



NONPOINT SOURCE SUCCESS STORY

Wyoming

Livestock Operators Help Restore Part of the Popo Agie River

Waterbody Improved

Several nonpoint sources of pollution contribute to high *Escherichia coli* concentrations in reaches of the Middle Fork Popo Agie River near the city of Lander. In 2018, the Wyoming Department of Environmental Quality (WDEQ) added a 0.7-mile segment of the river to the Clean Water Act (CWA) section 303(d) list due to the primary contact recreation designated use being impaired. Voluntary restoration efforts, including land use changes and agricultural best management practices (BMPs) led by Popo Agie Conservation District (PACD), livestock producers, and other partners, have reduced *E. coli* loading to the river. The 0.7-mile segment of the Middle Fork Popo Agie River now meets the water quality criterion for *E. coli*, and WDEQ has removed the segment from the impaired waters list in the 2020 305(b)/303(d) Integrated Report.

Problem

The Middle Fork Popo Agie River in west-central Wyoming is an important resource to local communities and Wyoming, with agricultural/rural land uses making up 95 percent of the watershed (Figure 1). The river is fed primarily by seasonal precipitation and montane snowmelt, and it provides drinking water for residents, irrigation and stock water for agricultural producers, high-quality fisheries and wildlife habitat, and numerous recreational opportunities.

Monitoring data collected by PACD in 2012–2014 demonstrated that *E. coli* concentrations exceeded the primary contact recreation use criterion of 126 most probable number (MPN)/100 milliliters (mL) on a 0.7-mile segment of the Middle Fork near Lander. This segment, referred to as the Mortimore Lane Bridge reach, was included on Wyoming's 2016/2018 CWA section 303(d) list. Multiple nonpoint sources of pollution are likely responsible for the impairments, including livestock waste, septic systems, faulty sewer infrastructure, pet waste and wildlife.

Story Highlights

PACD, partnering agencies and organizations, and landowners have worked proactively for many years to address recreation use impairments on the Middle Fork. Watershed planning began in 2005, where the above-mentioned partners established water quality objectives and action items. Between 2006 and 2010,

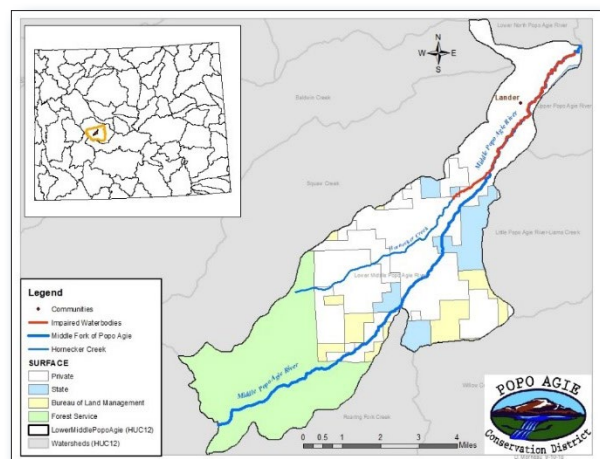


Figure 1. The Middle Fork Popo Agie watershed project area is in west-central Wyoming.

PACD helped homeowners replace five failing septic systems and assisted an agricultural producer with improving a small livestock operation by replacing an open irrigation ditch through paddocks with automated livestock waterers. In 2014, land-use changes and BMPs were implemented on a large livestock operation. Ditches were cleaned and piped to upgrade on-farm irrigation, which reduced constant seepage and efficiently delivered water to pastures, increasing production and subsequently reducing grazing pressure. Two practices were installed to limit livestock's direct access to surface water: a water gap was installed on Hornecker Creek, a key tributary to the Middle Fork (Figure 2), and 1.2 miles of riparian fence was built along Sheep Creek, a tributary to Hornecker



Figure 2. Livestock exclusion BMP installed on Hornecker Creek.

Creek. In 2017, an additional 1.1 miles of riparian and cross fencing were built along Hornecker Creek to reduce direct deposition and improve rotational grazing. An additional septic system was fixed in 2014 and other livestock BMP projects were completed along the river through 2018, including riparian fencing/livestock exclusion, stockwater development, cross-fencing, and irrigation conversion from flood to sprinkler.

Results

Since 2004, PACD collected *E. coli*, stream discharge, and other data in the Middle Fork Popo Agie watershed during the primary contact recreation season. This extensive dataset and its analysis provided insight into priority areas and sources. PACD also used microbial source tracking (MST) and detailed land use characterization to further identify or rule out sources. Insight gained from monitoring, MST, and land use characterization helped guide BMP implementation.

As a result of the improvements, particularly livestock BMPs in the Hornecker Creek drainage, base-flow monitoring data from 2007 to 2018 showed a downward trend in *E. coli* concentrations at the Mortimore Lane Bridge site. Furthermore, data collected during the 2017–2018 primary contact recreation seasons met the delisting criteria for the impaired 0.7-mile Mortimore Lane Bridge reach (Figure 3). This reach was subsequently removed from the 303(d) list of impaired waters with Wyoming’s 2020 CWA section

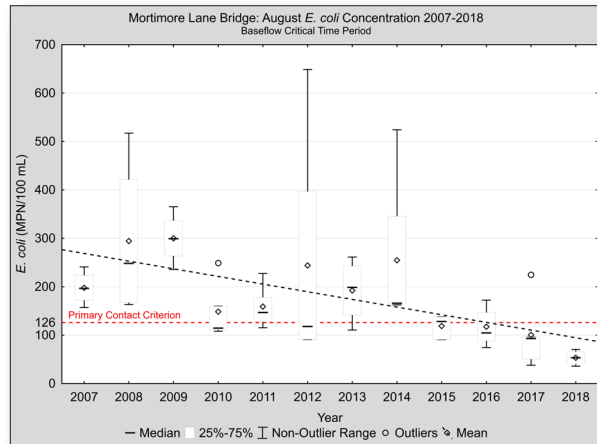


Figure 3. *E. coli* concentration data at Mortimore Lane Bridge in August 2007–2018.

305(b) and 303(d) Integrated Report. PACD and partners continue to work to restore other impaired segments of the Middle Fork. In 2020, PACD and WDEQ completed a new watershed-based plan for the Middle Fork that summarized past projects and provided a guide for future restoration efforts.

Partners and Funding

Partners played an important role in the successful restoration of an impaired waterbody by voluntarily mitigating nonpoint sources with PACD’s leadership. WDEQ and the Natural Resources Conservation Service (NRCS) provided technical assistance for monitoring and implementing practices. Landowners voluntarily participated in cost-share projects and provided access for monitoring. A private lab and the Wyoming Public Health Laboratory provided MST lab services, and the Wyoming State Courier Service helped transport MST samples. Other partners include the City of Lander, Wyoming Association of Conservation Districts, Fremont County Planning, and the Popo Agie Healthy Rivers Initiative. A total of \$5,000 in CWA section 319 funding supported PACD’s restoration efforts (2015–2018). WDEQ contributed an additional \$52,133 in state funds as part of that award. Over \$38,000 in nonfederal match was contributed by private landowners and the Wyoming Department of Agriculture. In addition, NRCS contributed Environmental Quality Incentives Program funding for several conservation practices in the watershed.



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