Coldwater Post-Fire Restoration Project *(amended)*

Recipient: Riverside Corona Resource Conservation District
Project Period: 12/03/2018 – 3/31/2021
Award Amount: $39,145.85
Matching Contributions: $12,663.92
Project Number: #8006.19.063336

Summary of Accomplishments

1) ***Species Management and Monitoring****: Trout were relocated to a surrogate stream from August 2018 until November of 2020, when they were re-introduced back to Coldwater Creek. The fish are being monitored and water quality and flows were sampled during site visits.*
2) ***Implement Adaptive Management Actions****. Invasive plant removal and monitoring along a 1.80 mile reach of creek, as well as planting of seedling trees collected on-site, removal of cattails, tamarisk and snakeroot and control of wild grape out of tree canopies. Selective removal of deadfall trees and debris dam removal.*
3) ***Measure Water Quality and Quantity****. Water quality and quantity continue as well as any adaptive management actions needed to allow flow and velocity of the water to improve substrate composition for fish refugia and reproduction and as they relate to overall health of the hydrology in the watershed.*
4) ***Develop a long-term management plan****. A draft LTMP has been developed that addresses long term tasks needed to recover and sustain fish habitat from the Holy Fire and implementation of post translocation monitoring of native fish, based upon genetic testing and future genetic management to reduce introgression.*

Project Activities & Outcomes

The primary activities that were conducted during the grant period were development of baseline photo stations, documentation of pre and post restoration activities at the photo points, selection of restoration and debris removal sites, conduct water quality testing, develop an LTMP and provide annual reports. The other main activities were:

Activity Start Time and Completion Dates:

1. Procure equipment for use in fish rescue and salvage, Dec 2018 - Dec 30, 2018. **Not conducted due to DFW restrictions on holding fish. See #4 below.**

2. Hold fish at DFW hatchery and RCD, if approved. Nov 2018 - Dec 30, 2020. **Completed between Aug 2018 and April 2019.**

3. Relocate fish to Coldwater or other select sites approved by DFW, Oct 1, 2019 - Oct 30, 2020. **Completed November 2020.** Fish from both Marion Creek (85 Coldwater population), and West Fork San Gabriel River (99 native population for genetics mixing) placed back into the

creek by RCRCD and DFW staff.

4. Hold and maintain fish for a period long enough to have the watershed recover (2yrs), Nov 1, 2018 - Dec 30, 2020. **This activity not conducted at RCRCD due to DFW fish holding restrictions. Funds used for restoration and staff time to conduct restoration activities at Coldwater and monitoring at the surrogate stream. Fish were placed in the surrogate stream during this time period.**

5. Apply adaptive management actions in the creek such as replanting of trees, removal of debris dams, burned and dead trees and weeds. Jan 2019 - Oct 2020. Completed during this time period with the following results:

Table 1 Coldwater Creek Tamarisk Removal 2019-2020

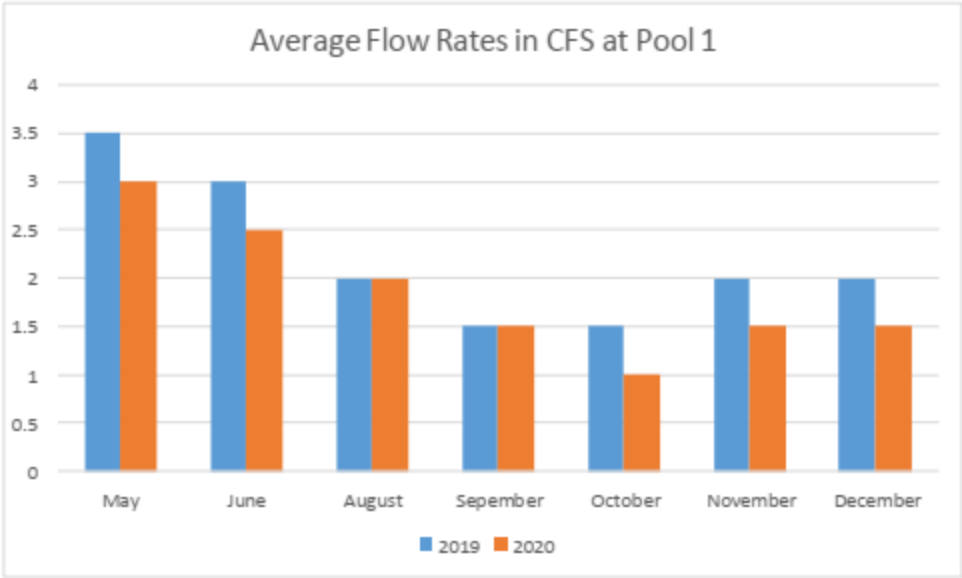
Date	**Location (reach)**	**Total # of Plants Removed**	**Species Removed**	**Crew Number**
9/16/20 and 10/14/20	Oak Pool to Slide	100	Tamarisk, Snakeroot	3
9/16/20	Slide Pool	300	Tamarisk	4
9/16/20 and 11/19/20	Mother Pool	100	Tamarisk, Snakeroot	5
10/14/20 and 11/23/20	Mother Pool to Spring	150	Tamarisk, Cattails	2
	2019	**4,800**		
	2020	**700**		
	Total	**5,500**		

