River Health Days: Community-Based Habitat Enhancement of the Lower San Lorenzo River (amended)

Recipient: Coastal Watershed Council
Project Period: 9/1/2021 – 8/30/2023
Award Amount: $30,000
Project Number: #8006.21.073497

Summary of Accomplishments

From September 2021 to August 2023, the Coastal Watershed Council's River Health Day Program has hosted 51 events, engaged 685 youth and adult volunteers, planted 900 new native plants comprising 24 species and removed 1,830 square feet of highly invasive plants including *Carpobrotus sp*., and *Rubus armeniacus*. This has increased biodiversity along the lower San Lorenzo River in Santa Cruz, CA, by removing existing cover of singular, highly invasive species and planting new species of site-specific native riverine plants that attract and support pollinators, increase the availability of nutrients and support a trophic cascade of benefits to other species in the food chain. This was measured by transect surveys demonstrating 0% cover of highly invasive species and 13.4% cover of native perennial plant cover in the final year of the project.

Project Activities & Outcomes

From September 2021 to August 2023, the Coastal Watershed Council's River Health Day Program activities included 51 events, where CWC engaged 685 youth and adult volunteers, planted 900 new native plants comprising 24 species and removed 1,830 square feet of highly invasive plants including *Carpobrotus sp.,* and *Rubus armeniacus.* Volunteers have been from local organizations, companies and schools, including Downtown Streets Team, REI, Salesforce, and Bay View and Gault Elementary Schools.

This has increased biodiversity along the lower San Lorenzo River in Santa Cruz, CA, by removing existing cover of singular, highly invasive species and planting new species of site-specific native riverine plants that attract and support pollinators, increase the availability of nutrients and support a trophic cascade of benefits to other species in the food chain. The newly planted species that have been the most successful either use rhizomes to spread or are shrubs including *Artemesia Douglasiana, Baccharis pilularis, Grindelia Stricta, Rubus ursinus,* and *Salvia mellifera*. In the newly planted species, CWC prioritized shrubs and plants with rhizomes, and honed in to the categories of plants that could survive well on an upland levee. These categories of plants include grassland, coastal chaparral, chaparral, and coastal strand. This shift resulted in 83% overall survival. CWC also removed a small 25-meter squared patch of *Arrundo donax*. While this was the only patch on the site, CWC will continue to monitor to ensure our efforts eradicated it in this location.

Another notable success was this year, for the first time, CWC observed a passerine nesting in a newly planted *Lupinus arboreus*. Throughout this last year, CWC continued to observe birds and study their behavior. In winter, CWC conducted a bird survey, which identified 29 avian species at the site. One blackbird species recorded wasn't fully able to be identified, though it was observed to be either an *Agelaius phoeniceus* or *Agelaius tricolor*, the latter of which is a California Bird Species of Special Concern. Another notable species was a *Falco columbarius*, which is rarely seen along the San Lorenzo River.

CWC measured success using the following objectives:

1. Highly invasive plant cover is reduced to less than 3% cover throughout the 1.5-acre enhancement site by August 30, 2023.

CWC has 6 transects that were established in June 2020. Each transect runs from the edge of the top of the levee to 50 feet toward the riverbank at specific GPS coordinates with accompanying narrative descriptions. Each spring, CWC measures percent coverage at 5 ft intervals along the transect. At each interval a 4-foot squared quadrat is used to estimate percent coverage of native plants, highly invasive plants, non-native plants, bare ground, and detritus litter in that quadrat. These measurements combined give an average percent coverage for the habitat enhancement site. This year the percentage coverage of highly invasive plants was 0%.,

2. Native perennial plant cover is increased to more than 15% cover throughout the 1.5-acre enhancement site by August 30, 2023.

The only project objective not exceeded was 15% native perennial plant cover, instead achieving 13.4% using the transect survey method described above. This due to a change in operations and maintenance along the leveed stretch of the lower San Lorenzo River, as described in the lessons learned section below, which required woody groundcover species to be trimmed.

3. Propagate, grow and plant 900 site-specific native riverine plants representing over 15 species sourced from within the San Lorenzo River watershed or nearby watersheds by August 30, 2023.

