ANNUAL RESTORATION MONITORING REPORT
YEAR 6

SAN FELIPE CREEK RESTORATION PROJECT
SANTA CLARA VALLEY HABITAT AGENCY

Prepared for

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Section 1. RESTORATION PROJECT OVERVIEW

1.1. INTRODUCTION AND SUMMARY

Nomad Ecology prepared this Annual Monitoring Report for the San Felipe Creek Restoration Project (project) on behalf of the Santa Clara Valley Habitat Agency (Habitat Agency). This report summarizes the annual monitoring results for Year 6 (2024) of monitoring. This monitoring report documents the results of Year 6 monitoring as measured against the San Felipe Creek Restoration Project Mitigation and Monitoring Plan (MMP) (Dudek 2019); however, it should be noted that the Habitat Agency is currently seeking a revision to the MMP to bring the performance standards associated with vegetation into alignment with the ecology of riparian and wetland habitats within the region. Therefore, the report also includes a summary of the proposed revisions to the performance standards and an assessment of the Year 6 project performance against those criteria (Section 4 and 5).

The project consists of the restoration, establishment, and enhancement of aquatic resources along San Felipe Creek and its tributaries between the Corral Trail and Cañada de Pala Trail in the Joseph D. Grant County Park in Santa Clara County, California (Figures 1 and 2). The restoration project contributes to the habitat restoration requirements of the Santa Clara Valley Habitat Plan (ICF International 2012). The project is also intended to provide compensatory mitigation for impacts to Waters of the U.S. and Waters of the State through enrollment of the project into the Santa Clara Valley Habitat Plan In-Lieu Fee Program (July 2023). Restoration of San Felipe Creek is mitigating for impacts from historical land uses and disturbances, enhancing aquatic and upland habitats, making San Felipe Creek more resilient to climate change, and providing educational opportunities for the public (i.e., Grant Park recreational users).

The project is restoring approximately 1 mile of stream through modification of in-channel habitat and restoration of sustainable natural channel and floodplain functions. Restoration construction was completed in 2018 and included the following activities:

- Improvements to park trails and associated drainage features
- Restoration of San Felipe Creek including inset floodplain creation, re-contoured ephemeral drainage, and inset floodplain creation.
- Improvements to an incised agricultural ditch and seasonal wetlands
- Rehabilitation of incised tributaries
- Rehabilitation of Boyds Creek (a tributary to San Felipe Creek) and an associated abandoned channel
- Enhancement of seasonal wetlands and a spring wetland

Per the MMP, monitoring began in 2018 following the completion of construction activities and will extend for a 10-year period through October 2028. This report presents the results of the sixth year (2024) of restoration monitoring. This report provides an overview of the restoration project; performance standards; requirements, timing, and methodology of monitoring efforts; monitoring results; and recommendations.

The performance of the project site is evaluated through comparison of the monitoring data to the performance standards in the current MMP. There are separate performance standards for wetland restoration areas and for stream and riparian buffer areas. There are additional wetland re-establishment success criteria, separate from the performance standards, evaluated in Year 5 and Year 10.

Based on vegetation monitoring in Year 6, the wetland rehabilitation and enhancement areas met four of seven of the interim performance standards. They met maximum cover by weed species, absolute cover of wetland species, target species richness, and hydrology criteria. Unsurprisingly, the restoration areas did not meet three vegetation cover criteria from the original MMP: container plant cover, seeded area cover, or relative cover of native species. However, the interim performance standards for these criteria are not based on realistic ecological development in these systems, as indicated by the fact they are plotted in a linear relationship over time instead of in the form of a natural growth curve. By contrast, the proposed revised performance standards include interim performance standards along natural growth curves that approximates realistic habitat development following restoration. For Year 6, the wetland rehabilitation and enhancement areas have met all of the proposed revised performance standards. Regardless, the site is continuing to grow and develop with increasing native cover. Recommendations are included to keep the site on track toward meeting final performance standards. Based on geomorphology and hydrology monitoring in Year 6 conducted by Balance Hydrologics, Inc. (Balance) (Donaldson et al. 2024), the wetland rehabilitation and enhancement areas are meeting all hydrology performance standards.

Based on vegetation monitoring in Year 6, the stream and riparian buffer areas met three of the six interim performance standards and almost met one of the interim performance standards. They met minimum cover of plants, maximum cover by weed species, and target species richness. They almost met relative cover of native species and are anticipated to meet it in Year 7. Unsurprisingly, the restoration areas did not meet container plant cover or cover of plants grown from cuttings. As with performance standards for wetland areas, the MMP performance standards, which are proposed for revision, do not account for ecological development of riparian vegetation. For Year 6, stream and riparian buffer areas have met all of the proposed revised performance standards. Continued maintenance including caging, mulching, and weed control will ensure these plants continue to grow, mature, and provide sufficient cover to meet final year performance standards, as proposed. Based on geomorphology and hydrology monitoring in Year 6 conducted by Balance (Donaldson et al. 2024), the stream and riparian buffers are meeting all performance standards.

Overall, the site is performing very well, with high cover of native vegetation and diverse native species present in the restored wetlands and stream/riparian buffer areas. Although up to 21% of the original container plantings have been replaced in 2020 (Year 2) and 2021 (Year 3), the strong maintenance effort and above-average precipitation years of 2023 and 2024 have resulted in high survivorship and rapid growth. Many of the original plantings are present, healthy and vigorous, and no longer receiving irrigation. The challenges with plant survivorship in Years 2 and 3 of monitoring have been successfully overcome with increased attention to maintenance, strategic addition of planting materials as part of adaptive management, and pig management including fencing improvements and pig trapping in Grant Park. The hydrologic design of the project, which is the foundation of the restoration project, has been consistently successful with the geomorphic and hydrologic performance standard being met every year. The restored hydrology is driving increased floodplain connectivity and increased groundwater availability which is likely increasing the availability of groundwater from natural precipitation. Good rain years (2023 and 2024) have likely further expedited establishment of replacement plants. This outcome mimics natural cycles where years with abundant precipitation bring higher levels of recruitment, growth, and survivorship than drought years in similar systems.

1.2. PERMIT HOLDER AND INFORMATION

The following permits were secured for this project and are held by the Santa Clara Valley Habitat Agency. This document was prepared in accordance with the conditions provided in the following regulatory permit documents:

- U.S. Army Corps of Engineers (USACE) File Number: 2017-00322S, and RGP 18, File Number: SPN-2012-00302S

- San Francisco Bay Regional Water Quality Control Board, Water Quality Certification, CIWQS Place ID 836012
- California Department of Fish and Wildlife Lake or Streambed Alteration Agreement, Notification Number 1600-2017-0309-R3
- Santa Clara Valley Habitat Agency Reporting File Number SCVHA-2-18-01

1.3. PROJECT SETTING

The project site is in the Joseph D. Grant County Park in unincorporated Santa Clara County, California (Figure 1). The project site is approximately 7 miles east of the City of San Jose in Section 12, Township 7 South, and Range 2 East of the U.S. Geological Survey Lick Observatory 7.5-minute quadrangle. The approximate center of the project site corresponds to GPS coordinates 37.320166, -121.699706. The restoration area is within the San Francisco Bay Area subregion of the California Floristic Province (Baldwin et al. 2012) and within the Coyote Creek Watershed.

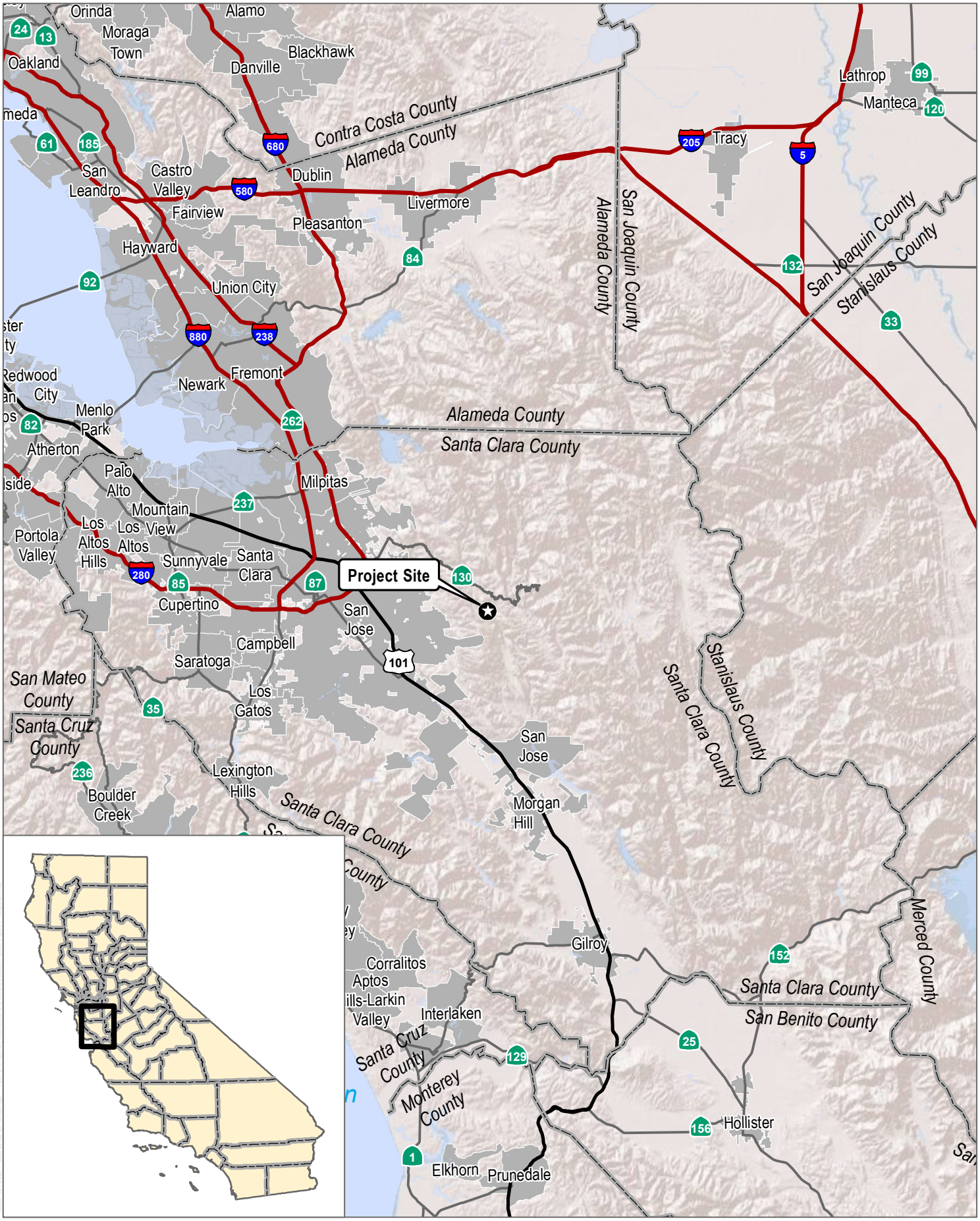
The project site is approximately 61 acres and is along approximately 1 mile of San Felipe Creek. The project site consists of undeveloped parkland bordering the San Felipe Creek corridor south of the Corral Trail and associated tributaries and uplands (Figure 2). Topography within the restoration area consists of low-gradient alluvial valley and terrace terrain, surrounded to the north, east, and south by steepening hill slopes.

1.4. RESTORATION PROJECT PURPOSE AND PROJECT ELEMENTS

1.4.1 PROJECT PURPOSE AND GOALS

The purpose of the project is to restore approximately 1 mile of stream by modifying in-channel habitat and restoring sustainable natural channel and floodplain functions within the reach of San Felipe Creek located between the Corral and Cañada de Pala Trails (Figure 3). Conditions prior to restoration were variable within the project reach but were generally categorized as an incised channel with a disconnected historical floodplain, limited groundwater connectivity, and areas that had converted to upland plant species (denuded of riparian vegetation). Legacy agricultural activities had influenced overland flow pathways and channel morphology. Restoration of San Felipe Creek will mitigate impacts from historical land uses and disturbances, enhance aquatic and upland habitats, make San Felipe Creek more resilient to climate change, and provide educational opportunities for the public. The restoration project was proposed to generate habitat restoration credits and contribute to species recovery per the requirements of the Santa Clara Valley Habitat Plan (Habitat Plan) (ICF International 2012) and mitigation needs of the Regional General Permit 18 (USACE 2016). In order to provide mitigation crediting for Waters of the U.S.—as well as Waters of the State—the qualified restoration credits of the project are proposed for enrollment into the Santa Clara Valley Habitat Plan In-Lieu Fee Program. Restoration of San Felipe Creek within the project area supports the biological goals and objectives of the Habitat Plan.

