



Water Quality Summary, Fiscal Year 2015

Overview

The Cumberland Piedmont Network (CUPN) began long-term monitoring of water quality at Cowpens National Battlefield (COWP) in fiscal year 2003 (October 2002 through September 2003). Sampling occurs quarterly in alternating years. Water quality is measured at four sites: Suck Creeks 2 and 3, Little Buck Creek and Long Branch of Island Creek. Based upon program requirements and specific park concerns, a set of parameters was chosen for long-term monitoring. This set includes the field measures of water temperature, specific conductance (SpC), pH, and dissolved oxygen (DO). Samples undergo laboratory analysis for *Escherichia coli* (*E. coli*) and acid neutralizing capacity (ANC).

This brief summarizes data collected from 1 October 2014 through 30 September 2015. Water quality data are available upon request to the Cumberland Piedmont Network, or at our website: <http://science.nature.nps.gov/im/units/cupn/index.cfm>.



Figure 1. Long Branch of Island Creek, 5 May 2015. Photo by Shepard McAninch.

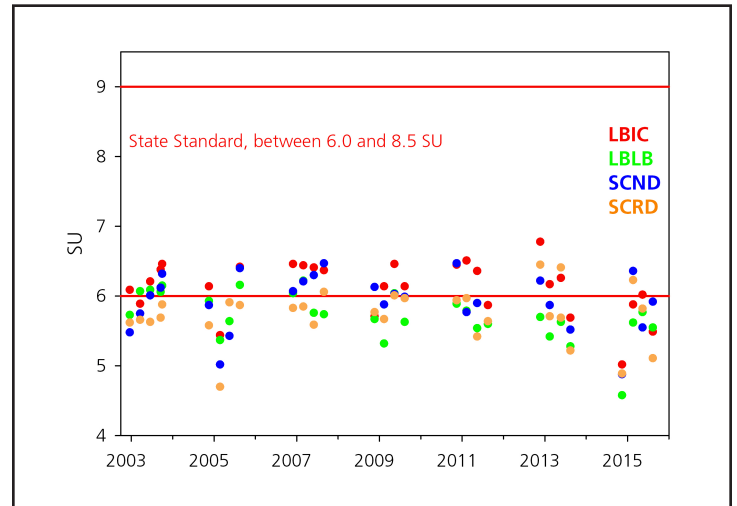


Figure 2. pH at Cowpens National Battlefield, FY03-FY15 (LBIC—Long Branch Island Creek, LBLB—Little Buck Creek, SCND—Suck Creek #2, SCRD—Suck Creek #3).

Significant Findings

Highlights of Fiscal Year 2015 Monitoring

There were 13 apparent violations of South Carolina's lower pH limit of 6.0 SU. Each of the four sites had at least three low pH values. This low pH actually reflects the natural conditions of Cowpens National Battlefield. The local bedrock is basically devoid of carbonate minerals and thus provides no natural buffering, as surface water pH is very close to that of the precipitation. The state stipulates that a water body is not in violation if a measurement reflects a natural condition.

Park Water in Good Condition

Generally, the water quality of Cowpens National Battlefield is in good condition. Occasionally, park waters may exceed the standard for *E. coli* during high flow (approximately once per monitoring year; no violations during 2015). Dissolved oxygen remains above the state lower limit of 4.0 mg/L, with the exception of one sample at Little Buck Creek in FY 2009 when the stream was nearly dry from a prolonged drought.

Water Quality Standards

All Cowpens National Battlefield waters are considered “South Carolina Outstanding Resource Waters,” which holds the highest standards under the Clean Water Act, as promulgated by the state. The state currently does not impose a standard for *Escherichia coli* bacteria, so the network has adapted the EPA recommendations for “Single Sample Infrequently Used Full Contact Recreation.” Acid neutralizing capacity (ANC) and specific conductance (SpC) are without state standards or federal guidelines. These parameters are useful in interpreting water quality.

Parameter	Standard
Water Temperature	Less than 32.2°C
Dissolved Oxygen	Greater than 4.0 mg/L
pH	Between 6.0 and 8.5 SU
<i>Escherichia coli</i>	Less than 576 MPN/100 ml
SpC	No standard
ANC	No standard

Future Monitoring

Water quality sampling is scheduled to resume in fiscal year 2017.

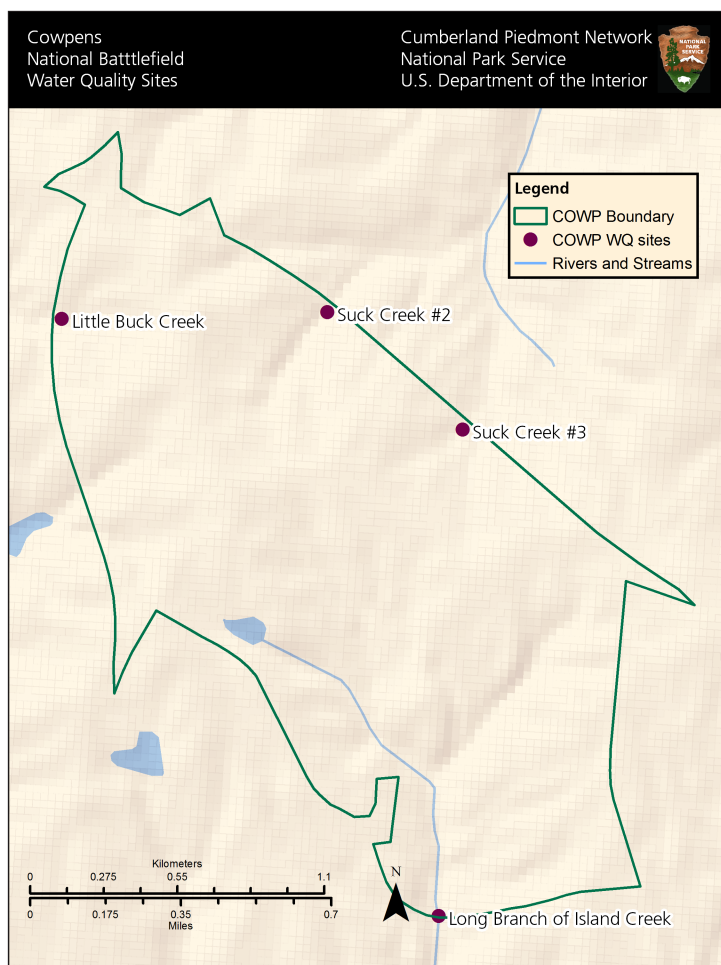


Figure 3. Map of Cowpens National Battlefield water-quality site locations.

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:

<http://science.nature.nps.gov/im/units/cupn/index.cfm>

CUPN Reports & Publications:

<http://science.nature.nps.gov/im/units/CUPN/publications.cfm>

About the NPS Inventory & Monitoring Program:

<http://science.nature.nps.gov/im/index.cfm>

Data Downloads via the Natural Resource Information Portal:

<http://irma.nps.gov>