LIVING ARROYOS

2021-2022 Annual Report

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Executive Summary

Living Arroyos is a multi-agency partnership in the Livermore-Amador Valley that includes the Zone 7 Water Agency (Zone 7), City of Dublin, City of Livermore, City of Pleasanton, and the Livermore Area Recreation and Parks District (LARPD). Initiated in 2013, the Living Arroyos Program (Program) is a unique community engagement opportunity that accomplishes multiple goals and provides additional benefits beyond the once or twice a year cleanup events that have traditionally been the means of public involvement in stream-related issues. Living Arroyos seeks to provide education on renewing and enhancing urban stream and riparian habitats as they relate to the watershed. The Program provides volunteer opportunities to local community groups and individuals, as well as to the broader Bay Area communities. It also provides training opportunities through internships and helps to develop local stewardship leaders. By establishing the connection between people and the arroyos in their own backyards, Living Arroyos interns and volunteers act as ambassadors for the watershed to foster a greater understanding of local water management issues impacting streams in the area. In addition to the Program's educational elements, Living Arroyos engages the community through volunteer assistance to complete project goals outlined in the Annual Workplan.

Major Changes and Milestones in 2021-22

- LARPD parted ways at the end of the Program year and did not renew the Task Order. A new implementation partner, the Alameda County Resource Conservation District, joined the partnership.
- All volunteer activities remained on hold during the first half of the 2021-22 program year due to public health concerns.
- Four program interns were hired in the fall of 2021.

Summary of Program Accomplishments

During the 2021-22 Program Year interns worked between one and five days a week, for a total of 138 workdays (see Table ES-1 for year-to-year comparison). Despite public health challenges, Living Arroyos staff accomplished a great deal of stream improvement during the ninth Program Year (Table ES-2).

Table ES-1. Summary of Living Arroyos workload for the past 3 years.

Activities	Program Year		
	2019-20	2020-21	2021-22
Number of Workdays	161	191	138
Project Hours	4,509	4,301	3,460
Volunteer Events	14	0	6

Table ES-2. Summary of Living Arroyos stream enhancement activities for the past 3 years.

Activities	Program Year		
	2019-20	2020-21	2021-22
Total stakes installed	247	143	26
Total plants installed *(excluding stakes)*	869	985	225
Acorns planted	360	649	723
Total gallons of mulch used	N/A	500	100
Invasive species removed (gallons)	5,620	4,002	1,508
Trash removed (gallons)	4,315	253	997
Total gallons of water used	209,825	266,931	256,442

Internship Program

Four interns were hired during the 2021-22 Program Year. Interns were currently enrolled or recent college graduates from local colleges or had connections to the Tri-Valley as a past or present resident of the area. Interns had degrees from, or were attending classes at the following schools:

- Las Positas College
- Diablo Valley College
- California State University, East Bay
- Cal Poly Humboldt

Intern responsibilities this year included:

- harvesting vegetative stakes for planting at project sites
- crafting fascines and installing bank stabilization projects
- hand-watering plantings

- install and repair drip irrigation systems
- removing invasive plant species
- installing native plant species
- harvesting, processing, and planting acorns

Program Hours and Field Work

The Program utilized 4,972 program hours and 3,460 project hours during the 2021-22 fiscal year. Program Staff tracked hours used per project for each partner (Table ES-3). Zone 7 Water Agency projects utilized 37% of program hours or 1,288 hours. The City of Livermore projects utilized 49% of program hours or 1,684 hours. The City of Pleasanton utilized 4% of program hours or 149 hours. The City of Dublin utilized 10% of program hours or 340 hours.[1]

Staff utilized 1,590 hours outside of supervising field work administering the program including: planning and scheduling field work, training interns and volunteers, scheduling and attending meetings, community outreach and education, and general coordination. The administration cost is shared by all partners based upon their share of cost and is factored into the overall program hours. (Table ES-3).

Table ES-3. Program Hours.

Program Partner	Project Hours*	Share of Program
Zone 7	1,288	37%
City of Livermore	1,684	49%
City of Pleasanton	149	4%
City of Dublin	340	10%
Total Project Hours	**3,460**	
*Program Admin Hours***	**1,512**	
TOTAL PROGRAM HOURS	**4,972**	

**Project Hours are based on actual staff time dedicated to a specific Partner's project. See Section 7: 2021-22 Projects for hours spent per project.*
***Program administration hours are assumed to be proportional to the hours dedicated to each Partner's projects.*

[1] Discrepancies in hours utilized for each Partner compared to the agreed upon cost share may occur within a single Program Year, but staff will ensure the cost-share is met for the overall contract period outlined in the Task Order.

Recommendations

Moving forward, Living Arroyos staff recommends:

- Staff recommends that we continue our efforts in volunteer outreach with the aid of the Program Partners through:
    - Participating in Open House and partner outreach events.
    - Continue to work with Program Partners to integrate the Living Arroyos volunteer events into their social media presence.
    - Presenting Program to college and high school classrooms to raise awareness of internship and volunteer opportunities.
- Integrating more educational experiences into existing projects to understand scope of work.
- Expanding the use of ArcGIS software for project monitoring and to provide partner feedback.

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1. INTRODUCTION

The Living Arroyos Program (Program) is a multi-agency partnership amongst the Zone 7 Water Agency (Zone 7) [2], City of Dublin[3], City of Livermore[4], City of Pleasanton[5], and the Livermore Area Recreation and Park District (LARPD)[6]. The Program is a unique community engagement opportunity that renews and enhances urban stream and riparian (streamside) habitats in the Livermore-Amador Valley (Valley) and re-establishes the connection between people and the arroyos in their own backyards. In addition, the Program provides training opportunities through internships and helps to develop local stewardship leaders.

Urban streams provide many benefits to the people who live in the area. They are an integral part of the community's water management system by helping to protect neighborhoods from flooding, helping to counteract pollution, and recharging the groundwater basin. The vision behind Living Arroyos is that local volunteers and interns will learn about and care for urban streams by enhancing these natural spaces, which provide habitat for an abundance of native plants and wildlife. The Program seeks to connect people with their local arroyos, their natural settings, and introduce the public to

[2] Zone 7 Water Agency, short for Alameda County Flood Control and Water Conservation District, is responsible for providing flood control and water resource management to the Livermore-Amador Valley. Zone 7 has a service area of approximately 425 square miles of land including the Cities of Dublin, Pleasanton and Livermore, and a portion of San Ramon, and serves approximately 240,000 residents. Within the service area, Zone 7 owns or maintains approximately 37 miles of channels and streams. Zone 7 has been a Program Partner since the Program began in 2013.

[3] The City of Dublin is the local planning authority that encompasses over 15 square miles of land and is home to more than 61,000 residents. Dublin joined as a Program Partner in March 2021.

[4] The City of Livermore is the local planning authority that encompasses over 26 square miles of land, home to more than 89,000 residents. City of Livermore owns and maintains roughly 12 miles of channels and streams within city limits. Livermore has been a Program Partner since the Program began in 2013.

