National Park Service
U.S. Department of the Interior

Inventory and Monitoring Division
Cumberland Piedmont Network

Water Quality Monitoring, Fiscal Year 2023

Overview

The Cumberland Piedmont Inventory and Monitoring Network (CUPN) began long-term water quality monitoring at Kings Mountain National Military Park in fiscal year 2003, sampling bi-monthly in alternating years. After FY17 the sampling changed to a quarterly schedule on alternate years. Water quality is measured at six sites: Kings Creek (RRKC), Upper Dellingham Branch (UPDB), Garner Branch (GBGB), Stonehouse Creek (SCSC), Long Branch (LBLB) and Cabin Creek (CACR; see map on page 2). Based upon program requirements and specific park concerns, parameters were chosen for long-term monitoring including water temperature, specific conductance (SpC), pH, and dissolved oxygen (DO). Samples undergo laboratory analysis for acid neutralizing capacity (ANC) and *Escherichia coli* (*E. coli*).

This brief summarizes data collected from November 2, 2022 through August 2, 2023 (FY23). Water quality data are available upon request to the Cumberland Piedmont Network.

Kings Creek on August 2, 2023. Photo by Johnathan Jernigan.

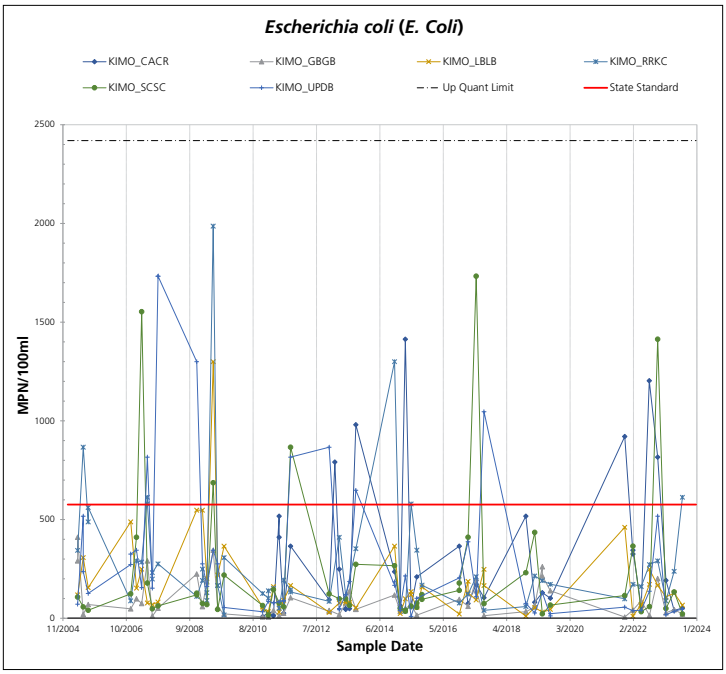


Figure 1. *E. coli* at Kings Mountain National Military Park FY03–FY23.

Significant Findings

Two violations of water quality standards were found during FY23. Twice *E. coli* was above the EPA recommended levels (Figure 1). Once at Stonehouse Creek on November 2, 2022, and once at Kings Creek on August 2, 2023. All other parameters were within state standards.

Stonehouse Creek on November 2, 2022. Photo by Johnathan Jernigan.

