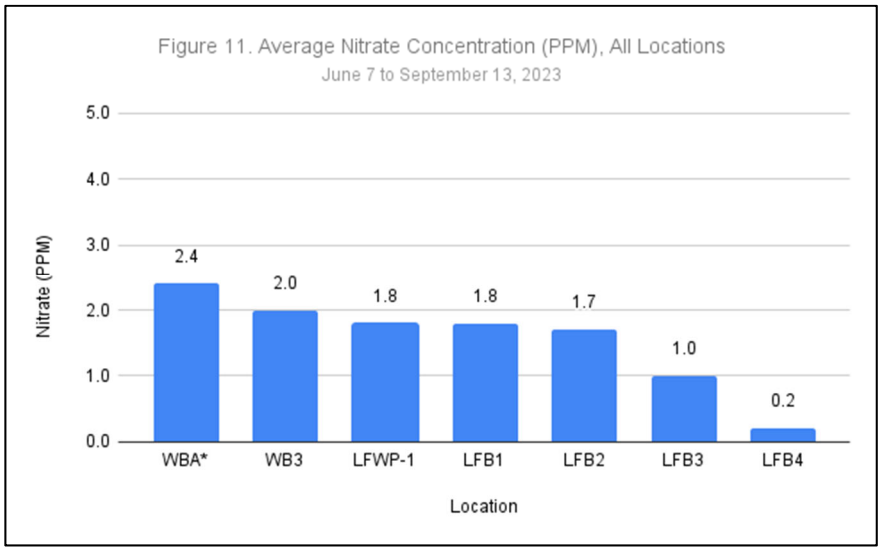
| Station Location | Station ID | # Water Temp > Air Temp. | % Exceeding Air Temp. |
|---|---|---|---|
| Willet Branch below Hillandale Townhouses | WBA | 6 | 46% |
| Willet Branch above Morgan Dr. | WB3 | 3 | 23% |
| Little Falls at Somerset Pool | LFB1 | 2 | 15% |
| Little Falls at Willard Park | LFWP-1 | 3 | 23% |
| Little Falls Branch below Massachusetts Avenue | LFB2 | 7 | 54% |
| Little Falls Branch at first Pedestrian Bridge | LFB3 | 9 | 69% |
| Little Falls Branch at Brookmont | LFB4 | 11 | 85% |

This phenomenon is illustrated in Figure 10, when the water temperature at the Brookmont site (LFB4) was above the air temperature on 11 of 13 sample dates.




## Nitrate

Volunteers began monitoring nitrate and nitrite (NOx) concentrations, parts per million (ppm), at each station this summer. The average values recorded at each station location are shown in Figure 11.[6] Human activity produces excess levels of nitrogen that can lead to harmful effects in streams including a reduction in dissolved oxygen content and overstimulation of plant growth. Sources of NOx to streams and groundwater include septic systems, wastewater/stormwater ponds, leaky sewer lines, and manure fertilizer application. According to the USGS, NOx concentrations above 1.0 ppm are indicative of these types of (i.e., anthropogenic) sources. [7]




[6] Results are being reported to the Izaak Walton League for the Nitrate Watch initiative.
[7] See https://dnr.maryland.gov/waters/coastalbays/Documents/Ch3.1.pdf

## Spill Events

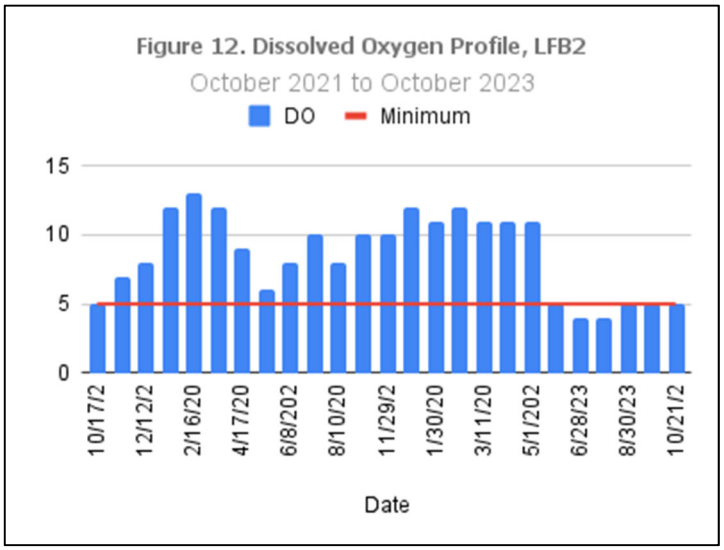
Volunteers were also alerted to spills during the summer. Problems in the creek are reported to Montgomery County DEP and WSSC Water.