[5] The City of Pleasanton is the local planning authority that encompasses over 24 square miles of land and serves more than 80,000 residents. Pleasanton joined as a Program Partner in 2016.

[6] Livermore Area Recreation and Parks District (LARPD) has assumed the responsibilities of the "Managing Partner" since June 2015. The title "Managing Partner" was changed to "Implementing Agency" under the 2016-17 Workplan.

all the beneficial water-related and ecological benefits provided by the arroyos for the watershed.

Natural stream corridors and their associated riparian ecosystems do not conform to political boundaries, which makes collaboration among various entities an essential component of effective watershed management. The Program is at the heart of a partnership between a local water agency (Zone 7), city governments (Dublin, Livermore, and Pleasanton), and the local park district (LARPD) to manage, enhance, and renew urban streams by engaging residents. Living Arroyos partners benefit by sharing costs and leveraging unique resources, aligning community vision of the watershed, avoiding redundancy, and achieving long-term management goals. The real key to making the Program a success is partnering with the people in the communities that in turn benefit from the work.

As it was initiated, the Living Arroyos Program started off with four goals:

(1) Engage residents in hands-on stewardship of natural resources while they experience nature close to home
(2) Increase public awareness of important watershed issues
(3) Improve habitat and water quality of local streams while maintaining and enhancing both public safety and regional flood protection
(4) Strengthen public/private partnerships within the community

As the Program grows and evolves, the goals will be revisited to reflect new members and responsibilities. This report outlines the Living Arroyos Program progress, accomplishments, and lessons learned during the 2021-22 Program Year.

LIVING ARROYOS PROGRAM OPERATING STRUCTURE

The Program was established in July 2013 for the purposes of initiating a public volunteer and internship program that engages the community in the stewardship of local streams within the Northern Alameda Creek Watershed and achieving maximum benefits with minimum costs by leveraging resources and boosting effectiveness in achieving the goals of the program. The Program is operating as a partnership among Zone 7, the City of Dublin, the City of Livermore, the City of Pleasanton, and LARPD (Program Partners). Program Partners collaborate to develop the Annual Workplan (Workplan) by contributing projects for the Program to work on during the Program Year (July 1–June 30) as well as funds to carry out Program work. Zone 7 has the additional role of Fiscal Agent—financial administrator responsible for collecting and administering the funds necessary to

implement the Program. LARPD is the Implementing Partner and is responsible for developing and executing the Workplan including implementing project activities measuring/reporting Program progress and accomplishments. The Implementing Partner is also responsible for preparing the Annual Report.

PROGRAM PARTNER COST SHARE

Program Partner cost share percentages are agreed upon during development of the annual Workplan. These percentages may be modified if other partners join the program in the future or upon mutual agreement of the partners.

Program Partner benefits should be roughly proportional to their contributions, e.g., a Partner contributing 25% of the budget of the program should on average receive 25% of the effort expended, measured in staff, intern, and volunteer person hours, by the program.

Zone 7's Program Cost contribution for Program Year 2021-22 is approximately 42%, City of Livermore's contribution is approximately 50%, City of Dublin's contribution is approximately 5%, and City of Pleasanton's contribution is approximately 3% of the total cost of the program. Program Partners agreed to average the percentages out over the two years of the current task order to reach the agreed upon share of cost.

PROGRAM AREA

There are approximately 120 miles of major creeks, streams, and arroyos within the Livermore-Amador Valley. The Program Area includes Zone 7's Service Area but work primarily occurs within the city limits of Dublin, Pleasanton, and Livermore, and includes the unincorporated lands around the Chain of Lakes (**Figure 1**). Program activities focus on the more than 45 miles of streams managed by the Program Partners.

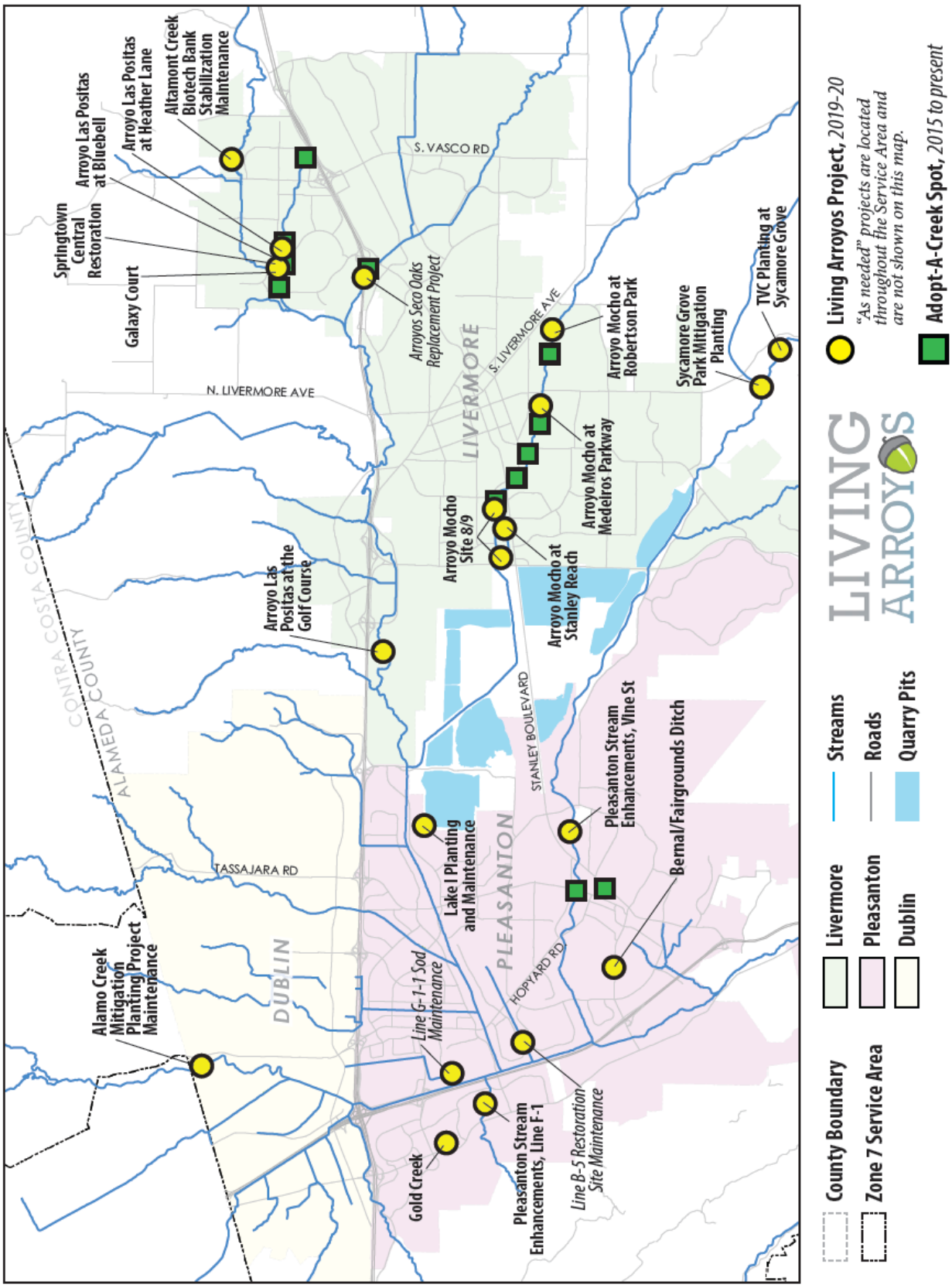

Figure 1. Living Arroyos Program Area (Livermore-Amador Valley), 2021-22.

