



Arundo Removal and Replacement Team 2019 Monitoring Report

In association with:

Friends of the Creeks

Friends of San Ramon Creeks

The Lafayette Creeks Committee

Friends of Pleasant Hills Creeks

CDFW File #: 1#: #1600-2018-0287-R3

Date Issued:

July 2020

Arundo Removal and Replacement Team

2019 Monitoring Report

SUMMARY

In fall 2019, the Walnut Creek Watershed Council (Council) and its Arundo Removal and Replacement Team (ARRT) worked with the Restoration Trust (Trust) and local creek groups to remove giant reed (*Arundo donax* also referred to as Arundo here) and other invasive plants from creek banks in Walnut Creek (City of Walnut Creek), Lafayette Creek (City of Lafayette), Grayson Creek (City of Pleasant Hill), and San Ramon Creek (City of Danville). Shortly after invasive and other non-native plant removal, each of the four sites was planted with plugs of the native creeping wild rye (*Leymus triticoides*) and valley sedge (*Carex barbarae*). Both species are rhizomatous perennials, and previous plantings have demonstrated that these species exclude non-native species over time, as well as provide native wildlife habitat, erosion control, fire suppression, and other values.

Site clearance was done by both private contractors working for the Trust and the community creeks groups. Planting was accomplished by community volunteers led by Trust staff. In all, 23,600 square feet (more than 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 three of the four sites. The species that were removed included giant reed, English ivy (*Hedera helix*), tree of heaven (*Ailanthus altissima*), privet, and other species. The fourth site—on Grayson Creek in Pleasant Hill—did not have significant stands of trees or perennials, but it was dominated by invasive annuals that had to be mowed.
- Community involvement in planting at the sites was significant and enthusiastic; at least 20 people showed up at each site and worked for at least two hours.
- Generally, the plantings have done well. At three of the four sites, plant cover by natives has grown from a trace or nothing to 15% or more in one year. Numerous native tree seedlings and saplings of a variety of species have established on three of the sites as well.
- Cutting alone will not eradicate Arundo. The ARRT tried cutting only, most notably at the San Ramon Creek site, and the Arundo grew back to its original extent within 8 months.

- Cutting with follow-up herbicide spraying just after cutting did not completely eliminate Arundo at any of the four sites. Arundo at each site required follow-up herbicide applications and/or hand removal.
- Cutting was generally successful at removing other invasives, though. Post-planting, non-Arundo invasive growth was not significant. Volunteers were largely responsible for removing the remaining ivy, privet, and other invasives at each site during the community plantings and did a great deal of work in that regard.
- Post-planting, non-Arundo exotic (non-invasive) weed growth was significant at the two exposed, sunny sites (San Ramon Creek and Grayson Creek); in both locations, annual weeds dominate the site. In the future, these weeds should be controlled with a pre-emergent herbicide applied after planting natives.
- Weed Slayer, an organic herbicide, was used in several experimental plots and appeared to work as well as glyphosate as a broad-spectrum herbicide¹. Weed Slayer was not as successful as Roundup on follow-up applications to Arundo in spring and summer, based on a side-by-side comparison of experimental plots at the Lafayette Creek site.
- The timing of the COVID-19 pandemic eliminated the possibility for community weeding in the spring, which would have been particularly useful.
- Costs for site clearance varied widely, from \$0.34/sq. ft. at San Ramon Creek to \$2.35/sq. ft. at Lafayette Creek. Density of the Arundo stand appears to be the primary factor; the Lafayette Creek stand was much denser than estimated and required three times as much offhaul as expected. Planting costs were defined by plug costs as all planting was done by volunteers. That cost averaged about \$0.44/sq. ft.

¹ The herbicides discussed in this report are generally “broad-spectrum” herbicides. These, like Roundup or Weed Slayer, kill all plants and are sprayed after the plants have “emerged”, that is, created above-ground growth. Other general herbicides discussed include “pre-emergents”, herbicides that are sprayed prior to plant emergence and that are particularly effective against annuals as they stop the seeds from sprouting and “broadleaf-specific” herbicides, such as 2,4-D, which only kill broadleaves (non-grass plants).

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. The effort is led by the ARRT, which as a first step, developed a comprehensive map of giant reed stands throughout the watershed. (See <https://www.wcwatershed.org/arundo-removal.html> for more information.) This mapping effort was organized by Mike Anciaux of the Friends of San Ramon Creek (FSRC).

