



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Texas

Improved Stakeholder Awareness Leads to Water Quality Restoration in Buck Creek

Waterbody Improved

High levels of *Escherichia coli* bacteria, primarily from wildlife, livestock and humans, in Buck Creek prompted the Texas

Commission on Environmental Quality (TCEQ) to add the creek to the Clean Water Act (CWA) section 303(d) list of impaired waters in 2000 for not supporting the primary contact recreation use. Extensive public outreach and education efforts increased public awareness of the condition of the creek and led to voluntary implementation of best management practices (BMPs) by landowners. Watershed restoration efforts contributed to reductions in bacteria loading. As a result, TCEQ removed Buck Creek from the state's list of impaired waters in 2010.

Problem

The Buck Creek watershed covers 289 square miles within the Red River Basin in the Central Great Plains of Texas. Located in the southeastern corner of the Texas Panhandle near the Oklahoma state line, Buck Creek is a small stream surrounded by rural and agricultural landscapes, with land uses primarily devoted to row crops and grasslands.

Water quality data collected between 1997 and 2005 showed that the geometric mean for *E. coli* bacteria concentrations within Buck Creek was 262.08 colony-forming units of bacteria per 100 milliliters of water (262.08 CFU/100 mL). The state's water quality standards require that *E. coli* levels not exceed a geometric mean of 126 CFU/100 mL over a seven-year assessment period. Because data showed elevated bacteria levels, TCEQ added Buck Creek to the CWA section 303(d) list of impaired waters in 2000 for not supporting its primary contact recreation use.

The monitoring data, combined with bacterial source tracking and watershed modeling, indicated that wildlife (including feral hogs) was the largest contributor of *E. coli* bacteria in the watershed. Other sources, including livestock (Figure 1) and humans, also contributed to pollutant loading.

Project Highlights

Beginning in May 2004, Texas AgriLife Research personnel conducted water quality monitoring in Buck Creek to identify potential pollutant sources contributing to the creek. They collected water samples once every two weeks from multiple sites throughout the creek. This monitoring program,



Figure 1. Wildlife and livestock with access to the creek can deposit fecal material that can contribute significantly to degraded water quality.

funded by CWA section 319(h) grants from the Texas State Soil and Water Conservation Board (TSSWCB), significantly augmented the historical monitoring dataset.

Texas AgriLife Research, the Texas Water Resources Institute and the TSSWCB jointly held 20 meetings and educational events to guide local stakeholders through the watershed planning process for Buck Creek. Stakeholders reviewed the water quality monitoring results, bacterial source tracking findings, and watershed modeling scenarios to make decisions on water quality goals and priority BMPs needed to restore and protect water quality in Buck Creek. The project team conducted education and outreach, including field days for agricultural producers to demonstrate BMP implementation and to encourage the producers to adopt BMPs as a way to

both improve water quality and enhance their operations. At a January 2008 Texas Watershed Steward Program workshop held in the Buck Creek watershed, nearly 61 percent of the participants indicated that they planned to adopt BMPs. In a follow-up survey conducted six months later, 80 percent of respondents indicated that they had adopted BMPs on their property.

Local landowners voluntarily implemented a number of agricultural BMPs to support grazing management, including:

- Installing off-stream alternative watering sources for livestock, which can reduce in-stream bacteria levels by 50–85 percent by making upland areas more desirable and drawing livestock away from riparian areas
- Implementing prescribed grazing systems to adjust stocking rates and grazing intensity
- Installing cross-fencing to manage livestock distribution and access to riparian areas.

In collaboration with landowners, the TSSWCB certified nine water quality management plans that implemented prescribed grazing on 29,630 acres. The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) developed conservation plans that include prescribed grazing on an additional 4,520 acres. Landowners also collaborated with the USDA Wildlife Services to conduct feral hog (an invasive species) abatement and removal activities. In total, Wildlife Services performed aerial control on 45,867 acres, removing 258 hogs.

Results

Water quality monitoring data show that the long-term *E. coli* geometric mean in Buck Creek now complies with the state's water quality standard. Data show a decrease in the geometric mean from 262.08 CFU/100 mL (1997–2005) to 31.07 CFU/100 mL (2002–2009) (Figure 2). As a result, TCEQ removed a 28-mile segment of Buck Creek from the state's list of impaired waters in 2010 for bacteria.

The success of this effort is attributed to education and outreach programming and landowners' voluntary implementation of BMPs throughout the watershed. Continued water quality improvements are likely to be achieved as landowners implement additional BMPs, as agreed upon by stakeholders and described in the watershed protection plan. Water quality monitoring continues to track and measure interim progress to implement the watershed protection plan and ensure this restoration effort remains a success.

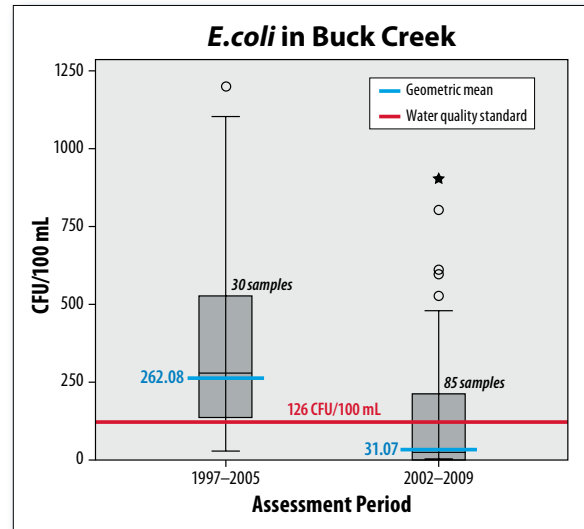


Figure 2. Statistical analyses of *E. coli* in Buck Creek show that the geometric mean for the 2002–2009 assessment period falls well within the water quality standard.

Partners and Funding

Over \$719,000 in CWA section 319(h) funds from the TSSWCB, paired with more than \$459,000 in non-federal matching funds from Texas AgriLife Research, supported the following projects in Buck Creek—collecting and analyzing water samples, conducting bacterial source tracking, developing pollutant loading models, facilitating stakeholder involvement in the watershed planning process, and crafting the watershed protection plan.

The Donley, Hall-Childress, and Salt Fork Soil and Water Conservation Districts (SWCDs) worked with landowners to voluntarily implement grazing management systems to reduce the impact of livestock on riparian areas. The TSSWCB and the NRCS worked through the SWCDs to provide approximately \$19,400 in state funding and \$97,600 in federal Farm Bill funding to landowners as financial incentives to implement management practices in the Buck Creek watershed.

Over \$12,000 in state and federal funds were used in the feral hog control effort headed by USDA Wildlife Services. State funds for feral hog abatement activities were provided through a grant from the Texas Department of Agriculture. Other key partners included local landowners, the Texas AgriLife Extension Service, the Texas Water Resources Institute, and the Red River Authority of Texas.



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