SUMMARY OF MAJOR CHANGES IN 2021-22

Volunteer events continued to be on hold for the first half of the Program Year due to public health concerns. Events resumed on December 18, 2021, with a brief pause in January due to surges in COVID cases in Alameda County.

LARPD did not renew the 2022-26 Task Order and parted ways with the Program at the end of June 2022. The Alameda County Resource Conservation District (ACRCD) signed on as the new implementation partner for the 2022-26 Task Order.

Four new interns joined the Program in the fall of 2021: Loren Roman-Nunez, Maverik Wilson, Mason Scheffer, and Vanessa Ferona. One long-term intern left the program, Megan Arp (2016-2022), after having accepted a position with WRA Environmental Consultants.

PHOTO: 2021-22 Crew, Summer 2022 (*from right to left: Joseph Steelman, Liam Hazelton, Vanessa Ferona, and Mason Scheffer*

2. INTERNSHIP PROGRAM

Living Arroyos interns are recruited from colleges and universities within 25 miles of the Program Area or have connections to the Tri-Valley as a past or present resident of the area. The driving force behind the intern program is to learn by doing. Every year, a handful of current and former college students from the local community are selected as paid interns for the Living Arroyos Program. As Program interns, they learn real-world stream management techniques that complement their in-class learning. Interns are given real time, hands-on responsibility for implementing environmental improvement projects for Program Partners. Interns also interact with and guide volunteers, gaining leadership skills and reinforcing their own knowledge by teaching others. Interns work under the supervision of the Program Coordinator 1–5 days per week, depending upon projects needs and intern availability.

Four additional interns were hired during the 2021-22 Program Year. Interns were currently enrolled or college graduates from local colleges or had connections to the Tri-Valley as a past or present resident of the area. Interns had degrees from, or were attending classes at the following schools:

- Las Positas College
- Diablo Valley College
- California State University, East Bay
- Cal Poly Humboldt

Intern responsibilities this year included:

- harvesting willow stakes for planting at project sites
- crafting fascines and installing bank stabilization projects
- hand-watering plantings
- install and repair drip irrigation systems
- removing invasive plant species
- planting native species
- harvesting, processing, and planting acorns

EDUCATIONAL OPPORTUNITIES

Living Arroyos encourages employees to participate in training activities that promote safety and health among employees, as well as opportunities for career development and personal growth based upon their interests. The Program encourages interns to continue learning during their internship time.

Staff incorporated regular field trips with professionals in natural resource management, biological monitoring, GPS mapping, and natural history. Riparian Bird Indexing (RBI)[7], was used in spring 2022 to enrich the internship educational experience and to provide valuable data on project performance.

In addition to the orientation tour and presentation provided to new staff, Living Arroyos staff participated in five educational opportunities during the 2021-22 Program Year:

- On November 5th, 2021, staff attended the East Bay Regional Park District Stewardship Seminar and learned about numerous natural resource topics.
- On December 17, 2021, staff joined the LARPD Open Space Rangers at Sycamore Grove and participated in the Audubon Christmas bird count.
- On January 6, 2022, staff joined Ecological Concerns Incorporated at Alamo Creek to learn how to install drip irrigation systems.
- Staff joined Leslie Keonig from Swaim Biological Incorporated for two California Red-legged Frog (CRF) surveys on May 4 and May 11, 2022.

PHOTO: Vanessa (left) and Loren (right) looking for evidence of CRF

[7] The RBI is a rapid means to evaluate stream health using native riparian birds as indicator species and measures species richness. See Page 5 for more details.

FEEDBACK FROM PREVIOUS LIVING ARROYOS INTERNS

"What drew you to being an intern with Living Arroyos and what do you like about it?"

"I joined the Living Arroyos program because I believe 'to be native to a place we must learn to speak its language'. Being a new inhabitant to the Bay Area, I felt it necessary to expand my language of its diverse ecology. Living Arroyos was a timely opportunity for me to meet like-minded nature enthusiasts while also receiving real-world natural resource conservation skills."
– Vanessa Ferona, 38

"I had some limited experience in restoration work previously but was looking for an opportunity to grow my knowledge and understanding of riparian ecosystems. Working with Living Arroyos provides a valuable, enriching experience that benefits the local sycamore alluvial woodland as well as educating the local community about our work. It's rewarding to return to restoration sites and see native plants that we've either planted or been caring for thriving." -Loren Roman-Nunez, 33

"The living arroyos program has been a big part in laying the groundwork for gaining experience towards my future career as a Park / Fish and Game Ranger. Getting to work in the outdoors is a big plus." – Mason Scheffer, 23

RIPARIAN BIRD INDEX

The Riparian Bird Index (RBI) is a simple yet biologically meaningful way to assess the performance of habitat enhancement and mitigation projects. The RBI (a species richness score for a given area) can be converted into a simple "poor," "fair," "good," or "excellent" rating to communicate the current conditions and how to improve project performance.

The RBI uses a three-tier system of native birds that serve as targets:

- Tier 1 riparian obligate species are most strongly associated with riparian vegetation or other riparian characteristics.
- Tier 2 riparian associated species are not strongly associated with riparian areas, but often occur at their greatest density in these areas.
- Tier 3 generalist species use riparian areas less frequently than Tier 1 or 2 species but have large home ranges that extend beyond the immediate area that would be restored.

Five study areas were selected each with one or more habitat enhancement projects contained within their reaches. Emphasis was placed on reaches with a variety of established and newly planted riparian vegetation. Study areas included:

- Arroyo Las Positas (ALP) from Heather Lane to the confluence with Altamont Creek, Livermore, CA.
- Golf Drive Creek at Golf Drive, Livermore, CA.
- Arroyo Mocho (AM) at Robertson Park, Livermore, CA.
- Arroyo del Valle (ADV) at Sycamore Grove Park, Livermore, CA.
- Alamo Creek at Willow Creek Drive, Dublin, CA.

Data (see Table 1) was collected monthly during regular field days from February through May 2021. A score of nine or above suggests a riparian habitat in excellent health. Staff will prepare a supplementary report that details the results of the RBI.