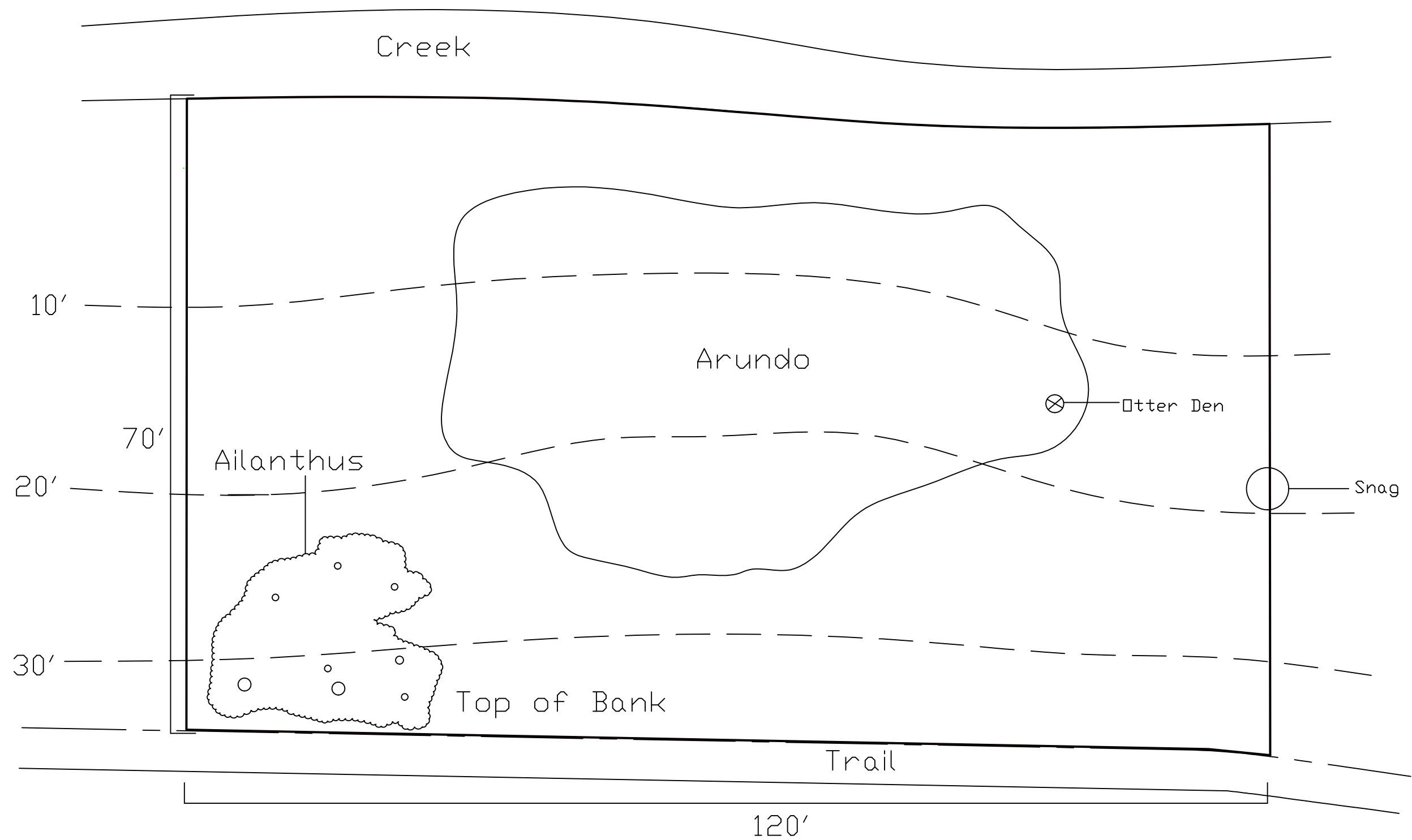
Dick Heron of the FSRC and on behalf of the Council, with assistance from Avé Brown (Contra Costa County Flood Control and Water Conservation District [FCD]), then applied for and received a California Department of Fish and Wildlife (CDFW) Streambed Alteration Agreement approval in 2018. This approval allowed for the removal of giant reed and other invasives as well as restoration work at removal sites. The approval was issued via an Operation of Law Letter, and FSRC began Arundo removal efforts at several sites in the San Ramon Creek sub-watershed.

In early 2019, the Council received funding for its Arundo removal efforts from the San Francisco Bay Regional Water Quality Control Board (RWQCB). The Council then requested that its member creek groups prioritize their potential projects. With Trust assistance, each creek group selected a project to complete in 2019. This monitoring report describes the four projects—San Ramon Creek, Lafayette Creek, Walnut Creek, and Grayson Creek—and the first year's monitoring results and lessons learned.

II. RESULTS

A. San Ramon Creek

The San Ramon Creek site (see attached plan) occupies about 120 ft. of creek bank and is about 70 ft. wide, totaling about 8,600 sq. ft. The site is in Hap Magee Ranch Park, and a split-rail fence and trail demarks its upper boundary. An approximately 10 ft. wide nearly level terrace forms the upper edge of the site, and the remainder is a relatively steep slope down to the creek. The site was dominated by a large (60 ft. by 40 ft.) stand of Arundo that had been cleared once but grew back to its original extent (View 1). The site also had numerous tree of heaven saplings reaching up to 30 ft. in height, as well as dense cover of English ivy and periwinkle (*Vinca major*). The site was partially shaded by mature valley oaks (*Quercus lobata*) on its up- and downstream edges.





View 1. San Ramon Creek site in June 2018. Note the large Arundo stand at the site center.

In 2018, the Arundo stand had been cleared by volunteers and Trust contractors. No herbicide spray was used on the Arundo, and the stand grew back to its original height (though not the same high density) quickly. In early December 2019, the stand was cut and all the non-native vegetation on site was cleared (View 2) and placed in a dumpster.



View 2. San Ramon Creek site in December 2019, following clearance of Arundo and other invasive plants.

Shortly after the Arundo was cut and cleared in December, the Arundo stubs were sprayed with a 41% solution of glyphosate to control reemergence. In mid-December, 20 community volunteers planted almost 5,000 plugs: 2,000 valley sedge plants and 3,000 creeping wild rye plants. The terrace at the top of the site was densely planted with creeping wild rye, and the steep slopes below were planted in scattered clumps with the sedge.