50 seedling and sapling trees (alder and sycamore) were planted or transplanted on-site, using plant material from the restoration location(s). Over **200 deadfall trees and debris dams** were removed after the fire and during the grant period by RCRCD and Conservation Corps staff.

Short-Term Outcomes were completed such as conducting post-fire assessments, hold fish in surrogate stream, apply adaptive management actions for planting and debris removal and develop an LTMP.

Long Term Outcomes were to implement aspects of the LTMP, which have been started. Continue water quality and flow testing, which are ongoing. Continue exotic plant removal and control which will continue in perpetuity and as funds permit (additional grants will be applied for). And monitoring of prohibited uses such as trespass, trail creation and possible marijuana farms in the backcountry. historic drainage path. The fill was off hauled and used for restoration of Site 8.

6. Measure water quality and flow and conduct post fire/flood habitat assessments April 2019 - Dec 2020. This activity was completed during the time period. Full water testing results and temperatures can be found in the full report.



7. Develop and implement an LTMP Mar 2019 - June 2020. This activity was completed and the full LTMP can be found in the final report

Additional activities were completed during the grant in addition to those agreed upon in the grant agreement. RCRCD has responsibility over the site and the habitat and species occurring there and has committed both staff and resources to maintain the function and values of the open space in perpetuity. There were no discrepancies between activities conducted/completed during the grant under the agreement. Any changes in grant activities or budget that were required due to changes in DFW approvals of those activities at the regional level were approved and reflected in amendments

Outcomes

Project outcomes were achieved during the grant due to staff time and experience with working at the site. The main outcome of the grant, and the conservation site in general, was to maintain and sustain the native population of rainbow trout, which is the only population that occurs in this area of the mountain range and the Trabuco Ranger district. Fish were removed after the Holy fire to prevent extirpation and held at a DFW hatchery until a surrogate stream could be found. Fish were then placed at the surrogate stream until conditions at Coldwater improved and RCRCD staff were able to install and maintain habitat structures and reduce non-native plant growth that occur as fire followers

What was anticipated to happen compared to what actually happened was that more exotic plants occurred along the waterway than was anticipated. Otherwise there were no other discrepancies that were not anticipated since staff have been working at the site for many years and are familiar with the hydrology, species and habitats.

No unexpected outcomes were realized during the grant period. All information on standard project outcome results and activities can be found in the full report.

Lessons Learned

The key lesson from the project is that the most effective conservation practices are to manage exotic plant species before they become established after a fire. Post fire weed management is critical in keeping and maintaining proper functions and values of the habitat. Some of those values are listed

below and on the next page and are a function improvement of the post fire habitat recovery.

