



# Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# Colorado

## Restoring and Stabilizing Stream Channel Improves the Lower Rio Blanco

### Waterbody Improved

The San Juan-Chama Diversion Project (opened in 1971) had led to reduced water flow and a loss of aquatic habitat in Colorado's Rio Blanco, a tributary to the San Juan River. As a result, in 1998 Colorado included a 12-mile reach of the Lower Rio Blanco on the state's Clean Water Act (CWA) section 303(d) list of impaired waters for failing to support its aquatic life designated use due to sediment. Project partners restored the stream channel to match the altered flow regime and educated landowners. These efforts restored the river's physical and biological function and improved water quality, prompting Colorado to remove the Rio Blanco, including the 12-mile reach of the Lower Rio Blanco, from the state's list of impaired waters in 2008.

### Problem

The Rio Blanco originates in the San Juan Mountains. It flows for 30 miles through the San Juan National Forest and private lands to its confluence with the San Juan River in southwestern Colorado (Figure 1). The state classifies the Rio Blanco as an Aquatic Life Coldwater Class 1/ Recreation Class 1 waterway supporting water supply and agricultural uses.

In 1971 the San Juan-Chama Diversion Project opened, diverting 70 percent of the Rio Blanco's historical flow to supply water for municipal, domestic, industrial and other uses. A basin summary prepared in 1990 by the U.S. Forest Service found that the diversion and land use practices (including livestock grazing, irrigated pasture, recreation and domestic activities associated with low-density urban development) had negatively affected the Rio Blanco, including a 12-mile reach of the Lower Rio Blanco, from the Blanco Diversion Dam to the San Juan-Chama Project to its confluence with the San Juan River. The diversion and land use practices had created a wide, shallow stream with very little pool and cover habitat (Figure 2). Water temperatures were high, exceeding the lethal limits for trout (77°F to 81°F). In addition, flow changes and streambank erosion had altered the riparian zone and led to sediment loads that exceeded the stream's transport capacity.

Colorado's sediment water quality standards require that waters be free from bottom deposits detrimental to beneficial uses. Because of the loss of aquatic habitat resulting from the construction and operation of the San Juan-Chama Diversion,

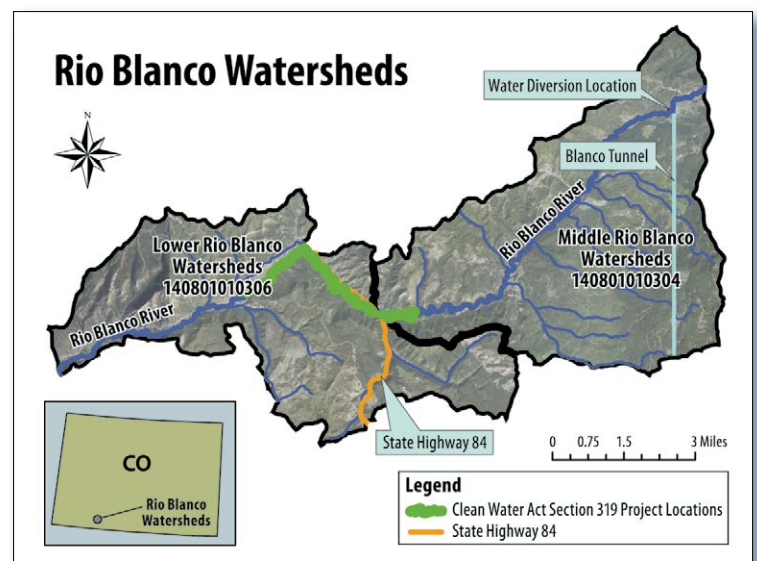


Figure 1. The Rio Blanco watershed is in southwestern Colorado.

in 1998 the state placed a 12-mile reach of the Lower Rio Blanco on Colorado's list of impaired waters for failing to support its aquatic life use due to excessive sediment deposition.

Restoration was completed and the stream returned to meeting standards before a total maximum daily load was developed.



Figure 2. Before restoration, water diversion and land use activities caused the Lower Rio Blanco to be wide and shallow.

## Project Highlights

The Rio Blanco River Restoration Project was the Colorado Department of Public Health and Environment's first CWA section 319-funded project aimed at addressing hydrologic modifications. In 1999, project partners—the Colorado Water Conservation Board, the Lower Blanco Property Owners Association and other partner agencies—implemented a stream channel restoration demonstration project on a 1.1-mile reach of the Lower Rio Blanco. The project partners implemented a number of best management practices (BMPs) to stabilize the stream channel, including

- Fortifying the streambanks by installing grade control structures and native material revetment (permanent structures composed of natural materials to protect eroding banks)
- Deepening the channel to decrease the stream width-to-depth ratio, which in turn decreases water temperature and improves the river's sediment transport capacity



Figure 3. Project partners installed cross vanes and other stream channel stabilization BMPs.

- Restoring stream meanders, which offers greater physical stability
- Installing rock weirs (channel-spanning rock structures) and cross vanes to redistribute the stream energy away from the banks and toward the center of the stream (Figure 3).

Because a mixture of private and public lands surround the Lower Rio Blanco, project partners collaborated extensively with local landowners and partner agencies. A series of meetings expanded on existing watershed-wide efforts to address stream flow and water quality issues in the basin and involved individual landowners in the watershed planning process.

CWA section 319 funds supported an additional stream restoration project to continue channel stabilization efforts on the Lower Rio Blanco in 2001. In 2002 additional section 319 funds were used to repair flood damage to the newly installed BMPs. In total, project partners conducted stream channel restoration on approximately 3.25 miles of the Lower Rio Blanco.

## Results

The channel reconfiguration and bank stabilization efforts were designed to improve the natural ability of the river to transport sediment and maintain fishery habitat, despite reduced flow in the lower river reach. Project partners restored natural meanders and riffle-to-pool ratios and achieved a healthy width-to-depth ratio, allowing the river to flush fine sediment that had been smothering the substrate (including aquatic insects and fish eggs), thereby improving aquatic habitat. Pool depth increased from as little as 0.5 inch to 6 to 7 feet, providing year-round trout habitat.

Post-project monitoring conducted by the Colorado Division of Water Resources showed marked improvements in sedimentation, temperature, and dissolved oxygen levels, as well as greater aquatic insect diversity and abundance. On the basis of these data and evident improvements in the physical conditions and biological health of the river, Colorado determined that the restored reach fully supports its aquatic life designated use. As a result, the state removed the Rio Blanco, including the 12-mile segment of the Lower Rio Blanco, from the impaired waters list in 2008.

## Partners and Funding

Restoration partners included the Colorado Water Conservation Board (project coordinator, technical assistance); the Colorado Division of Wildlife (in-kind match); the Colorado Division of Water Resources (in-kind match); the San Juan Water Conservancy District (lead sponsor); the Southwestern Water Conservation District (match and outreach); and the Lower Blanco Property Owners Association (cash and in-kind match, including innovative "Adopt a Rock" boulder sponsorships to help fund stream channel stabilization efforts and chokecherry jelly sales).

Restoration efforts were supported by two CWA section 319 projects (\$329,537 total), \$356,089 in matching funds from local and state partners, and \$70,000 in other federal funds (including \$49,000 from the U.S. Department of Agriculture's Environmental Quality Incentives Program, which supported stream restoration). An additional \$12,237 in CWA section 319 funds and \$8,486 in match funds also helped repair damage from flooding before new BMPs were fully established.



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