NONPOINT SOURCE SUCCESS STORY

North Carolina

Diverse Efforts Reduced Bacteria in the Bald Creek Watershed

Waterbody Improved

Bacteria from nonpoint source (NPS) pollution, including livestock waste and human sewage, impaired five waterbodies in the Bald Creek watershed. The North Carolina (NC) Division of Water Resources (DWR) added the 6.5-mile Bald Creek and its four major tributaries to the Clean Water Act (CWA) section 303(d) list of impaired waters in 2010 for fecal coliform bacteria impairment. Following a 2006 local watershed plan for Bald Creek, state and local agencies implemented numerous agricultural best management practices (BMPs) and conducted stream restorations in the watershed. These efforts have reduced bacterial loading to the streams, which contributed to the removal of all impaired stream segments in the Bald Creek watershed from the state's list of impaired waters in 2018.

Problem

The 17.5-square-mile Bald Creek watershed, located in the Blue Ridge Mountains of North Carolina, drains into the middle portion of the Cane River, part of the Nolichucky River watershed and the French Broad River Basin (Figure 1). This sparsely populated area of western Yancey County is mostly forested with some agricultural and residential development. Pastureland, which constitutes roughly 14 percent of the watershed, is primarily in the flat, productive land found along the lower stream reaches. Unrestricted cattle access to the streams and the loss of riparian buffers, as well as residential sewage issues, contributed to bacterial issues in the watershed. A 1999 survey found that almost a third of households in the watershed had inadequate sewage systems, including failing septic systems and the use of straight pipes feeding bacteria into the streams.

In 2004, fecal coliform bacteria concentrations at all five sampling stations in the Bald Creek watershed exceeded the state recreational fresh water quality standard, which requires that fecal coliforms: (1) not exceed a geometric mean of 200 colonies (col) per 100 milliliters (mL), based on at least five consecutive samples examined during any 30-day period and (2) not exceed 400 col/100 mL in more than 20 percent of the samples examined during that period. Follow-up monitoring confirmed high fecal levels, and in 2010, the 6.5-mile Bald Creek (assessment unit 7-3-22) and four of its tributaries—Elk Wallow Creek, Fox Creek, Lickskillet Branch, and Possumtrot Creek—were added to the CWA section 303(d) list of impaired waters.

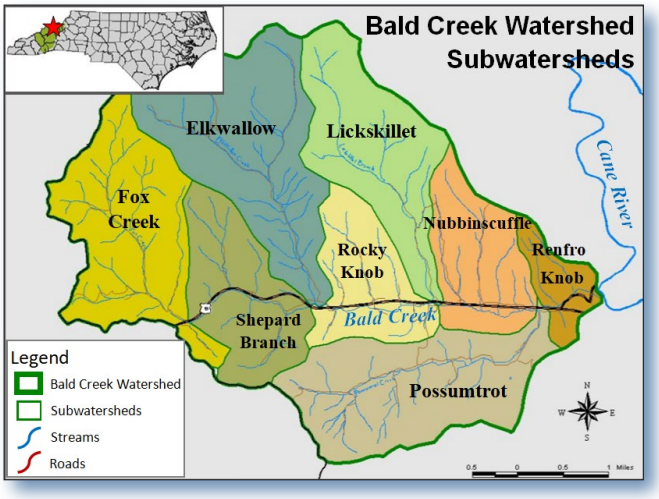

Figure 1. The Bald Creek watershed and its tributaries are in western North Carolina.

Story Highlights

In 2006, the NC Ecosystem Enhancement Program, now the Division of Mitigation Services (DMS), developed the Bald Creek Local Watershed Plan, which identified areas for compensatory mitigation and addressed water quality issues through targeted restoration and enhancement. Along with this effort, DMS worked with the NC Cooperative Extension Service to sponsor training workshops designed to teach local contractors about stream restoration and enhancement. In 2007, DMS implemented one of the projects identified in the plan along two unnamed tributaries to Bald Creek. The project included 1,335 linear feet (lf) of stream restoration and an additional

3,144 lf of stream enhancement, including riparian buffer planting, invasive species removal and floodplain restoration (Figure 2). The project also included the creation of a half-acre wetland, wetland plantings, installation of livestock exclusion fencing, and removal of a small dam.

NC Agricultural Cost Share Program (ACSP) projects have also addressed bacterial contamination from livestock in the watershed. This voluntary program, funded by the NC Department of Agriculture & Consumer Services (NCDACS) and administered by local soil and water conservation districts (SWCDs), provides partial funding for farmers to install BMPs on their properties. DWR has used U.S. Environmental Protection Agency section 319(h) grant funding since 1995 to support a NPS planning coordinator to assist SWCDs with the implementation of ACSP projects. Since July 2000, ACSP has funded numerous BMPs in the Bald Creek watershed, including 22,316 lf of livestock exclusion fencing, one stream crossing, and four cisterns. Since July 2012, Yancey County SWCD has used $70,555 of ACSP funds to implement BMPs around Bald Creek and its tributaries, with $23,518 of match provided by landowners. Finally, in an effort to address human sources of bacterial contamination, the NC Clean Water Management Trust Fund funded at least 15 septic repairs in the watershed before 2009.

Results

DWR conducted a special study on the Bald Creek watershed in 2016 to determine if fecal coliform concentrations were still elevated. The geometric mean of the five samples taken from each of the five sites in a 30-day period were below the state limit of 200 col/mL (Table 1). As a result, DWR removed every stream segment in the Bald Creek watershed from the CWA section 303(d) list in 2018, including 2.2-mile Fox Creek, 3.1-mile Elk Wallow Creek, 3.4-mile Lickskillet Branch, 3.4-mile Possumtrot Creek, along with Bald Creek. This means each segment is meeting state water quality standards for recreational use. Additionally, Elk Wallow Creek, Lickskillet Branch, and Possumtrot Creek are meeting their designated use as trout waters. Monitoring from 2003–2004 showed that the benthic and fish communities were meeting state standards for abundance and diversity, but many of the lower reaches of the stream have poor riparian and aquatic habitat. Continued efforts to reduce bacterial contamination (both human and animal), expand riparian buffer, and improve stream habitat will help ensure the Bald Creek watershed continues to meet water quality standards and the needs of the community.

Figure 2. A DMS stream restoration site in an unnamed tributary to Bald Creek.

Table 1. Fecal coliform monitoring results in the Bald Creek watershed.

Stream segment	Mean fecal coliform concentration (col/100mL)	
	2004	2016
Bald Creek (7-3-22)	1276	174
Fox Creek (7-3-22-1)	328	145
Elk Wallow Creek (7-3-22-4)	615	165
Lickskillet Creek (7-3-22-5)	916	151
Possumtrot Creek (7-3-22-7)	458	152

Note: NC's Class C waters fecal coliform limit is 200 col/100mL.

Partners and Funding

DMS created the Bald Creek Local Watershed Plan to guide and implement a stream and wetland restoration project. The Yancey County SWCD implemented numerous BMPs funded through the NCDACS. Section 319(h) grant funding is used to support an NPS planning coordinator in the NCDACS to work with SWCDs on NPS projects.

U.S. Environmental Protection Agency
Office of Water
Washington, DC

EPA 841-F-20-001AA
October 2020

For additional information contact:

Rishi Bastakoti, PhD
NC Division of Water Resources
919-707-3623 • rishi.bastakoti@ncdenr.gov
Kelsey Rowland
NC Division of Water Resources
919-707-3679 • kelsey.rowland@ncdenr.gov