

Northeast Creek Report - *E. coli* Monitoring

June 2025 – September 2025

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Introduction

The Community Environmental Health Laboratory (CEHL) at MDI Biological Laboratory analyzed water samples from Northeast Creek for *Escherichia coli* (*E. coli*) levels between June and September 2025. Samples were collected and analyzed on June 26, July 24, August 14, August 28, September 11, and September 25, totaling six analysis days.

The Northeast Creek Water Quality Monitoring Project comprises eight distinct sites, with water samples from seven of these sites analyzed for bacteria by CEHL staff (**Table 1 and Figure 1**).

Table 1. Northeast Creek water sampling sites, each with a site description, geographic coordinates, a designation of freshwater vs. marine, and a sampling method.

VRMP Site ID	Site Description	Geographic Coordinates	Freshwater/ Marine	Sampling Method/Location
NEC01	Northeast Creek mainstem from Stone Barn Farm	44.418056, -68.306944	Freshwater	Wading/Reach with extension pole or sample from boat
NEC02 <i>Samples not run by CEHL</i>	Northeast Creek Estuary at Rte. 3 Bridge	44.424712, -68.326889	Tidal	Wading/Reach
ABB01	Aunt Betsey's Brook at Gilbert Farm Rd	44.405833, -68.319444	Freshwater	Wading/Reach
FHB01	French Hill Brook at Betsey's Rd	44.406389, -68.312222	Freshwater	Wading/Reach
OMB01	Old Mill Brook at Norway Dr	44.41460, -68.29570	Freshwater	Culvert/Wading/Reach

OMB02	Old Mill Brook at Mill Brook Rd	44.398889, -68.287778	Freshwater	Wading/Reach
LB01	Liscomb Brook at Norway Dr	44.41917, -68.29167	Freshwater	Wading/Reach
SB01	Stony Brook upstream of Hamilton Pond	44.42611, -68.28361	Freshwater	Wading/Reach

Figure 1. Map of the Northeast Creek Water Quality Monitoring sampling sites.

