

Santa Clara Creek- Headwaters Restoration

State(s): New Mexico

Managing Agency/Organization: Santa Clara Pueblo – Forestry

Type of Organization: Tribe

Project Status: Underway

Project type: WNTI Project

Project action(s): Riparian or Instream Habitat Restoration, Monitoring, Education/Outreach. Restoration will remove 3 barriers and reconnect 2 miles and 3 acres of habitat.

Trout species benefitted: Rio Grande Cutthroat Trout

Population: Santa Clara Creek watershed

Project summary: Santa Clara Pueblo is a federally recognized tribe of Native American people located along the Rio Grande in northern New Mexico, USA. The pueblo encompasses 90 square miles of tribal land and is home to 2,600 residents who rely on these lands for food, medicine, recreation, and spiritual sanctuary. Traditional uses of the land include farming, grazing, hunting, fishing, and pottery making. Central to the culture and heritage of these Tewa speaking people is the Santa Clara Creek. This cold water stream flows 24-miles west-to-east, across 4,300 vertical feet from its headwaters in the Jemez Mountains, down Santa Clara Canyon into the Rio Grande. This creek is one of two perennial streams that connect the Rio Grande to the Jemez Mountains and was once home to the endemic Rio Grande cutthroat trout. The other stream is the Rio Frijoles, which is contained within Bandelier National Monument and is currently scheduled for cutthroat introduction. Since the mid-1900's, recreational fishing and the stocking of non-native species wiped out populations of this native species in the Santa Clara Creek Watershed. In 2011, a collaboration between the Santa Clara Pueblo and the U.S. Fish & Wildlife Service sought to reintroduce the Rio Grande Cutthroat. Suitable habitat in the upper Santa Clara watershed was designated, a fish barrier constructed, non-native fish culled, and Rio Grande cutthroat were acquired and staged at a nearby hatchery. Within days of the reintroduction, the Los Conchas wildfire tore through the Jemez Mountains, impacting 16,000 acres of Santa Clara tribal forests. The largest fire in State history at the time, this fire incinerated half of the Santa Clara watershed, decimating vegetation and later leading to catastrophic flooding. The magnitude of these flood events resulted in five presidential disaster declarations, \$250 million in damages, and 100% fish kill in the Santa Clara Creek watershed. The Tribe has since embarked on a collaborative recovery strategy to restore this watershed which acts as their pharmacy, food store, clothing store, and biologic classroom.

Working from the highest elevations at the watershed boundary, a top-down restoration approach has been implemented through efforts aimed at erosion control and hazardous fuel reduction. Since 2014, over 6,000 erosion control structures have been built in over 30 tributaries. These efforts have been compounded with contour felling, mulching and seedling planting. Standard burn area rehabilitation practices have been applied and have evolved into innovative adaptations that utilize natural materials and enhance ecosystem function whenever possible, reducing costs and foreign impacts on the ecosystem. By combining a collaborative recovery strategy with a "naturalistic approach to watershed restoration and flood mitigation", Santa Clara Pueblo is emerging at the forefront of bio-engineering, or engineering with nature.

Problem the Project Addresses: The problems this project addresses are both physical and cultural. For the community, and most especially the children, there is an enormous cultural sense of loss, and also a sense of fear, because the Santa Clara Canyon that has for generations been at the core of the tribe's identity is gone. Indeed, the damage is now a threat to their existence. Through collaboration, creek restoration and the re-establishment of native species, the ecosystem and cultural ties to this sacred landscape can be reconnected. The benefits of these efforts will lead to enhanced recreation opportunities for the Tribe and general public, while concurrently enhancing resiliency to future disasters, climate change, and cultural disconnect.

Sediment transport and deposition has been the largest physical obstacle in restoring Santa Clara Creek. Since 2011, \$26M has been spent on sediment removal from the Canyon. In 2015, the first attempt at treating stream itself was designed, permitted, and eventually abandoned due to the continued sediment load threatening to fill in any structure or habitat created. Fortunately, the past two years the watershed has transitioned into a period with substantial signs of stabilization. Most notably through the emergence of vegetation cover (grasses & shrubs), and also with exponential increases in infiltration rates as the hydrophobic properties of soils have dissolved. As a result, the first stream restoration and road crossing design has been initiated on the main stem of Santa Clara Creek. The initial project addressing the creek is the FEMA 4199 Flood Mitigation and Creek Restoration project. Funded through FEMA's Hazard Mitigation Grant Program (HMGP) and the San Manuel Band of Mission Indians (California), this \$3M project will address three sites in the Upper Santa Clara Canyon: 2 sites located on the main stem of Santa Clara Creek; and the