Overall, the project is resulting in increased aquatic resource functions and services by restoring, establishing, and enhancing wetland and non-wetland waters of the United States, including improving functions within an existing on-site ditch and incised channel, and restoring riparian woodland adjacent to San Felipe Creek. These restoration actions are expected to benefit special-status species such as California tiger salamander (*Ambystoma californiense*) and California red-legged frog (*Rana draytonii*) by providing upland habitat and refugia. The project is also increasing the diversity of native wetland and riparian vegetation, as well as improving the functional capacity of existing on-site streams by increasing the potential for addition of allochthonous material (organic matter and nutrients imported into an ecosystem), providing flood protection benefits, and providing groundwater recharge.



SOURCE: Shaded Relief Basemap

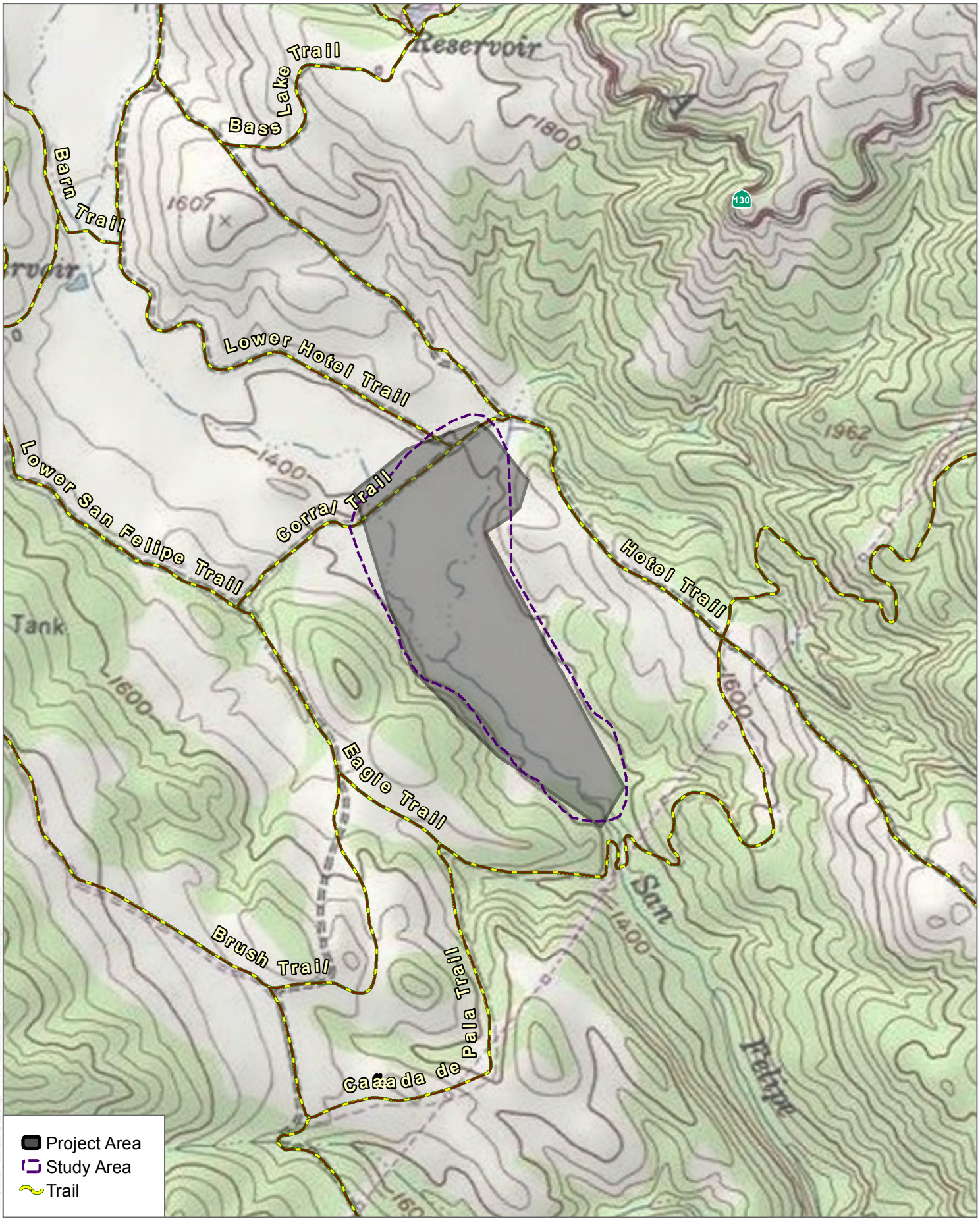
DUDEK

0 4 8 Miles

FIGURE 1

Regional Map

San Felipe Creek Restoration Project



SOURCE: USGS 7.5-Minute Series Lick Observatory Quadrangle

DUDEK

0 500 1,000 Feet

FIGURE 2

Vicinity Map

San Felipe Creek Restoration Project

1.4.2 PROJECT ELEMENTS

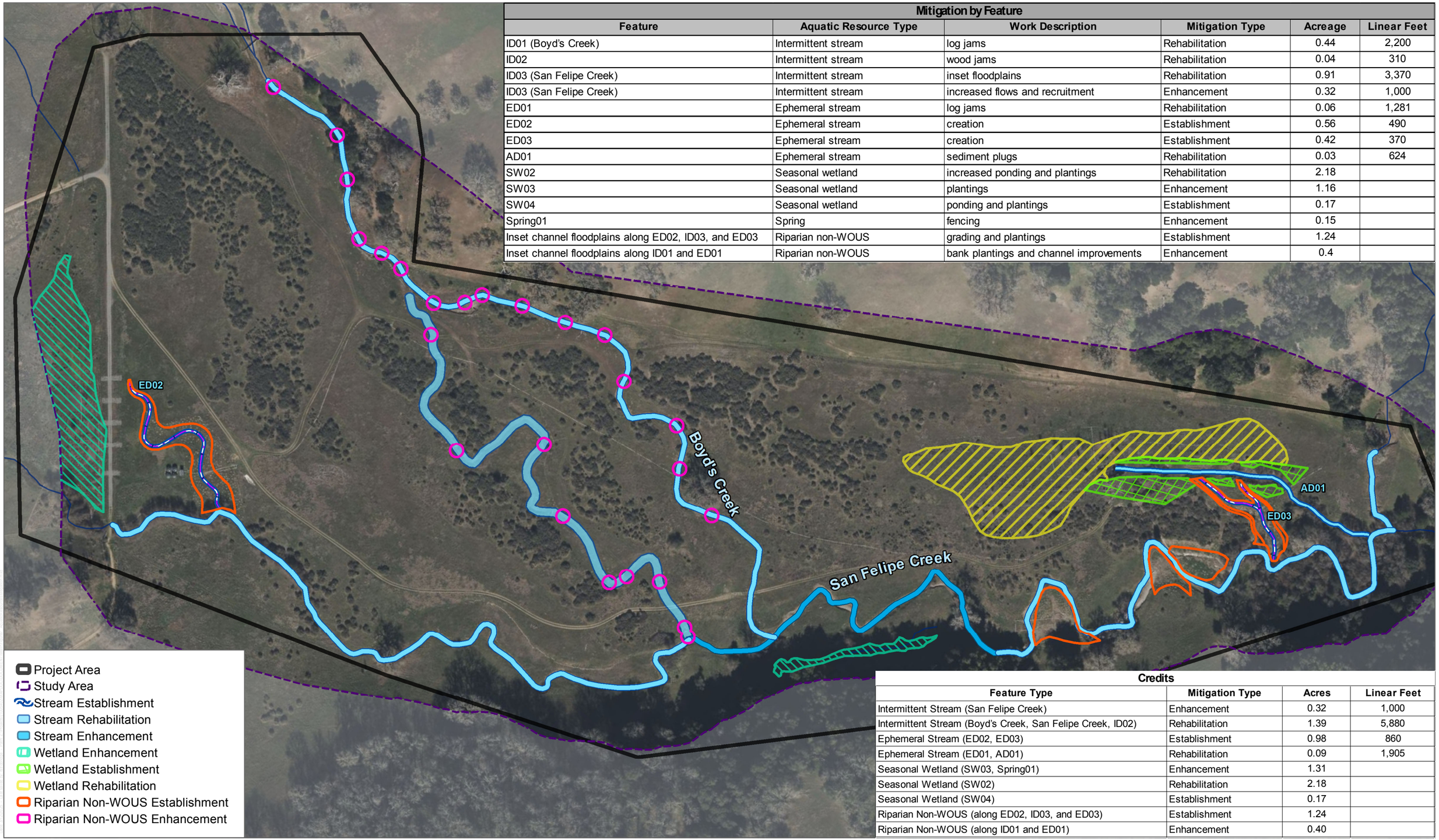
The following project elements were implemented with the goal of establishing (i.e., creating), re-establishing, rehabilitating, and enhancing the creek and wetland areas into the desired habitat types. Per Habitat Plan definitions (ICF International 2012), all of these methods are considered under the umbrella term "restoration." Each element is described in further detail below. The anticipated mitigation type and amount for each project element is provided in Table 1. Features are shown on Figure 3.

Table 1. Aquatic Resource Mitigation Types and Amounts per MMP

FEATURE	AQUATIC RESOURCE TYPE	WORK DESCRIPTION	MITIGATION TYPE[1]	ACREAGE	LINEAR FEET
ID01 (Boyds Creek)	Intermittent stream	Log jams	Rehabilitation	0.44	2,200
ID02 (Eastern Incised Tributary)	Intermittent stream	Wood jams	Rehabilitation	0.04	310
ID03 (San Felipe Creek Reaches 1, 3, and 4)	Intermittent stream	Inset floodplains	Rehabilitation	0.91	3,370
ID03 (San Felipe Creek Reach 2)	Intermittent stream	Increased flows and recruitment	Enhanced	0.32	1,000
ED01 (Boyds Creek Abandoned Channel)	Ephemeral stream	Log jams	Rehabilitation	0.06	1,281
ED02 (Ephemeral Drainage)	Ephemeral stream	Creation	Establishment	0.56	490
ED02 (Ephemeral Drainage)	Ephemeral stream	Creation	Establishment	0.42	370
AD01 (Agricultural Ditch)	Ephemeral stream	Sediment plugs	Rehabilitation	0.03	624
SW02 (Rehabilitated Seasonal Wetland)	Seasonal wetland	Increased ponding and plantings	Rehabilitation	2.18	N/A
SW03 (Enhanced Seasonal Wetland)	Seasonal wetland	Plantings	Enhancement	1.16	N/A
SW04 (Re-established Seasonal Wetland)	Seasonal wetland	Ponding and plantings	Re-establishment	0.17[2]	N/A
Spring01 (Spring Wetlands)	Spring wetland	Fencing	Enhancement	0.15	N/A

Source: San Felipe Creek Restoration Project – Year 3 Annual Report (Dudek 2021)
[1] Per Habitat Plan definitions (ICF International 2012), all of these methods are considered under the umbrella term "restoration."
[2] Year 5 wetland delineation results identified that this feature was 0.17 acres in extent instead of 0.38 acres as depicted in the MMP.