Site clearance had been budgeted at \$3,950, but it only cost \$2,900 (\$0.34/sq. ft.). This was largely due to the low density of this Arundo stand. A single, 40 cu. yd. dumpster sufficed for this site, much less than was needed for Walnut Creek and Lafayette Creek; this was probably a result of the previous clearance work done at San Ramon Creek. However, as opposed to the other sites, a significant amount of vegetation other than Arundo (especially tree of heaven and English ivy) was removed from the San Ramon Creek site.



View 3. San Ramon Creek site in March 2020 with dense growth of planted plugs and some weeds throughout site. Creeping wild rye is prominent in the foreground.

Monitoring was completed throughout the spring with final vegetation sampling done in June 2020. Table 1 below summarizes the results. Appendix A has tabular raw data.

Table 1
San Ramon Creek Vegetation Sampling Results 2019

Parameter	Baseline (Pre-Restoration)	2019	Comments
Absolute Plant Cover	90%	70%	
Absolute Native Cover	5%	15%	Does not include mature trees
Absolute Exotics Cover	20%	45%	Mostly non-native annual grasses
Absolute Invasives Cover	70%	10%	Arundo is being controlled

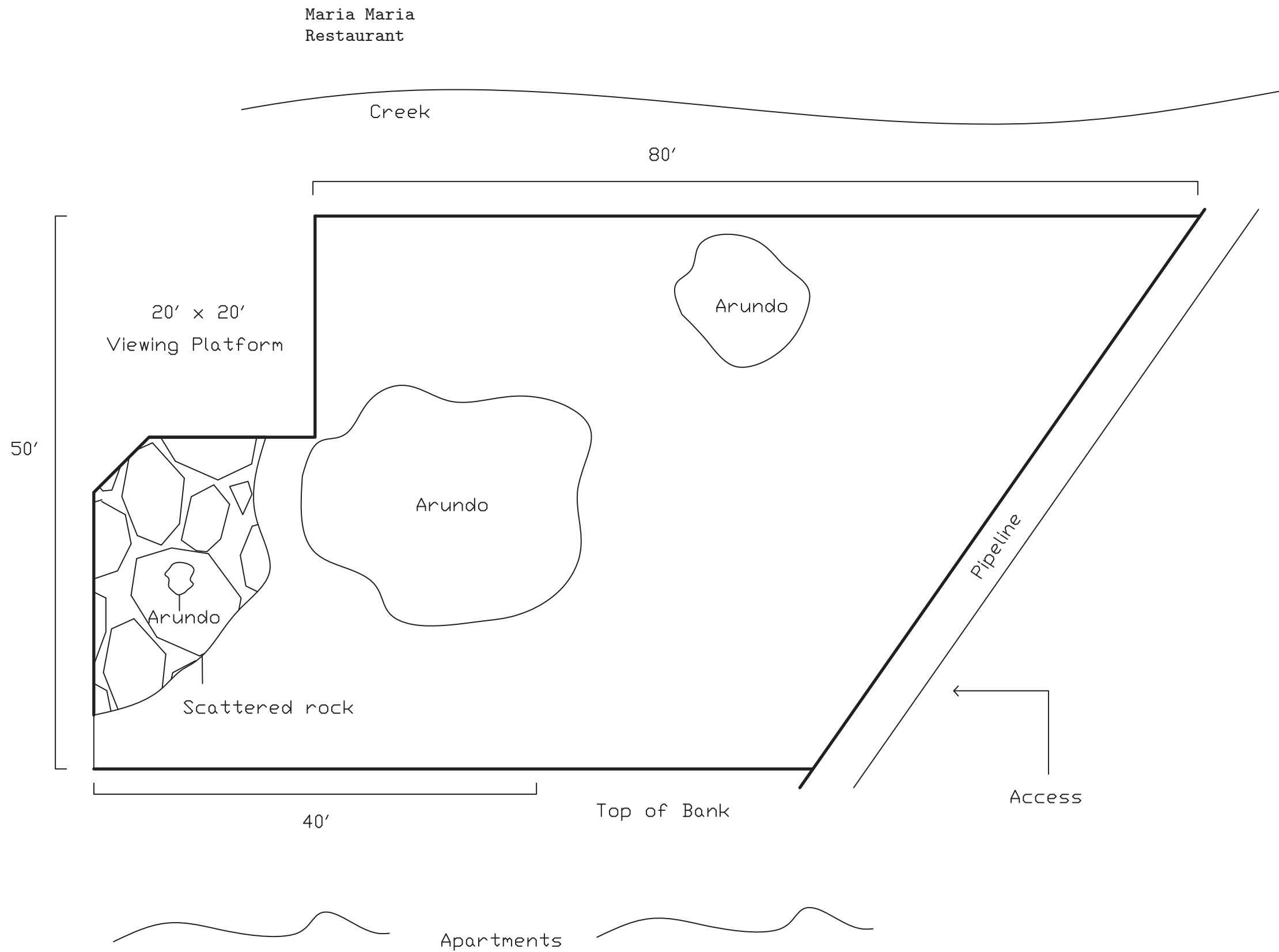
Initial plug growth was significant, helped by late spring rains (View 3). However, as of June, the non-native annual grasses, especially ripgut brome (*Bromus diandrus*), had become the dominant plant on-site, providing for high absolute cover and high cover by exotics (non-native species that are not considered highly invasive). Creeping wild rye grows in patches and singly throughout the upper third of the site with valley sedge scattered in the lower two-thirds, but they provide relatively low absolute cover overall. The competition with the grasses has clearly worked against the native plantings. Cover by invasives, especially compared to the baseline, is very low. Dick Heron of the FSRC has followed up on the Arundo and sprayed a number of the resprouts.

