



Water Quality Summary, Fiscal Year 2022

Overview

Cumberland Piedmont Network (CUPN) began long-term water quality monitoring at Little River Canyon National Preserve (LIRI) in fiscal year 2007. Sampling occurs monthly during two consecutive years, followed by five off years. Water quality is measured at 11 sites (see map next page). Six sites are along the main stem of Little River at DeSoto Falls (Figure 1), DeSoto State Park, Highway 35 Bridge, Eberhart Point, Billy's Ford, and Canyon Mouth; and five sites on tributaries, East and Middle Forks, Lookout Mountain Camp, Yellow, and Johnnie's Creeks. Based on 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 *Escherichia coli* (*E. coli*) and turbidity. Samples are sent to the University of Tennessee-Knoxville Water Lab for analysis of Acid Neutralizing Capacity (ANC) and nitrate (NO_3).

This brief summarizes data collected from October 21, 2021 through September 21, 2022. Water quality data are available by request to the Cumberland Piedmont Network.



Figure 1. Visitors enjoying Little River at Highway 35 Bridge on May 18, 2022. Photo by Mary Shew.

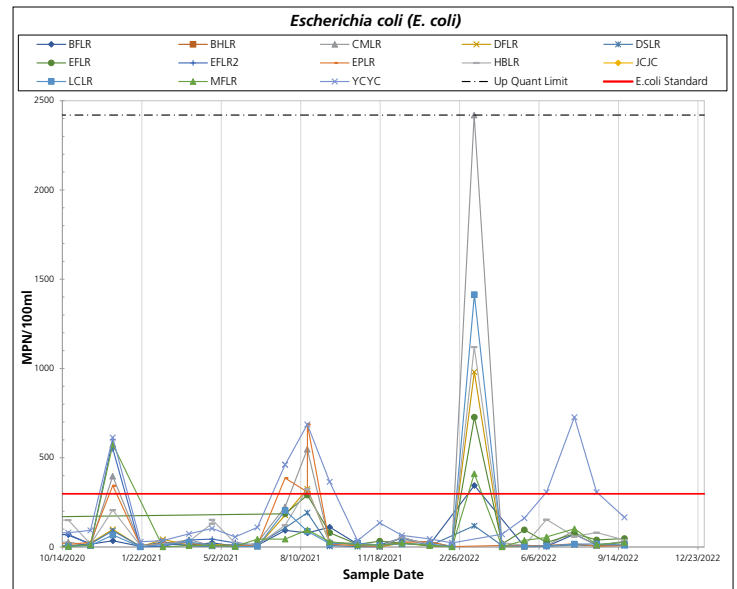


Figure 2. *E. coli* at Little River Canyon National Preserve, FY06–FY22 (BFLR—Billy's Ford Little River, CMLR—Little River at Canyon Mouth Park, DFLR—Little River at DeSoto Falls, DSLR—Little River at DeSoto State Park, EFLR—East Fork Little River, EPLR—Little River at Eberhart Point, HBLR—Little River at Highway 35 Bridge, JCJC—Johnnie's Creek, LCLR—Lookout Mountain Camp, MFLR—Middle Fork Little River, YCYC—Yellow Creek).

Significant Findings

There were 15 violations of water quality standards in FY22. The EPA's recommendation for *E. coli* (Figure 2) was exceeded ten times. Seven of these exceedances occurred on March 16, 2022. In general, elevated *E. coli* levels corresponded with precipitation events for the week prior to sampling, indicating non-point sources of bacteria. The low pH state standard was violated six times. Five of these occurrences were on September 21, 2022, where the week preceding sampling had no precipitation accumulation. The overall low pH of park waters is likely a reflection of the natural condition influenced by local geology and precipitation. The local silica sandstone bedrock is near devoid of carbonate minerals, offering limited natural buffering. Overall, average nitrate (NO_3) has declined since the last sampling in 2014–2015. Mean nitrate in FY21–22 was 0.47 mg/L, compared to a mean of 2.83 mg/L in FY14–15.

