



## Ninety Six National Historic Site Water Quality Summary Fiscal Year 2012

### Water quality at Ninety Six National Historic Site remains fair.



Star Fort Lake, July 10, 2012. Image by Shepard McAninch.

The Cumberland Piedmont Network Inventory and Monitoring Program began long-term water quality monitoring at Ninety Six National Historic Site in fiscal year 2004. Water quality is measured quarterly on alternate years at four sites; Star Fort Lake, Tolbert Branch, and the east and west boundary crossings of Henley Creek. Based upon program requirements and findings of the water quality inventory, a set of parameters was chosen for long-term monitoring; including the field measures of water temperature, specific conductance (SpC), pH, and dissolved oxygen (DO). Samples were also collected for analysis for *Escherichia coli* (*E. coli*) and acid neutralizing capacity (ANC).

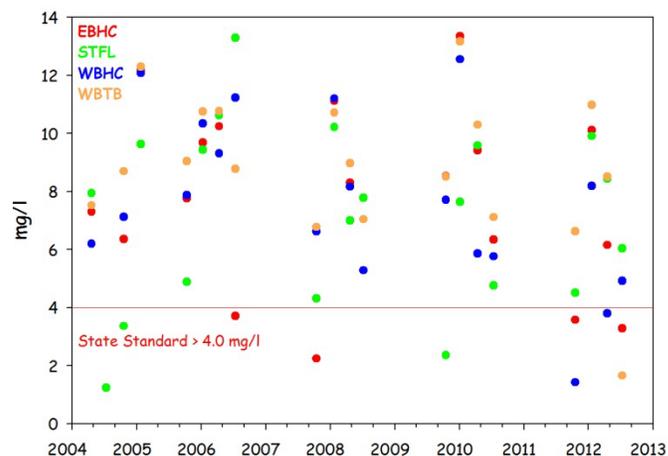
### Highlights of Fiscal Year 2012 Monitoring

Water quality standards were exceeded in the upper pH limit and dissolved oxygen – consistent with findings since this program began in FY04. However, unlike past years there were no violations of the USEPA guidelines of 576 Most Probable Number (MPN)/100 ml for *E. coli*. The lack of high bacteria is likely a result of sampling relative to recent rainfall (runoff) events. Low flows attributed to depressed DO in Henley and Tolbert Creeks; the former below the state standard of 4 mg/l in 50% of the samples, the latter in one of four samples (see figure). Twice the pH exceeded the upper limit of 9.0 SU in the lake during warmer months (water temperature was one degree above the state limit of 32.2 °C during the July sample). This is the same pattern we have observed in the five annual rounds since monitoring began. It is likely that the cause of the increased pH is a product of photo-synthesis of algae in the lake. If photosynthesis consumes more CO<sub>2</sub> than can be atmospherically in-gassed into the lake the end result is the production of hydroxyl ions which raise the pH.

### Future Monitoring

Water quality sampling is scheduled to resume in fiscal year 2014. Water quality data are available upon request to the Cumberland Piedmont Network or our website:

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



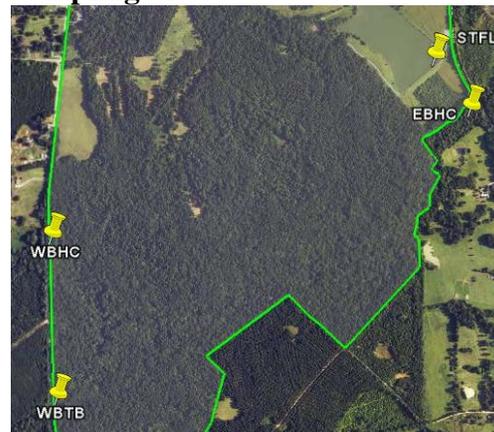
Dissolved oxygen at Ninety Six National Historic Site 2004-2012.

### Water Quality Standards

All park waters are considered “Freshwaters” under the Clean Water Act as promulgated by the state of South Carolina. The state currently does not impose a standard for *Escherichia coli* bacteria so we have adapted the USEPA recommendations for “Single Sample Infrequently Used Full Contact Recreation.” Other monitored parameters, ANC and SpC, are without state standards or federal guidelines.

<b>Water Temperature</b>	Not to exceed 32.2°C
<b>Dissolved Oxygen</b>	Not to exceed 4.0 mg/l
<b>pH</b>	Between 6.0 and 9.0 SU
<b><i>Escherichia coli</i></b>	Not to exceed 576 MPN/100ml
<b>SpC</b>	No Standard
<b>ANC</b>	No Standard

### Sampling Sites



- WBHC** Henley Creek, west boundary
- WBTB** Tolbert Branch, west boundary
- STFL** Star Fort Lake
- EBHC** Henley Creek, east boundary