Overall, removal and almost complete eradication of the invasives has been successful—the Arundo has resprouted but is being controlled, and the other invasives are insignificant. This site does have relatively low cover by natives compared to Walnut Creek and Lafayette Creek though, probably due to the competition with the non-native grasses. The ARRT should consider replanting this site with additional native plants and using a pre-emergent herbicide to control the annual exotics.

B. Walnut Creek

The Walnut Creek site (see attached plan) occupies about 160 ft. of creek bank and is about 50 ft. wide, totaling about 8,000 sq. ft. (this site is about 2,800 sq. ft. larger than originally planned). The site is privately owned, but it connects to City-owned lands downstream. The site is almost entirely sloped, although it levels off a bit immediately adjacent to the creek.

The site was dominated by two Arundo stands, one about 30 ft. by 30 ft. (View 4) and another about 15 ft. by 20 ft. The site was also carpeted with English ivy over a good amount of downed wood, making for treacherous footing. Numerous black locust (*Robinia*



pseudoaccacia) saplings were also found along the creek's edge. The site was partially shaded by mature Fremont cottonwoods (*Populus fremontii*) and several valley oaks.



View 4. Walnut Creek site in December 2019. Note the large stand of Arundo at the center of the site and large amounts of downed wood. Note the mature cottonwood tree leaning toward the top left corner of the photo.

We began site clearance in early December 2019. Accessing the site was very difficult, but we created a series of steps down the slope to make access easier. A 60 cu. yd. dumpster was filled with Arundo, ivy, and other invasives. The cut Arundo was then sprayed in late December with Roundup at the manufacturer's rates (3%). View 5 shows the cleared site.

We had originally budgeted \$6,900 for site clearance, but due to the expansion of the site area, we spent \$11,600 (about \$1.45/sq. ft.) on site clearance.

In January 2020, approximately 30 community volunteers planted 3,000 valley sedge plugs and 5,000 creeping wild rye plugs. The soil at this site is relatively sandy and was easy to plant in, but accessing the site with tools and plug trays was difficult.



View 5. Walnut Creek site after clearance. The leaning cottonwood tree in the center provides a reference point to compare the cleared site with the pre-cleared site shown in View 4.



View 6. Walnut Creek site in May 2020. The grass in the center of this photo is creeping wild rye. Note the leaning cottonwood tree that appears in previous Views. Arundo can be seen resprouting to the left of the tree.

Monitoring was completed throughout the spring with final vegetation sampling done in June 2020; View 6 shows the site slightly before the monitoring was completed. Table 2 below summarizes the results. Appendix A has tabular raw data.

Table 2
Walnut Creek Vegetation Sampling Results 2019

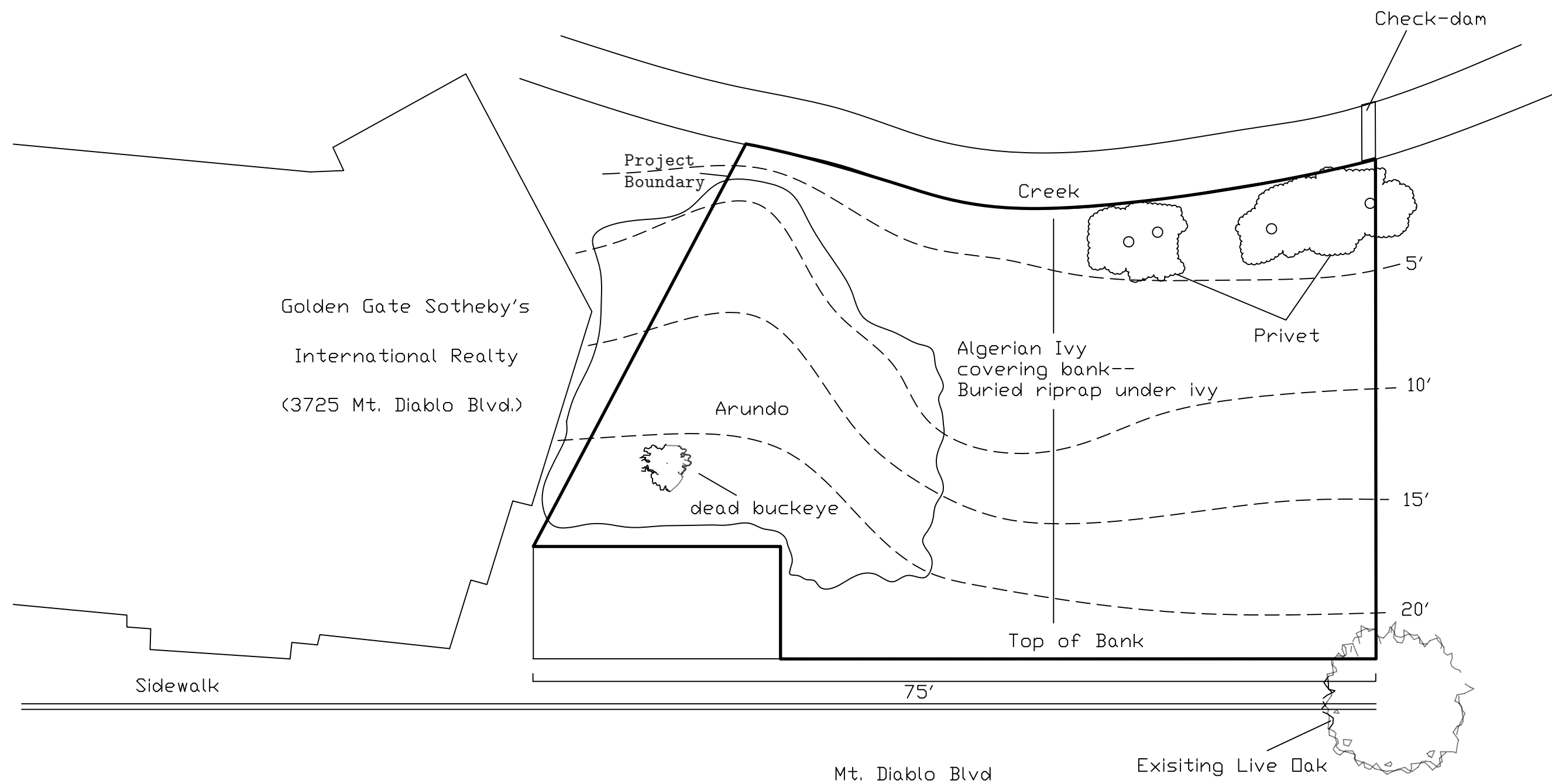
Parameter	Baseline (Pre-Restoration)	2019	Comments
Absolute Plant Cover	90%	60%	Low absolute cover due to sandy soil
Absolute Native Cover	5%	25%	Does not include mature trees
Absolute Exotics Cover	20%	15%	Exotic cover is diverse
Absolute Invasives Cover	65%	20%	Great reduction in invasives

