

WNTI – Santa Clara Creek Headwaters

2021 (Final) Performance Progress Report (PPR) for the period of 10/1/2020 – 12/31/2021

Santa Clara Pueblo began implementing the Western Native Trout Initiative's (WNTI) Santa Clara Creek – Headwaters restoration project in May of 2021. The project area was first evaluated during site reviews by professional services contractors Wildland Hydrology Consultants, and Blue Mountain Consulting on May 17th. These reviews were conducted with a fishery focus, while building upon previous ecological consulting services by Zeedyk Ecological Consulting and Queen of the River Consulting that were provided as cost-share through The Nature Conservancy – Rio Grande Water Fund. The justification for applying multiple consultants was to capture diverse hydrology, geomorphology, and fisheries perspectives to achieve our goal of developing habitat diversity and resilience.

Brandon Rosgen of Wildland Hydrology, and Jim Nankarvis of Blue Mountain Consulting provided field inspection of disturbed areas from flooding and sediment deposition, and then asked to view 'reference reaches' that were less impacted and recovering. Their feedback focused on identifying sediment sources and impaired reaches of the stream, then proposing solutions, recommendations, and prescriptions to remedy these impaired areas.



Fig. 1) Consultants Brandon Rosgen and Jim Nankarvis inspect both undisturbed 'reference reaches' and sediment impacted areas of Santa Clara Creek Headwaters on May 17th, 2021.

The FEMA 4199 project area was of particular concern due to the creation of new flood mitigation structures that lacked microhabitat and a bankfull bench in between the larger grade control features. It was noted that the new bottomless culvert lacked ideal stream morphology and provided an excellent area to start developing a bankfull bench while integrating woody debris and small pools. Areas upstream and downstream of the culvert were also identified for additional rock-drop and woody debris integration. Off-channel water sources (i.e. springs) were then visited to evaluate pond potential. Areas on both Santa Clara Creek and Turkey Creek were found to have potential for pond creation. It was advised earthen berm dams, with larger dams lined with geotextile fabric, would perform best during larger flood events.

Implementation commenced in late June with Santa Clara Pueblo Forestry staff leading the effort with assistance from the Southwest Tribal Fisheries Consortium tribal youth crew. Efforts began with hand crews developing a bankfull bench and side channel pool to encourage fish passage and facilitate proper stream dynamics under a recently completed bottomless culvert.



Fig. 2) Field implementation crews began work by developing a bankfull bench and side channel pool to encourage fish passage and facilitate proper stream dynamics under a recently completed bottomless culvert.

Field implementation continued with creation of new habitat features, while modifying previously constructed features through adaptive management. Previously constructed structures that had experienced varying levels of degradation were modified by adjusting rocks to align flows and facilitate scour. Areas displaying habitat impairment from sedimentation, shallow water, fish passage obstruction, and lack of cover were prioritized. To date, 16 rock drops were built for grade control and to increase water depth. Sites with minimal cover were provided with woody debris and a few select sites were planted with juvenile aspen trees.



Fig. 3) A WNTI treated site that depicts toe-wood that had water redirected to undercut the log, a downstream rock vein installed to facilitate pooling, and woody debris dispersal with aspen planting to promote cover.

Off-channel pond creation was first developed along the most prominent spring and relic wetland along Santa Clara Creek. A series of four pools were dug using a mini excavator. The upper, most prominent dam was lined with geotextile fabric and then woody debris, rocks, and shrub (willow and aspen) plantings. The effort led to the creation of four off-channel pools that are intended to provide a foundation for beaver to colonize and build upon when introduced in 3-5 years, while also providing off-channel habitat and connectivity for Rio Grande Cutthroat when introduced in 1-2 years. These ponds provide additional drought resilience by raising water tables, expanding wetlands and cumulatively increasing surface water storage by ~57 cubic yards.



Fig. 4) Off-channel pond creation in a relic wetland historically occupied by beaver. The enhancement created four off-channel ponds that will provide freeze resistant habitat for trout, while increasing surface and subsurface water storage to provide habitat resilience to drought.

Two additional ponds were created ~90 yards and ~120 yards downstream of the road crossing and on the north side of Santa Clara Creek. Adaptive management provided maintenance and modifications to six additional sites in Turkey Creek. Two fish barriers were treated in Turkey Creek by creating bypass channels around the barrier. Woody debris supplemented all structures and surrounding floodplains for cover, shade, and storm water runoff protection.



Fig.5) Fish barrier bypass constructed along Turkey Creek. A relic tributary was utilized to direct water around a 6-foot tall debris dam that presented a barrier to fish migration. This bypass channel was created to establish the flow around the barrier to facilitate fish passage. The new channel will be monitored and treated with adaptive management in the future months and years. Adaptive management will prioritize the development of habitat microsites to facilitate fish holding and a bankfull channel with floodplain connectivity to accommodate flow variability.

Outreach included press in the Santa Clara Pueblo monthly newsletter, project viewing during site visits with political dignitaries and conservation professionals, and an abstract was submitted to the special session for Wildfire Impacts on Native Trout during the American Fisheries Society 151st Annual Meeting. The session was subsequently post-poned to a future date outside this project performance period. As a non-local travel alternative to attending the conference, email authorization was attained from WNTI and the USFWS to allow Santa Clara Forestry staff attend the Natural Channel Design in the Arid Southwest Workshop in Flagstaff, AZ from September 27-October 1st. The workshop was attended by the Santa Clara WNTI Project Manager, Garrett Altmann. Workshop principles attained are to be integrated during the final phase of project implementation from October-December, 2021 to increase project viability and resiliency.

Project implementation concluded with the transplanting of grass plugs and juvenile aspens trees in November and early December, 2021. Aspen transplants were sourced during dormancy using heavy equipment (back-hoe) from an upland area adjacent to the relic beaver pond revitalization.



Fig.6) Aspen transplants were placed along newly created ponds to facilitate shade for cover and maintaining cold water temperatures.

Outreach extended to youth groups from the Santa Fe Indian School and Santa Fe Prep High School who each provided additional assistance in the form of woody debris integration, planting, and pond expansion.



Fig.7) Outreach activities provided additional support to the successful completion of this project by integrating “toe-wood” to provide bank stability and habitat cover. Douglas fir and Ponderosa conifer seedlings were then planted in adjacent uplands, and grass plugs were sourced from adjacent vegetated areas to facilitate shading and habitat connectivity.



Fig.8) Dams and ponds located in the upper relic wetland were expanded to increase surface and subsurface water storage and riparian habitat.

Budget Summary

The federal share of WNTI expenditures to complete this project totaled \$50,000. **The budget was expended in full before 12/31/21.** The majority of funding went to salaries and fringe benefits during project implementation. Remaining expenses applied this period included program supplies, fuel, vehicle lease/rental equipment, professional services, and fuel.

- Salaries: \$28,305.56
- Fringe Benefits: \$7,176.63
- Professional Services: \$5,354.60
- Program Supplies (including Fuel): \$5,000
- Non-local Travel: \$1,825.51
- Workshop Registration: \$1,000
- Rental Equipment/Vehicle Lease: \$1,337.70

Project closeouts will be completed and submitted within the first 90-days of 2022.



Fig.9) Completed off-channel ponds integrated into relic beaver ponds and wetland complex (December, 2021).

This report was completed by WNTI Project Manager, Garrett Altmann, of the Santa Clara Pueblo - Forestry Department. WNTI Grant Review was provided by Therese Thompson. Federal Grant Administration was provided by Nate Caswell and Jennifer Johnson of the USFWS.