Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Wyoming

Restoring Natural Hydrology Improves Fish Habitat

Waterbody Improved

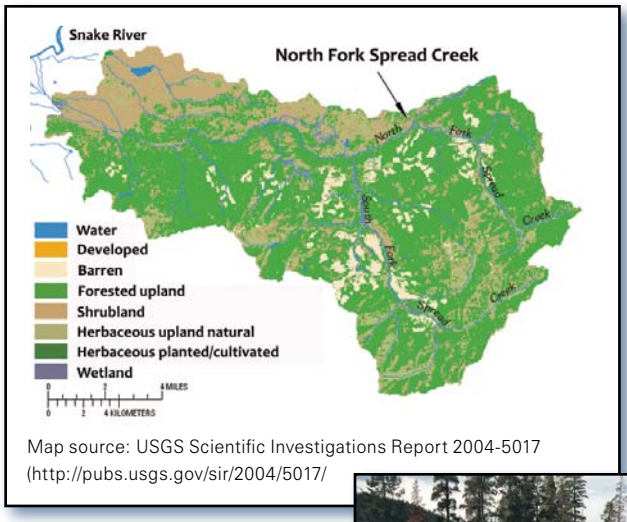
Historic livestock grazing, timber harvest activities, and road and dike construction caused excessive sedimentation in North Fork Spread Creek, which threatened aquatic life and cold water fisheries designated uses. As a result, the Wyoming Department of Environmental Quality (WDEQ) added a segment of North Fork Spread Creek to Wyoming's 1998 Clean Water Act (CWA) section 303(d) list of impaired waters. Stakeholders implemented several best management practices (BMPs) designed to reduce sedimentation, including restoring the stream channel and floodplain to natural conditions. Water quality improved, and two trout species returned to the creek. As a result, WDEQ removed North Fork Spread Creek from the CWA section 303(d) list of impaired waters in 2008.

Problem

North Fork Spread Creek is approximately 15 miles southeast of Moran, Wyoming. The creek's headwaters begin at approximately 8,242 feet in elevation, in the Bridger-Teton National Forest. The upper basin is largely undeveloped except for some gravel roads. Most of the basin is forested upland, shrubland, and herbaceous upland; the remaining drainage area is largely barren highlands, with some wetlands and water (Figure 1). Recreational use in the basin is common, and grazing occurs in the lower basin.

The watershed is naturally geologically unstable; historic livestock grazing has exacerbated the instability and caused streambank and riparian vegetation damage. In addition, timber harvesting and road and dike construction have resulted in further damage. When combined, the natural and induced conditions caused the stream to erode, become substantially wider and shallower, and form a braided rather than meandering channel (Figure 2). Ultimately, excessive sediment in streams can blanket important streambed cobble and gravel habitats needed for macroinvertebrates to thrive and native Snake River cutthroat trout to spawn.

WDEQ classifies North Fork Spread Creek as waterbody type 2AB, thus, it is protected for drinking water, cold-water game and nongame fisheries, fish consumption, aquatic life, recreation, wildlife, industry, agriculture and scenic value uses. Sedimentation threatened the creek's cold-water fishery and aquatic life designated uses, prompting WDEQ to add a one-mile reach of the creek to the



Map source: USGS Scientific Investigations Report 2004-5017 (http://pubs.usgs.gov/sir/2004/5017/

Figure 1. Spread Creek drains to the Snake River in extreme western Wyoming.

Figure 2. A braided channel along North Fork Spread Creek before restoration.

state's 1998 CWA section 303(d) list for habitat degradation.

Project Highlights

As early as 1992, the U.S. Forest Service (USFS) began recognizing the links between land use activities and the disturbance issues within the North Fork Spread Creek watershed and committed to restoring the stream using a natural approach. To predict the natural potential of this study reach, the USFS used an adjacent and structurally intact upstream stream segment as a reference. USFS assessed the two streams using the Wyoming Stream Integrity Index (WSII) and River Invertebrate Prediction and Classification System (RIVPACS).

The USFS completed the North Fork Spread Creek Riparian Demonstration Project, in part using CWA section 319 funding. Restoring a 0.5-mile-segment of North Fork of Spread Creek (within the section 303(d)-listed reach) began in 1997, and included reestablishing proper width and depth, meander, slope and bed features (Figure 3). The effort also restored or enhanced the natural floodplain, riparian community and fish habitats. New riparian vegetation included a mixture of willows, grasses and forbs. Last, project partners moved an adjacent road to a higher elevation, which lessened the possibility of seasonal flooding and erosion.

Figure 3. Restoring a streambank using buried revetments along North Fork Spread Creek.

Results

The North Fork Spread Creek Riparian Demonstration Project successfully restored the floodplain and appropriate channel form. The project added 14 meanders within the study reach using buried revetments to stabilize banks (see Figure 3). It also included placing large cobbles at the upstream and downstream ends of riffles to maintain reach gradient. Project partners planted a mixture of shrubs, forbs, grasses and several thousand rooted willow cuttings throughout the creek's floodplain to stabilize soil.

By 1998 fish habitats had increased by 150 percent (according to Wyoming's WSII and RIVPACS macroinvertebrate indices). The stream included large, woody debris and pools, which serve as important refuge habitats for fish. The success of such improvements on the biological community can be seen by comparing fish survey data from before and after project implementation (Table 1). A WDEQ assessment indicates that the stream is now meeting its aquatic life and cold-water fisheries uses; therefore, WDEQ removed the stream from the CWA section 303(d) list of impaired waters in 2008.

Table 1. Number of fish species measured from 1994 to 1998

Fish Species	1994 counts	1998 counts
Snake River Cutthroat Trout	0	19
Brook Trout	35	41

Partners and Funding

Partners in the North Fork Spread Creek Riparian Demonstration Project included the USFS, Teton Science School students (who collected biomonitoring data), Wyoming Game and Fish Department, Wyoming Association of Conservation Districts, Teton County Natural Resource District, and the Natural Resources Conservation Service (project review). Funding for this CWA section 319 project totaled $88,896; including $27,373 in section 319 grants; $19,475 in nonfederal cash match; $1,538 in nonfederal, in-kind match; and $41,510 contributed by the Bridger-Teton National Forest.

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