Absolute plant cover at this site is relatively low due to the extent of sandy soils, which tend to be problematic for seedlings due to drought stress. That said, native cover is relatively high, as the planted perennials favor sandy soils. Additionally, several natives including mugwort (*Artemisia douglasiana*) are appearing and colonizing patches at the site. The cover by exotics is relatively low compared to the other sites, largely due to the sandy soils and low water retention noted above. Similarly, cover by invasives is low and declining as follow-up control of *Arundo* proceeds.

Overall, this site shows a good deal of promise. The planted native graminoids have already reached about 25% cover and appear capable of continuing to expand. There are also a number of native tree species already at the sapling stage and these will provide shade, wildlife habitat, and other functions.

C. Lafayette Creek

The Lafayette Creek site (see attached plan) occupies about 70 ft. of creek bank and is about 40 ft. wide, totaling about 3,000 sq. ft. The site is owned by the City and is integral to the City's downtown creeks system. The site has a relatively level terrace at its uppermost edge, but this is only about 3 to 4 ft. wide; next to that, it slopes gently down to the creek. The site was dominated by a large, dense *Arundo* stand (30 ft. by 30 ft.). The site was also heavily carpeted with English ivy and had a stand of mature privet near the creek (View 7). Like the previously described sites, shade was provided by mature native trees, in this case, coast live oak and California buckeyes (*Aesculus californica*).





View 7. Lafayette Creek site in December 2019. Note the large stand of Arundo in the background, screening the neighboring building. English ivy covers remainder of site.

We began site clearance in early December. Site accessibility was very good, but the density of the Arundo stand was impressive and unforeseen. Clearing the site required filling three 20 cu. yd. dumpsters, primarily with Arundo stalks over several days (View 8). The site was then sprayed in late December with Roundup at the manufacturer's rates (3%).

We had originally budgeted \$6,500 for site clearance, but due to the high density of the Arundo stand, we spent \$7,050 (about \$2.35/sq. ft.).



View 8. Lafayette Creek site after clearance. This photo has the same orientation as View 7.

In January 2020, approximately 30 community volunteers pulled the remnant ivy roots and planted 3,000 plugs: 1,000 valley sedge plants and 2,000 creeping wild rye plants.



View 9. Lafayette Creek site in May 2020. Grass along upper half of the site is creeping wild rye. Arundo can be seen resprouting at the center of the photo's background. This photo has the same orientation as Views 7 and 8.

Monitoring was completed throughout the spring with final vegetation sampling done in June 2020; View 9 shows the site shortly before monitoring. Table 3 below summarizes the results. Appendix A has tabular raw data.