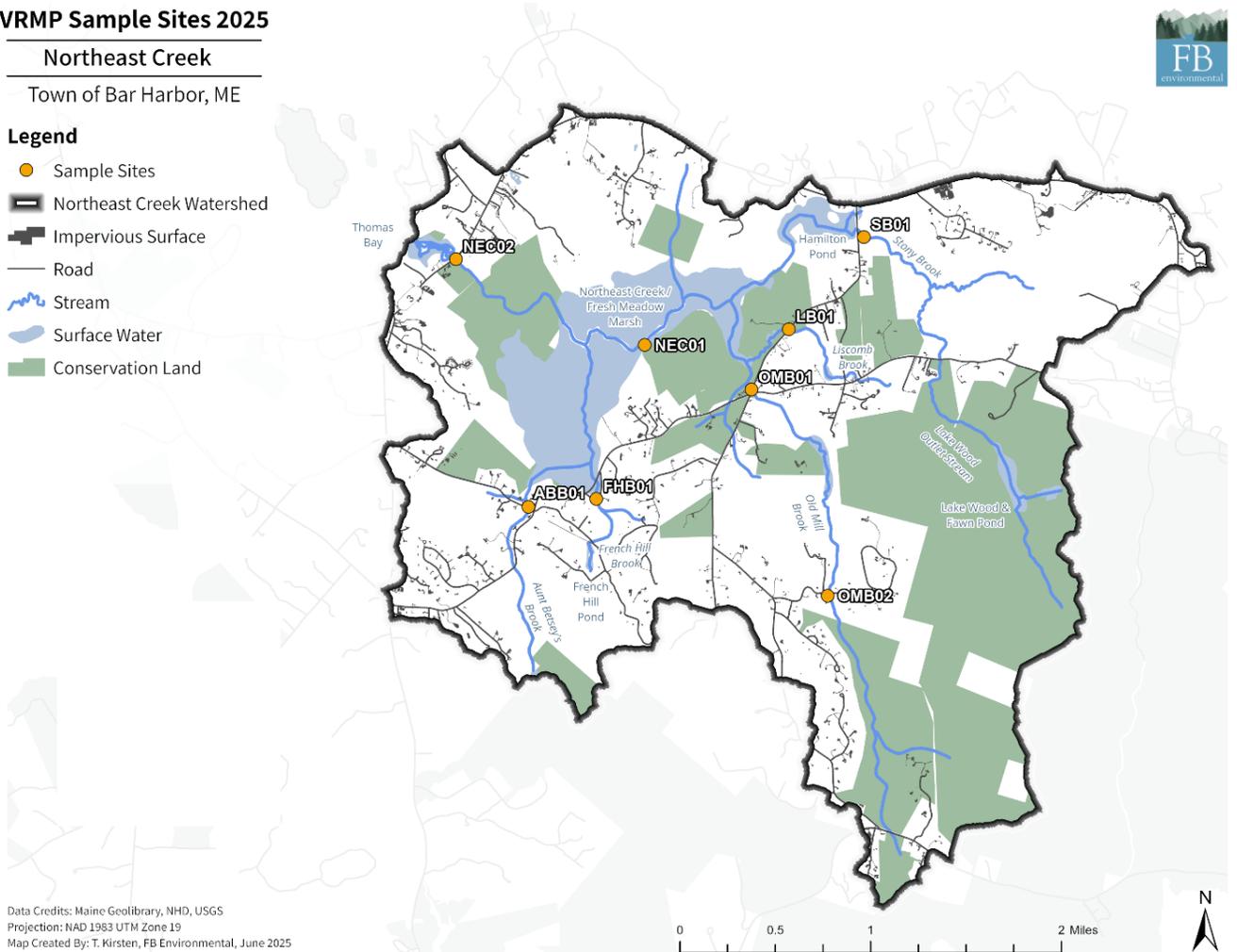
VRMP Sample Sites 2025

Northeast Creek

Town of Bar Harbor, ME

Legend

- Sample Sites
- Northeast Creek Watershed
- Impervious Surface
- Road
- ~ Stream
- Surface Water
- Conservation Land



Data Credits: Maine Geolibrary, NHD, USGS
 Projection: NAD 1983 UTM Zone 19
 Map Created By: T. Kirsten, FB Environmental, June 2025

METHODS

Training:

On May 30th, CEHL staff met with the project's organizers and volunteers near Northeast Creek. CEHL members trained volunteers on standardized procedures for collecting water samples in Whirl-Pak bags. Using a Sharpie, each bag is labeled with site, date, and time, $\frac{3}{4}$ of the way down the bag. The bag is then attached to sampling tongs via the white tabs; the perforated strip at the top of the bag is ripped off, and the bag is placed underwater without opening it. Once underwater, the bag is opened by releasing the tension on the tongs and swirled in a figure 8 to fill the bag three-quarters full. The bag is then removed from the tongs and whirled to create a tight seal, while leaving an air space at the top.

Quality Control:

Quality control was performed on June 18, 2025, using IDEXX-QC. This included running a positive control, *Escherichia coli*, and two negative controls - *Pseudomonas aeruginosa* and sterile water. Only *E. coli* tested positive, indicating quality control standards were met. Additionally, incubator and refrigerator temperatures were checked each sample- processing day to ensure accuracy. The temperature, date, and time of readings were recorded in laboratory logs.

Sample Collection and Handling:

Water samples were collected in the morning on each sampling day by field volunteers. Samples were stored on ice to maintain a temperature below 10 °C during transport. Upon arrival at the lab, they were refrigerated at 4 °C and processed within two hours, ensuring incubation began before the eight-hour limit between collection and incubation. Datasheets were copied after the chain of custody signatures were put in place.

Laboratory Protocol:

The lab benchtop was sterilized with 70% ethanol. Sterile vessels and Quanti-Trays were labeled with Northeast Creek site identifiers (e.g., NECO1, ABB01, etc). A sterile water control was included with each batch to verify test validity. One hundred mL of each sample was transferred into its respective sterile vessel. Colilert reagent was added, and the vessel was aseptically capped, sealed, and mixed until the reagent dissolved. Samples were poured into their respective Quanti-Trays, which were then sealed using a Quanti-Tray Sealer. Trays were incubated at 35 ± 0.5 °C for 18–22 hours.

Reading Results:

After incubation, results were assessed by comparing each tray to a comparator provided by IDEXX to determine the presence or absence of total coliforms. To determine *E. coli*, trays were

then examined under a UV light (365–366 nm), and fluorescent wells were marked. Both small and large fluorescing wells were counted, and the Most Probable Number (MPN) was determined using the Quanti-Tray MPN Table.