Mitigation by Feature					
Feature	**Aquatic Resource Type**	**Work Description**	**Mitigation Type**	**Acreage**	**Linear Feet**
ID01 (Boyd's Creek)	Intermittent stream	log jams	Rehabilitation	0.44	2,200
ID02	Intermittent stream	wood jams	Rehabilitation	0.04	310
ID03 (San Felipe Creek)	Intermittent stream	inset floodplains	Rehabilitation	0.91	3,370
ID03 (San Felipe Creek)	Intermittent stream	increased flows and recruitment	Enhancement	0.32	1,000
ED01	Ephemeral stream	log jams	Rehabilitation	0.06	1,281
ED02	Ephemeral stream	creation	Establishment	0.56	490
ED03	Ephemeral stream	creation	Establishment	0.42	370
AD01	Ephemeral stream	sediment plugs	Rehabilitation	0.03	624
SW02	Seasonal wetland	increased ponding and plantings	Rehabilitation	2.18	
SW03	Seasonal wetland	plantings	Enhancement	1.16	
SW04	Seasonal wetland	ponding and plantings	Establishment	0.17	
Spring01	Spring	fencing	Enhancement	0.15	
Inset channel floodplains along ED02, ID03, and ED03	Riparian non-WOUS	grading and plantings	Establishment	1.24	
Inset channel floodplains along ID01 and ED01	Riparian non-WOUS	bank plantings and channel improvements	Enhancement	0.4	



Credits			
Feature Type	**Mitigation Type**	**Acres**	**Linear Feet**
Intermittent Stream (San Felipe Creek)	Enhancement	0.32	1,000
Intermittent Stream (Boyd's Creek, San Felipe Creek, ID02)	Rehabilitation	1.39	5,880
Ephemeral Stream (ED02, ED03)	Establishment	0.98	860
Ephemeral Stream (ED01, AD01)	Rehabilitation	0.09	1,905
Seasonal Wetland (SW03, Spring01)	Enhancement	1.31	
Seasonal Wetland (SW02)	Rehabilitation	2.18	
Seasonal Wetland (SW04)	Establishment	0.17	
Riparian Non-WOUS (along ED02, ID03, and ED03)	Establishment	1.24	
Riparian Non-WOUS (along ID01 and ED01)	Enhancement	0.40	

SOURCE: Bing Maps (Accessed in 2019)

DUDEK 0 100 200 Feet

FIGURE 3

Aquatic Resources Mitigation

San Felipe Creek Restoration Project

Improve Corral Trail and Lower Hotel Trail

Prior to restoration efforts, the Corral Trail was lower than the surrounding fields, and it captured runoff that would otherwise flow across and infiltrate into the Boyds Creek alluvial fan, resulting in erosion of the road and excess sediment delivery to San Felipe Creek, and reducing recharge across the alluvial fan. The Corral Trail was modified using filling to allow flows to pass the road to the south onto the alluvial fan. Where runoff flowed across and eroded the Hotel Trail, an Arizona Crossing (i.e., low-flow crossing) was constructed to prevent erosion, reduce fine sediment loading, improve trail access, and reduce trail maintenance.

Along the Corral Trail near the seasonal wetland to the east of San Felipe Creek, there was an existing buried rock drain that was inadequate to carry water across the trail during high-flow periods. The project built up the grade along the Corral Trail to reduce flow and erosion across the trail, in tandem with installation of additional rock drain lenses to carry water from the upstream to downstream side of the road, where it naturally flows into San Felipe Creek. The elevation of the rock lenses was designed to maintain the hydrology of the existing seasonal wetland upstream. To avoid concentration of flows, each drainage lens contains a single 4-inch-diameter high-density polyethylene pipe located at the same elevation. The pipes are redundant and are included to prolong the life of the drainage lenses and avoid erosion of the Corral Trail from overtopping and maintain existing water surface elevations and hydroperiods in the existing wetland. These pipes are intended to provide a low-flow path that can easily be maintained by parks staff.

The aforementioned trail and road modifications did not have any direct impacts on waters of the United States. There are indirect, beneficial effects on downstream water quality and quantity in Boyds Creek and San Felipe Creek. Disturbed areas resulting from the trail improvements were seeded with native upland plant species. The trail itself was not seeded.

Restoration of San Felipe Creek (ID03)

The project approach acknowledges the varying states of incision from reach to reach, and accelerated the channel evolution process by excavating, expanding, and revegetating inset channel floodplains. Advancing the channel evolution process to stable form proactively removes fine sediment before it is introduced to the system by way of bank erosion and failure, while at the same time establishing more frequent floodplain inundation and encouraging more frequent aquifer recharge. The excavated floodplains will likely store fine sediment transported from upstream of the site, further reducing fine-sediment impacts.

Reach 1 (upstream portion of on-site San Felipe Creek [ID03] to confluence with Boyds Creek abandoned channel [ED01])

Inset floodplain creation (ID03-01 and ID03-01A) occurred in Reach 1 of San Felipe Creek (ID03) to advance widening processes and re-sculpt inset flood bench features. The flood bench was excavated between 1 to 3 feet above the channel bed based on storm flow observations; recurrence flow analysis; and relationships between slope, watershed areas, and channel geometry in downstream reference reaches. The restoration approach and plant palettes were tailored to the intermittent flow regime of this area. The above actions should result in creek rehabilitation within Reach 1 of San Felipe Creek. Per Habitat Plan definitions this is considered stream restoration. Additionally, these actions should result in restoration of the willow riparian forest and scrub or mixed riparian forest and woodland land cover type per the Habitat Plan.

Ephemeral Drainage (ED02)

There was a small head cut along San Felipe Creek just downstream of the Corral Trail in the vicinity of ID03-01A. The project re-contoured the feature into a broad ephemeral drainage (ED02) (creek establishment or stream restoration per Habitat Plan definitions) that maintains slow, overland flow as it

approaches San Felipe Creek. The downstream portion of the ephemeral drainage creates a backwater channel when San Felipe Creek floods, slowing flow and increasing early-season infiltration.

Reach 2 (confluence with Boyds Creek abandoned channel downstream to eastern edge of spring wetland)

Reach 2 of San Felipe Creek (ID03) was generally in good condition and had good connection with the valley surface and well-developed inset floodplains, so no work occurred within this reach. Reach 2 will be enhanced by way of increased water flows and improved riparian cover over time.

Reaches 3 and 4 (downstream portion)

Additional inset floodplains (ID03-02, ID03-03, and ID03-04) were developed in this reach of San Felipe Creek (ID03). There were existing inset floodplains, but more extensive floodplain inundation and riparian diversity was intended by lowering selected inset floodplains and planting more riparian species. The restoration approach and plant palettes were tailored to the intermittent flow regime of these areas. The additional inset floodplains should result in creek rehabilitation (stream restoration per Habitat Plan definitions) within Reaches 3 and 4. Additionally, these actions should result in restoration of the willow riparian forest and scrub, or mixed riparian forest and woodland land cover type per the Habitat Plan.

Improve Incised Agricultural Ditch (AD01) and Seasonal Wetlands (SW02 and SW04)

Linear plug treatments were implemented within the incised agricultural ditch (AD01) to slow the drainage of water through the ditch. These sediment plugs serve to re-establish the water table adjacent to the ditch to support additional seasonal wetlands (SW04), arrest incision, and encourage spreading of flows across valley bottomlands. In addition to re-established seasonal wetland areas (SW04), the existing seasonal wetlands (SW02) adjacent to the agricultural ditch were rehabilitated by way of improved hydrology and planting native species. The restoration approach and plant palettes were tailored to the intermittent flow regime of these areas.

Additionally, a new ephemeral creek (ED03) and floodplain feature (ID03-05) were established to direct the channel to a new confluence with San Felipe Creek upstream of the ditch's previous confluence, consistent with valley floor topography. This feature was intended to restore the willow riparian forest and scrub, or mixed riparian forest and woodland land cover type defined in the Habitat Plan. Disturbed existing willows in the incised agricultural ditch were used to revegetate banks and plugs. Undisturbed willows were anticipated to self-propagate upslope in the ditch. Additionally, the established creek was planted with native species. The restoration approach and plant palettes were tailored to the intermittent flow regime of these areas.

Rehabilitate Incising Tributary (ID02) Using Staked Wood Jams

Installation of staked wood jams occurred to rehabilitate (restore per Habitat Plan definitions) the incised tributary (ID02) located in the southern portion of the project site. Staked wood jams retain sediment and aggrade the channel, reversing the downcutting trend. The wood jams were installed in a phased approach, which should result in an eventual 6 to 7 feet of increased channel elevation. The wood jams were planted from cuttings using red willow (*Salix laevigata*) and arroyo willow (*Salix lasiolepis*). The restoration approach and plant palettes were tailored to the intermittent flow regime of these areas.

Rehabilitate Boyds Creek (ID01) and Boyds Creek Abandoned Channel (ED01)

The project elements implemented within the Boyds Creek alluvial fan included living log jams planted with container plants to encourage distribution of flows to abandoned swales and channels across the Boyds Creek fan. Areas at the head of the alluvial fan impacted by former agricultural operations and roads were graded and lowered and overbank swales were restored to allow flood-flows to spread across the alluvial fan more frequently.

Constructed living log jams consist of large wood, with and without root wads, paired with native container plants consisting of western sycamore (*Platanus racemosa*) and valley oak (*Quercus lobata*). The restoration approach and plant palettes were tailored to the intermittent flow regime of these areas. Western sycamore plantings were only used when genetically pure container plants were procured at the time of planting. Valley oaks were used as substitutions, as needed.

Enhancement of Seasonal Wetland (SW03) and Spring Wetland (Spring01)

Within the existing seasonal wetland (SW03) at the northern portion of the project site and the spring wetland (Spring01) adjacent to San Felipe Creek, enhancement (restoration per Habitat Plan definitions) occurred in the form of non-native and invasive plant species control and installation of permanent exclusion fencing to improve wetland habitat diversity and function. Non-native and invasive plants that were removed from the wetlands include poison hemlock (*Conium maculatum*∗), Fuller's teasel (*Dipsacus fullonum**), and curly dock (*Rumex crispus**). Invasive weed control is ongoing in the seasonal wetland and spring wetland.

The spring wetland had been decimated by feral pigs (*Sus scrofa*), and as a result there was little vegetation within the wetland. Permanent exclusion fencing was installed to protect the project area, including the spring wetland. With the exclusion fence installed, the wetland area has naturally revegetated with native plants.

1.4.3 Initial Planting and Seeding

Initial restoration implementation included planting container plants and willow stakes (Table 2) and seeding with native seed mixes (Tables 3-5). Initial planting efforts included installation of 7,624 container plants in the wetland rehabilitation and enhancement areas, 1,871 tree and shrub container plants in the riparian buffer and stream areas, and 400 willow cuttings installed along living log jams and in the riparian enhancement areas (Dudek 2020b, 2021, 2023). A total of 9,514 tree and shrub container plants and willow cuttings were installed during initial planting at the project site.

Table 2. Original Plantings Installed During Initial Restoration Implementation

Scientific Name	Common Name	Type of Planting	Quantity of Planting Installed[1]
Aesculus californica	California buckeye	tree pot4	17
Baccharis salicifolia	mulefat	deepot	110
Carex praegracilis	field sedge	liners	1,882
Frangula californica	California	deepot	65
Juncus effusus	common rush	tree bands	1,741
Juncus patens	spreading rush	tree bands	2,254
Juncus xiphioides	iris-leaved rush	tree bands	1,891
Platanus racemosa	western sycamore	tree pot4	150
Quercus douglasii	blue oak	tree pot4	5
Quercus lobata	valley oak	tree pot4	293
Ribes californicum var. *californicum*	California gooseberry	deepot	160

* Denotes a plant species not native to California.

Scientific Name	Common Name	Type of Planting	Quantity of Planting Installed[1]
Rosa californica	wild rose	deepot	230
Rubus ursinus	California blackberry	deepot	130
Salix laevigata	red willow	cuttings	200
Salix lasiolepis	arroyo willow	cuttings	200
Sambucus mexicana	elderberry	deepot	86
Symphoricarpos albus var. *laevigatus*	snowberry	deepot	100
		Total	**9,514**

Source: San Felipe Creek Restoration Project As Built Plans in the Year 3 Annual Monitoring Report (Dudek 2021).

Table 3. Original Seed Mix Type 1 – Wetland Riparian Mix

Scientific Name	Common Name	Application Rate (lbs. pure live seed/ac)
Achillea millefolium	yarrow	0.2
Cyperus eragrostis	umbrella plant	2.0
Elymus glaucus	blue wild rye	10.0
Elymus trachycaulus	slender wheatgrass	6.0
Festuca rubra	native red fescue	8.0
Hordeum brachyantherum subsp. *brachyantherum*	meadow barley	12.0
Lasthenia californica	goldfields	0.5
	Total	**38.7**

Source: San Felipe Creek Restoration Project As Built Plans in the Year 3 Annual Monitoring Report (Dudek 2021).