CWC and subcontractor Central Coast Wilds propagated, grew and planted 900 site-specific native plants representing 24 species that enhanced habitat value along the lower San Lorenzo River. *Symphyotrichum chilense* and *Acmispon glaber* have been two notable species for ecosystem benefits. *Symphyotrichum chilense* is known to be a nectaring plant for listed *Danaus plexippus* populations. Since installing 45 plantings, CWC has observed Monarch butterflies (*Danaus plexippus*) regularly using *Symphyotrichum chilense* for feeding. Another species that is seen supporting the river ecosystem is *Acmispon glaber*, which feeds and supports native bumblees (*Bombus sp*.), which are in decline. *Acmispon glaber* also fixes nitrogen in the soil which increases the chance of plant survivability and growth for nearby plantings.

Lessons Learned

Lessons learned from the project period came from evaluation data, including transect surveys and survivorship analysis. CWC learned that chaparral, coastal chaparral, grassland, and coastal strand species are

the most successful on the upper section of the levee system within the habitat enhancement area. This was reflected in the 2023 survivorship percentage of 83%. This was one of the highest survivorship percentages to date. CWC will continue to choose plantings from these communities for this zone in future years to ensure high survivorship rates.

CWC adjusted maintenance practices to achieve higher survivorship rates, including mulching with sterile rice straw and increasing the frequency of watering. Another successful adjustment made was to plant in groupings of at least 5 for herbaceous and shrub species and up to 15 for grass species. Dense plantings make it harder for weeds to encroach. Additionally, planting as early in the rainy season as possible gave plantings more time in the ground during the rainy season, allowing them to grow deeper roots to ensure their survival throughout drier months. CWC will continue to learn from our monitoring efforts and regional experts to achieve a biodiverse and sustainably improved riparian ecosystem along the lower San Lorenzo River.

In addition to the effective conservation practices highlighted above, CWC also faced changing circumstances during this project period that required improved collaboration with local partners, described here. The results of these challenges improved not only CWC's but the City of Santa Cruz's focus on ecology within Public Works Department activities, thus extending the conservation benefits beyond the conservation community. Other municipalities and nonprofit partners could learn from this experience to improve partnership on public lands and river levees elsewhere.

The San Lorenzo River levees were constructed in 1959 as the main component of a large-scale cooperative flood control project between the City of Santa Cruz and the United States Army Corps of Engineers (USACE). During the project period, the City of Santa Cruz (City) sought to certify the levee system as meeting the FEMA criteria outlined in Title 44, Section 65.10 of the Code of Federal Regulations (44 CFR 65.10). The City retained MBK Engineers (MBK) to provide program management to oversee the engineering evaluation and identify any remaining items or other actions deemed necessary to complete FEMA certification of the San Lorenzo River levee system. MBK identified improved vegetation management and burrowing rodent mitigation as necessary maintenance activities for levee certification. To obtain this accreditation, the City needed to trim additional vegetation to allow for more thorough visual inspections for burrowing rodents and fill the burrowing rodent holes with a grouting mixture.

The update to the City of Santa Cruz's operations and maintenance activities resulted in a challenge to CWC's ongoing habitat enhancement work as originally planned, as it required that woody ground cover species were trimmed in order to allow for a visual inspection of the levee during high flow events. However, this challenge did result in capacity building within CWC to better understand the intricacies of federal and state policies related to the San Lorenzo River levee system, improved communication among municipal, nonprofit and community partners and improved processes within the City of Santa Cruz that emphasize ecological protections in future contractor procurement to conduct this operations and maintenance activities.

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Future Restoration Efforts

In the future CWC plans to expand the habitat enhancement along the lower San Lorenzo River. We have previously planted and seeded in the section from the Soquel Street bridge to the Laurel Street bridge. After this July we will move our planting/seeding to the confluence of Branciforte Creek and the Lower San Lorenzo River. This zone is adjacent to the previous zone and is very biodiverse in bird species. We will begin by removing invasives, and slowly begin seeding this area. We will prioritize our efforts in this area and continue all necessary maintenance on our previous planting/seeding zones as they become further established. The maintenance in our previous zones will include monitoring for the resurgence of invasive species, removing any that re-appear, tending to seed plots which we will use to help seed the new adjacent areas, tending to previous plantings, and tending to all naturally occurring native plants

Dissemination

Lessons learned and project results are shared by Coastal Watershed Council staff in introductory remarks to volunteers at events when introducing the project site along the lower San Lorenzo River, on CWC's communication channels including the website's blog and social media, and at remarks to the Santa Cruz City Council and other public meetings when discussing policy change along the river levee.

Project Photos

Image 1: Coastal Watershed Council volunteers celebrate their hard work on National Trails Day, Saturday, June 3, 2023.

Image 2: Coastal Watershed Council volunteers work to remove highly invasive Himalayan Blackberry (Rubus armeniacus) from the banks of the San Lorenzo River.