Table 3
Lafayette Creek Vegetation Sampling Results 2019

Parameter	Baseline (Pre-Restoration)	2019	Comments
Absolute Plant Cover	90%	70%	
Absolute Native Cover	5%	40%	Does not include mature trees
Absolute Exotics Cover	10%	15%	Diverse group of weeds
Absolute Invasives Cover	75%	15%	Significant reduction

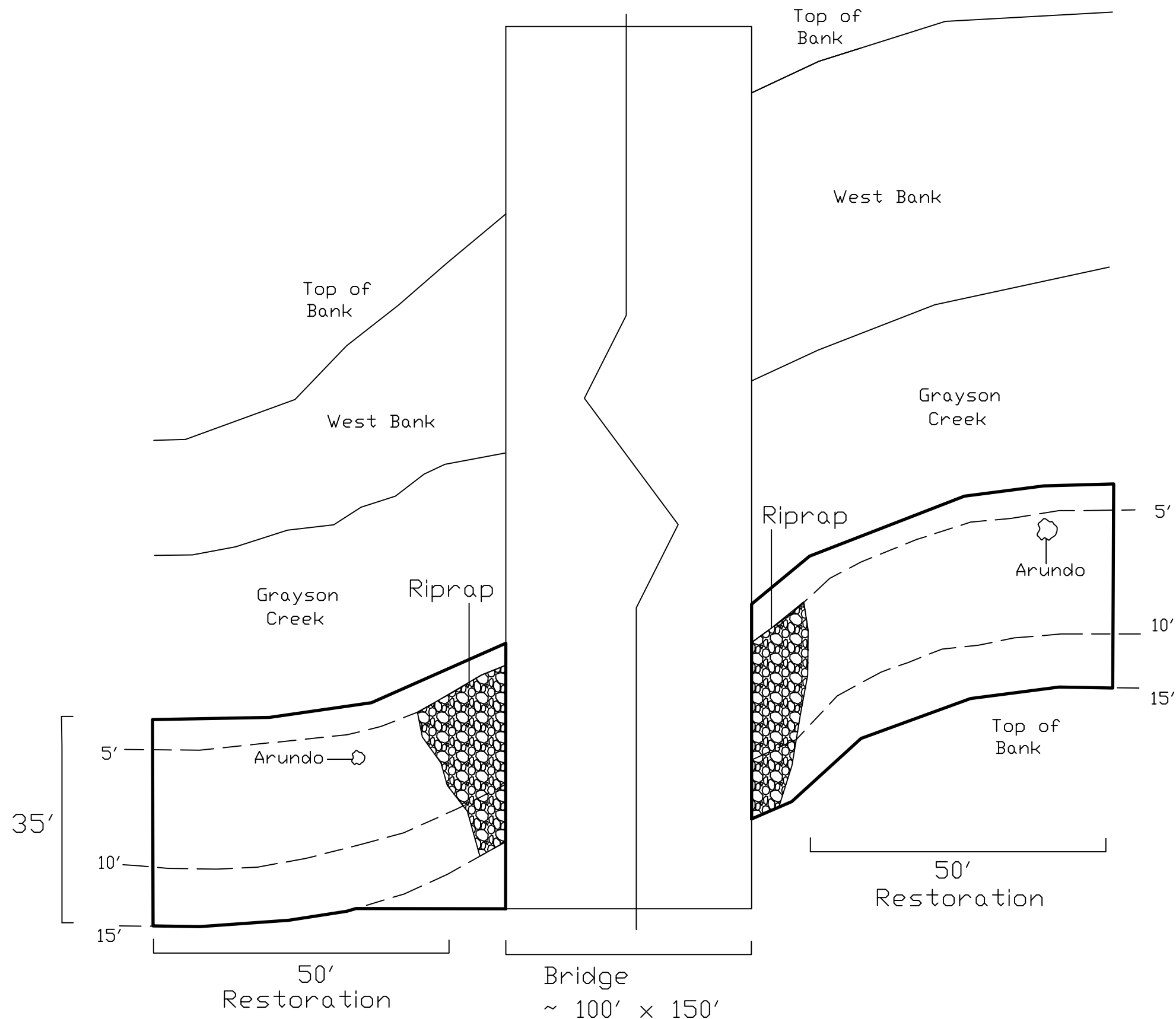
Absolute plant cover at the Lafayette Creek site is moderate and reflects the recent plantings and weed control efforts. Native cover is high; the creeping wild rye in particular is growing rapidly at this site. The cover by exotics is relatively low compared to the other sites, probably due to the lack of a seed bank and the slightly shady conditions. Cover by invasives is low and declining as follow-up control of the Arundo proceeds.

Overall, this site is progressing well. Cover by the recently-planted native plants is increasing on a monthly basis, and there are a large number of native tree seedlings.

D. Grayson Creek

The Grayson Creek site (see attached plan) occupies about 100 ft. of creek bank from up to downstream (south to north) that is bisected into two equal parts by the Golf Club Road (GCR) bridge and is about 40 ft. wide (from creek edge to top of bank) for a total of about 4,000 sq. ft. It includes an initial slope about 20 ft. wide and then a very gently sloped terrace, also about 20 ft. wide, next to the creek.

The site is owned by the FCD and is managed as a flood control channel. The site is open, with gently sloped, sunny banks with a gravel road atop the bank. Prior to our work, the site was dominated by a variety of non-native grasses and forbs with two small stands of Arundo—one on the north side and one on the south side of the GCR bridge. There are no trees or shrubs on this site as they are kept cleared by the FCD.



The Grayson Creek site was divided into four quadrants to test weed control options. Each quadrant was about 25 ft. (north to south or down- to upstream) and 40 ft. wide (east to west) and numbered from north to south. Thus, Quad 1 was the northernmost, etc. Quad 1 was mowed and treated with Roundup (in a 3% solution). Quad 2 was mowed and treated with Weed Slayer, an organic herbicide (at the manufacturer's suggested rates, also about 3%). Quad 3 was mowed and weeded by volunteers, but not otherwise treated. Quad 4 was not mowed or treated.