Water Quality Standards

All Little River Canyon National Preserve waters are considered “Alabama Outstanding Resource Waters,” the highest standards under the Clean Water Act as promulgated by the state. The exception is the East Fork in Georgia, which falls under Georgia fish and wildlife standards. The states currently do not impose a standard for *E. coli* bacteria, so we have adapted the EPA recommendations for “Full Contact Recreation.” The states are without a standard for nitrate (NO_3); the EPA limit for drinking water of 90 mg/L as NO_3 is used for comparison. Acid neutralizing capacity (ANC) and specific conductance (SpC) are without state standards or federal guidelines. These parameters are useful in interpreting water quality (Table 1).

Table 1. Applicable standards for Alabama and Georgia (mg/L—milligrams per liter, $\mu\text{S}/\text{cm}$ —microsiemens per centimeter, MPN—most probable number, NTU—Nephelometric Turbidity Units, NS—no standard).

Parameters	Alabama	Georgia
Water Temperature	< 32.2°C (90°F)	< 32.2°C (90°F)
Dissolved Oxygen	> 5.5 mg/L	> 4.0 mg/L
pH (range)	6.0 – 8.5 SU	6.0 – 8.5 SU
SpC ($\mu\text{S}/\text{cm}$)	No Standard	No Standard
ANC (mg/L CaCO_3)	No Standard	No Standard
<i>E. coli</i>	< 298 MPN/100 mL	< 298 MPN/100 mL
Nitrate	< 90 mg/L as NO_3	< 90 mg/L as NO_3
Turbidity	< 50 NTU	No Standard

Future Monitoring

Water sampling will resume in fiscal year 2027.

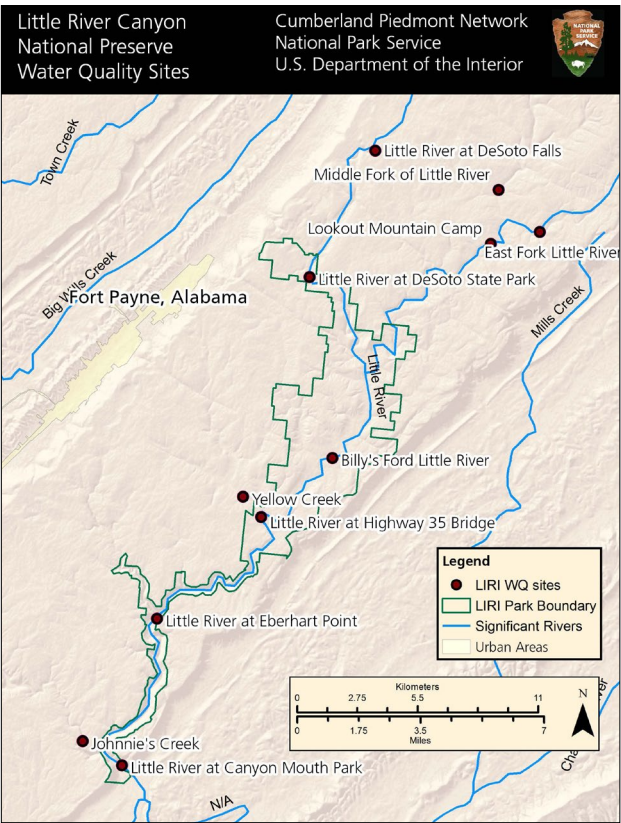


Figure 3. Little River Canyon National Preserve WQ sites.

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 and Publications:

<https://www.nps.gov/im/cupn/reports-publications.htm>

About the NPS Inventory and Monitoring Program:

<https://www.nps.gov/im/index.htm>

Data Downloads via the Natural Resource Information Portal:

<https://irma.nps.gov/Portal/>

Contact

Emma Brinley Buckley, *CUPN Hydrologist*

emma_brinleybuckley@nps.gov

Brenda Wells, *CUPN Biologist*

brenda_wells@nps.gov