Source of Methods:

IDEXX Colilert®-18 Test Method for the Simultaneous Detection of Total Coliforms and *E. coli* in Water https://calusawaterkeeper.org/docs/Colilert-18_SOP_2016.pdf

Data Records/ Inputs: Laboratory logs containing the bacterial results, along with scanned field data sheets, were emailed to Hailey Bondy at hbondy@barharbormail.org. Additionally, bacterial results and field data were recorded on anecdata.org as part of the Acadia Water Quality Monitoring project.

RESULTS and DISCUSSION

Table 2. *E. coli* concentrations at each designated Northeast Creek site across six sampling dates. Numbers highlighted in yellow represent *E. coli* concentrations greater than the EPA standard of 320 colony-forming units (cfu)/100 mL for *E. coli* in recreational freshwater.

SITE	6/26/25	7/24/25	8/14/25	8/28/25	9/11/25	9/25/25
NECO1	344.8	980.4	1986.3	>2419.6***	1553.1	1732.9
ABB01	235.9	50.4	307.6	No data*	870.4	No data*
FHB01	68.9	30.1	No data*	No data*	No data*	No data*
OMB01	137.6	22.1	240.0	70.3	No data**	No data**
OMB02	86.0	63.1	91.0	No data*	44.1	No data*
LB01	816.4	44.1	275.5	37.9	38.6	3.0
SB01	68.3	2.0	4.1	No data*	13.1	1.0

* No data due to water at sampling site being dried up

** No data due to inaccessibility of site because of construction

*** All wells in the Quanti-Tray fluoresced under UV light (365–366 nm), preventing an exact *E. coli* count and resulting in a “greater than” value.

The U.S. Environmental Protection Agency (EPA) has set a recreational water quality standard for *E. coli* in freshwater of 320 colony-forming units (cfu) per 100 mL (EPA, 2012). This threshold is based on epidemiological studies linking gastrointestinal illness to *E. coli* exposure in recreational freshwater environments (Cabelli et al., 1982).

In this study, site **NECO1** exceeded the EPA standard on all six sampling dates, indicating consistently high levels of *E. coli*. Site **ABB01** exceeded the standard on two occasions—once in June and again in early September—while site **LB01** exceeded the threshold only once, in June.

The summer sampling period was marked by unusually dry conditions (**Table 3**). Some sites dried up completely (**Table 2**), preventing sampling, while others—although still containing water—likely experienced altered bacterial levels due to reduced flow and other environmental changes. Rainfall has been shown to significantly influence *E. coli* concentrations, typically increasing levels through surface runoff and resuspension of sediments (Kleinheinz et al., 2009). Thus, a lack of rain throughout the summer season could have resulted in lower bacterial counts.

Table 3. Rain (inches) for June – September 2025 on Mount Desert Island. Recorded from Acadia National Park’s air quality station on McFarland Hill using an ETI NOAA IV rain gage.

Month	Rain (inches)
June	2.79
July	0.83
August	1.08
September*	1.04

*September 1 - September 25 at 8 am

Furthermore, strong sunlight, especially in the absence of cloud cover and precipitation, can decrease bacterial concentrations by promoting die-off in surface waters (Fujioka and Narikawa, 1982). Given that all samples in this study were collected using a wading and reach technique, targeting the upper layers of water, prolonged sun exposure during dry conditions may likely have contributed to lower *E. coli* counts at some sites.

It is also essential to note that site **OMBO1** was affected by ongoing construction related to culvert removal and replacement (**Figure 2**). Although access to the sampling area was initially maintained, dewatering activities associated with the construction likely influenced *E. coli* concentrations. Access was later restricted during the final two sampling events (**Table 2**), making it impossible to collect water samples at this location.

It is important to emphasize that each water sample represents only a single point in time. Because water is inherently dynamic (in a state of continuous movement), and because environmental conditions and bacterial concentrations can change rapidly due to factors such as rainfall, temperature, solar radiation, wind, and human activity (e.g., agricultural runoff, septic leakage, and industrial discharge), water quality monitoring is also inherently dynamic. To effectively monitor such a system that is constantly changing, frequent sampling over time is required to account for continual fluctuations. In this study, there were six sampling days over the course of 3 months (June 26 - September 25), and so many potential changes in water quality were not captured in the sampling schedule.



Figure 2. Construction near site **OMBO1**.

References

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