



Walnut Creek Watershed Creek Restoration Program

2021 Monitoring Report

In association with:

Friends of the Creeks

The Lafayette Creeks Committee

Contra Costa Resource Conservation District



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SUMMARY

In fall 2020, the Walnut Creek Watershed Council (Council) and the Restoration Trust (Trust) and local creek groups removed giant reed (*Arundo donax* also referred to as Arundo here) and other invasive plants from creek banks in Walnut Creek (City of Walnut Creek) and Lafayette Creek (City of Lafayette) to further mitigation requirements imposed on the City of Concord for bridge replacement work by the Corps of Engineers (Corps file no 2017-00447S) and the San Francisco Bay Regional Water Quality Control Board (Place ID no 841430). Shortly after invasive and other non-native plant removal, both of the sites were planted with plugs of the native creeping wild rye (*Leymus triticoides*) and valley sedge (*Carex barbarae*) as well as, at Lafayette, native trees and shrubs.

Site clearance, planting and subsequent herbicide applications were done by private contractors working for the Trust. In all, about 20,500 square feet (almost half an acre) of creek bank were cleared of invasives and restored.

Important results include the following:

- Each site included dense stands of invasive species. At least 120 cubic yards of invasive plant material were removed from each site. The species that were removed included giant reed, English ivy (*Hedera helix*), tree of heaven (*Ailanthus altissima*), privet, and other species.
- The 2020 plantings had mixed success. Application of a pre-emergent herbicide shortly after planting resulted in the mortality of almost 70% of the plugs. The contractor recognized the issue and has paid for new plants and planting, which has been completed in 2021. At Lafayette, the Creeks Committee, led by Ron Hufft and Jeff Gilman, has almost completely eradicated the Arundo and, with Trust help, installed a drip irrigation system and more than 20 native trees and shrubs. Walnut Creek was not able to muster as many volunteers due to the coronavirus epidemic but remained involved, nonetheless. However, only five trees and shrubs were planted of a projected 32. However, at both sites, the number of volunteer trees and shrubs, especially California buckeye (*Aesculus californica*) has been significant, at least twice the proposed number of trees and shrubs.
- Overall, our Arundo removal program appears to be working well with repeated experiments providing a control program that is reaching 100%.
- Also, the removal of the other invasives has generally been highly successful. Lafayette, for example, has only scattered clumps of the thornless blackberry that once dominated the site to a height of 4 to 5 feet.
- The timing of the COVID-19 pandemic eliminated the possibility for community planting or weeding in the spring, which would have been particularly useful.

I. INTRODUCTION

The Council began a major effort to eradicate giant reed from the Walnut Creek watershed and to restore local creeks with native plants in 2016. In 2020, the Council received funding for its creek restoration efforts through the San Francisco Bay Regional Water Quality Control Board (RWQCB) for bridge construction mitigation. The Council then proposed and prepared plans for creek restoration work at Walnut Creek and Lafayette Creeks. This monitoring report describes the results of this effort.

II. RESULTS

A. Walnut Creek

The Walnut Creek project site is part of a larger Council study area (**Figure 1**), which consists of the north bank of Walnut Creek from Lincoln Avenue downstream to the pedestrian bridge in Civic Park in the City of Walnut Creek. This area is within lands owned by the City of Walnut Creek, except for a small private inholding near the Walnut Creek Library.

Within the study area, the project site consists of about 10,200 sq. ft. bounded on the west by Lincoln Avenue, on the north by the Walnut Creek Library parking lot, on the east by the private inholding noted above, and on the south by the water's edge of the creek (**Figure 2**). This project site is just downstream of the former Maria Maria site at which the Council and Trust removed a large stand of *Arundo* and restored about 8,000 sq. ft. of bank to native riparian habitat.

The project site averages about a 2-3:1 slope with an elevation drop of about 30 ft. over the 70 ft. or so of width. This slope was gentle enough to plant, as evidenced by the plantings done on the Maria Maria site, which is steeper.

The creek in the study area is perennial with relatively constant flow in the spring, drying to a reduced flow in the summer. Irrigation for tree and shrub plantings (if needed) is available from the City landscaping immediately adjacent to the project site. Soils in the study area and project site are clay loams. These are relatively permeable but hold enough water to prevent rapid drying of the newly planted vegetation (Zentner 1997).

