Chickamauga and Chattanooga
National Military Park

National Park Service
U.S. Department of the Interior

Inventory and Monitoring Division
Cumberland Piedmont Network

Water Quality Monitoring, Fiscal Year 2024

Overview

The Cumberland Piedmont Network Inventory and Monitoring Program (CUPN) began long-term water quality monitoring at Chickamauga and Chattanooga National Military Park (CHCH) in fiscal year 2003 (FY03). Water quality is measured every month over a two-year period followed by a five-year hiatus (concordant with the U. S. Geological Survey's national long-term water quality program). Eight sites are monitored at the park (see map on page 2) including six in Georgia: West Chickamauga Creek (WCCC), Black Branch (VCBB), Cave Spring (CSCS), Skyuka Spring (SSSS), Jackson Spring (JSJS) and Lookout Creek (NCLC); and two in Tennessee: Rock Spring (RSRS) and Gum Spring (GSGS).

Based upon program requirements and findings of the water-quality inventory, a set of parameters was chosen for long-term monitoring. These parameters include the field measures of water temperature, specific conductance, pH, and dissolved oxygen. Samples undergo laboratory analysis for *Escherichia coli* (*e. coli*) and acid neutralizing capacity.

This brief summarizes data collected from November 2002 through September 2024, highlighting October 19, 2023 through September 19, 2024. Water quality data are available upon request to the Cumberland Piedmont Network.

Significant Findings

There were nine violations of water quality standards in FY24. Five times the dissolved oxygen level at Cave Spring fell below the Georgia standard of 4.0 mg/L. Depressed oxygen is common for this site and appears to be a natural condition because this small spring ceases to flow during dry summer and autumn months (Figure 1). Four times the Georgia single sample limit of 576 MPN/100mL for *Escherichia coli* was exceeded, twice each for Cave Spring and Black Branch (Figure 2). Most Probable Number (MPN) is a statistical method of estimating bacteria colony density. Both sites exceeded the Georgia standard on September 30, 2024, likely caused by high runoff from the remnants of Hurricane Helene.

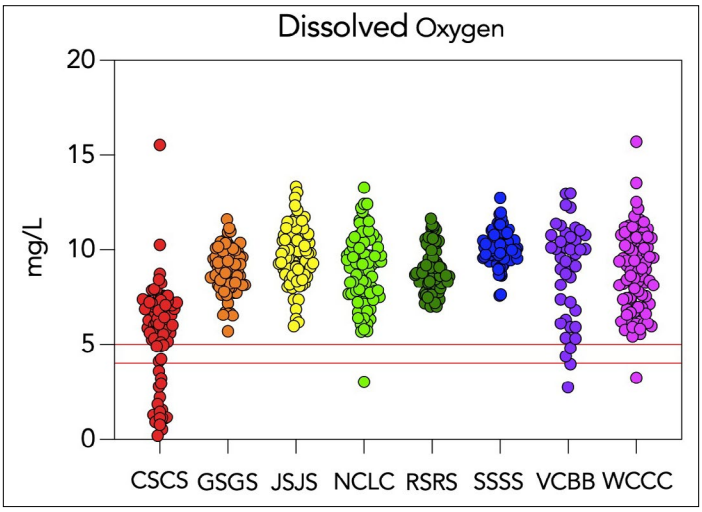


Figure 1. Dissolved oxygen at Chickamauga and Chattanooga NMP November 2002 through September 2024. Red lines represent the Georgia and Tennessee standards 4.0 and 5.0 mg/L, respectively. Depressed oxygen levels are uncommon at all sites except Cave Spring. [CSCS=Cave Spring; GSGS=Gum Spring; JSJS=Jackson Spring; NCLC=Lookout Creek; RSRS=Rock Spring; SSSS=Skyuka Spring; VCBB=Black Branch; WCCC=West Chickamauga Creek]. NPS / CUPN

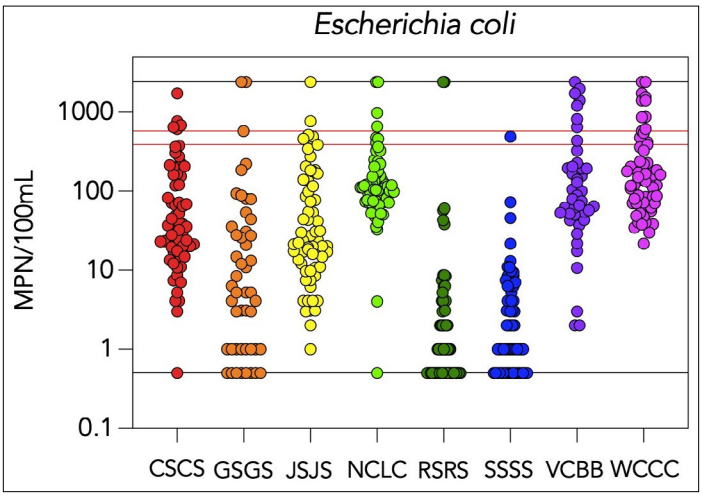


Figure 2. *Escherichia coli* at Chickamauga and Chattanooga NMP October 2008 through September 2024. The red lines represent the Georgia and Tennessee standards of 487 and 576 MPN/100mL, respectively. The lower black line is set at 0.5 and represents values below the detection limit of 1 MPN/100mL. The upper black line is set at 2420 MPN/100mL representing all values above the detection limit. It is uncommon for park waters to exceed state standards, especially remarkable for the large Skyuka Spring (SSSS). NPS / CUPN

