



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# Utah

## Riparian Area Grazing Management Practices Reduce Phosphorus Loads and Restore Water Quality

### Waterbody Improved

Excess phosphorus from agricultural runoff led Utah to list the upper and lower segments of the Little Bear River on its 1998, 2000 and 2002 303(d) lists of impaired waterbodies. Landowners, local watershed organizations and many federal, state and local government agencies collaborated to implement agricultural best management practices (BMPs), which improved water quality in the Little Bear River and its tributaries. These improvements prompted the Utah Department of Environmental Quality (UDEQ) to remove the upper segment of the Little Bear River from the 303(d) list for total phosphorus (TP) in 2004. Water quality in the lower segment of the Little Bear River has also improved significantly, but it still exceeds standards and remains on the 2004 303(d) list for TP and hydrological modification.

### Problem

The Little Bear River is split into upper and lower segments for management purposes. The upper segment is approximately 6.8 miles long and runs from the East Fork to Hyrum Reservoir. The lower, 28.1-mile segment runs from Hyrum Reservoir to Cutler Reservoir. UDEQ included both segments on its 1998, 2000 and 2002 303(d) lists of impaired waterbodies because the segments did not fully support aquatic life and cold water fishery designated uses due to high TP concentrations and hydromodification.

Agricultural practices are the leading sources of the nonpoint source pollution in the Little Bear River and the primary cause of water quality impairment. Much of the corridor is used for livestock grazing and crop production. In addition, several tributaries contributed high sediment loads during storm events—largely because of severe streambank erosion, channel straightening, road damage, poorly managed upland grazing and cropland erosion (Figure 1).

The Little Bear River total maximum daily load (TMDL) outlines several goals, including that TP concentrations may not exceed the water quality standard, 0.05 milligrams per liter (mg/L), and that the TP load will be reduced by 13 kilograms per day (kg/day) above Cutler Reservoir and 2.4 kg/day above Hyrum Reservoir. Although the goal is to not exceed the TP standard at all, a stream is not actually identified as *non-supporting* until 25 percent or more of its samples exceed the 0.05 mg/L TP value. Therefore, to meet water quality standards, the TP levels in Little Bear River must not exceed



Figure 1. This photo shows an example of a typical eroding streambank in the Little Bear River watershed before the restoration project began.

the 0.05 mg/L standard more than 25 percent of the time. The TMDL also identifies hydrologic modification as a water quality concern in the lower segment. Phosphorus is readily adsorbed to sediment particles, so a reduction in erosion and total suspended solids will also lead to a reduction in TP in both segments.

### Project Highlights

Beginning in 1989, community planning efforts by the Little Bear River Steering Committee gave rise to the operating structure of this project, and over the course of 15 years, the public has been continuously informed and involved. The group developed the Little Bear River Watershed Plan in 1992 as part of a comprehensive, coordinated resource

management effort to address nonpoint source pollution in the drainage basin.

Since then, project partners implemented more than 100 water quality improvement projects on the Little Bear River and its tributaries, including many different types of riparian area grazing management and streambank stabilization BMPs. These included stabilizing 9,350 feet of streambank using 14 in-channel drop structures and 19 rock barbs, completing 59 animal waste management projects, placing more than 22,300 feet of riparian fencing and implementing many other projects such as filter strips, livestock exclusion, pasture planting, range seeding and other farming and irrigation BMPs. Project partners also established successful education and outreach programs and completed several fishery improvement projects.

## Results

The cumulative effects of these on-the-ground restoration efforts, combined with outreach and education activities, have led to better land use practices by landowners and reduced pollutant loadings to the streams (Figure 2). Data show that water quality in both segments of the Little Bear River has significantly improved. Figure 3 presents the percentage of samples exceeding the TP standard during three periods of intensive monitoring conducted since 1993. The TP levels in the upper segment decreased from 34 percent exceedance of the standard in the 1993–1994 monitoring cycle to 8 percent exceedance by the 2003–2004 cycle. The TP levels in the lower segment decreased from 88 percent exceedance of the standard in the



Figure 2. This photo shows an example of a restored stream channel in the Little Bear River watershed after significant restoration had taken place.

1993–1994 cycle to 50 percent exceedance by the 2003–2004 cycle.

These results indicate that TP levels in the upper segment of the Little Bear River are consistently below state water quality standards. Therefore, UDEQ removed the upper 6.8 miles of the Little Bear River from its 2004 303(d) list for TP. Although the lower segment is still nonsupporting, a steady decrease in TP and total suspended solids indicates that the BMPs in place are positively affecting the watershed.

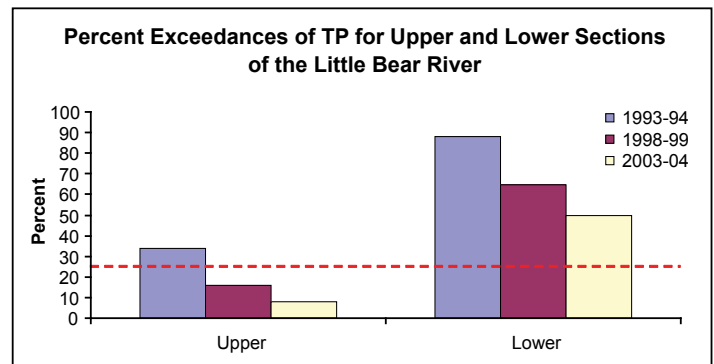


Figure 3. Recent monitoring data show that TP levels in the upper section of the Little Bear River are now below the 25 percent exceedance target level as represented by the red dotted line.

## Partners and Funding

Since 1991 UDEQ has administered a total of \$1,616,055 in Clean Water Act section 319 grant funds to implement the variety of BMPs previously mentioned. Project partners relied on an additional \$1,082,170 of nonfederal and \$1,554,178 in federal funding to restore the Little Bear River watershed. Utah Division of Wildlife Resources and Utah State University conducted specific partnership efforts to improve the fishery and fish habitat. U.S. Department of Agriculture funds helped improve habitat and agricultural production by focusing on a holistic approach to farm and environmental management. The Natural Resources Conservation Service provided technical assistance to plan, design, implement BMPs and evaluate BMP effectiveness. U.S. Fish and Wildlife Service provided technical assistance for fish habitat projects and streambank and stream channel design. Local participants included the Cache County Local Work Group, the local soil conservation district, the Little Bear Water Users Association, Cache Society of Fisheries and many others.



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