Vegetation in the study area consisted of two distinct components (Table 1 and View 1). The vegetation on the banks was primarily a mix of exotics, many of which are invasive (Table 1). Typical dominants include English ivy (*Hedera helix*), common periwinkle (*Catharanthus roseus*), and Himalayan blackberry (*Rubus armeniacus*), with scattered dense patches of *Arundo*.

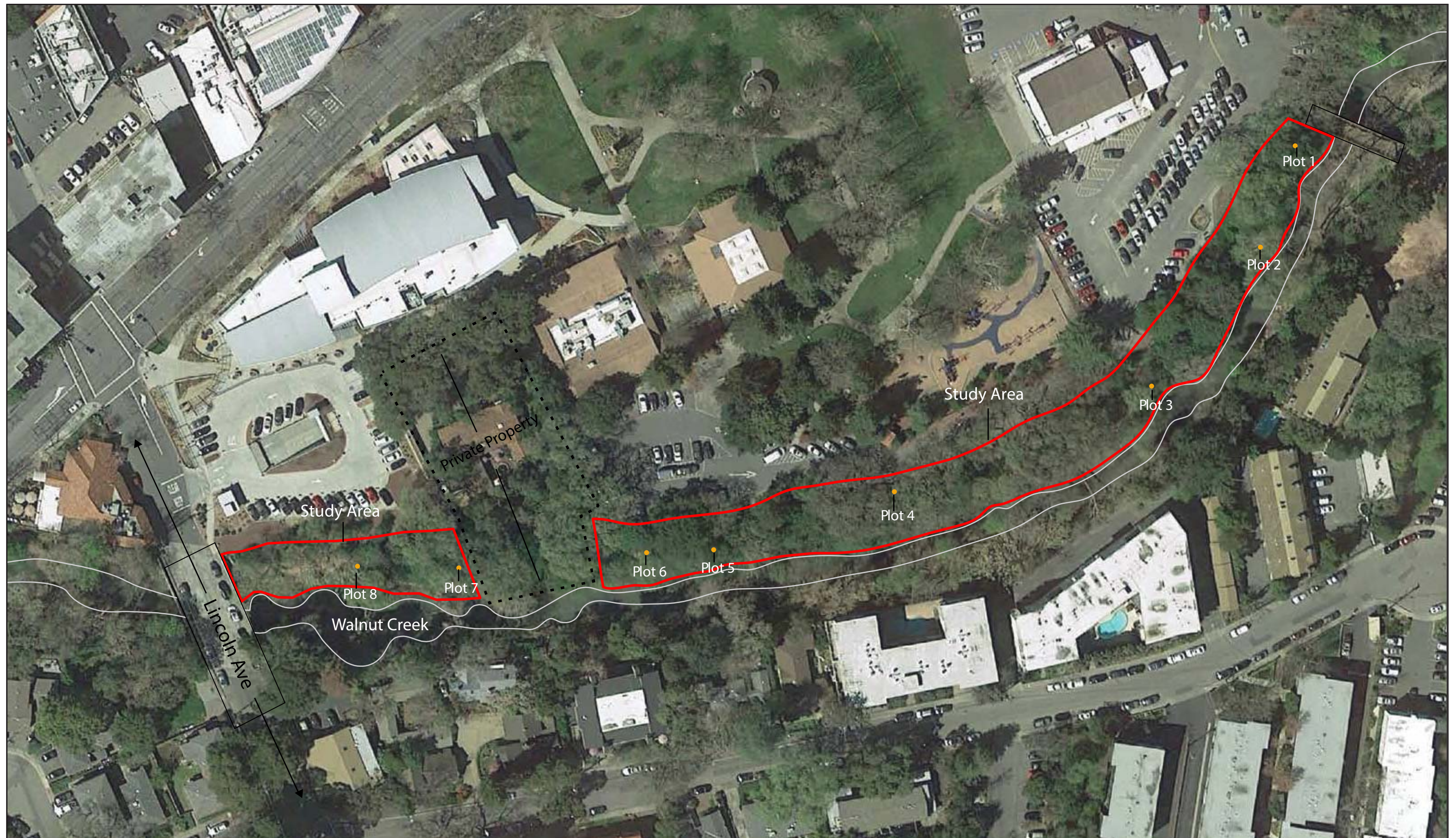




Table 1
Sampled Vegetation from the Walnut Creek Study Area prior to restoration
 See Figure 1 for sample plot locations; data shown as % cover
 Key: Y= Native; N= Non-native; Inv=Invasive