Table 1: 2021-22 RBI Results

Site Name	Rating	Average Score
ALP at Heather	Fair	4.5
Golf Drive Creek	Fair	3.3
AM at Robertson Park	Fair	5.25
ADV at Sycamore Grove	Good	6.9
Alamo Creek	Excellent	10.2

3. VOLUNTEER PROGRAM

Volunteers are the heart of the program. Living Arroyos invites the local community to engage and connect with creeks and arroyos that have a personal connection by hosting workdays in which volunteers participate in hands-on activities that protect and enhance the waterways in their area. Volunteering gives them a tangible sense of the value of watersheds, and a stronger understanding of their role in preserving the quality of watersheds. Volunteer days are held on the first and third Saturdays of the month between October and April.

VOLUNTEER WORKDAYS

Living Arroyos held 6 volunteer days twice per month during the abbreviated[8] volunteer season (December 2021 – April 2022). A total of 104 unique volunteers (Table 2) worked on four different sites throughout the Program Area: Arroyo Las Positas at Heather Lane (Livermore, CA), Arroyo Mocho at Robertson Park (Livermore, CA), Arroyo Mocho at the Stanley Reach (Livermore, CA), and Touriga Creek (Pleasanton, CA). Volunteer activities included: installing native plants, hand removing non-native plants, and removing trash items (Table 3).

Table 2. Volunteer data by Program Year, all years.

Volunteerism Data	2017-18	2018-19	2019-20	2020-21	2021-22
Total volunteer days (9–11:30 am)	19	16	14	0	6
Total unique volunteers engaged	389	524	350	0	104
Total volunteer hours	1,440	1,590	1,386	0	372
Average number of volunteers per event	25	40	33	0	23

[8] *To comply with public health concerns, all public and private volunteer events were postponed until December 2021. Additionally, volunteer activities were put on hold for thirty days in late January due to public health concerns.*

Table 3. Volunteer activities by Program Year.

Volunteer Activities	2017-18	2018-19	2019-20	2020-21	2021-22
Plant acorns	--	--	1.5 days	--	--
Plant riparian trees	5 days	10 days	5.5 days	--	1 day
Mulch oak sites	4 days	--	--	--	--
Invasive species removal	5 days	2 days	3 days	--	2.5 days
Trash removal	5 days	4 days	4 days	--	2.5 days
TOTAL	**19 days**	**16 days**	**14 days**	**0 days**	**6 days**

PHOTO: Volunteers after removing invasive weeds at Touriga Creek (Pleasanton, CA) on April 9, 2022

WHO ARE OUR VOLUNTEERS?

Fun for the Whole Family

There are several wonderful aspects to volunteering with Living Arroyos, but we continue to hear how glad people are to be able to volunteer as a family. There is no minimum age requirement for volunteers, so community members can bring their children and teens to teach them the value of giving back.

Student Engagement

Many Living Arroyos volunteers are students, from high schools located throughout the Livermore-Amador Valley, looking to fulfill their community service requirements. This prompts an awakening of interest in conservation and allows knowledge and information about the Program to be picked up by young community members.

There were several student groups that repeatedly sent volunteers to events including: Amador Valley High School, Dougherty Valley High National Honor Society, Dougherty Valley High UNICEF, Dublin High School Key Club, Granada High School, and Livermore High School.

Local Businesses and Community-Based Organizations

Local community-based groups participated in our public volunteer events including the Global Leadership Initiative for Youth (GLIFY), the Project Management Institute, and Workday, Inc.

VOLUNTEERS COME FROM ALL OVER

The largest number of volunteers call Livermore home (**Table 4**) and overall, 69% of our volunteers traveled from within the Tri-Valley area (Dublin, Pleasanton, Livermore, and parts of San Ramon). However, our volunteers arrived from all directions and distances, from as far as San Francisco, CA and Benicia, CA, demonstrating the wide geographic reach of the Program's appeal.

Table 4. Number of volunteers by City, 2021-22.

CITY	# of Volunteers	2021-22
Livermore	**40**	**32%**
Pleasanton	**24**	**19%**
Dublin	**16**	**13%**
San Francisco	7	6%
San Ramon	**7**	**6%**
Danville	5	4%
Castro Valley	3	2%
Walnut Creek	3	2%
Brentwood	2	2%
Pleasant Hill	2	2%
Moss Landing	2	2%
Benicia	2	2%
Fremont	2	2%
Alamo	2	2%
Martinez	2	2%
Concord	1	1%
Mountain House	1	1%
Lafayette	1	1%
Hayward	1	1%
Mountain View	1	1%
Richmond	1	1%
Sacramento	1	1%
TOTAL	**126**	

Bold *indicates cities within the Livermore-Amador Valley Watershed. Not all volunteers provided location data.*

LIVING ARROYOS VOLUNTEERS SPEAK FOR THEMSELVES

A short survey was sent out via Google Surveys asking volunteers about their experiences with Living Arroyos (**Figure 2**). Of the respondents, 84% felt that their volunteer efforts increased their knowledge of stream ecosystem functions. Additionally, 76% of respondents believed that volunteer workdays enhanced their interest in urban streams and 84% said they felt more connected with nature. Volunteers were asked whether they would volunteer with Living Arroyos again and 100% of the 13 respondents answered yes.

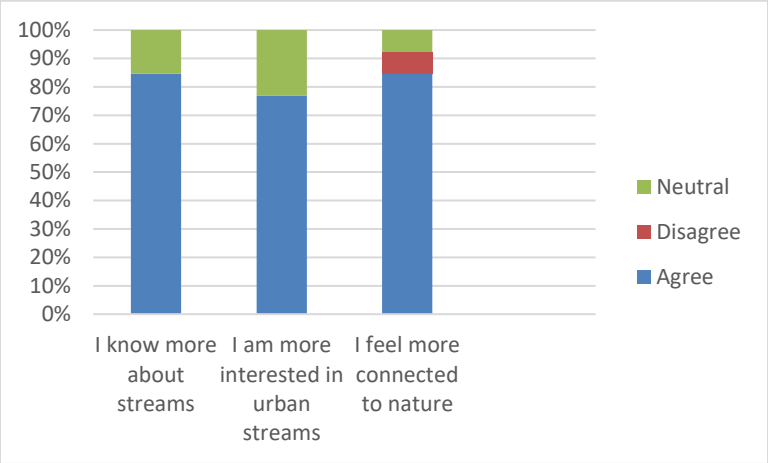

Figure 2 Volunteer Survey Results, 2021-22

INDICATORS OF COMMUNITY ENGAGEMENT AND INTEREST

- Volunteers return multiple times, often bringing friends and family members.
- Living Arroyos staff received several emails from local groups looking for volunteer opportunities during the 2021-22 program year.
- Staff received multiple emails asking for spots to adopt, scouting projects, or whether there were intern openings.