As with the other sites, we began site clearance in December; on this site, though, mowing was the only clearance method used. Herbicide spraying of either Roundup or Weed Slayer was completed on Quads 1 and 2 shortly thereafter as described above (View 10). Planting took place in January 2020 with a large complement of volunteers. We described the spray/no-spray conditions for the four quadrants, and the volunteers eagerly attacked the Quad 3 weeds (View 11).



View 10. Grayson Creek site in February 2020 north of the GCR bridge. This photo shows Quad 1 (foreground) and Quad 2 (background), which were sprayed with different herbicides (Roundup in Quad 1 and Weed Slayer in Quad 2). The herbicides used on both Quads controlled nearly 100% of weeds present at that time.



View 11. Grayson Creek site in February 2020 south of the GCR bridge. This photo shows Quad 3 (foreground), which was weeded by volunteers who did an extremely effective job. Quad 4 (background) was not weeded or sprayed.

We had originally budgeted \$3,250 for site clearance, but only spent \$2,900 (about \$0.91/sq. ft.). The low cost reflects the minimal presence of *Arundo* (or other woody invasives) on-site.

The northern Quads (Quads 1 and 2) at the Grayson Creek site experienced significant weed growth after planting (View 12).

Additionally, a local Canadian goose flock began intensive grazing on all four Quads. The creeping wild rye on the slope was generally spared, but the valley sedge on the terrace was decimated.



View 12. The northern Quads at the Grayson Creek site in May 2020 (same orientation as View 10). Note the dominance of mustard and other weeds.

Table 4
Grayson Creek Vegetation Sampling Results 2019

Parameter	Baseline (Pre-Restoration)	Quad 1	Quad 2	Quad 3	Quad 4
Absolute Plant Cover	90%	50%	70%	40%	100%
Absolute Native Cover	0%	10%	10%	10%	1%
Absolute Exotics Cover	60%	30%	50%	20%	70%
Absolute Invasives Cover	30%	10%	10%	10%	30%

Absolute plant cover after the restoration effort varies significantly by quadrant. The weed growth and goose grazing reduced native plant cover significantly. However, this site provided some valuable lessons. First, we learned that on open sunny sites, we should expect significant weed growth after site clearance (and soil disturbance) and plan accordingly.

Second, where geese occur in the project vicinity, cleared sites will be attractive grazing areas. Last but not least, Weed Slayer is an effective alternative to Roundup for initial site clearance. Our follow-up efforts elsewhere indicate that Weed Slayer may not be as effective against Arundo as Roundup, but this site had little Arundo so that was not a factor.

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. Alan Blade, Wendy Gollop, Heather Rosmarin, and the other Friends of Pleasant Hill Creeks members; Lesley Hunt of Friends of the Creeks; Dick Heron, Mike Anciaux, and the other Friends of San Ramon Creek members; 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. Katie Hart of the RWQCB provided access to funding, support, and direction.

APPENDIX A

Vegetation Sampling Data

San Ramon Creek 2019 Vegetation Monitoring Results

Scientific Name	Common Name	Status	Cover	Comment
<i>Aesculus californica</i>	CA buckeye	N	1%	Saplings
<i>Ailanthus altissima</i>	Tree of heaven	I	+	One small seedling
<i>Arundo donax</i>	Giant reed	I	5%	Being removed
<i>Avena fatua</i>	Slender oat	E	5%	
<i>Brassica nigra</i>	Black mustard	E	+	
<i>Bromus diandrus</i>	Ripgut brome	E	30%	The dominant plant
<i>Carex barbarae</i>	Valley sedge	N	5%	Scattered
<i>Conium maculatum</i>	Poison hemlock	I	+	
<i>Erodium cicutarium</i>	Redstem filaree	E	+	
<i>Galium aparine</i>	Bedstraw	E	4%	
<i>Geranium dissectum</i>	Cutleaf geranium	E	+	
<i>Hedera helix</i>	English ivy	I	2%	
<i>Juglans californica</i>	CA walnut	N	+	Several seedlings
<i>Leymus triticoides</i>	Creeping wild rye	N	12%	Primarily on the upper terrace
<i>Lolium multiflorum</i>	Italian ryegrass	E	5%	
<i>Medicago polymorpha</i>	CA burclover	E	+	
<i>Raphanus sativa</i>	Wild radish	E	+	
<i>Sambucus mexicana</i>	Black elderberry	N	1%	Three large shrubs at center of the site
<i>Sonchus oleraceus</i>	Milk thistle	E	+	
<i>Stipa milacea</i> var. <i>milacea</i>	Smilo grass	I	2%	On site edges