third on an ephemeral tributary. This project has also emphasized a naturalistic approach to watershed restoration and flood mitigation by taking a 'stream first' approach to designing infrastructure that will prioritize natural stream function. Bottomless culverts have been designed to provide roadway crossings while conveying 100-year precipitation events, facilitate meandering, floodplain connectivity and fish passage. Green infrastructure and bio-engineering principles that maximize natural materials are being applied to stream bank and roadway designs. To enhance natural function and create fish habitat, the project has been allocated \$108K creek restoration above and below each site. By creating optimal stream habitat, the tribe is again working toward the goal of reintroducing native Rio Grande Cutthroat Trout to the Santa Clara Creek watershed. Not only will this expand the current range of this species, their viability in the Jemez Mountains will increase through the expansion of limited high altitude habitat that is resilient to projected climate change. Construction is scheduled to begin in spring 2019.

Objectives: The Santa Clara Creek- Headwaters Restoration Project objective is to maximize ecosystem potential for sustaining a prime, cold-water native fishery that is resilient to variable flow rates from drought and flood events. This project will directly tie into the FEMA 4199 project area by extending stream restoration and habitat enhancement. Stream habitat will be enhanced through the implementation of:

- induced meandering
- grade control structures (log drops, rock dams, baffles, weirs, cross veins)
- removal of natural fish barriers
- bank full channel with floodplain connectivity
- shrub planting to increase canopy/water shading
- wetland enhancement/propagation
- beaver dam analogs (BDA's)
- dispersing woody debris

These measures are intended to increase stream length, habitat complexity, connectivity, and canopy shading to build, protect, and sustain a native cold-water fishery. They will also enhance and expand wetlands, which in turn will increase sub-surface waters storage for increased resilience to drought and climate change.

This project will be implemented as an extension to the existing plans developed under the San Manuel-Kha'po Revitalization and FEMA 4199 Flood Mitigation and Creek Restoration Projects. By leveraging these projects and their respective cost-match together, the emergent headwaters of Santa Clara Creek can be restored into suitable habitat for native trout. For instance, the 4199 project includes at total length of 425-feet of creek restoration, with WNTI funding, this will extend creek restoration 2,100' upstream to the emergent headwaters of Santa Clara Creek and 1,500' downstream to the confluence with Turkey Creek. That would increase our stream restoration area by 3,600'. Furthermore, current stream design and 404/401 permitting extends into these areas. Specialized consulting will provide structure type recommendations to allow the tribe to extend further into these reaches. As funds allow, we will expand efforts upstream into the Turkey Creek tributary, an area that historically sustained fish. A series of relic beaver ponds occur approximately 1,700' upstream. The ponds located on the southeastern bank offer tremendous potential for re-establishing deep pools that would remain freeze resistant in winter. These dams will be rebuilt at the small blown out sections and a connected set of 3 pools will link fish passage into Turkey Creek. Further downstream, intend to provide an additional 100' feet of grade control, habitat creation, and fish passage up from the confluence of Santa Clara Creek with Sheep Head Creek. While the Sheep Head tributary has an unknown history of supporting fish, there is enough flow to potentially support trout habitat in this tributary. The rationale with increasing habitat availability in Turkey Creek and the Sheep Head tributary is to provide habitat in multiple tributaries to enable resiliency for the population if one drainage were to ever experience a catastrophic flood or drought.

Partners:

- Santa Clara Pueblo - Forestry and Office of Environmental Affairs
- San Manuel Band of Mission Indians
- US Army Corps of Engineers
- Santa Clara Pueblo Khap-po Community School
- Santa Fe Indian School
- New Mexico State Forestry Department
- Natural Resource Conservation Service
- Trout Unlimited – Truchas, Enchanted Circle and Bosque Chapters

Project Monitoring: This project will include an annual monitoring report. The following information will be included:

- a. Photographic documentation of the baseline conditions (first year only).
- b. A discussion of peak flows during spring and monsoon peak events and the treatment locations response to high flows. This discussion should be cumulative from year to year to enable the reviewer to obtain an overall understanding of the riverine restoration treatments efficacy since project implementation.
- c. Photographs of not less than 3 treatment locations to determine both the efficacy of the restoration procedures as well as the subsequent increase in habitat diversity. The same locations shall be photographed annually and displayed in the monitoring report. Differences shall be prominently noted, both in the report text and annotated in the photo captions. Submitted photos should be formatted to print on standard 8 ½ by 11 inch paper, dated, and clearly labeled with direction and location from which the photo was taken. The photo location points should also be identified on the appropriate maps.
- d. Discussion of any unusual events that might have impacted or may impact the efficacy of the restoration procedures in the future, such as a large-scale erosion event.
- e. Adaptive management recommendations if project components are not meeting performance measures.

Funding Source(s): National Fish Habitat Action Plan

Project cost: \$50,000

Start Date: 09/01/2019 **Completion Date:** 9/30/2020

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