VOLUNTEER APPRECIATION EVENT

Each year, Living Arroyos hosts a Volunteer Appreciation event at the end of the volunteer season. On Saturday, May 7, 2022, the Program hosted an appreciation event at the Stanley Reach in Livermore, CA. Twenty-seven volunteers removed 320 gallons of trash from the Arroyo Mocho. They were given t-shirts with the program logo and treated to a catered lunch from Mr. Pickle's.

4. COMMUNICATIONS AND OUTREACH

SOCIAL MEDIA OUTLETS

Living Arroyos continued to utilize the social media outlets that had been developed in the past nine years since the Program started:

- Updated and maintained Living Arroyos website at www.livingarroyos.org. This website contains information about the program as well as upcoming workday information and blog posts about events and progress.
- Used Facebook and Twitter to educate and share photos with volunteers and community members.

LIVING ARROYOS APPAREL

Living Arroyos t-shirts were distributed at the volunteer appreciation event as a thank you gift from the program partners, an ongoing tradition at the end of each volunteer season.

PHOTO: Volunteers after picking up trash at the Stanley Reach (Livermore, CA) on May 7, 2022

5. ADOPT-A-CREEK SPOT

Living Arroyos continued to coordinate cleanups for the Adopt-A-Creek Spot (AACS)—a sibling program that promotes healthy creeks through active community participation and education. Dublin, Livermore, and Pleasanton rely on Living Arroyos to carry out AACS coordination tasks for major cleanups in the Fall and Spring as well as smaller cleanups throughout the rain year.

During the 2021-2020 Program Year, Living Arroyos staff continued to implement best management practices to:

- schedule and coordinate monthly/bi-annual creek cleanup events,
- resolve specific issues regarding Livermore spots #1-11 (e.g., graffiti, illegally dumped items, homeless camps, etc.), and
- manage disposal of trash/debris/recyclables collected from cleanup events.

In 2021-22 Living Arroyos staff continued coordinating creek cleanups for Program Partners through the AACS (**Table 4**). Due to restrictions related to COVID-19, volunteers cleaned up creeks in small groups consisting of only their cohort and logged their data using the CleanSwell app.

Two large cleanups are generally scheduled during the Program Year:

- Creeks to Bay Cleanup in September.
- Community Service Day in May.

Due to public health concerns, a cluster of cleanups occurred in September 2021 as part of Coastal Cleanup Month and our Creeks to Bay cleanup efforts. The Community Service Day for the City of Livermore was postponed until May 2023.

Table 4. AACS Program Data, 2016-2020

	Program Year			
	2018-19	2019-20	2020-21	2022-23
Volunteers	452	223	145	141
Gallons removed	4,915	6,259	160	216

6. 2021-22 PROJECTS

The Living Arroyos Workplan (Workplan) is a living document that outlines project locations, project goals, and an estimated project budget. The Workplan also provides details of project maintenance, monitoring, and reporting requirements. The document is amended throughout the Program Year to reflect site additions or alterations.

The Living Arroyos 2021-22 Workplan included twenty-two projects within the Livermore-Amador Valley (Table 5) and one sibling program the Adopt a Creek Spot. Over the course of 138 days, Living Arroyos field staff completed project tasks for nineteen of the proposed projects (Table 5).

Table 5. Living Arroyos Program Partners and their designated projects, Program Year 2021-22.

PROGRAM PARTNER*	PROJECTS
Zone 7 Water Agency	
Z-1	Arroyo Mocho at Stanley Reach
Z-2	Arroyo Las Positas at Vasco
Z-3	Arroyo Seco Oaks Replacement Project
Z-4	Arroyo Mocho Medeiros Parkway
Z-5	Arroyo Valle Bank Stabilization Project Plantings
Z-6	Alamo Creek Mitigation Planting Project
Z-7	Minor Biotechnical Bank Stabilization (As needed)**
Z-8	Vegetation and Trash Management (As needed)**
City of Dublin	
D-1	Watershed Story Map
D-2	Trash Management / Hotspot Cleanup (As needed)
City of Livermore	
L-1	Arroyo Las Positas at Galaxy Court
L-2	Arroyo Mocho Site 8 and 9 Restoration Area
L-3	Sycamore Grove Mitigation Plantings
L-4	Springtown Restoration - Central/Bluebell Drive
L-5	Arroyo Las Positas at Bluebell
L-6	Arroyo Las Positas at Heather Lane
L-7	Arroyo Las Positas at Golf Drive
L-8	SMP Bank Stabilization Projects
L-9	Las Positas Golf Course (Gold Course) Mitigation Plantings
L-10	Robertson Park Mitigation Plantings
L-11	Ravenswood Pollinator Bioswale
City of Pleasanton	
P-1	Gold Creek / Touriga Creek Restoration
P-2	Bernal Hotspot Cleanups

** LARPD is the Implementing Agency for the Program and does not include project sites in the annual Workplan. ** Projects that did not have work to complete this year.*

ZONE 7 WATER AGENCY (ZONE 7)

Living Arroyos worked on six projects for Zone 7 Water Agency in 2021-22.

Table 6. Zone 7 Hours

Zone 7 Project	Program Hours
Arroyo Mocho at Stanley Reach	893
Arroyo Las Positas at Vasco	78
Arroyo Seco Oaks Replacement Project	4
Arroyo Mocho Medeiros Parkway	38
Arroyo Valle Bank Stabilization Project Plantings	170
Alamo Creek Mitigation Planting Project	105
Minor Biotechnical Bank Stabilization	0
Vegetation and Trash Management	0
TOTAL HOURS	**1,288**

Z-1) Arroyo Mocho at Stanley Reach (Stanley Reach)

The Stanley Reach project was conceived in 2012 as an alternative flood control and reforestation project and was the first project of the Living Arroyos program. The original Workplan for this project involved establishing three distinct habitats on the site in different zones: riparian habitat in channel (Zone A), native grassland along the banks (Zone B), and oak woodland at the top of bank (Zone C).

2021-22 project goals involved additional removal of invasive plant species, summer hand watering, planting acorns in Zone B, and annual monitoring and reporting of vegetation survival status.

The program hosted three public volunteer events at the Stanley Reach during the 2021-22 Program Year. On February 19, 2022, fourteen volunteers removed 185 gallons of trash from the Arroyo Mocho. On March 5, 2022, eighteen volunteers removed 560 gallons of invasive weeds from the reach. On May 7, 2022, twenty-seven volunteers removed 320 gallons of trash from the creek and were treated to a volunteer appreciation party.

ACTIONS: Living Arroyos spent 858 program hours on the Stanley Reach in the 2021-22 Program Year (see Table 6).

Program activities at the Stanley Reach for 2021-22 are summarized below:

- Removed 560 gallons of invasive plant species by hand.

- Used 40,250 gallons of water to keep riparian vegetation alive in Zone A during the dry season.
- Removed 505 gallons of trash from the channel.
- Planted 267 acorns in Zone B.

A separate monitoring and maintenance report is submitted to Zone 7 that details the specific monitoring of the site for the calendar year.

PHOTO: Vanessa (foreground) and Mason (background) planting acorns at the Stanley Reach. April 24, 2022.