Walnut Creek 2019 Vegetation Monitoring Results

Scientific Name	Common Name	Status	Cover	Comment
<i>Aesculus californica</i>	CA buckeye	N	1%	Several small saplings
<i>Artemisia douglasiana</i>	Mugwort	N	1%	Small colony standing
<i>Arundo donax</i>	Giant reed	I	10%	Being removed
<i>Avena fatua</i>	Slender oat	E	+	
<i>Brassica nigra</i>	Black mustard	E	+	
<i>Bromus hordeaceus</i>	Soft brome	E	+	
<i>Carex barbarae</i>	Valley sedge	N	10%	Dense in patches; growing well
<i>Conium maculatum</i>	Poison hemlock	I	+	
<i>Convolvulus arvensis</i>	Morning glory	E	+	
<i>Erodium cicutarium</i>	Redstem filaree	E	+	
<i>Geranium dissectum</i>	Cutleaf geranium	E	+	
<i>Hedera helix</i>	English ivy	I	5%	Resprouts from roots
<i>Juglans californica</i>	CA walnut	N	+	1 sapling
<i>Leymus triticoides</i>	Creeping wild rye	N	20%	Dense, tall stands in patches
<i>Medicago polymorpha</i>	CA burclover	E	+	
<i>Polypogon monspeliensis</i>	Rabbit's foot grass	E	+	
<i>Populus fremontii</i>	Fremont cottonwood	N	1	Saplings
<i>Quercus agrifolia</i>	Coast live oak	N	2%	Numerous seedlings
<i>Raphanus sativa</i>	Wild radish	E	+	
<i>Robinia pseudoacacia</i>	Black locust	I	+	Near creek edge
<i>Senecio lamarckii</i>	Fireweed groundsel	E	1	
<i>Solanum nigrum</i>	Black nightshade	E	1	
<i>Sonchus oleraceus</i>	Milk thistle	E	+	
<i>Stipa milacea</i> var. <i>milacea</i>	Smilo grass	I	2%	On site edges
<i>Torilis arvensis</i>	Hedgeparsley	E	2%	
<i>Umbellularia californica</i>	California bay	N	+	One large seedling

Lafayette Creek 2019 Vegetation Monitoring Results

Scientific Name	Common Name	Status	Cover	Comment
<i>Aesculus californica</i>	CA buckeye	N	1%	Numerous seedlings
<i>Arundo donax</i>	Giant reed	I	8%	Being removed
<i>Brassica nigra</i>	Black mustard	E	+	
<i>Bromus hordeaceus</i>	Soft brome	E	+	
<i>Bromus diandrus</i>	Ripgut brome	E	+	
<i>Carex barbarae</i>	Valley sedge	N	8%	Becoming dense on lower half of site
<i>Convolvulus arvensis</i>	Morning glory	E	+	
<i>Erodium cicutarium</i>	Redstem filaree	E	+	
<i>Geranium dissectum</i>	Cutleaf geranium	E	+	
<i>Hedera helix</i>	English ivy	I	5%	Resprouts from roots
<i>Juglans californica</i>	CA walnut	N	+	One seedling
<i>Leymus triticoides</i>	Creeping wild rye	N	12%	Dense, tall stands along the upper third of the site
<i>Ligustrum lucidum</i>	Glossy privet	I	+	One resprout
<i>Medicago polymorpha</i>	CA burclover	E	+	
<i>Oxalis pes-caprae</i>	Bermuda buttercup	E	+	
<i>Conium maculatum</i>	Poison hemlock	I	+	
<i>Quercus agrifolia</i>	Coast live oak	N	2%	Numerous seedlings
<i>Rubus armeniacus</i>	Himalayan blackberry	I	+	
<i>Sonchus oleraceus</i>	Milk thistle	E	+	
<i>Stipa milacea</i> var. <i>milacea</i>	Smilo grass	I	+	
<i>Torilis arvensis</i>	Hedgeparsley	E	+	
<i>Umbellularia californica</i>	California bay	N	+	One large seedling
<i>Vinca major</i>	Periwinkle	I	+	

Grayson Creek 2019 Vegetation Monitoring Results

Scientific Name	Common Name	Status	Quad 1	Quad 2	Quad 3	Quad 4
<i>Arundo donax</i>	Giant reed	I	0%	0%	0%	0%
<i>Avena fatua</i>	Slender oat	E	1%	5%		4%
<i>Brassica nigra</i>	Black mustard	E				+
<i>Bromus diandrus</i>	Ripgut brome	E	+	5%		
<i>Carex barbarae</i>	Valley sedge	N	1%	1%	+	
<i>Cirsium vulgare</i>	Bull thistle	E			1%	+
<i>Conium maculatum</i>	Poison hemlock	I	1%	3%	+	3%
<i>Cynodon dactylon</i>	Bermuda Grass	I	1%	5%		25%
<i>Erodium cicutarium</i>	Redstem filaree	E	+	+		2%
<i>Foeniculum vulgare</i>	Fennel	E			1%	5%
<i>Geranium dissectum</i>	Cutleaf geranium	E	+	+		3%
<i>Leymus triticoides</i>	Creeping wild rye	N	4%	5%	5%	
<i>Lepidium latifolium</i>	Pepper Weed	I	1%	5%		
<i>Lolium multiflorum</i>	Italian ryegrass	E	1%	2%		3%
<i>Malva rotundifolia</i>	Cheeseweed	E	1%			
<i>Polygonum aviculare</i>	Knotweed	E	+		+	
<i>Portulaca oleracea</i>	Purslane	E	5%			
<i>Raphanus sativa</i>	Wild radish	E	4%	10%	+	5%
<i>Rubus armeniacus</i>	Himalayan blackberry	I	2%		2%	
<i>Rumex crispus</i>	Curly dock	E				+
<i>Sonchus oleraceus</i>	Milk thistle	E	+			1%
<i>Stipa milacea</i> var. <i>milacea</i>	Smilo grass	I	+	5%		10%
<i>Torilis arvensis</i>	Hedgeparsley	E				3%
<i>Xanthium strumarium</i>	Cocklebur	E	2%	1%		