	Status	Plot	1	2	3	4	5	6	7	8
		Bare Ground	15%	15%	15%		63%	87.5%		
Gray rush	Y	<i>Juncus patens</i>						15%		
Sweet fennel	N	<i>Foeniculum vulgare</i>			0.1%		2.5%			
Wall bedstraw	N	<i>Galium parisiense</i>	2.5%	15%	2.5%		15%			0.1%
English ivy	Inv	<i>Hedera helix</i>	87.5%	15%	62.5%	87.5%				87.5%
Giant reed	Inv	<i>Arundo donax</i>		15%	0.1%				87.5%	15%
Common periwinkle	Inv	<i>Catharanthus roseus</i>		15%	15%					
Smilo grass	Inv	<i>Stipa miliacea</i>		2.5%			2.5%			0.1%
Himalayan blackberry	Inv	<i>Rubus armeniacus</i>		2.5%					87.5%	15%
Bermuda buttercup	N	<i>Oxalis pes-caprae</i>			0.1%		38%			
Bitter cress	N	<i>Cardamine oligosperma</i>					3%			
Milk thistle	N	<i>Silybum marianum</i>								0.1%
Privet	Inv	<i>Lingustrum</i> sp.							5%	



View 1: Walnut Creek site prior to restoration from Lincoln Avenue, looking north. February 2020. Note large stand of *Arundo* on west (left) bank.

In September 2020, a Trust contractor cleared the invasive and non-native vegetation from the site and the *Arundo* and other stumps were sprayed with herbicide. A follow-up herbicide spray was then completed in October. Planting of the graminoid plugs (creeping wild rye, valley sedge, etc.) was completed in January 2021. Shortly after planting, the contractor sprayed the planting sites with a pre-emergent herbicide to control annual weeds. Unfortunately, the herbicide chosen also killed 60 to 70% of the newly planted plugs. The contractor reviewed the site with the Trust, recognized their responsibility for the loss of plantings and paid for additional plantings to be done this year.

Monitoring was completed by the Trust throughout the spring with final vegetation sampling done in July 2021. Table 2 below summarizes the results.

Table 2
Walnut Creek Vegetation Sampling Results 2021

Parameter	Baseline (Pre-Restoration)	2021	Comments
Absolute Plant Cover	90%	20%	Low absolute cover due to loss of plugs and weed control.
Absolute Native Cover	5%	5%	Surviving plugs are doing well.
Absolute Exotics Cover	20%	5%	Weed control has been highly successful.
Absolute Invasives Cover	65%	20%	Arundo stands have partially recovered.

Absolute plant cover at this site was relatively low at the time of monitoring due to the loss of plantings and the very successful weed control; although the pre-emergent herbicide led to the loss of many plugs, it also was very successful at suppressing weed growth. Native cover was low but cover by exotics was also relatively low, especially compared to the baseline, largely due to the weed control work. Cover by invasives is lower than the baseline but recovering due to the lack of volunteer maintenance work on-site, a result largely of the coronavirus.

View 2 shows the site in February 2022, after replanting in December 2021.



View 2: Walnut Creek site looking north (note trees in background visible in View 1). February 2022, after re-planting. Green growth visible in photo are native graminoids.

Overall, despite the loss of most of the plantings in 2021, this site now shows a good deal of promise. The native graminoids have been replanted by the Trust and the City has provided an irrigation source for watering. Weed control has been relatively successful and the site appears to be progressing well.

C. Lafayette Creek

The Lafayette study area for the 2020 restoration effort consisted of the north bank of Lafayette Creek just before its confluence with Las Trampas Creek from the pedestrian bridge over Lafayette Creek downstream to upstream of the “Las Trampas curve” where Las Trampas Creek makes an abrupt right turn (**Figure 3**). This is all public land owned by the City of Lafayette, Contra Costa County Flood Control District (County FCD) and East Bay Regional Park District (EBRPD) in the City of Lafayette. Within the study area, the project site consisted of about 7,300 sq. ft. and is bounded on the west by the pedestrian bridge, on the north by the public/private parking lot, on the south by the water’s edge of the creek, and on the east by an unmarked line (**Figure 4**). This project site is downstream of the Lafayette Phase 1 site at which the Project





Sponsors removed a large stand of *Arundo* and restored about 5,000 sq. ft. of bank to native riparian habitat.

