Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Tennessee

Implementing Grazing and Erosion Control Best Management Practices Improves McKnight Branch

Waterbody Improved

Pasture grazing along Tennessee's McKnight Branch contributed to damaged riparian areas, increased stream siltation, and habitat alteration, prompting the Tennessee Department of Environment and Conservation (TDEC) to add the stream to the state's Clean Water Act (CWA) section 303(d) list of impaired waters in 2000. Project partners implemented agricultural best management practices (BMPs) that reduced siltation and improved water quality. As a result, TDEC removed McKnight Branch from the state's CWA section 303(d) list of impaired waters in 2010.

Problem

McKnight Branch is an 18.8-mile-long stream that flows across rural Cannon and Rutherford counties in central Tennessee, just east of Murfreesboro. McKnight Branch is in the McKnight Branch–East Fork Stones River watershed (HUC 051302030104), and it is a part of the larger Stones River watershed and the Inner Nashville Basin (Figure 1).

Streams in this ecoregion are typically low-gradient and flow over limestone (Figure 2). The primary land use in the watershed is farmland. McKnight Branch's designated uses are livestock watering and wildlife, irrigation, fish and aquatic life, and recreation.

Monitoring data in 2000 indicated that McKnight Branch had failed two biological reconnaissance (biorecon) studies, one in the spring and one in the fall. Biorecon is a tool used to recognize stream impairment as determined by species richness measures, emphasizing the presence or absence of indicator organisms without regard to relative abundance. Low dissolved oxygen was also observed at one of the monitoring sites. These data showed that the waterbody failed to support its fish and aquatic life designated use. Therefore, in 2000 TDEC placed the 18.8-mile McKnight Branch segment (TN05130203026-0200) on the state's CWA section 303(d) list of impaired waters for riparian loss and habitat alterations due to pasture grazing activities. This impaired segment included Northcutt Branch, a tributary that runs into McKnight Branch from the east. In 2002 TDEC developed a siltation and habitat alteration total maximum daily load (TMDL) for the Stones River watershed, which includes McKnight Branch.

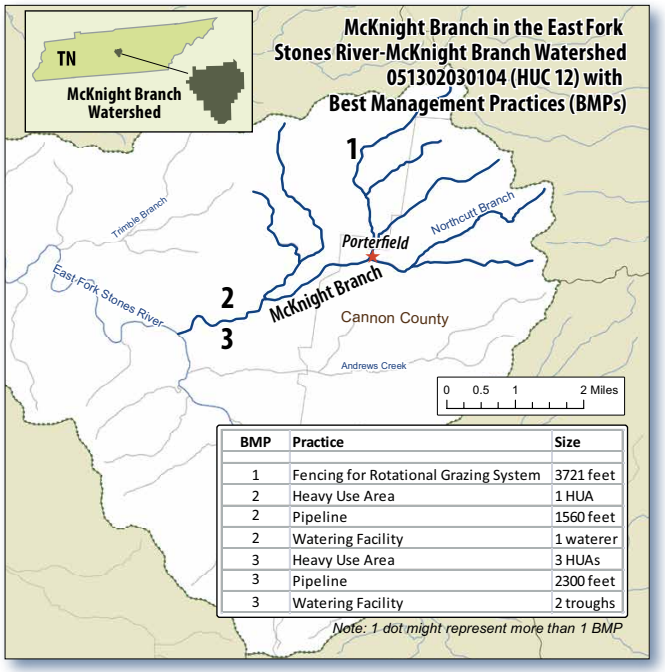

Figure 1. Landowners implemented numerous BMPs at priority sites in the McKnight Branch watershed.

Project Highlights

Soil Conservation District (SCD) offices in Cannon and Rutherford counties helped local landowners enhance wildlife habitat and implement BMPs to

Figure 2. This Cannon County stream is typical of those found in this ecoregion.

Figure 3. Farmers offer alternative water sources for their animals in rotational grazing areas.

improve water quality (Table 1). The SCDs organized hands-on field days to help farmers understand the harmful effects of sediment loss and to encourage them to implement BMPs.

With the encouragement of the SCDs, many farmers installed livestock exclusion fencing to prevent erosion by keeping animals away from sensitive streambank areas. They also installed fencing for rotational grazing, which allowed pasture vegetation to recover and begin providing greater yields. To deliver readily available clean water to their animals in rotational grazing areas, the farmers installed water distribution systems that included pipelines, heavy-use areas, and watering facilities (Figure 3).

Table 1. BMPs installed along McKnight Branch (2006–2007)

NRCS Code	Practice	Size of Practice
382D	Fencing for Rotational Grazing System	3,721 feet
516	Pipeline	3,860 feet
561	Heavy-Use Area	4 units
614	Watering Facilities	3 units

Results

BMPs implemented along McKnight Branch (see Figure 1 for BMP locations) are helping to control erosion and reduce siltation, which in turn has allowed the waterbody to meet water quality standards. In 2007, following BMP implementation, TDEC staff performed a biorecon study at River Mile 3.0 (upstream of Trimble Road in Porterfield). The principal metrics used for the survey are (1) the number of families (or genera) of mayflies, stoneflies, and caddisflies (collectively referred to as EPT—short for the order names Ephemeroptera, Plecoptera, and Trichoptera); (2) the number of other pollution-intolerant families (or genera); and (3) the total number of macroinvertebrate families (or genera) in a stream. The biorecon survey is scored on a scale from 1 to 15—a score of less than 5 is regarded as very poor, while a score of more than 10 is considered good.

The 2007 survey documented 8 EPT families, 5 pollution-intolerant families, and 25 total families, which translated into a perfect biorecon score of 15 out of 15 and a habitat score of 130 out of 200 (considered good in this ecoregion). These data indicated significant improvements in the biology of the stream. McKnight Branch now fully supports its designated uses, including the fish and aquatic life use. On the basis of these data, TDEC removed McKnight Branch from Tennessee's list of impaired waters in 2010.

Partners and Funding

Many federal and state agencies, local organizations, and individual landowners worked together to improve water quality in the McKnight Branch watershed. Key partners included the SCD offices of Cannon and Rutherford counties, the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), the Tennessee Department of Agriculture's Nonpoint Source Program, TDEC, and local farmers. BMP installation was supported by the state's Agricultural Resources Conservation Fund (created through Tennessee's real estate transfer tax), NRCS Farm Bill funding, and matching funds from landowners.

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