Water Quality Standards

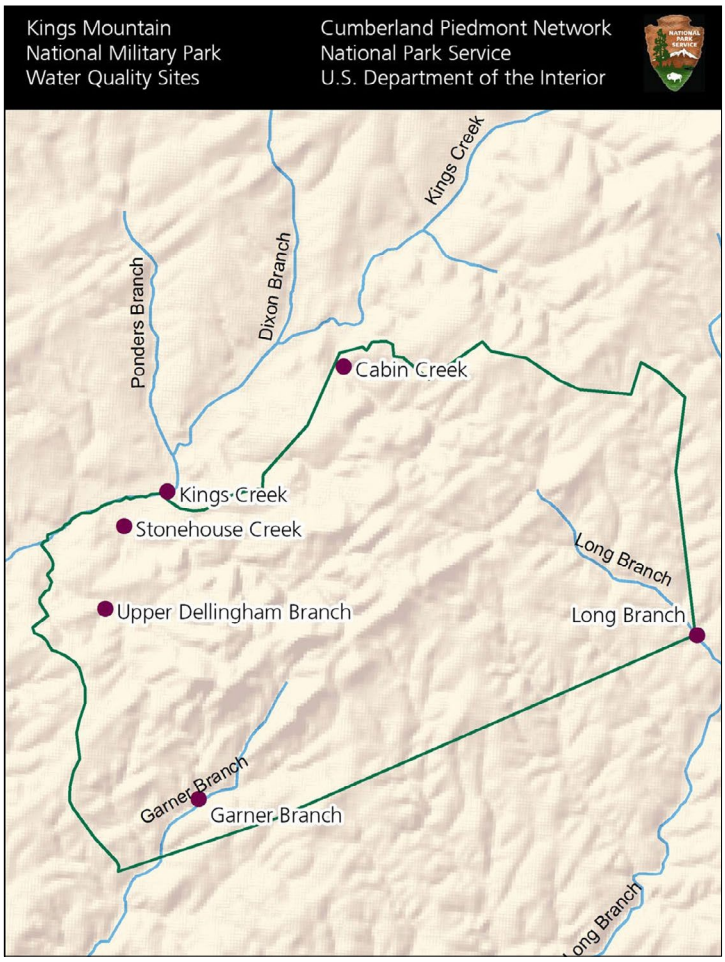
All Kings Mountain National Military Park waters are considered "South Carolina Outstanding Resource Waters," the highest standards under the Clean Water Act as promulgated by the state. The state currently does not impose a standard for *E. coli* bacteria so we have adapted the EPA recommendations for "Single Sample Infrequently Used Full Contact Recreation" standard of less than 576 MPN/100mL. Most Probable Number (MPN) is a statistical method of estimating bacteria colony density. Specific conductance (SpC) is without a state standard or federal guidelines but is useful in interpreting water quality results.

Table 1. Parameters and Standards.

Parameter	Standard
Water temperature	Less than 32.2°C (90.0°F)
Dissolved oxygen	Greater than 4.0 mg/L
pH	Between 6.0 and 8.5 SU (standard units)
Escherichia coli	Less than 576 MPN/100 mL
Specific conductance	No standard

Future Monitoring

Sampling will resume in fiscal year 2025.



Water-quality monitoring sites at Kings Mountain National Military Park in FY 2023.

About the Cumberland Piedmont Network

In 1999, the National Park Service initiated a long-term ecological monitoring program, known as "Vital Signs Monitoring," to provide the minimum infrastructure to allow more than 270 national park system units to identify and implement long-term monitoring of their highest-priority measurements of resource condition. The overarching purpose of natural resource monitoring in parks is to develop scientifically sound information on the current status and long-term trends in the composition, structure, and function of park ecosystems, and to determine how well current management practices are sustaining those ecosystems.

The NPS Vital Signs Monitoring Program addresses five goals for all parks with significant natural resources:

- Determine the status and trends in selected indicators of the condition of park ecosystem,
- Provide early warning of abnormal conditions,
- Provide data to better understand the dynamic nature and condition of park ecosystems,
- Provide data to meet certain legal and Congressional mandates, and
- Provide a means of measuring progress towards performance goals.

Effective long-term management and stewardship of natural resources in the Cumberland Piedmont Network begins with baseline knowledge of these resources. To acquire this knowledge, an inventory program was established by the National Park Service with the goals of acquiring baseline information for a variety of resources, from bibliographic information to species occurrence and distribution.

For More Information

CUPN Home Page:
https://www.nps.gov/im/cupn/index.htm

CUPN Reports & Publications:
https://www.nps.gov/im/cupn/reports-publications.htm

About the NPS Inventory & Monitoring Program:
https://www.nps.gov/im/index.htm

Data Downloads via the Natural Resource Information Portal:
https://irma.nps.gov/Portal/

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