Z-2) Arroyo Las Positas at Vasco

Several biotechnical bank stabilization and repair treatments were installed to address erosion damage from the 2017 winter storms along Arroyo Las Positas just east of North Vasco Rd. in Livermore, CA. Treatments included coir logs, wrapped fill lifts (WFLs), use of live stakes at the toe (mulefat and willow), and slop/top of bank plantings (salt grass plugs, other low shrub species, etc.)

ACTIONS: The program utilized 78 hours and 2,950 gallons of water to keep plantings alive during their second summer (see Table 6).

Z-3) Arroyo Seco Oaks Replacement Project ("Arroyo Seco")

The Arroyo Seco project was taken on to replace four mature oak trees that were damaged by adjacent road work during construction to add more lanes onto I- 580. The workplan for the project involved replacing the four lost oaks at a 5:1 minimum ratio or a minimum of twenty oaks surviving at the end of two years.

ACTIONS: Due to the statewide COVID-19 Shelter-In-Place order work was not completed for this project during the 2019-20 program year.

Z-4) Arroyo Mocho Medeiros Parkway

In spring 2019, the Program planted 24 Western Sycamores (*Platanus racemosa*) at Medeiros Parkway. In January 2021, staff installed 8 fascines and 30 willow stakes to repair a bank erosion caused by runoff from the nearby access road.

ACTIONS: The Program spent 38 program hours watering the sycamores, willows, and mulefat installed in previous years (see Table 6).

Z-5) Arroyo Valle Bank Stabilization Project Plantings

The Arroyo Valle Bank Stabilization Project planting component included a select planting palette to revegetate the repaired slope with native plantings. Site prep and installation of container plants was completed by Ecological Concerns, Inc. in fall 2020. The Program took on weeding and watering tasks in addition to completing the acorn planting in late winter 2021.

ACTIONS: The Program spent 170 program hours watering and maintaining the project site (see Table 6). Weeding and repairs to the drip irrigation system were completed as needed. Staff used 8,250 gallons of water to keep plantings alive during the dry season and removed approximately 400 gallons of invasive weeds.

Z-6) Alamo Creek Mitigation Planting Project Maintenance

The Program took on maintenance and watering tasks for the Alamo Creek Mitigation Planting Project, which was completed in the spring of 2020 by Ecological Concerns, Inc.

ACTIONS: The Program spent 105 program hours watering and monitoring the newly planted vegetation at the site (see Table 6). Weeding and repairs to the drip irrigation system were completed as needed. The program used 5,250 gallons of water to keep plants alive during the dry season.

Z-7) Minor Biotechnical Bank Stabilization

Living Arroyos implemented and monitored willow staking efforts in small areas within the Livermore-Amador Valley, as needed, to help stabilize banks and reduce erosion.

ACTIONS: Minor Biotechnical Bank Stabilization was not needed during the 2021-22 program year (see Table 6).

Z-8) Vegetation and Trash Management (as needed)

Vegetation management and enhancement activities as needed.

ACTIONS: Vegetation and Trash Management was not needed during the 2021-22 program year (see Table 6).

CITY OF DUBLIN (DUBLIN)

The program was tasked with a single project for the City of Dublin during the 2021-22 program year.

Table 7. City of Dublin Hours

Dublin Project	Program Hours
Watershed Story Map	265
Trash management / Hotspot Cleanup (As needed)	41
TOTAL HOURS	**306**

D-1) Watershed Story Map

The program was tasked with creating an ESRI Story Map for the City of Dublin Website. The Story Map provides an overview of the Alameda Creek watershed and the sub-watersheds within the City of Dublin. The project also focuses on several species native to the area, providing photos and a brief description of their ecological role. The Watershed Story can be viewed here. This project was led by program intern Liam Hazelton with assistance from Megan Arp.

ACTIONS: Staff utilized 265 program hours to plan, design, and create the Watershed Story Map for the City of Dublin (see Table 7).

D-2) Trash management / Hotspot Cleanup (As needed)

Dublin tasked the program with cleaning up three trash hotpots during the 2021-22 program year. Spots included South San Ramon Creek behind Dublin High School, Alamo Canal near City Hall, and Alamo Creek near Stagecoach Trail.

ACTIONS: Staff utilized 41 program hours to remove and dispose of trash from the hotspots over the course of two field days (see Table 7).

CITY OF LIVERMORE (LIVERMORE)

Living Arroyos worked on 8 projects for the City of Livermore in 2021-22.

Table 8. City of Livermore Hours

Livermore Project	Program Hours
Arroyo Las Positas at Galaxy Court	4
Arroyo Mocho Site 8 and 9 Restoration Area	2
Sycamore Grove Mitigation Plantings	320
Springtown Restoration - Central/Bluebell Drive	60
Arroyo Las Positas at Bluebell (SMP Site 17)	16
Arroyo Las Positas at Heather Lane	379
Arroyo Las Positas at Golf Drive	404
SMP Bank Stabilization Projects	230
Las Positas Golf Course (Golf Course) Mitigation Plantings	20
Robertson Park Mitigation Plantings	201
Ravenswood Pollinator Bioswale	48
TOTAL HOURS	**1,684**

L-1) Arroyo Las Positas at Galaxy Court (Galaxy Court)

The goals for the Galaxy Court project are to assist the City of Livermore in achieving mitigation goals for the Galaxy Court Culvert Replacement Project. The native vegetation is intended to compete with and (in time) shade out cattails and tulles in the stream channel that increase risk of flooding in the adjacent neighborhood. The 2021-22 Workplan called for annual vegetation and photo monitoring.

ACTIONS: Living Arroyos spent 4 program hours during the 2021-22 program year using ESRI Field Maps to monitor site (see Table 8).

L-2) Arroyo Mocho Site 8 and 9 Restoration Area

The Arroyo Mocho Site 8 Restoration Area is located near Rockrose Street in Livermore, CA. The area was selected to help mitigate for temporary and permanent impacts for Stream Maintenance Program activities along the Arroyo Mocho. The 2021-22 Workplan called for annual monitoring of the project, including survivorship and photo monitoring.

ACTIONS: Living Arroyos spent 2 program hours at Site 8 and 9 in the 2021-22 program year monitoring the site (see Table 8).

L-3) Sycamore Grove Mitigation Plantings

The Sycamore Grove mitigation planting is in Sycamore Grove Park near the Arroyo Road/Olivina gate entrance in Livermore, CA. This project mitigates for the removal of two trees that were destroyed by a wildfire that occurred in 2015 from a downed PG&E powerline. The 2021-22 Workplan called for annual vegetation and photo monitoring and regular watering during the dry season.

ACTIONS: Living Arroyos used 320 program hours at Sycamore Grove in the 2021-22 program year watering and monitoring the project site (see Table 8). The program used 21,500 gallons of water during the dry season.