Table 4. Original Seed Mix Type 2 – Riparian Mix

Scientific Name	Common Name	Application Rate (lbs. pure live seed/ac)
Achillea millefolium	yarrow	0.2
Cyperus eragrostis	umbrella plant	2.0
Elymus glaucus	blue wild rye	10.0
Elymus trachycaulus	slender wheatgrass	6.0
Festuca rubra	native red fescue	8.0
Heliotropium curassavicum	heliotrope	1.0
Hordeum brachyantherum subsp. *brachyantherum*	meadow barley	12.0
Sisyrinchium bellum	blue-eyed grass	2.0
	Total	**41.2**

Source: San Felipe Creek Restoration Project As Built Plans in the Year 3 Annual Monitoring Report (Dudek 2021).

Table 5. Original Seed Mix Type 3 – Upland Mix

Scientific Name	Common Name	Application Rate (lbs. pure live seed/ac)
Achillea millefolium	yarrow	0.2
Bromus carinatus	California brome	6.0
Clarkia purpurea	purple clarkia	2.0

SCIENTIFIC NAME	COMMON NAME	APPLICATION RATE (LBS. PURE LIVE SEED/AC)
Elymus glaucus	blue wild rye	15.0
Eriogonum fasciculatum	California buckwheat	1.5
Eriophyllum confertifolium	golden yarrow	0.25
Hordeum brachyantherum subsp. *brachyantherum*	meadow barley	8.0
Phacelia californica	California phacelia	1.0
Sisyrinchium bellum	blue-eyed grass	2.0
Stipa pulchra	purple needlegrass	12.0
	Total	**47.95**

Source: San Felipe Creek Restoration Project As Built Plans in the Year 3 Annual Monitoring Report (Dudek 2021).

1.5. RESTORATION IMPLEMENTATION AND MONITORING SCHEDULE

Project construction began in late summer 2018 and continued through November 2018. Implementation of the restoration plantings began once grading of the channel areas and installation of the intended improvements were complete, as per the final as-built engineering plans. Seeding occurred on October 23 and 25, 2018. Planting of woody vegetation and plugs occurred on November 7 through November 19, 2018. Habitat Agency staff submitted the as-built engineering plans to regulatory agencies on May 13, 2019; the plans were also included within the Year 1 Annual Report (Dudek 2020a).

Plantings were made in the fall of 2018. Therefore, the annual monitoring report for 2019 was the Year 1 Report and the report for 2024 is the Year 6 Report. The implementation schedule for the overall restoration program and status is presented in Table 6.

Table 6. Restoration Implementation Schedule

IMPLEMENTATION TASK	SCHEDULE	YEAR 6 STATUS
Order seed and container plants	Upon approval of the 65% Design Submittal.	Complete
Restoration site clearing and grading	After Notice to Proceed with construction and before channel/slope grading.	Complete
Restoration channel/slope grading	After site clearing and grading.	Complete
Restoration area finish grading	Upon certification of channel grading; based on final construction phasing strategy.	Complete
Initial weed treatment	After site grading.	Complete
Temporary irrigation	To be installed after initial weed treatment. Discontinued by the end of Year 3 and removed/abandoned at the end of Year 5.	Complete and Currently Maintained
Seed mix application	Following weed eradication and before container planting.	Complete
Container planting and cutting installation	Following weed eradication and container planting.	Complete. Additional planting occurred in 2020 and 2021, and 2023.

IMPLEMENTATION TASK	SCHEDULE	YEAR 6 STATUS
Establishment Period: Assessment of installation, seed germination, and plant establishment	Weekly during initial 120-day period following seeding and container plant installation.	Complete
Site maintenance	10 years. Monthly during Year 1; monthly during November through April, and every other month during May through October for Years 2–10; maintenance visits will also be informed by the biological monitoring and biologist's recommendations.	Year 6 Complete; Ongoing
Restoration monitoring	Qualitative monitoring quarterly during Year 1, beginning with successful completion of initial maintenance period, and bi-annual during Years 2–10. Quantitative monitoring (transects) annually in Years 2–10.	Year 6 Complete; Ongoing
Final sign-off	End of Year 10 (or following completion of final performance standards)	To be Completed

Source: San Felipe Creek Restoration Project – Year 3 Annual Report (Dudek 2021)

During the 10-year maintenance and monitoring period, the project will be assessed to document the status of the compensatory mitigation effort, measured against the project performance standards outlined in the MMP (Dudek 2019). Dudek conducted the annual restoration monitoring during the initial 3 years of the 10-year monitoring period. Habitat Restoration Sciences Inc. (HRS) conducted the first 3 years of the 10-year site maintenance. Beginning in Year 4 (2022), Nomad Ecology conducted the biological monitoring, and Confluence Restoration, Inc. (Confluence) conducted site maintenance. Balance Hydrologics, Inc. has conducted the geomorphic and hydrologic monitoring since Year 1 (Donaldson et al. 2019-2024).

Annual reports for the 10-year maintenance and monitoring period will be submitted each year for compliance with the permit reporting requirements and will be submitted by December 31 to accommodate California Department of Fish and Wildlife and San Francisco Regional Water Quality Control Board requirements.

1.6. SUMMARY OF ADAPTIVE MANAGEMENT ACTIONS IN PRIOR YEARS

Maintenance and monitoring activities, as well as remedial actions to improve site performance and achievement of performance standards have been ongoing since implementation of the restoration project.

1.6.1 ADDITIONAL PLANTING AND SEEDING EFFORTS

Based on the results of Year 1 and Year 2 monitoring (Dudek 2020a, Dudek 2020b), plantings were not meeting performance standards for survival. Plant loss and mortality that occurred shortly after installation was attributed to high rainfall and heavy flows, with additional loss over time due to feral pig activity, irrigation malfunction, and drought (Dudek 2020b). A Remedial Plan (Dudek 2020c) was developed to correct performance deficiencies of the project, with the intent to bring the project back into conformance with performance standards. Recommendations from the Remedial Plan (Dudek 2020c) included installation of replacement plantings, which was completed in two phases. The replacement planting palettes included additional species not originally included in 2018: coyote brush (*Baccharis pilularis* subsp. *consanguinea*), California mugwort (*Artemisia douglasiana*), toyon (*Heteromeles arbutifolia*), and Fremont cottonwood (*Populus fremontii*) (Table 7 and 11). These species were recommended as replacement plants to add to the species richness and habitat complexity of the project

site and were observed within the San Felipe Creek watershed in the project vicinity. The additional species were approved by the San Francisco Bay Regional Water Quality Control Board on October 21, 2020 (Dudek 2023).

Phase 1 container planting occurred in November 2020, and included 751 container plants (Table 7) installed in the riparian buffer and stream habitats where sediment accretion/deposition occurred (Dudek 2023). Select seeded areas that were eroded by feral pig activity were reseeded in December 2020; seed mixes (Tables 8-10) varied from the original seed mixes due to species availability and were approved by the Habitat Agency. An additional 100 willow cuttings were installed in January 2021 in select locations where soil moisture and hydrology would most likely be conducive to success in ID02, ID03-03, ID03-04, ED03-01, ED03-02, and ED03-03 (Dudek 2023). Phase 2 container planting occurred in October and November 2021, and included an additional 1,273 container plants (Table 11) and 50 willow cuttings (Dudek 2023).

A total of 50 supplemental willow cuttings were installed on February 16, 2023, at locations along ID-03-2, ID-03-03 and ID03-04.

Table 7. Phase 1 Replacement Container Plantings – 2020

Scientific Name	Common Name	Quantity Installed	Planting Area(s)
Baccharis salicifolia	mulefat	92	ID03-1A; ID03-03, -04, -05
Frangula californica	California coffeeberry	153	ID03-1A; ID03-03, -04, -05
Heteromeles arbutifolia[1]	toyon	56	ID03-1A; ID03-03, -04, -05
Juncus balticus subsp. *ater*[1]	Baltic rush	98	SW02, 03
Populus fremontii[1]	Fremont cottonwood	20	ID03-1A; ID03-03, -04, -05
Quercus lobata	valley oak	90	ID03-1A; ID03-03, -04, -05
Rubus ursinus	California blackberry	27	ID03-1A; ID03-03, -04, -05
Salix lasiolepis	arroyo willow	1	ID03-1A; ID03-03, -04, -05
Sambucus mexicana	blue elderberry	102	ID03-1A; ID03-03, -04, -05
Schoenoplectus californicus[1]	California bulrush	112	ED03-02, SW02, 03
	Total Container Plants	**751**	

Source: Record of Replanting Activities for the San Felipe Creek Restoration Project (Dudek 2023).
[1]Denotes species not included in the original plant palette.

Table 8. Phase 1 Reseed Mixes Type 1 – Wetland Mix

Scientific Name	Common Name	Source	Application Rate (lbs. pure live seed/ac)
Carex densa[1]	dense sedge	Alameda County	1.3
Hordeum brachyantherum subsp. *brachyantherum*	meadow barley	Contra Costa County	10.0
Juncus patens	common rush	Alameda County	1.0
		Total	**12.3**

Source: Record of Replanting Activities for the San Felipe Creek Restoration Project (Dudek 2023).
[1]Denotes species not included in the original wetland seed mix.

Table 9. Phase 1 Reseed Mix Type 2 – Riparian Mix

Scientific Name	Common Name	Source	Application Rate (lbs. pure live seed/ac)
Artemisia douglasiana[1]	California mugwort	Alameda County	0.25
Carex densa[1]	dense sedge	Alameda County	1.3
Castilleja exserta[1]	purple owl's clover	Alameda County	2.5
Grindelia stricta[1]	gumweed	Alameda County	2.0
Hordeum brachyantherum subsp.	meadow barley	Contra Costa	10.0
Juncus patens[1]	common rush	Alameda Couty	1.0
Diplacus aurantiacus[1]	sticky monkeyflower	Santa Clara County	0.15
		Total	**17.2**

Source: Record of Replanting Activities for the San Felipe Creek Restoration Project (Dudek 2023).
[1]Denotes species not included in the original riparian seed mix.

Table 10. Phase 1 Reseed Mix Type 3 – Upland Mix

Scientific Name	Common Name	Source	Application Rate (lbs. pure live seed/ac)
Acmispon glaber[1]	deerweed	Santa Clara County	3.0
Artemisia californica[1]	coastal sagebrush	Santa Clara County	0.5
Elymus glaucus	blue wild rye	Santa Clara County	12.0
Eriogonum fasciculatum	California buckwheat	Alameda County	1.5
Eschscholzia californica[1]	California poppy	Alameda County	1.5
Lupinus bicolor[1]	dove lupine	Santa Clara County	4.0
Diplacus aurantiacus[1]	sticky monkeyflower	Santa Clara County	0.15
Salvia millifera[1]	black sage	Santa Clara County	2.0
Stipa pulchra	purple needlegrass	Santa Clara County	12.0
		Total	**36.65**

Source: Record of Replanting Activities for the San Felipe Creek Restoration Project (Dudek 2023).
[1]Denotes species not included in the original upland seed mix.

Table 11. Phase 2 Replacement Plantings – 2021

Scientific Name	Common Name	Quantity Installed	Planting Area(s)
Aesculus californica	California buckeye	104	ID03-02, ID01, ED01
Artemisia douglasiana	California mugwort	96	ID01, ED01
Baccharis pilularis[1]	coyote brush	94	ID03-02, ID01, ED01
Baccharis salicifolia	mulefat	135	ID01, ED01
Frangula californica	California coffeeberry	95	ID03-02, ID01, ED01
Heteromeles arbutifolia[1]	toyon	143	ID03-02
Platanus racemosa	western sycamore	45	ID03-02, ID01, ED01
Populus fremontii[1]	Fremont cottonwood	75	ID03-02

Scientific Name	Common Name	Quantity Installed	Planting Area(s)
Quercus agrifolia[1]	coast live oak	62	ID03-02
Quercus lobata	valley oak	140	ID03-02, ID01, ED01
Ribes californicum var. *californicum*	California gooseberry	25	ID03-02
Rosa californica	California rose	57	ID03-02
Rubus ursinus	California blackberry	55	ID03-02
Sambucus mexicana	blue elderberry	107	ID01, ED01
Symphoricarpos albus var. *laevigatus*	snowberry	40	ID03-02
Total Container Plants		**1,273**	

Source: Record of Replanting Activities for the San Felipe Creek Restoration Project (Dudek 2023).
[1]Denotes species not included in the original plant palette.