Water Quality Standards

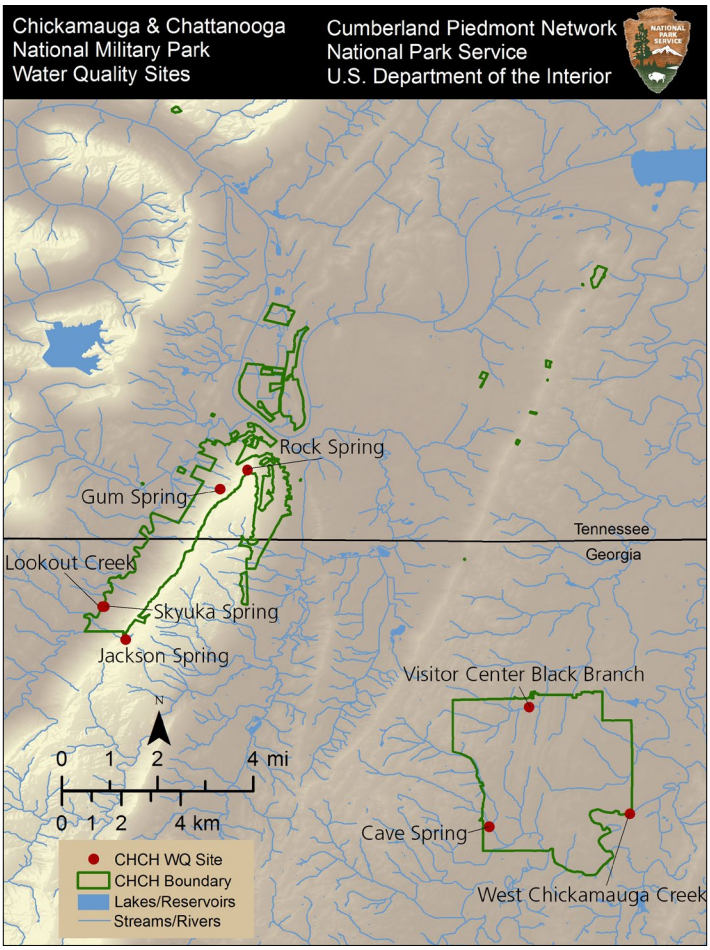
The park's surface streams are assigned specific state standards based on designated uses. Georgia does not have a single sample standard for *Escherichia coli*, therefore, based on the lack of recreational use, we have adopted the EPA recommendation for "Single Sample Infrequently Used Full Contact Recreational" standard of 576 MNP/100 mL.

Table 1. Parameters and Standards.

Parameter	Standard
Water temperature	Georgia: Less than 32°C (89.6°F)
	Tennessee: Less than 30.5°C (86.9°F)
Dissolved oxygen	Georgia: Greater than 4.0 mg/L
	Tennessee: Greater than 5.0 mg/L
pH	Georgia: Between 6.0 and 8.5 SU
	Tennessee: Between 6.0 and 9.0 SU
Escherichia coli	Georgia: Less than 576 MPN/100 mL
	Tennessee: Less than 487 MPN/100 mL
Specific conductance	No standard, Georgia or Tennessee
Acid neutralizing capacity	No standard, Georgia or Tennessee

Future Monitoring

Water quality sampling is scheduled to resume in FY30.



Water-quality monitoring sites at Chickamauga and Chattanooga National Military Park in FY24. NPS / CUPN

Lookout Creek (NCLC) on October 26, 2023. The watershed upstream of this site is 445 square kilometers (172 square miles) and largely privately owned. NPS / Jeff Duncan.

About the CUPN

In 1999 the National Park Service initiated a long-term ecological inventory and monitoring program in more than 280 National Park Service units. This program monitors fundamental elements and processes in park ecosystems to help indicate the overall health or condition of park resources. Data generated allows us to better understand natural processes and the results of management actions, and help guide parks in the successful protection and use of park resources. Information gathered is shared widely through the production of technical reports, resource briefs, and journal publications.

The Cumberland Piedmont Inventory and Monitoring Network, one of 32 networks across the country, includes 14 parks that share geographic proximity and common natural resources. Parks within each of the networks work together to plan, design, and conduct inventories and long-term monitoring. The Cumberland Piedmont Network provides long-term monitoring for water quality, cave bats, crickets and meteorology, Allegheny woodrats, forest vegetation, ozone foliar damage, and invasive species.

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/

Contact

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West Chickamauga Creek (WCCC) on April 16, 2024. The stream as depicted is receding from a rainfall event and remains turbid from runoff. The watershed upstream of this site is 360 square kilometers (139 square miles) and largely privately owned. NPS / Jeff Duncan.