NONPOINT SOURCE SUCCESS STORY

New Mexico

Management Efforts on Public Land Restored Riparian Zone and Reduced Water Temperature in Jaramillo Creek

Waterbody Improved

Jaramillo Creek was once a productive trout fishery on the Valles Caldera National Preserve in New Mexico. Fish surveys conducted in 2003 showed a dramatic decline in water quality, and the stream was listed as impaired for temperature, turbidity, and aluminum. Beginning in 2011, the New Mexico Environment Department (NMED) funded multiple stream restoration projects. The watershed group Los Amigos de Valles Caldera used plug-and-pond methods to raise the water table and restore wetlands. They also installed in-channel structures to prevent erosion and sedimentation. Another project from the watershed group Wild Earth Guardians protected riparian areas by planting native vegetation and constructing cattle and elk exclosures. As a result, Jaramillo Creek was delisted for temperature in 2016. The creek remains listed for turbidity, aluminum, and nutrients. NMED expects the creek to continue improving as the vegetation matures and riparian conditions improve.

Problem

The NMED conducted a special water quality survey in 2001–2002 when the Valles Caldera National Preserve was transferred from private to public land ownership. This survey indicated water quality problems; as a result, NMED listed Jaramillo Creek as impaired for temperature, turbidity, and aluminum. The creek was failing to meet its designated use for High-Quality Cold Water Aquatic Life Use. Jaramillo Creek was once considered a productive trout fishery, but a 2003 fish survey captured only two fish in the project reach, compared with a similar reach on the nearby East Fork Jemez River where 279 fish were found. The probable sources of impairment on Jaramillo Creek included road runoff, rangeland grazing and wildlife use.

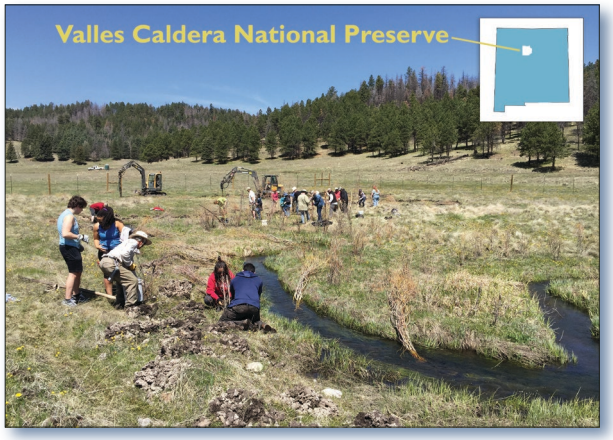

Figure 1. Volunteers plant native species along Jaramillo Creek in the Valles Caldera National Preserve.

Story Highlights

The successful restoration of Jaramillo Creek results from several projects, including meadow wetland restoration, fencing and planting (Figure 1). First, Los Amigos de Valles Caldera group completed a project to preserve and restore high elevation slope wetlands using the plug-and-pond method, which involves plugging an incised channel with excavated soil from meadow sediments and creating small ponds as a byproduct (Figure 2). Los Amigos de Valles Caldera successfully restored wetlands and retained sediment by installing machine-built plug and pond structures at 25 sites, with 10 built by hand and 15 with heavy machinery. Additional post-fire sediment and turbidity pollution prevention was achieved by installing one-rock dams at 25 sites, sod clump bank protection at 10 sites, Zuni Bowls at two headcuts, and rolling dips and trial drains at seven sites.

Subsequently, the Wild Earth Guardians, with help from the New Mexico Youth Conservation Corps, planted native riparian vegetation on a 2.3-mile reach of Jaramillo Creek with over 60,000 willow stems,

Figure 2. Jaramillo Creek before (top) and after (bottom) plug-and-pond treatment.

which exceeded the workplan objective. Additionally, they mixed in 400 cottonwood, 400 thinleaf alder, 400 aspen, and additional forage species. They constructed nine exclosure fences that protected a total of 43 acres of newly restored riparian habitat. Crews also built small exclosures to protect individual cottonwood and aspen from rodent depredation.

Results

The many projects that have been implemented in Jamarillo Creek have helped improve the water quality. The Surface Water Quality Bureau (SWQB) at NMED has measured stream temperature on Jaramillo Creek to monitor the effects of these projects since 2012. The surveys showed decreases in temperature; the creek met all criteria for High-Quality Cold Water Life Use, including maintaining a maximum temperature below 23°C. As a result, Jaramillo Creek was delisted for temperature impairment in 2016. The creek met temperature criteria during 2017 as well (Figure 3).

Keystone Restoration Ecology monitored additional effects of the Los Amigos de Valles Caldera project. Before/after project photo point monitoring shows that the plug-and-pond treatments successfully spread water and restored wetlands (Figure 2). The

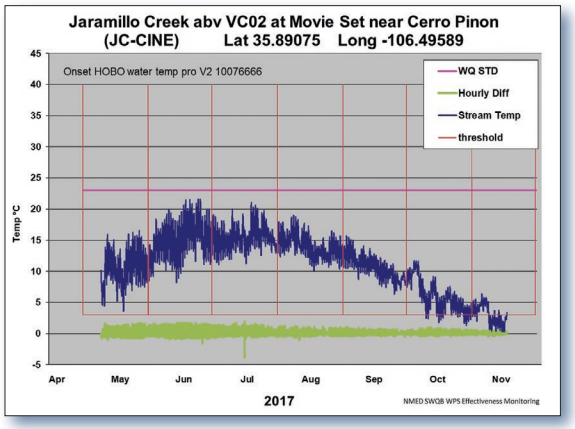

Figure 3. The 2017 thermograph for Jaramillo Creek downstream of the restoration reach shows that temperatures have remained below the standard.

Bank Erosion Hazard Index (BEHI), which evaluates the susceptibility of stream banks to erosion, showed that the average score for treated banks dropped from 31 (high) to 8 (very low).

Monitoring by Timberline Environmental on behalf of WEGUARD indicates that over 75 percent of the riparian species planted have survived, and they are expected to further enhance shading as they mature. Shade has significantly increased within the project area, with densiometer monitoring indicating that shade has increased to 49.5 percent, which is greater than the 30 percent objective. Enhanced shading due to the high survival rate of riparian plantings have contributed to lower water temperatures in Jaramillo Creek. The exclosures that were constructed to protect plantings and alter resource use by livestock and wildlife have been successful. The exclosures are protecting the native riparian woody plantings as well as the existing herbaceous vegetation from the impacts of grazing, which has allowed the opportunity for the vegetation to grow and shade the creek.

Partners and Funding

The primary partners on the restoration projects were Los Amigos de Valles Caldera, Keystone Restoration Ecology, Wild Earth Guardians, Timberline Environmental, New Mexico Youth Conservation Corps and the Valles Caldera National Preserve. The total Clean Water Act Section 319(h) funding for these projects was $596,746, and the projects were managed by the Watershed Protection Section of NMED SWQB.

U.S. Environmental Protection Agency
Office of Water
Washington, DC

EPA 841-F-19-001I
February 2019

For additional information contact:

Nina Wells, Los Amigos de Valles Caldera
505-660-2351 • nwells9@gmail.com
Daniel Guevara, NMED Surface Water Quality Bureau
505-476-3086 • daniel.guevara@state.nm.us
Jim Matison, Wild Earth Guardians
505-795-1131 • jmatison@wildearthguardians.org