1.6.2 Irrigation Management

The irrigation system was transitioned from sprinkler to drip irrigation throughout 2020 and 2021 to ensure replacement plants would receive enough water. The drip irrigation system has been regularly inspected, and repairs and maintenance was regularly conducted to ensure functionality during each monitoring year. As of the end of 2024, only plantings planted in 2022 or later are receiving irrigation.

1.6.3 Geomorphic and Hydrology Adaptive Management Activities

In addition to plantings, additional adaptive management activities have occurred. On November 4, 2020, HRS replaced a log jam in Boyds Creek that had been dislodged in an attempt to protect plantings on an outside bank. On August 26, September 20 and September 21, 2021, HRS constructed a debris jam structure to redirect flows into the pre-project channel alignment where a cutoff channel had formed at ID03-02 in 2019 (Donaldson et al. 2023).

In 2023, the Balance monitoring team observed bank erosion in the Eastern Incised Tributary, caused by an improperly placed fence across the downstream end of the channel that facilitated debris wracking. Bank stabilization work was completed by SCVHA and Triangle Properties in coordination with the Balance project design and monitoring team on November 6, 2023. This work consisted of the removal of fencing installed across the tributary and layering of large rock, slash, and compacted soil, as well as planting willow stakes and adding a staked debris jam along the right bank to prevent future erosion. The repair performed well over 2024, with no further considerable erosion observed in this area (Donaldson et al. 2024).

Details on these adaptive management activities can be found in the Geomorphic and Hydrologic Monitoring Reports (Donaldson et al. 2020, 2023, 2024).

1.7. Proposed Changes to Vegetation Monitoring Performance Standards

In September 2023, the project team met with the permitting agencies to present proposed revisions to the performance standards of the project. The changes were proposed due to the observation by current restoration ecology staff working on the project that a subset of the current MMP performance standards/performance standards are inconsistent with the principles of restoration ecology and habitat development, they do not reflect the site-specific installation design of native plants for the project, and/or they do not accurately reflect the specific ecology of the project site. During the meeting, the permitting

agencies responded favorably to the revisions. In February 2024, the Habitat Agency presented the permitting agencies with a memo titled *San Felipe Creek Riparian Restoration Mitigation Monitoring Plan (MMP) Success Criteria Amendment Proposal* that summarized these proposed revisions to the project MMP performance standards. This memo is attached as Appendix A. In summary, the proposed changes include the following:

Changes to performance standards for Wetland Rehabilitation and Enhancement Areas include:

1. **Consolidate Native Cover Standards**: Replace the three separate standards—cover of container plants, cover of cuttings, and seeded area minimum cover of native plants—with a single performance standard: *absolute cover of native perennial species compared to the reference site*.
2. **Remove "Cover of Cuttings" Standard**: Eliminate this standard, as cuttings were not utilized in wetland rehabilitation and enhancement areas.
3. **Expand Wetland Species Definition**: Modify the "absolute cover of wetland species" standard to include FAC species, providing a more representative comparison between restored and reference wetlands. FAC species have higher cover in both the reference and restored wetlands, so this change increases the comparative capacity of this metric and unifies it with the USACE Uniform Performance Standards for wetlands.
4. **Revise Interim Targets for Relative Cover of Native Species**: Introduce new interim targets that reflect typical natural growth curves, with slower increases in early years and rapid gains approaching Year 10, while maintaining the final success criterion.
5. **Retain Existing Standards for Weed Cover and Species Richness**: No changes proposed to these performance standards.

Changes to performance standards for Non-Wetland Waters (Streams) and Riparian Buffer Areas include:

1. **Consolidate Native Cover Standards**: Replace the separate standards—cover of container plants, cover of cuttings, and seeded area minimum cover of native plants—with a single performance standard: *absolute cover of perennial native species compared to the reference site*.
2. **Adjust Seeded-Only Area Standard**: Revise the standard for seeded-only areas to focus on *seeded area minimum cover of non-invasive plants*, reflecting erosion control goals instead of high native canopy cover.
3. **Revise Interim Targets for Relative Cover of Native Species**: Align interim targets with natural growth curves, reflecting slower early increases and rapid gains nearing Year 10, without changing the final success criterion.
4. **Retain Existing Standards for Weed Cover and Species Richness**: No changes proposed to these performance standards.

These proposed changes streamline vegetation performance standards and align them more closely with ecologically informed restoration goals, ensuring robust outcomes and better tracking of site development over time.

Section 2. YEAR 6 MAINTENANCE AND MANAGEMENT ACTIVITIES

2.1. ROUTINE SITE MAINTENANCE

Routine site maintenance was performed by Confluence throughout the project site during Year 6. Per the MMP (Dudek 2019), maintenance and monitoring are to continue for 10 years or until the project performance standards have been met. Maintenance activities included fence and gate inspection and repair; irrigation inspection, repair, and maintenance; plant inspection and cage repair and upgrading; weed management, control, and treatment; trash and debris removal; mowing; and other related activities. Confluence monitored the site for evidence of feral pig activity, as fences and gates are designed to exclude feral pigs. All maintenance dates, activities and site notes to date for Year 6 are summarized in Table 12. A more extensive table of maintenance activities can be found in Appendix B.

Invasive species are defined in the MMP as species that threaten the diversity or abundance of native species through competition for resources, predation, parasitism, interbreeding with native populations, transmitting diseases, or causing physical or chemical changes to the invaded habitat (Dudek 2019). The California Invasive Plant Council (Cal-IPC) identifies, lists, and rates invasive species (Cal-IPC 2024). Per the MMP, species rated "moderate" or "high" by Cal-IPC are considered weeds and are monitored for comparison to the project performance standards (Dudek 2019). In Year 6, weed management activities targeted black mustard (*Brassica nigra**), hoary mustard (*Hirschfeldia incana**), curly dock, yellow star-thistle (*Centaurea solstitialis**), bull thistle (*Cirsium vulgare**), Italian thistle (*Carduus pycnocephalus* ssp. *pycnocephalus*), stinkwort (*Dittrichia graveolens**), medusahead grass (*Elymus caput-medusae**), and pepperweed (*Lepidium latifolium**).

Table 12. Summary of Site Management Activities for Year 6

MONTH (DAYS) IN 2024	MANAGEMENT ACTIVITIES CONDUCTED DURING MONTH	SITE NOTES
January 18	• Site health inspection • Harvest and plant 24 willow cuttings at ID03-02, 7 California wild rose transplants, and one experimental sycamore cutting	Harvested and planted 24 willows in 4 clusters, at the upper floodplain; ID03-02. Planted 7 rose transplants from creek bank just downstream. Also planted an experimental sycamore cutting. Plants are dormant. Noticed new growth on mugwort and elderberry. Farthest downstream floodgate on San Felipe creek was getting worked on during time of visit. Water levels in ponds are low (1-2 feet), and all other drainages on site are dry. Checked the spring for evidence of pig activity, no rooting observed.
February 2, 12, 15, 16, 22	• Site inspection • Irrigation inspection • Harvest and plant willow cuttings at upper and lower floodplains.	Planted 50+ willow cuttings in lower floodplain, 3-4 ft apart, in clusters of 3-7, primarily on edges of creek with a few in the center of the floodplain. Harvested 20 willows from stand near pump house, and installed them at the upper floodplain. Noticed a large leak at bottom of tank inside the pump house. Appears to have been leaking since the water was turned back on. Closed valves before tanks as well as valve right outside pump house. Water flowing in San Felipe and Boyd creeks. Performed perimeter walk and inspected fence line. No signs of damage. Pig remains observed outside restoration perimeter on the other side of fence.

Month (Days) in 2024	Management Activities Conducted during Month	Site Notes
March 4, 6, 7, 8, 18, 19, 20	• Site inspection • Fence and flap gate inspection and repair • Preparation for new plantings in the lower and upper floodplain	Delivered supplies to the site, including 100 pieces of rebar and 3 rolls of wire for caging. Assessed the three flap-gates. Removed two old fence post stuck under upstream flap gate. Downstream flap gate appears that it will have a gap underneath when water level drops due to channel down cutting. Boyd flap has water flowing through it with not much sediment built up behind it. Water flowing in all creeks and channels. Standing water is present in the flow line at the pump house and both creek crossings in the site have water flowing through. Planted 60 new plants in the lower floodplain and 40 in the upper floodplain. Folded gopher baskets in preparation for plantings. Elderberry are very green throughout and found many buckeye seedlings sprouting. No signs of acorn sprouts yet. Lower floodplain shows a lot of mugwort regrowth.
April 18, 23	• Site inspection • Irrigation inspection, repairs, and maintenance • Weed control • Plant inspection and maintenance	Purchased 1000 linear feet (10 rolls) of wire for browse cage upsizing, which will make approximately 120 cages that are 2.5 diameter Observed herbicide treatment on the perennial pepperweed in SW03 wetland was pretty successful with about 25% regrowth. Assessed irrigation system. Replaced a cracked irrigation fitting at the pump house. Float valve is sticky, which makes it difficult for the float to fully turn off. Pressurized system and flushed air from the lines. Soil moisture is still medium to high in most basins at the upper floodplain. Plants on the center “island” of the floodplain are considerably drier due to gravely soil. Ponds are full and have recently spilled over into the side channel. Flap gates are pig secure at this time. Plants are very healthy throughout with a lot of new native recruits but, also a lot of weeds. New buckeyes from seed are coming up but no signs of acorn sprouts yet. Weeded Italian thistle, curly dock, and mustard. Removed small cages from 7 snowberry plants. Wire was badly intertwined with the snowberry and the plants are spreading. 1000+ feet of dripline tubing is needed to run to the new plants in the Upper floodplain; probably need a similar amount of new drip tubing in the lower floodplain as well.
May 1, 2, 10, 16, 23	• Irrigation inspection, repairs, and maintenance • Weed control • Plant inspection and maintenance	Irrigation system inspected and repaired as needed. Built a new valve assembly at the upper floodplain, ID03-02. Laid out drip irrigation to all new plantings in the upper floodplain, approximately 160 total (cuttings, container plants, transplants and seeded basins). Cleaned filters and set timers to run weekly on new plantings. Buckeye seeds are growing taller, observed one acorn planted basin with an oak seedling. Mowed invasive weeds along the Corral trail road including medusahead grass and yellow starthistle. Weeded planted areas in the upper floodplain. Mowed medusahead in SW02 and SW03.

Month (Days) in 2024	Management Activities Conducted during Month	Site Notes
June 3, 10, 13, 14, 19, 20	• Irrigation inspection, repairs, and maintenance • Weed management • Plant inspection and maintenance • Mowed roads and access points	Mowed roadways and staging areas along upper and lower floodplain Inspected fence line and gates. Observed a location where fence could be closed tighter where previous repairs were made. Lower San Felipe flap-gate with a significant gap underneath from stream downcutting. Assembled cages and installed larger cages to 45 plantings. Irrigation system inspected and made repairs as needed. Cleaned filters in upper and lower floodplains. Repaired irrigation tubing chewed by rodents. Hand-pulled weeds from planted basins and outside of cages, including yellow starthistle and mustard. Mowed medusahead in SW02 and SW03 and pump house.
July 5, 10, 15, 16, 24, 25, 29, 31	• Irrigation inspection repairs, and maintenance • Weed management • Plant inspection and maintenance, cage installation • Mowed roads and access points	Goat grazing work being completed in ID-03-01B outside of planted areas. Hand-pulled high priority invasive plants and mowed weeds around plantings, focusing on stinkwort, yellow starthistle, and perennial pepperweed. Mowed patches of mustard plants near plantings. Irrigation system inspected and repaired as needed. Assessed tank filling issue. Hand watered some older plants. Rodents chewing the irrigation line, and causing breaks, made repairs as needed. Applied deer repellent to new willow plantings. Observed rodent browsing activity on woody plants. Assembled cages and installed larger cages to plantings. Some plant mortality observed, but the site is doing well overall. Pond level at the uppermost pond is drying out. Mowed access road to Boyd's Creek.
August 15, 16, 29, 30	• Irrigation inspection, repairs, and maintenance • Weed management • Plant inspection and maintenance, larger cage installation • Mowed roads and access points	Weeded yellow starthistle, bull thistle, and mustard at ID03-05, ED03-01, ED03-02, ED03-03, ED03-04, ED03-05, and upper floodplains. Mowed larger stands of dry mustard and raked up. Flagged 30+ trees to receive larger cages. Small cages on large plants and empty basins removed. Installed 28 larger cages to plants in the pond basins and side-channel planting areas. Noticed more dead trees with bark chewed off at the base from rodent browsing. Applied deer repellent to new willow plantings in the lower and upper floodplain planting areas. Browsing has slowed down on these willows, so deer repellent spray is proving to be effective. Sprayed trees in the pump house area with repellent as well, particularly to vole browsing locations lower on the main trunks. Applied herbicide to perennial pepperweed stand in SW03 with 1 gallon Polaris mix (4 oz. Polaris) Irrigation system inspected and repaired as needed.

