



# NONPOINT SOURCE SUCCESS STORY

## Montana

### Deep Creek Meets Sediment Water Quality Standard after Years of Work

#### Waterbody Improved

Excess sediment and habitat degradation in Deep Creek caused by streambank modifications, flow alterations and historical grazing in riparian areas inhibited the stream's ability to support its beneficial uses. As a result, the Montana Department of Environmental Quality (MDEQ) added Deep Creek to the state's Clean Water Act (CWA) section 303(d) list of impaired waters in 1988. Starting in the 1990s, best management practices such as irrigation improvements, riparian fencing and stream restoration led to improved sediment conditions in Deep Creek, which prompted MDEQ to remove Deep Creek from the state's impaired waters list for sediment in 2016.

#### Problem

The 111-square-mile Deep Creek watershed is a tributary of the Missouri River, in central Broadwater County near Townsend, Montana. The watershed topography ranges from steeply wooded slopes in the Helena National Forest portions of the eastern upper watershed to the flat irrigated farmlands along the Missouri river floodplain boundary.

A loss of riparian habitat, streambank modifications and destabilization, and flow alterations from water diversions contributed to the impairment of the creek for sediment/siltation in 1988. The Deep Creek total maximum daily load, developed in 1996 to address this impairment, applies to the middle and lower sections (20.4 stream miles) below the Helena National Forest Service boundary (Figure 1).

#### Project Highlights

Restoration efforts completed between 1990 and 2003 included significant bank erosion work, approximately 18,500 feet of bank reshaping, vegetative plantings, and riparian fencing. The Broadwater Conservation District and Montana Fish, Wildlife and Parks coordinated the restoration efforts. Beginning in 2009 the Montana Department of Transportation engaged in sediment reduction activities along Highway 12; these are continuing in the upper portion of the watershed.

A significant flood event in 2011 damaged numerous public and private structures and infrastructure, destroyed existing bank stabilization projects and fences, and caused further stream degradation. As a result,

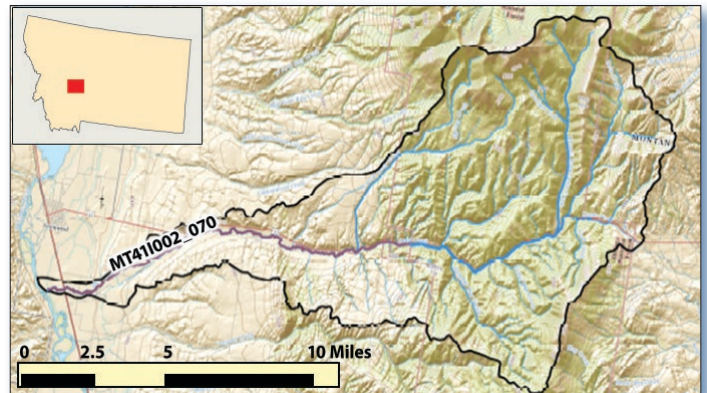


Figure 1. The middle and lower Deep Creek watershed areas are covered by a sediment total maximum daily load.

local, state and federal partners launched a renewed restoration effort in the watershed. In 2012–2013 the partners assessed the creek and developed *The Deep Creek Watershed Restoration Plan*, which provides recommendations for restoration. This plan focused on a multifaceted restoration approach to benefit the stream, landowners and water users. In fall 2013 the Broadwater Conservation District applied to MDEQ's CWA section 319 program and received a three-year award (2014–2017) to help implement a number of these recommendations.

Deep Creek was selected as a National Water Quality Initiative (NWQI) watershed for the 2014–2016 timeframe, which provided additional U.S. Department of Agriculture (USDA) Natural Resources and Conservation Service (NRCS) resources to address agricultural concerns. Lidar data was collected in 2014, and a 100-year channel migration zone map was completed in 2015. Irrigation improvements, off-stream watering, alternative source water for crop irrigation, and additional fencing, riparian re-vegetation, and

stream channel work is being accomplished with numerous partners including Montana Fish, Wildlife and Parks; the Montana Department of Natural Resources and Conservation; MDEQ (CWA section 319 funding); and local landowners (see photos).

## Results

There have been measurable improvements in in-stream flow and aquatic life. MDEQ monitored for sediment/siltation at three sites in the lower Deep Creek watershed (DC-01, DC-03, DC-05), for low flow alterations; at seven sites for temperature; and at six sites for nutrients. Monitoring occurred in 2014, and will continue at the same sites and frequency in 2019 and 2024. Broadwater Conservation District monitored for flow and temperature, and Montana Fish, Wildlife and Parks monitored fish counts and redds. Sediment/siltation monitoring in 2014 showed no excess aggradation of sediment or percent fines in substrate that would impair spawning habitat or aquatic life.

The applicable targets include (1) the percent fines less than 6 millimeters (mm) in size should account for less than or equal to 19 percent of fines and (2) the percent fines less than 2 mm in size should account for less than or equal to 17 percent of fines. With the exception of one site where the percent fines less than 6 mm in size was 20.9 percent (slightly above target, likely due to location near the mouth of the creek), all assessment parameters meet sediment targets. There was abundant spawning habitats overall, characterized by unconsolidated surface layer gravels that were mostly in the range of 8 mm to 45 mm. On the basis of these data, Montana removed the sediment impairment for Deep Creek (segment MT411002\_070) from its impaired waters list in 2016. The creek remains listed as impaired because of elevated temperatures and low flow. Nevertheless, there have been marked improvements in stream flow and in the health of macroinvertebrate and fish communities during the critical late summer period.

## Partners and Funding

Recent restoration efforts were supported by multiple partners, including up to \$2 million dollars in landowner contributions. The Broadwater Conservation District acted as the CWA section 319 project lead, using a total of \$518,637. Montana Fish, Wildlife and Parks provided monitoring and funding (\$30,000).



Numerous partners implemented projects including improving irrigation methods (top), installing alternative water (middle), and restoring flood-damaged streambanks (bottom).

The Montana Department of Natural Resources and Conservation provided another \$50,000. The USDA NRCS acted as the NWQI Agency Lead, and provided technical and financial support (\$1,500,000). Lastly, MDEQ provided technical support and funding.



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