**Somerset Sewage Spill** - On July 20, there was a leaking manhole cover spilling sewage into the Little Falls Branch near the LFB1 Somerset Pool station. WSSC was notified and investigated the spill. Further information is found at https://www.wsscwater.com/sites/default/files/2023-07/2023.07.20.pdf

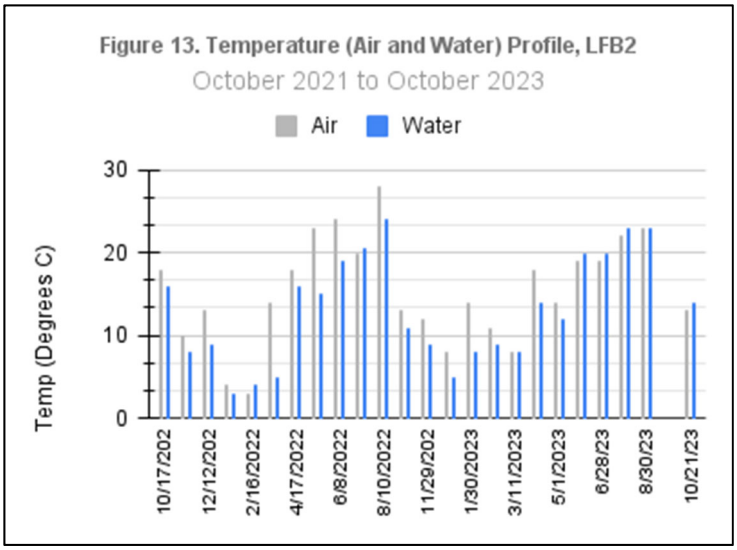
**Muriatic Acid Spill** - Dead fish and discolored waters were noticed on August 8 near the Willard Avenue Park and reported to Montgomery County DEP. Muriatic acid, a diluted solution of hydrochloric acid used to lower pH levels, was discharged into the creek by the Bethesda pool. Images of the damage to the creek can be found at https://www.lfwa.org/updates/illegal-dumping-if-you-see-something-say-something

## Seasonal Water Quality Trends (LFB2)

Dissolved oxygen (DO) is naturally found in the water and is used by zooplankton and fish to breathe. A concentration of 5 to 10 parts per million (ppm) is a healthy level for streams like the Little Falls branch. DO and air/water temperature were measured monthly at LFB2 from October 2021 to October 2023. As shown in Figure 12, DO exceeded 5 PPM in every sample in 2022, but dropped slightly below 5 ppm in the summer of 2023. DO levels are generally elevated in the winter months when the water temperature is low and there is less biological activity.




As expected, air and water temperatures ranged from 2 to 28 Degrees C and remained below the 32°C threshold between 2021 and 2023 as shown in Figure 13. The air temperature was slightly lower than the water temperature on one occasion during February-March of both years.




## Volunteer Citizen Scientists

The 2023 water quality data was collected by volunteer citizen scientists every week this summer. The findings in the report would not have not been possible without their dedicated effort. In no particular order, the LFWA extends a thank you to:

Averill Simone

Emily Simone

Bobby Pestronk

Emily Cordas

Jane Mercer

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Eve Park

Henry Park

Daniel Park

Julie Steinberg

Maria Sokolowski

Sally Winthrop

Sara Robinson

Woody Stanley

Audrey Steward

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