Month (Days) in 2024	Management Activities Conducted during Month	Site Notes
September 5, 6, 10, 12, 18, 19, 20, 24, 25	• Irrigation inspection, repairs, and maintenance • Weed management, treatment • Plant inspection and maintenance, larger cage installation	Mowed both sides of creek in ID02. Hand pulled yellow starthistle, and mowed large patches. Pulled and mowed weed debris brought to a dump site at corner of site for removal. Hand pulled stinkwort and tree tobacco from creek bed drainages. Removed PVC and dripline laterals in Boyd Creek irrigation zone. Removed small cages on empty basins and large plants. Installed larger cages to 29 additional plants. Materials are staged for removal from site. Weeded dry grass from planted basins and sprayed repellent on the plants in the pump house zone to deter vole activity. Seeing some improvement in plant health, but minimal. Some vole damage observed on cottonwoods and elderberry in upper floodplain, and some new plants in the lower floodplain. Irrigation system inspected and repaired as needed. Perennial pepperweed flowering heads removed at SW03. Resprayed the stand in SW03 with 1.5 gallons (6 oz. Polaris). Ponds still with some standing water at base.
October 2, 7, 16, 22, 31	• Fence, site inspection • Irrigation inspection, repairs, and maintenance • Weed management, treatment • Plant inspection and maintenance, larger cage installation • Seed and cutting harvesting, preparation for 2024 replanting effort.	Irrigation system inspected and repaired as needed. Float valve stuck at tanks and overflowing, and repaired. Remove drip irrigation from larger plants, hand water as needed. Removed remaining drip irrigation tubing and cages, and fixed the PVC pipe in the lowest 3 planting zones on Boyd Creek. Performed perimeter walk and inspected fence line. No signs of damage. Weeded yellow starthistle, mustard, tobacco, white top, prickly lettuce, and stinkwort. Consolidated weeds into one pile below large bay at the base of the hill for removal. Removed 13 small cages from the upper floodplain planting area, 11 from large plants growing out of cage, and 2 were at empty basins. Constructed 11 new large cages with remaining wire on site, and installed to plants. Several plantings from 2024 effort have died, including most new toyon plantings. Only 1-2 acorns survived, most did not sprout, nearly all buckeye seedlings are alive and doing well. Locations where 2024 planting efforts were not successful will be used for fall 2024 planting effort from seeds or cuttings harvested on site or very nearby including coast live oak and valley oak acorns, coffeeberry seeds, willow cuttings, possibly mulefat cuttings, cottonwood and sycamore cuttings, bare root rose and other transplants. Upper and lower floodplains have about 40 empty basins each, the pump house area has room for 50-100 new plants due to vole damage, totals 120-180 replants possible for 2024. Native plant cover is increasing in cover, including sticky monkeyflower, narrowleaf milkweed, western vervain, blue witch nightshade, willow herb, coyote mint, California everlasting, vinegar weed, California poppy, bee plant, stinging nettle, yarrow, and sage brush. Applied repellent to plantings in lower and upper floodplains and pump house planting area. Browsing and chewing has decreased, and many heavily damaged plants are now recovering with new growth and stump sprouts. Vole damage has caused some mortality to container plants. Collected valley oak and coast live oak acorns. Collected coffeeberry seed from individual on dirt road to Boyd Creek Helix on site making repairs in southern most section of site. Beaver dams and grading is complete.

Month (Days) in 2024	Management Activities Conducted during Month	Site Notes
November 7, 12	• Irrigation maintenance and preparation for the winter season • Weed management • Plant inspection and maintenance	Loaded trailer and hauled metal wire and caging materials from site. Weeded the upper floodplain planting area. Checked herbicide application of perennial pepperweed at SW03, appears successful. Prepared irrigation system for winter by removing the creek crossing PVC pipes and draining the 3" mainline. Watered plants at pump house zone and older plants in upper and lower floodplain zones before turning off the water system.

2.2. Supplemental Plantings

Approximately 50 supplemental willow cuttings were harvested from on site and installed on January 18 and Feb 16, 2024, in the upper floodplain at ID-03-2. On February 15, 2024, more than 50 supplemental willow cuttings were planted in the lower floodplain, 3-4 feet apart in clusters of 3-7 individuals.

A supplemental planting effort of 100 container plants was completed between March 18-20, 2024 at ID03-02, ID-03-03, ID-03-04, and ID03-05. The container plantings included 30 mulefat (*Baccharis salicifolia*), 20 blue elderberry (*Sambucus mexicana*), 20 coffeeberry (*Frangula californica* subsp. *californica*), 15 toyon, and 15 coyote brush. Additionally, 100 willow cuttings, 60 basins planted with oak acorns [a mix of valley oak and coast live oak (*Quercus agrifolia*)], and 40 California buckeye (*Aesculus californica*) seeds were planted.

2.3. Geomorphic and Hydrologic Adaptive Management

In 2024, the SCVHA moved forward with additional strategic adaptive management actions for select areas, which Balance recommended in the Year 5 monitoring report (Donaldson et al., 2023). The project site is already meeting all hydrologic and geomorphic performance standards, so these actions were designed with stewardship in mind, to enhance the hydrologic performance of the site. Balance provided design recommendations for these structures as part of the 2024 adaptive management effort (Goodwin et al. 2024). The effort was completed by SCVHA and Helix Environmental Construction Group (Helix) in coordination with the Balance project design and monitoring team. First, as proposed in the original design basis report (Donaldson et al., 2017), Helix installed three additional timber debris jams, and three staked debris jams in the Incised Eastern Tributary (ID02), to continue to promote channel aggradation through this reach and elevate the alluvial aquifer. Second, Helix lowered the Boyds Creek distributary channel inlets and constructed eleven Type 1 debris jams throughout the Boyds Creek mainstem, to promote more regular activation and inundation of the distributary channels and further restore the alluvial fan function in this area. In channel grading activities occurred between September 5 and October 15, 2024. Minor adjustments to debris jams (i.e., placement of rock and wood), seeding, and demobilization were implemented on October 16 and 17, 2024.

Details on this adaptive management activity including photos can be found in the 2024 Geomorphic and Hydrologic Monitoring Report (Donaldson et al. 2024).

Section 3. SUCCESS CRITERIA, PERFORMANCE STANDARDS AND MONITORING METHODS

The MMP contains success criteria for wetland re-establishment areas, performance standards for wetland rehabilitation and enhancement areas, and performance standards for non-wetland waters (streams) and riparian buffer areas (Dudek 2019). The performance standards were established in the MMP to determine if the compensatory mitigation project is achieving its objectives. The MMP requires the site to be monitored and maintained for 10 years (2019 to 2028) or until performance standards have been met. As discussed in Section 1.7, the Habitat Agency proposed amendments to the MMP performance standards that would better reflect the site performance. These are discussed in this section. Restoration features are shown in Figures 3 and 4.

3.1. WETLAND RE-ESTABLISHMENT SUCCESS CRITERIA

Per the MMP, the following functional wetlands success criteria must be met for the wetland re-establishment mitigation areas by the end of Year 5 or Year 10 of monitoring.

3.1.1 WETLANDS RE-ESTABLISHMENT AREAS MUST MEET ALL THREE WETLAND PARAMETERS

The wetlands re-establishment areas under the jurisdiction of the USACE must meet the definition of three-parameter USACE-jurisdictional wetlands by the end of the 5-year maintenance and monitoring period. A delineation of the wetland establishment areas will be required prior to resource agency sign-off from the USACE and RWQCB. If it is determined that the wetland establishment areas meet the vegetation and hydrology criteria for a USACE wetland, but are lacking hydric soils, the USACE may waive, at their discretion, the need to obtain hydric soils prior to sign-off if the site is progressing towards hydric soils and will likely become hydric in the near future.

3.1.2 WETLANDS RE-ESTABLISHMENT AREAS MUST BE SELF-SUSTAINING

The wetlands re-establishment mitigation areas must be self-sustaining (i.e., able to survive on their own without artificial support) by the end of the 10-year maintenance and monitoring period. Determination of self-sustainability will be the presence of natural growth cycles and healthy wetlands vegetation that has not been irrigated in the preceding 2 years prior to the end of the 10-year maintenance and monitoring period.

3.1.3 WETLANDS RE-ESTABLISHMENT AREAS MUST SHOW EVIDENCE OF NATURAL RECRUITMENT

The wetlands re-establishment mitigation areas must show evidence of natural recruitment of native wetlands and/or riparian species within the mitigation area. This means naturally occurring native species colonize the site in addition to the originally planted container plants or applied seed.

3.2. WETLAND REHABILITATION AND ENHANCEMENT AREAS PERFORMANCE STANDARDS

Per the MMP, the following performance standards will be achieved for all wetland rehabilitation and enhancement areas at the end of each year of monitoring. Table 13 outlines the performance standards as outlined in the MMP (Dudek 2019). Table 14 outlines the proposed revisions to the wetland rehabilitation and enhancement areas vegetative performance standards. If revegetation efforts fail to meet performance

standards in any one year, the habitat restoration specialist will recommend remedial actions to the Habitat Agency and maintenance contractor that will help enhance the project to a level of conformance. Several of the performance standards require comparison of the restoration site to a reference site which are shown in Figure 4.

