



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Alaska

Restoring Stream Channel and Floodplain Reduces Turbidity

Waterbody Improved

Past placer mining (the mining of loose soils and sediment for minerals) along Alaska's Caribou Creek resulted in reduced sinuosity, a non-functioning floodplain, and loose-sediment tailings piles throughout the floodplain that reduced riparian function. Erosion of unstable areas created high levels of turbidity that violated water quality standards, prompting the National Park Service (NPS) to suggest that the Alaska Department of Conservation (ADEC) add Caribou Creek to the Clean Water Act (CWA) section 303(d) list in 1994. In 2002 NPS and other partners began restoring the damaged portions of Caribou Creek by removing tailings and restructuring and replanting the floodplain. Monitoring in 2009 showed that Caribou Creek met the turbidity water quality standard. Additional restoration activities in 2010 improved the creek further. As a result, ADEC removed Caribou Creek from the CWA section 303(d) list in 2010.

Problem

Caribou Creek (Figure 1) is in Denali National Park and Preserve in south-central Alaska's Kantishna Hills. In the early 1900s, individual miners flocked to streams in the Kantishna Mining District—including Caribou Creek—to seek their fortunes. Miners began dredging Caribou Creek for gold in the 1930s. Over the years, mining techniques became more aggressive and destructive. By the 1970s and 1980s, miners were using bulldozers to move streambed materials through large-scale hydraulic wash plants to separate gold flakes and nuggets from other streambed materials. The companies left long rows of eroding tailing piles in the floodplain (Figure 2) and eroding stream banks that remained devoid of vegetation. By 1990, Caribou Creek had the most extensive placer-mining-related damage of any drainage in Denali National Park and Preserve—361 acres comprising 13.1 miles of damaged aquatic and riparian habitat. Some miners restored their claims upon completion of the mining, but others did not.

Eroding sediment from the damaged areas of the Caribou Creek watershed produced high levels of turbidity. Data from the early 1980s showed that turbidity exceeded water quality standards 64 percent of the time. These data, combined with best professional judgment concerning ongoing disturbances from past placer mining, prompted NPS to request that ADEC consider Caribou Creek impaired. On the basis of this request, ADEC added a 16.1-mile-long segment of Caribou Creek to the 1994 CWA section 303(d) list of impaired waters for turbidity.

National Park Service



Figure 1. Caribou Creek flows through south-central Alaska's Kantishna Hills.

National Park Service



Figure 2. Before reclamation efforts, piles of tailings covered the Caribou Creek floodplain and restricted creek flow.

National Park Service



Figure 3. Caribou Creek in 2002 after NPS leveled and contoured large tailings piles to restore natural channel meanders and riparian function.

National Park Service



Figure 4. In 2010 NPS reinforced previously restored curves in the main channel with coir logs (background) and rock vanes (foreground).

Project Highlights

Caribou Creek flows within the present-day boundaries of the Denali National Park and Preserve. Congress created Denali National Park in 1917 as Mt. McKinley National Park. In 1980 Congress approved the Alaska National Interest Lands Conservation Act, which enlarged the park to 6.1 million acres and renamed it Denali National Park and Preserve.

A 1985 court order imposed an injunction on mining in the Kantishna Mining District pending an Environmental Impact Statement (EIS). After the EIS was completed in 1990, NPS proceeded to acquire many valid mining claims. As NPS acquired mined lands, it evaluated the areas for possible restoration activities. By 2001, NPS was ready to begin restoring Caribou Creek.

Between 2001 and 2010, NPS removed hazardous materials and equipment from five former mining claim areas, removed an abandoned airstrip, leveled and contoured large tailings piles to restore natural channel meanders (Figure 3), installed coir (coconut fiber) logs, and reestablished vegetation to control erosion.

In 2010 NPS implemented additional restoration efforts with the help of contracted specialists at Hydraulic Mapping and Modeling (design), Environmental Compliance Consultants and Oasis Environmental (construction). They widened and smoothed the upper portion of the disturbed floodplain (last mined in the mid-1980s), creating a relief channel for flood events. They also reinforced some previously restored curves in the main channel of Caribou Creek (Figure 4).

Results

As a result of the restoration efforts, erosion and turbidity levels in Caribou Creek declined. Alaska's water quality standard required that turbidity not exceed 5.0 nephelometric turbidity units (NTU) above natural conditions when the natural turbidity is 50 NTU or less. Monitoring data collected monthly in Caribou Creek's headwaters and near the mouth from June through September of 2009 and 2010 by USGS show turbidity levels consistently less than 2.0 NTU, well within the water quality standards.

In addition, in 2009 NPS performed follow-up topographic monitoring at seven cross sections of the stream channel. The agency also surveyed channel locations and sinuosity with a global positioning system. After analyzing USGS water quality monitoring and stream channel data, NPS concluded that the creek is meeting the turbidity standard. On the basis of that information, ADEC removed Caribou Creek from the 2010 CWA section 303(d) list of impaired waters for turbidity.

Partners and Funding

NPS implemented restoration efforts, worked with the U.S. Geological Survey to track the progress of the water quality recovery, and shared the data with ADEC and the U.S. Environmental Protection Agency. Approximately \$185,000 in NPS Natural Resource Preservation Program funding supported data collection, project planning and design, and project implementation efforts in 2000–2002. Denali Park and Preserve received another \$2.5 million in NPS funds in 2008–2010 for large-scale restoration efforts in Caribou Creek and other waterbodies in the Kantishna Mining District.



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For additional information contact:

Brock Tabor
Alaska Department of Environmental Conservation
907-465-5023 • brock.tabor@alaska.gov

Guy Adema
Denali National Park and Preserve
907-683-2294 • guy_adema@nps.gov