L-4) Springtown Restoration- Central/Bluebell Drive

The Springtown Restoration Project is located between Bluebell Drive and Heather Lane along the Arroyo Las Positas. The 2021-22 Workplan called for removal of lower branches of mature willows, supplemental dry season watering, and annual vegetation and photo monitoring. As is the case for all the current Springtown mitigation sites, the native vegetation is intended to compete with and (in time) shade out cattails and tulles in the stream channel that increase risk of flooding in the adjacent neighborhood.

ACTIONS: Living Arroyos spent 60 program hours at the Springtown Restoration site in the 2021-22 program year removing branches from maturing willows and monitoring planted materials (see Table 8). 13,411 gallons of water were used as needed during the dry season.

L-5) Arroyo Las Positas at Bluebell (Bluebell)

The Bluebell site is located on the Arroyo Las Positas near Bluebell Drive and is on the north bank from the Galaxy Court site. The goal of the project is to establish a native canopy to shade the creek to address on site mitigation requirements from the Stream Maintenance Program. The 2021-22 Workplan called for annual vegetation and photo monitoring.

ACTIONS: Living Arroyos spent 16 program hours at Bluebell in the 2021-22 program year monitoring planted materials and taking photo points (see Table 8).

L-6) Arroyo Las Positas at Heather Lane (Heather Lane)

The Arroyo Las Positas at Heather Lane was originally planted in 2019 with additionally plantings occurring in 2020 and 2021. The long-term goal of the project is to prevent flooding during heavy storm events caused by water pooling due to the channel being clogged with cattails. The site is focused on developing a riparian canopy to shade out

cattails and to mitigate for impacts created by the low-flow channel that was created in 2019. In the 2021-22 Workplan the program was tasked with planting and monitoring the project as well as conducting dry season watering and hand weeding.

ACTIONS: Living Arroyos spent 379 program hours at Heather Lane in the 2021-22 program year (see Table 8). The program also hosted a public volunteer event on March 26, 2022, where 43 volunteers removed 280 trash from the Arroyo Las Positas. Additionally, Program staff planted 141 acorns during the rainy season and used 146,494 gallons of water during the unusually long dry season.

PHOTO: Volunteers on March 26, 2022 removing trash from the creek.

L-7) Arroyo Las Positas at Golf Drive (Golf Drive)

The Arroyo Las Positas at Golf Drive is a mitigation project on a secondary channel the empties into a pond at the end of Golf Drive in Livermore, CA. The site mitigates for onsite disturbances caused in 2019 through in channel vegetation management. The Program was tasked with planting in designated areas, watering during the dry season, and annual monitoring for survivorship and photo points.

ACTIONS: Living Arroyos spent 404 program hours at the Golf Drive in the 2021-22 program year (see Table 8). Staff used a total of 27,650 gallons of water during the unusually long dry season.

L-9) SMP Bank Stabilization Projects

The SMP Bank Stabilization Projects are a series of small project sites along the Arroyo Mocho at Robertson Park. The program was tasked with installing native plants and vegetative cuttings from willows, cottonwood, and mulefat as well as providing regular watering during the dry season.

ACTIONS: Living Arroyos spent 230 program hours installing, monitoring, and watering plantings in the 2021-22 program year (see Table 8). Staff installed 34 native vegetative cuttings along with 29 plants and 75 acorns. The program used 7,800 gallons of water to keep plantings alive during the dry season.

L-9) Las Positas Golf Course (Golf Course) Mitigation Plantings

The Golf Course site is located on the Arroyo Las Positas at the Las Positas Golf Course. This project addresses the Tier 2 mitigation requirements for maintenance work which occurred along Collier Canyon to address storm related damages from 2017. The 2021-22 Workplan called for annual monitoring of vegetation for survival and photo monitoring.

ACTIONS: Living Arroyos spent 20 program hours at the Golf Course in the 2021-22 program year (see Table 8) monitoring the site using ESRI Field Maps to take geolocation data while assessing plant vigor and capturing photo points.

L-10) Robertson Park Mitigation Plantings

The Robertson Park mitigation plantings is part of the City of Livermore's Stream Maintenance Plan and is meant to mitigate for damages that have occurred along the Arroyo Mocho. The 2021-22 Workplan called for planting an extension to the project as well as manually running the irrigation system. Staff also conducted annual monitoring of the project using ESRI Field Maps to take geolocation data while assessing plant vigor and capturing photo points.

ACTIONS: Living Arroyos spent 201 program hours at Robertson Park in the 2021-22 program year (see Table 8) facilitating volunteer activities, watering, and monitoring. Staff hosted a volunteer event on December 18, 2021, where fifteen volunteers installed and mulched eighty-seven native plantings.

PHOTO: Volunteers on December 18, 2021 planting at Robertson Park.

L-11) Ravenswood Hedgerow

The Ravenswood Hedgerow is located at Ravenswood Historical Site and Vineyard. It is approximately 226-feet-long with an 870-foot perimeter. The hedgerow is positioned around an existing drainage swale, in an area with high public visibility and is immediately adjacent to the entrance and main driveway. The hedgerow encompasses a total of 4,700 square feet and consist of native plants from Xerces Pollinator Kits that were provided by the Xerces Society. Five California Central Coast Hedgerow Kits were provided for the Ravenswood Hedgerow Project, these kits contain 17 woody and herbaceous transplants (including milkweed).

The Program was tasked with installing the Xerces Pollinator Kits at the Ravenswood Hedgerow.

ACTIONS: Living Arroyos utilized 48 program hours to install 98 native plants in 2021-22 program year (see Table 8).

CITY OF PLEASANTON (PLEASANTON)

Living Arroyos worked on two projects for the City of Pleasanton in 2021-22.

Table 9. City of Pleasanton Hours

Pleasanton Project	Program Hours
Gold Creek / Touriga Creek Restoration	101
Bernal Hotspots Cleanup	48
TOTAL HOURS	**149**

P-1) Gold Creek / Touriga Creek Restoration

Restoration efforts for the City of Pleasanton occur at two different sites depending upon the needs of the partner. Gold Creek and Touriga Creek are ongoing vegetation management projects that focus on the removal of invasive species. The 2021-22 Workplan called for three field days and one volunteer event to remove invasive English ivy and Texas privet.

ACTIONS: The Program spent 101 program hours at Touriga Creek 540 gallons of weeds and 30 gallons of trash during the 2021-22 Program Year (see Table 9). Staff hosted a public volunteer event on April 9, 2022, where fourteen volunteers hand weeded and picked up trash.

PHOTO: Volunteers hand weeding at Touriga Creek, Pleasanton, CA. April 9, 2022.

P-2) Bernal Hotspots

The Bernal Ditch runs along Bernal Avenue, directly across from the Alameda County Fairgrounds in Pleasanton, California. There are restaurants, fast food eateries and a 24-hour gas station/mini-market within a quarter mile of the ditch. Both the fairgrounds and the downtown area are high traffic areas on weekends. This location is one of the few waterways in the City of Pleasanton that has been monitored in the past for collecting trash. The Program was tasked with cleaning the hotspot on a quarterly basis.