Sheet 1
Sheet 3
Sheet 2
Lower Hotel Trail
Corral Trail
Boyd's Creek
San Felipe Creek
Abandoned Boyd's Creek Channel
Boyd's Creek
Eastern Tributary
Spring 01
01
02
03
04
05
06
07
08
09
10
11
RG
39
35*
35
34
33
32
31
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36
36
37
38
40
29/29*
28
SW03
ED03
ID03-01A
ID03
ID03-1B
ID01
ED01
SW02
SW04
ED03-01
ED03-02
ED03-03
ED03-04
ED03-05
16*
17/17*
18/18*
27
27*
21
26
22*
16
19/19*
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12
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ID02
AD01
ID03-04
ID03-05
ID03-03
ID03-02
ID03
ED03
ID03
NOMAD ECOLOGY

February 2025

Legend

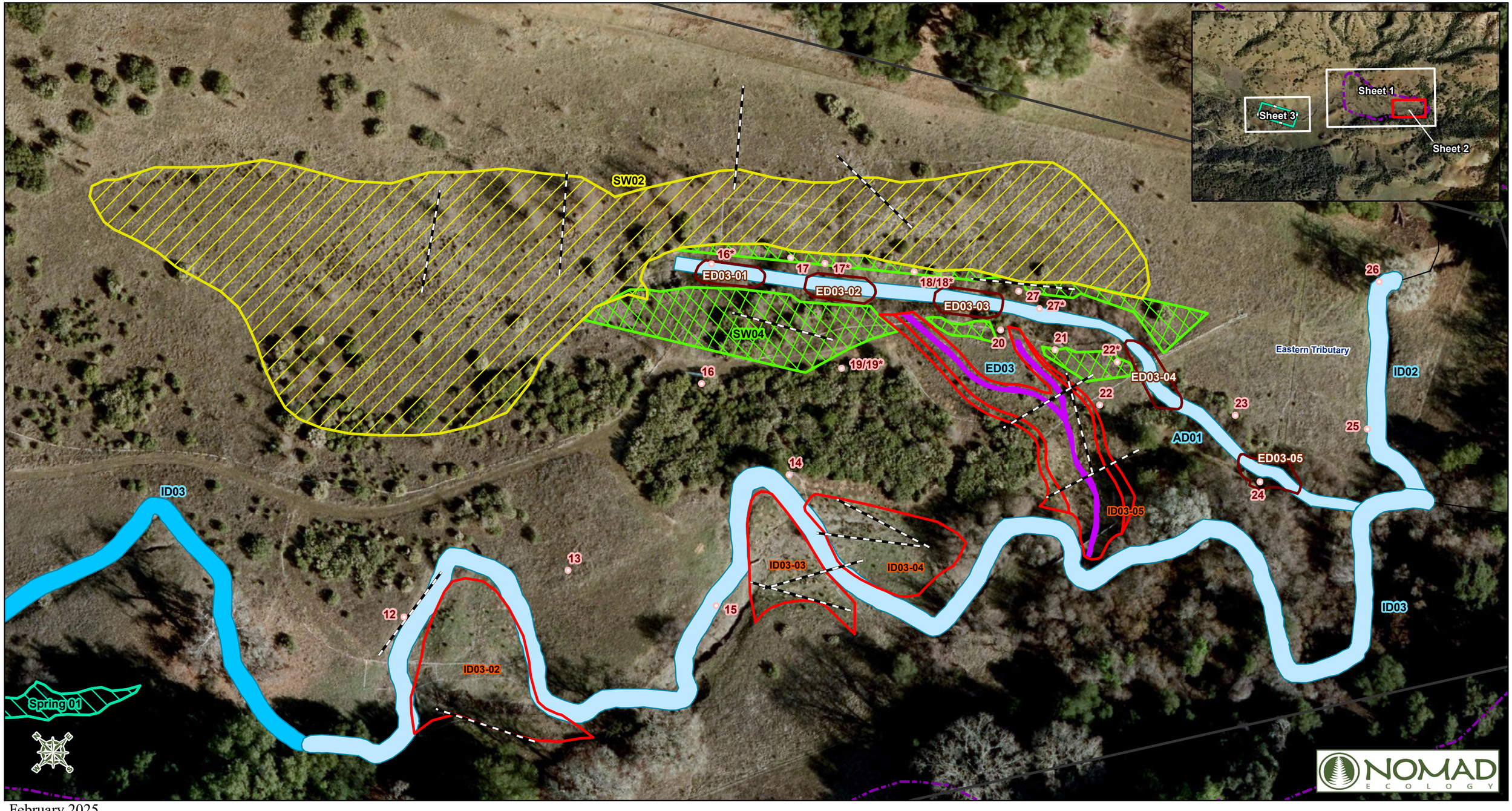
- Project Area
- Study Area
- Wetland Reference Site
- Photo Point Locations
- Vegetation Monitoring Transects
- Stream Establishment
- Stream Rehabilitation
- Stream Enhancement
- Wetland Enhancement
- Wetland Establishment
- Wetland Rehabilitation
- Riparian Non-WOUS Enhancement
- Riparian Non-WOUS Establishment
- Riparian Non-WOUS Enhancement - Not for Credit
- Other (Agricultural Ditch Sediment Plugs)

Figure 4
Transect, Photo Point, and Reference Site Locations
San Felipe Creek Restoration Project

1:3,000
0 125 250
Feet

Sheet 1 of 3

Santa Clara County, California



February 2025

Legend

- Project Area
- Study Area
- Photo Point Locations
- Vegetation Monitoring Transects
- Stream Establishment
- Stream Rehabilitation
- Stream Enhancement
- Wetland Enhancement
- Wetland Establishment
- Wetland Rehabilitation
- Riparian Non-WOUS Enhancement
- Riparian Non-WOUS Establishment
- Other (Agricultural Ditch Sediment Plugs)

Figure 4

Transect, Photo Point, and Reference Site Locations

San Felipe Creek Restoration Project

1:900

0 37.5 75 Feet

Sheet 2 of 3

Santa Clara County, California

February 2025

Legend
- Photo Point Locations
- Vegetation Monitoring Transects
- Riparian Reference Site

Figure 4
Transect, Photo Point, and Reference Site Locations
San Felipe Creek Restoration Project

1:1,800
0 75 150
Feet

Sheet 3 of 3

Santa Clara County, California

Table 13. Wetland Rehabilitation and Enhancement Performance Standards

Performance Metric	Monitoring Year									
	1 (2019)	2 (2020)	3 (2021)	4 (2022)	5 (2023)	6 (2024)	7 (2025)	8 (2026)	9 (2027)	10 (2028)
Container Plants (Minimum Performance)	90% plant survivorship	85% plant survivorship	25% vegetated cover	30% vegetated cover	35% vegetated cover	40% vegetated cover	45% vegetated cover	50% vegetated cover	55% vegetated cover	60% vegetated cover
Cuttings (Minimum Performance)	70% plant survivorship	65% plant survivorship	15% vegetated cover	20% vegetated cover	25% vegetated cover	30% vegetated cover	35% vegetated cover	40% vegetated cover	45% vegetated cover	50% vegetated cover
Seeded Areas (Minimum Cover of Plants)[1]	50% cover	55% cover	60% cover	65% cover	70% cover	70% cover	70% cover	70% cover	70% cover	70% cover
Maximum Cover by Weed Species[2]	15% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover
Absolute Cover of Wetland Species (OBL, FACW, or FAC)[3]	≥50% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species
Relative Cover of Native Species	≥50% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species
Target Species Richness	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site
Hydrology	≥14 days of ponding or saturated soils in an average or above-average precipitation year	≥14 days of ponding or saturated soils in an average or above-average precipitation year	≥14 days of ponding or saturated soils in an average or above-average precipitation year	≥14 days of ponding or saturated soils in an average or above-average precipitation year	≥14 days of ponding or saturated soils in an average or above-average precipitation year	≥14 days of ponding or saturated soils in an average or above-average precipitation year	≥14 days of ponding or saturated soils in an average or above-average precipitation year	≥14 days of ponding or saturated soils in an average or above-average precipitation year	≥14 days of ponding or saturated soils in an average or above-average precipitation year	≥14 days of ponding or saturated soils in an average or above-average precipitation year

Source: San Felipe Creek Restoration Project – Mitigation and Monitoring Plan (Dudek 2019)
Year 6 is shaded gray as these are the applicable performance standards for this annual report.
[1] Although the MMP says "Minimum Cover of Native Plants", this performance standard has been interpreted to be Minimum Cover of all Plants starting in Year 1 (Dudek 2020a).
[2] Weeds shall be non-native plant species rated Moderate to High according to the California Invasive Plant Council excluding common non-native grass species that have naturalized throughout California (Cal-IPC 2024).
[3] Prior project reports mistakenly defined wetland species as consisting of OBL and FACW species. This report and all subsequent reports define wetland species by the indicators OBL, FACW, and FAC, in accordance with the USACE wetland delineation methodology.
[4] The seasonal wetland reference site is in the northeastern portion of SW03 and is shown in Figure 4.

Table 14. Proposed Wetland Rehabilitation and Enhancement - Vegetation Performance Standards Revisions

Performance Metric	Monitoring Year									
	1 (2019)	2 (2020)	3 (2021)	4 (2022)	5 (2023)	6 (2024)	7 (2025)	8 (2026)	9 (2027)	10 (2028)
Absolute Cover of Native Species Compared to Reference Site[1]	90% plant survivorship	85% plant survivorship	≥ 6% of reference site absolute cover	≥ 10% of reference site absolute cover	≥ 15% of reference site absolute cover	≥ 21% of reference site absolute cover	≥ 29% of reference site absolute cover	≥ 40% of reference site absolute cover	≥ 55% of reference site absolute cover	≥ 75% of reference site absolute cover
Maximum Cover by Weed Species[2]	20% cover	15% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover
Absolute Cover of Wetland Species (OBL, FACW, or FAC)[3]	≥50% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species	≥75% reference[4] absolute cover of wetland species
Relative Cover of Native Species	≥15% relative cover of native species	≥15% relative cover of native species	≥15% relative cover of native species	≥20% relative cover of native species	≥30% relative cover of native species	≥40% relative cover of native species	≥50% relative cover of native species	≥60% relative cover of native species	≥70% relative cover of native species	≥75% relative cover of native species
Target Species Richness	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site

[1]Cells highlighted in gray are revised.
[2]Weed species are those categorized as highly invasive by the California Invasive Plant Council (Cal-IPC), and/or those identified by the monitoring restoration ecologist as having the potential to interfere with meeting project goals.
[3] Prior project reports mistakenly defined wetland species as consisting of OBL and FACW species. This report and all subsequent reports define wetland species by the indicators OBL, FACW, and FAC, in accordance with the USACE wetland delineation methodology.
[4] The seasonal wetland reference site is in the northeastern portion of SW03 and is shown in Figure 4.

3.3. Non-Wetland Waters (Streams) and Riparian Buffer Areas Performance Standards

Per the MMP, the following performance standards will be achieved for non-wetland waters (streams) and riparian buffer areas at the end of each year of monitoring (Dudek 2019). Table 15 outlines the performance standards as outlined in the MMP (Dudek 2019). Table 16 outlines the proposed revisions to the non-wetland waters (streams) and riparian buffer areas vegetative performance standards. If revegetation efforts fail to meet performance standards in any one year, the habitat restoration specialist will recommend remedial actions to the Habitat Agency and maintenance contractor that will help enhance the project to a level of conformance. Several of the performance standards require comparison of the restoration site to a reference site which are shown in Figure 4.

Table 15. Non-Wetland Waters (Streams) and Riparian Buffer Areas Performance Standards

Performance Metric	Monitoring Year									
	1 (2019)	2 (2020)	3 (2021)	4 (2022)	5 (2023)	6 (2024)	7 (2025)	8 (2026)	9 (2027)	10 (2028)
Container Plants (Minimum Performance)	90% plant survivorship	85% plant survivorship	25% vegetated cover	30% vegetated cover	35% vegetated cover	40% vegetated cover	45% vegetated cover	50% vegetated cover	55% vegetated cover	60% vegetated cover
Cuttings (Minimum performance)	70% plant survivorship	65% plant survivorship	15% vegetated cover	20% vegetated cover	25% vegetated cover	30% vegetated cover	35% vegetated cover	40% vegetated cover	45% vegetated cover	50% vegetated cover
Seeded Areas (Minimum cover of all plants)[1]	50% cover	55% cover	60% cover	65% cover	70% cover	70% cover	70% cover	70% cover	70% cover	70% cover
Maximum Cover by Weed Species[2]	20% cover	15% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover
Relative Cover of Native Species	≥50% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species
Target Species Richness	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]
Hydrology – Inset Floodplains on San Felipe Creek	Inset Floodplain inundation if peak flows exceed a 2-year event	Inset Floodplain inundation if peak flows exceed a 2-year event	Inset Floodplain inundation if peak flows exceed a 2-year event	Inset Floodplain inundation if peak flows exceed a 2-year event	Inset Floodplain inundation if peak flows exceed a 2-year event	Inset Floodplain inundation if peak flows exceed a 2-year event	Inset Floodplain inundation if peak flows exceed a 2-year event	Inset Floodplain inundation if peak flows exceed a 2-year event	Inset Floodplain inundation if peak flows exceed a 2-year event	Inset Floodplain inundation if peak flows exceed a 2-year event
Hydrology – Boyds Creek Alluvial Fan – Living Log Jams	Flow in 2 or more channels during the winter season	Flow in 2 or more channels during the winter season	Flow in 2 or more channels during the winter season	Flow in 2 or more channels during the winter season	Flow in 2 or more channels during the winter season	Flow in 2 or more channels during the winter season	Flow in 2 or more channels during the winter season	Flow in 2 or more channels during the winter season	Flow in 2 or more channels during the winter season	Flow in 2 or more channels during the winter season
Channel Form	< 1 foot of channel bed elevation loss	< 1 foot of channel bed elevation loss, averaged over reach and absent of significant knickpoint	< 1 foot of channel bed elevation loss, averaged over reach and absent of significant knickpoint	<1 foot of channel bed elevation loss, averaged over reach and absent of significant knickpoint	<1 foot of channel bed elevation loss, averaged over reach and absent of significant knickpoint	< 1 foot of channel bed elevation loss, averaged over reach and absent of significant knickpoint	< 1 foot of channel bed elevation loss, averaged over reach and absent of significant knickpoint	< 1 foot of channel bed elevation loss, averaged over reach and absent of significant knickpoint	< 1 foot of channel bed elevation loss, averaged over reach and absent of significant knickpoint	<1 foot of channel bed elevation loss, averaged over reach and absent of significant knickpoint