The creek banks in the study area range from moderately steep to moderately gentle. The project site averages about a 3:1 slope with an elevation drop of about 30 ft. over 60-to-120 ft. of width. This was gentle enough to plant, as evidenced by the work done upstream.

Lafayette Creek in the study area is perennial with relatively constant flow in the spring, drying to a greatly reduced amount in the summer. Irrigation for tree and shrub plantings is available from the public landscaping immediately adjacent to the project site at the pedestrian bridge.

Soils in the study area and project site are clay loams. These are relatively permeable (compared to a purely clay soil) but hold enough water to prevent rapid drying of the newly planted material and are highly suitable for riparian restoration.

As in the Walnut Creek study area, vegetation in the Lafayette study area consisted of two distinct components (Table 3 and View 3). However, unlike Walnut Creek, the Lafayette Creek slopes were dominated by one invasive species, Elmleaf (thornless) blackberry (*Rubus ulmifolius* var. *anoplothysus*) with an admixture of clumps of *Arundo*. English ivy was also present.

Table 3
Sampled Vegetation from the Lafayette Study Area
 See Figure 3 for sample plot locations.
 (data shown as % cover)

Key: Y=Native; N=Non-native; Inv=Invasive

	Status	Plot	1	2	3	4
		Bare Ground				
Giant reed	Inv	<i>Arundo donax</i>			15%	
Elmleaf blackberry	Inv	<i>Rubus ulmifolius</i> var. <i>anoplothysus</i>	87.5%	87.5%	87.5%	87.5%
English ivy	Inv	<i>Hedera helix</i>		2.5%		
Plum	Inv	<i>Prunus</i> sp.	5%			
Privet	Inv	<i>Ligustrum</i> sp.			20%	
Willow	Y	<i>Salix</i> sp.			5%	30%



View 3: Lafayette site (left bank), looking north. February 2020. Note large stand of *Arundo* at upper left and lack of native trees in floodplain.

In September 2020, the invasive and non-native vegetation were cleared from the site by a Trust contractor and the *Arundo* and other stumps sprayed with herbicide. A follow-up herbicide spray was then completed in October.

Planting of the graminoid plugs (creeping wild rye, valley sedge, etc.) was completed in January 2021. As with the Walnut Creek site, the contractor sprayed the planting sites with a pre-emergent herbicide to control annual weeds, which then killed 60 to 70% of the newly planted plugs. The contractor paid for additional plantings to be done. In April, the community volunteers with the Trust installed a drip irrigation system and planted 16 native trees and shrubs on-site (View 4).



View 4: Lafayette site, April 2020. Volunteer installation of drip irrigation system, trees and shrubs.

Monitoring was completed by the Trust throughout the spring of 2021 with final vegetation sampling done in June 2021. Table 4 below summarizes the results.

Table 4
Lafayette Creek Vegetation Sampling Results 2021

Parameter	Baseline (Pre-Restoration)	2021	Comments
Absolute Plant Cover	90%	30%	Site is relatively bare due to weed control
Absolute Native Cover	5%	20%	Does not include mature trees
Absolute Exotics Cover	10%	5%	Very few weeds
Absolute Invasives Cover	75%	15%	Significant reduction with minor clumps resprouted

Like Walnut Creek, absolute plant cover at this site was relatively low due to the loss of plantings and the very successful weed control; although the pre-emergent herbicide led to the loss of many plugs, it also was very successful at suppressing weed growth. Native cover was low but cover by exotics is relatively low compared to the baseline, largely due to the weed control work. Cover by invasives is very low due to the volunteer maintenance work on-site, which has been on-going despite the coronavirus.

View 5 shows the site in February 2022, after replanting in December 2021.



View 5: Lafayette site, February 2022, looking north after replanting. Note large tree in background; same tree is visible in View 3.

III. ACKNOWLEDGEMENTS

This work was supported and made possible with the help of a large number of people. Bob Simmons, as the chair of the Council, was responsible for organizing the effort. Lesley Hunt of Friends of the Creeks; and Jeff Gilman, Ron Hufft, and the other members of the Lafayette Creeks Committee all did yeoman's work in organizing individual site plantings and maintenance. Lisa Damerel of the Contra Costa Resource Conservation District was at every planting event, organizing and coordinating logistics, and providing important support. Melissa Farinha of CDFW responded promptly to our many questions and she and other CDFW staff provided moral support.