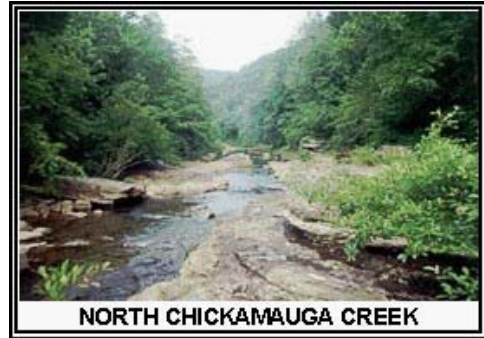


North Chickamauga Creek Acid Mine Reclamation

Project Description: North Chickamauga Creek begins with the union of two small streams, Standifer and Brimer Creeks, near the crest of Walden Ridge in southeast Tennessee. The creek flows eastward for a few miles, collecting flow from upland tributaries, and then begins a rapid descent toward the valley floor, cutting a spectacularly scenic, deep central gorge into the sandstone of the plateau. In its 32-mile course from ridge top to the Tennessee River, the creek drains some 120 square miles of upland and valley land.



The upper 18 miles of North Chickamauga Creek have been damaged by acid mine drainage. Small scale coal mines along Standifer Creek and Hogskin Branch are the primary sources of impact to the watershed. Low pH, high sulfate, and elevated concentrations of iron, manganese, and aluminum entering the streams have significantly reduced or eliminated the native fish and benthic populations in the upper watershed area. Water quality problems in the lower section of the creek, which flows through one of the most rapidly growing areas of Hamilton County, include sedimentation and elevated levels of fecal coliform following periods of heavy rainfall. The initiative to protect and restore the water quality of North Chickamauga Creek is being pursued through a public/private partnership effort that involves federal, state, and local governmental agencies, nonprofit organizations, landowners, and local citizens.

The objectives of this project were to: 1) improve water quality in the upper 18 miles of North Chickamauga Creek; 2) demonstrate best available technology in design and construction of passive treatment systems for acid mine drainage; and 3) promote public understanding and awareness of the problem of acid mine drainage and the technology available for addressing this problem.

Assessment of acid producing mine sites in the upper North Chickamauga Creek watershed was completed in 1995; return visits to the mines sites were conducted to determine seasonal changes in water quality and quantity. Field activities associated with the project included biological survey of fish and macroinvertebrates in North Chickamauga Creek and its major tributaries. The assessment studies identified 20 underground mines that discharge acid mine drainage to North Chickamauga Creek or its tributaries. Five sites were ranked (based on water quality and quantity) for corrective action. The Three Sisters mine sites selected were closed and pipes installed to direct drainage to the spillways.



To reduce the effect of acid mine drainage, passive treatment systems were designed that incorporated the best available technology. Passive treatment systems have been installed at two priority sites and a third system was completed in 2000. At the Three Sisters site, reclamation included: road upgrade and construction, backfilling four deep mine openings, constructing limestone channels from the mine openings to the wetlands, placing dam embankment, installing wetland drain system, and revegetation of all affected areas.

In addition to the restoration work at the mine sites, Biology Faculty at the University of Tennessee, Chattanooga conducted detailed chemical and biological monitoring of installed passive treatment systems. One project monitored fish, invertebrates, some aspects of water quality, and estimation of habitat status. A second project monitored the development of sulfur transformations within oxygen depleted sediments in certain stream beds in the watershed, to determine the effects of mine drainage.

Work continues to complete a greenway along the lower 8 miles of the creek. The greenway plan developed by the North Chickamauga Creek Conservancy (NCCC), in cooperation with other agencies, was adopted by the City of Chattanooga. Hiking and bicycling trails, picnic areas, and canoe access points, have been established along the lower 4 miles of the creek. A 180-acre farm on the creek, owned by the City of Chattanooga, is used by the Chattanooga Nature Center as a satellite base for conducting environmental education programs. NCCC is assisting the City and The Trust for Public Land in securing the donation and purchase of other land parcels needed to complete the 8-mile greenway plan.

This project demonstrates methods for watershed restoration and improvement of water quality in the upper 18 miles of North Chickamauga Creek. Restoration and improvement will be accomplished through continued construction of passive treatment systems for acid mine drainage and completion of the greenway along the creek. The project will also provide an opportunity for restoration of a warm water fishery and possible reestablishment of a state endangered fish, the Ohio River Muskellunge.

Lead Agency: Tennessee Department of Agriculture Nonpoint Source Pollution Program (TDA-NPS)

Funding: EPA 319: \$58,544 **Matching:** \$36,467

Project Location: TN, North Chickamauga Creek Watershed, Sequatchie and Hamilton Counties, near Chattanooga, Tennessee; Three Sisters site (Standifer Creek)

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