ACTIONS: The Program cleaned the Bernal Hotspots four times during the 2021-22 program year, using 48 program hours (see Table 9). Staff removed 32 gallons of trash from the project site over the course of four separate days, including: September 22nd, 2021, and January 13th, April 27th, and June 24th in 2022.

7. SUMMARY OF PROGRAM ACCOMPLISHMENTS

During the 2021-22 Program Year, interns worked approximately one to five days a week, for a total of 138 workdays.

Over the years, with help from our hard-working volunteers, the Living Arroyos field staff accomplished a great deal of stream improvement during the ninth Program Year (Table 10).

Table 10. Living Arroyos stream enhancement and management activities for the past 5 years.

Activities	PROGRAM YEAR				
	2017-18	2018-19	2019-20	2020-21	2021-22
Total acorn sites planted	--	--	360	393	241
Total acorns planted (3 per site)	--	--	1,080	1,180	723
Total acorns collected	--	--	1,513	2,145	3,717
Total stakes harvested	--	--	247	239	34
Total willow stakes planted	572	336	230	143	34
Total riparian trees planted	701	1,430	869	985	225
Total mulch used on plants (gallons)	3,112	--	--	500	100
Total invasive species removed (gallons)	29,713	730	5,620	4,002	1,508
Total trash removed (gallons)	1,674	1,424	4,315	94	997
Total water used (gallons)	--	--	262,175	278,020	283,505

8. PROGRAM EXPENDITURES

BUDGET

The Living Arroyos Program budget (Table 11) is composed of both **Program Costs** to run the program as mutually agreed upon by Program Partners. **Project Costs** are the responsibility of the Project Proponent and not presented here. [9]

Table 11. Living Arroyos projected and actual Program Costs for the 2021-22 rounded.

Item	Projected Budget	Actual Expenditures	Billed to date (%)	Budget Remaining
Personnel (staff and interns)	$191,000	$177,714	93%	$13,286
TOTAL PERSONNEL	**$191,000**	**$163,397**	86%	$47,484
Field Equipment & Supplies	$3,000	$1,557	52%	$1,443
Equipment Rental	$4,750	$2,401	51%	$2,349
Volunteer Supplies	$500	$0	0%	$500
Travel	$2,500	$1,882	75%	$618
Event Costs	$2,000	$1,010	51%	$990
Marketing/Outreach	$1,500	$837	56%	$663
Training	$750	$0	0%	$750
TOTAL DIRECT COSTS	$15,000	$7,687	51%	$7,313
TOTAL	206,000.00	$185,400	90%	$20,600

[9] ***Program Costs*** *include the following:*

- *Program Coordinator salary and benefits, and intern stipends*
- *Purchase or rental of equipment that can be used for multiple projects; equipment storage; and consumable supplies related to the volunteer and/or intern programs*
- *Travel, trainings, and other miscellaneous expenses causally related to the Program; and*
- *Communication activities and elements to ensure consistent messaging among Partners and to the public.*

Project Costs *include the following:*

- *Any elements that remain with the project site (e.g., irrigation systems, signage, plants, planting supplies, etc.)*
- *Contractors engaged to carry out project specific tasks (e.g., hydro seeding, installation of irrigation systems, etc.)*
- *Any other project specific costs requested by the Program Partner*

Actual expenditures for the Program were within the budgeted amount for 2021-22 (Table 11). In some areas, Program Costs were below projected amounts. This is likely due to times when Living Arroyos operated with a smaller crew due to intern turnover, staff training and equipment use that was provided in large part by LARPD, and other learning opportunities did not have registration fees associated with it.

EQUIPMENT PURCHASES

The following equipment items were purchased for the Program as Program Costs:

- 84- 36" Wooden Grade Stakes
- 4- Cans of marking paint
- 6- bundles of planting flags
- 1- 2.5 gallon gas can
- 5- bags of container mix soil
- 2- 50' 1" Double Jacket Fire Hoses
- 2- Hori Hori Knives
- 12- 12" Harvest Sickles
- 2- 8 quart bags of vermiculite

9. FUTURE RECOMMENDATIONS

Increase Volunteer Outreach

Living Arroyos staff recommends that we continue our efforts in volunteer outreach with the aid of the Program Partners.

To increase volunteer outreach, staff recommends:

- Participating in Open Houses and other events offered by the program partners.
- Presenting program to students at local colleges and high schools.
- Working with Program Partners to integrate the Living Arroyos volunteer events into their social media presence.

Improve Educational and Professional Development Opportunities for Interns

Staff recommends building on existing efforts and creating a more robust program to offer educational and professional opportunities for interns to aide them in building technical skills in natural resource management and conservation.

To improve education and professional development opportunities for interns, staff recommends:

- Working with Program Partners to identify job shadowing opportunities.
- Integrate learning activities into projects, such as ARCS GIS mapping, writing CEQA reports, or grant writing.
- Working with Program Partners to do regular (monthly or quarterly) 1-on-1 or presentations on the variety of professional pathways in the water, public sector, or environmental field.

10. MEETING PROGRAM GOALS

This section highlights the Program's accomplishments relative to the goals outlined in the 2021–22 Workplan.

Goal #1: Engage residents in hands-on stewardship of natural resources while they experience nature close to home.

Living Arroyos hired a total of four interns from the Livermore-Amador Valley to give them direct experience in managing and conserving natural resources. The hope is that these real-world projects and educational opportunities will enhance their learning and provide technical skills to further their career. The program also hosted six volunteer events this year where 104 unique volunteers gained firsthand experience being stewards of the Livermore-Amador Valley watershed.

The Living Arroyos Program demonstrated that communities and local agencies can collaborate on stream projects that meet maintenance and permitting objectives.

Goal #2: Increase public awareness of important watershed issues.

To reach a much broader audience, Living Arroyos continued to conduct outreach to the public through social media outlets, collaboration with school administrators and local community organizations.

Goal #3: Improve habitat and water quality of local streams while maintaining and enhancing both public safety and regional flood protection.

Living Arroyos field staff completed project tasks for eighteen projects, including planting and plant maintenance (e.g., watering), biotechnical erosion control measures, trash cleanup, non-native invasive species removal, as well as monitoring the success of past projects to learn and plan. All project tasks were aimed at improving local stream conditions.

Goal #4: Strengthen public/private partnerships within the community.

Local agencies continue to support the program and are seeing a benefit in leveraging resources and working across boundaries to achieve common goals.

Living Arroyos continued to cultivate community relationships with local school groups and businesses. The demand for volunteer events during the 2021-22 program year has persisted despite the abbreviated volunteer season. Many local groups and businesses reached out to Staff to schedule events for them. Requests for private events exceeded the Program's ability to accommodate them.

This review illustrates that the Living Arroyos Program efforts are providing benefits for streamside habitat and water quality while strengthening partnerships among local agencies and community members.