Coldwater Site Aquatic Habitat Variable Scores:

a. **Exotic Vertebrates (ev)**
   The site currently has no exotic vertebrates present in the water habitat. No exotic fish or amphibian species were found during the survey or after the fire. Current Variable Score: 1.0
b. **Bank Stability (bst)**
   The erosional or depositional nature of the river can increase or decrease the habitat value of the site from year to year. At the mitigation survey area, most bank areas, (ones that can be defined), were considered to be moderately unstable. Over 50% of the streamside habitat has high erosional potential during flood events. This is also due to unstable substrate material that cannot coalesce between rainfall seasons, and from confinement of the river floodplain due to levee size and location, reducing meander and increasing velocity, depending on flow volume. Current Variable Score: 0.3
c. **Vegetative Protection (bvp)**
   Current streamside vegetation is less than 60% of the survey area. This is related to the bank stability score above and can change from year to year. Since the middle Santa Ana is confined to a pre-determined floodplain width, the natural process of meander has been altered at this location. Historical meander of the river was much greater in both width and complexity, with numerous braids, oxbows and backwaters. In some sections below the mitigation area, these hydrologic features can be found, albeit, in a smaller scale. Cropped or laid-down vegetation is apparent. Current Variable Score: 0.3
d. **Sediment Deposition (sed)**
   The mitigation site has a high sediment deposition variable. This is common with the current hydrologic condition of the river and is affected by upstream events such as fire, parent material source uplift (geologic faulting) and gradient. There are no pools or other similar in-stream structures due to constant sediment deposition and shifting, although some gravel and cobble is present and of good quality. Current Variable Score: 0.2
e. **Epifaunal Substrate (epi)**
   Substrate conducive to the colonization of macro-invertebrates is sorely lacking at the mitigation site. This may be due to the “flashy” nature of flood waters in the river, or to the variable water flows from upstream during the period when these species can reproduce. Flows in the summer are shallow and intermittent at the location, with most being less than 15cm in depth. Current Variable Score: 0.3
f. **Channel Roughness (ruf)**
   A component of both channel confinement and system hydrology, channel roughness at the site is highly variable from year to year. In areas where sediments have accumulated, and mature vegetation is present, channel roughness is high, and improves water retention and percolation in the soft bottom areas. It also provides longer growing conditions for native plants and is of good quality around stabile hummocks. Currently, the channel supports between 25 and 60% native vegetation at any one time. Current Variable Score: 0.8
g. **In-stream Cover (ins)**
   Since the river is confined in the survey area, in-stream cover for fish and amphibians is lacking. Some snags and submerged logs are present, but these are a structure of rack and

litter on the substrate surface, more than a factor of aquatic in-stream habitat. If surface waters were deeper, and more prolonged, these features would have a higher score. At this point, shallow, unidirectional flows move most surface material out of the survey area, unless it is well rooted. Current Variable Score: 0.2

Habitat Variable	**Post- Fire Baseline Score**	**Current Score**
Exotic Vertebrates (ev)	1.0	1.0
Bank Stability (bst)	0.3	0.8
Vegetative Protection (bvp)	0.3	0.8
Sediment Deposition (sed)	0.2	0.5
Epifaunal Substrate (epi)	0.3	0.6
Channel Roughness (ruf)	0.8	1.0
In-stream Cover (ins)	0.2	0.8
Overall FUS	**0.51**	**0.83**

Dissemination

Since the site is on private property, and is a conservation area, the general public is not provided access or use. However, two adjacent landowners were active in some aspects of the grant. The GoCo Services Company which operates the Glen Ivy Hot Springs Spa participated in erosion control activities at the mouth of the canyon to reduce impacts to habitat after fish were removed and before post-fire flood and debris flows occurred, and the US Forest Service, Cleveland National Forest provided timber crews to help remove some deadfall immediately after the fire and provided staff to help monitor water flow and temperatures during the grant as well as transport of fish back to the creek.

POSTING OF FINAL REPORT: *This report and attached project documents may be shared by the Foundation and any Funding Source for the Project via their respective websites. In the event that the Recipient intends to claim that its final report or project documents contains material that does not have to be posted on such websites because it is protected from disclosure by statutory or regulatory provisions, the Recipient shall clearly mark all such potentially protected materials as "PROTECTED" and provide an explanation and complete citation to the statutory or regulatory source for such protection.*

Project Photos

Image 1: Habitat Assessment in Coldwater Creek

Image 2: Returning fish to Coldwater

Image 3: Deadfall Removal in Coldwater

Image 4: Tamarisk and Snakeroot control in Coldwater

Image 5. Flow Monitoring in Coldwater

Please contact CDFW-OSPR Small Spills Restoration Coordinator for additional project information or materials.