Corral Trail Drainage Lenses	During- and post-storm: If Corral Trail is/was overtopped, positive flow off of road maintained with no significant erosion of road or fill prism. Dry season: pipes are not plugged.	During- and post-storm: If Corral Trail is/was overtopped, positive flow off of road maintained with no significant erosion of road or fill prism. Dry season: pipes are not plugged	During- and post-storm: If Corral Trail is/was overtopped, positive flow off of road maintained with no significant erosion of road or fill prism. Dry season: pipes are not plugged	During- and post-storm: If Corral Trail is/was overtopped, positive flow off of road maintained with no significant erosion of road or fill prism. Dry season: pipes are not plugged	During- and post-storm: If Corral Trail is/was overtopped, positive flow off of road maintained with no significant erosion of road or fill prism. Dry season: pipes are not plugged	During- and post-storm: If Corral Trail is/was overtopped, positive flow off of road maintained with no significant erosion of road or fill prism. Dry season: pipes are not plugged	During- and post-storm: If Corral Trail is/was overtopped, positive flow off of road maintained with no significant erosion of road or fill prism. Dry season: pipes are not plugged	During- and post-storm: If Corral Trail is/was overtopped, positive flow off of road maintained with no significant erosion of road or fill prism. Dry season: pipes are not plugged	During- and post-storm: If Corral Trail is/was overtopped, positive flow off of road maintained with no significant erosion of road or fill prism. Dry season: pipes are not plugged	During- and post- storm: If Corral Trail is/was overtopped, positive flow off of road maintained with no significant erosion of road or fill prism. Dry season: pipes are not plugged
Lower Hotel Trail Arizona Crossing	Articulated mat is stable and no significant knickpoints have formed	Articulated mat is stable and no significant knickpoints have formed	Articulated mat is stable and no significant knickpoints have formed	Articulated mat is stable and no significant knickpoints have formed	Articulated mat is stable and no significant knickpoints have formed	Articulated mat is stable and no significant knickpoints have formed	Articulated mat is stable and no significant knickpoints have formed	Articulated mat is stable and no significant knickpoints have formed	Articulated mat is stable and no significant knickpoints have formed	Articulated mat is stable and no significant knickpoints have formed
Staked Wood Jams	Staked material is intact and in such a condition to capture sediment and organic material transported by creek.	Staked material is intact and in such a condition to capture sediment and organic material transported by creek.	Staked material is intact and in such a condition to capture sediment and organic material transported by creek.	Staked material is intact and in such a condition to capture sediment and organic material transported by creek.	Staked material is intact and in such a condition to capture sediment and organic material transported by creek.	Staked material is intact and in such a condition to capture sediment and organic material transported by creek.	Staked material is intact and in such a condition to capture sediment and organic material transported by creek.	Staked material is intact and in such a condition to capture sediment and organic material transported by creek.	Staked material is intact and in such a condition to capture sediment and organic material transported by creek.	Staked material is intact and in such a condition to capture sediment and organic material transported by creek.

Source: San Felipe Creek Restoration Project – Mitigation and Monitoring Plan (Dudek 2019)
Year 6 is shaded gray as these are the applicable performance standards for this annual report.
[1] Although the MMP says "Minimum Cover of Native Plants", this performance standard has been interpreted to be Minimum Cover of all Plants starting in Year 1 (Dudek 2020a).
[2] Weeds shall be non-native plant species rated moderate to high according to the California Invasive Plant Council excluding common naturalized grass species (Cal-IPC).
[3] Reference sites include established willow riparian habitat upstream and within the same reach of the project site and were identified in Year 1 of monitoring and are shown on Figure 4.

Table 16. Revised MMP Non-Wetland Waters (Streams) and Riparian Buffer Areas - Vegetation Performance Standards

Performance Metric	Monitoring Year									
	1 (2019)	2 (2020)	3 (2021)	4 (2022)	5 (2023)	6 (2024)	7 (2025)	8 (2026)	9 (2027)	10 (2028)
Absolute Cover of Native Perennial Species Compared to Reference Site[1]	90% plant survivorship	85% plant survivorship	≥ 6% of reference site absolute cover	≥ 10% of reference site absolute cover	≥ 15% of reference site absolute cover	≥ 20% of reference site absolute cover	≥ 25% of reference site absolute cover	≥ 35% of reference site absolute cover	≥ 55% of reference site absolute cover	≥ 75% of reference site absolute cover
Seeded Areas (Minimum Cover of Non-Invasive Plants) (Seeded only riparian areas only)	50% cover	55% cover	60% cover	65% cover	70% cover	70% cover	70% cover	70% cover	70% cover	70% cover
Maximum Cover by Weed Species[2]	20% cover	15% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover
Relative Cover of Native Species	≥15% relative cover of native species	≥15% relative cover of native species	≥15% relative cover of native species	≥20% relative cover of native species	≥30% relative cover of native species	≥40% relative cover of native species	≥50% relative cover of native species	≥60% relative cover of native species	≥70% relative cover of native species	≥75% relative cover of native species
Target Species Richness	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]

[1]Cells highlighted in gray are revised.
[2]Weed species are those categorized as highly invasive by the California Invasive Plant Council (Cal-IPC), and/or those identified by the monitoring restoration ecologist as having the potential to interfere with meeting project goals.
[3] Reference sites include established willow riparian habitat upstream and within the same reach of the project site and were identified in Year 1 of monitoring and are shown on Figure 4.

3.4. MONITORING SCHEDULE AND SITE VISITS

3.4.1 ANNUAL MONITORING SCHEDULE

Monitoring methods consist of a combination of quantitative and qualitative data collection to assess restoration progress in relation to the performance standards described in the MMP (Dudek 2019). Quantitative monitoring occurs in the late spring/early summer during Years 2 through 10. Qualitative monitoring occurs quarterly during Year 1, beginning with successful completion of the initial 120-day maintenance period, and bi-annually during Years 2 through 10. Monitoring methods and timing, as well as associated performance metrics are summarized in Table 17.

Table 17. Mitigation Monitoring Methods and Timing

MONITORING TASK	MONITORING YEAR		PERFORMANCE METRIC
	YEARS 1 AND 2	YEARS 3 THROUGH 10	
WETLANDS RE-ESTABLISHMENT, REHABILITATION, AND ENHANCEMENT MONITORING			
Quantitative Monitoring: Vegetation – Belt Transects	April-June, beginning in Year 2	Annually, April-June	Container Plants Survivorship or Vegetated Cover Cuttings Survivorship or Vegetated Cover Seeded Areas Cover of Native Plants Maximum Cover by Weed Species Absolute Cover of Wetland Species Relative Cover of Native Species Target Species Richness Wetland Delineation in Year 5 for Wetland Re-establishment Area
Hydrologic Monitoring	October 1- September 30	October 1 – September 30	Hydrology including Hydroperiod and Groundwater Levels
Qualitative Monitoring	Quarterly, beginning with successful completion of 120-day maintenance period; bi-annually Year 2	Bi-annually	Invasive Weeds Wildlife Observations Plant Health and Vigor Maintenance Needs
STREAM AND RIPARIAN BUFFER MONITORING			
Quantitative Monitoring: Vegetation – Point Intersect Transects	April – June, beginning in Year 2	Annually, April – June	Container Plants Survivorship or Vegetated Cover Cuttings Survivorship or Vegetated Cover Seeded Areas Cover of Native Plants Maximum Cover by Weed Species Relative Cover of Native Species Target Species Richness
Qualitative Monitoring	Quarterly, beginning with successful completion of 120-day maintenance period; bi-annually Year 2	Bi-annually	Plant survival and vigor Wildlife usage Maintenance Needs
Hydrologic Monitoring	N/A	N/A	Hydrology Channel Form Drainage Lenses Arizona Crossing Staked Wood Jams

3.4.2 MONITORING SITE VISITS IN 2024

The site was monitored on eight dates during the Year 6 monitoring year (Table 18). Balance staff visited the project site on February 19, April 9, September 13 and 18, and October 8, 2024 to conduct monitoring as detailed in the 2004 Geomorphic and Hydrologic Monitoring Reports (Donaldson et al. 2024).

Nomad Ecology principal restoration ecologist Erin McDermott and botanist Leanne Feely conducted monitoring visits on May 6 and 8, and Nomad Ecology senior restoration ecologist Jaclyn Inkster and botanist Leanne Feely conducted a late season monitoring visit on July 29, 2024. Habitat Agency staff made regular site visits throughout the year which are not included in Table 18. All monitoring visits required by the MMP for Year 6 were conducted.

Table 18. 2024 Monitoring Site Visits

MONITORING ELEMENT	FEB 19, 2024	APRIL 9, 2024	MAY 6, 2024	MAY 8, 2024	JULY 29, 2024	SEPT 13, 2024	SEPT 18, 2024	OCT. 8, 2024
Quantitative Monitoring: Wetland Vegetation – Belt Transects	-	-	X	-	-	-	-	-
Quantitative Monitoring: Stream and Riparian Buffer Vegetation – Point Intersect Transects	-	-	X	X	-	-	-	-
Hydrologic Monitoring	X	X	-	-	-	X	X	X
Qualitative Monitoring	-	-	X	X	X	-	-	-
Invasive Plant Assessment	-	-	X	X	X	-	-	-
Photo Point Photo Monitoring	-	-	-	X	-	-	-	-
Overall Site Assessment	-	-	X	X	X	-	-	-

3.5. MONITORING METHODS

3.5.1 QUANTITATIVE MONITORING

Wetland Delineation

As required by the MMP, a formal assessment of jurisdictional wetland delineation in the wetland re-establishment area (SW04) was conducted in Year 5 (2023) to confirm wetland acreage. The vegetation, soils, and hydrology of the site were examined following the guidelines outlined in the Routine Determination Method in the Corps of Engineers 1987 Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (Regional Supplement USACE 2010). Based on this protocol, topography and field characteristics including evidence of inundated or saturated soil conditions resulting from permanent or periodic inundation by ground water or surface water, the prevalence of hydrophytic vegetation (e.g., plant species typically adapted for life in saturated soil conditions), and the presence of hydric soils, were evaluated to determine the limits of potentially jurisdictional waters of the U.S. within the study area. Data were collected at a total of two data point locations, using the Wetland Determination

Data Form – Arid West Region which can be found in the Year 5 Annual Monitoring Report (Nomad Ecology 2024).

Per the MMP, if the desired wetland acreage is not achieved in Year 5 or if climatic conditions were atypical in that year (i.e., below average rainfall year), a wetland delineation will be repeated at the site in subsequent years to accurately determine the wetland acreage supported by the site. Alternatively, the actual wetland acreage created as determined by the delineation will be credited against the wetland restoration requirements set forth in the MMP. A wetland delineation was not completed in Year 6.

Wetland Vegetation – Belt Transects

Vegetation sampling was conducted on May 6, 2024, by Nomad Ecology principal restoration ecologist Erin McDermott and botanist Leanne Feely. For wetland habitat rehabilitation, enhancement, and creation areas, the belt transect method of vegetation sampling was used to determine compliance and achievement of the revegetation performance standards. Permanent belt transects measuring 30 to 50 meters long were established in the wetland revegetation areas at representative locations during Year 2 by Dudek at the time of the first sampling event (Dudek 2020b). During 2022 monitoring, belt transects were placed in the same locations, however some belt transects were shortened so that the entire belt transect was included within the feature being sampled as determined based on field conditions, and all belt transects were the same length (26 meters). In 2023 and 2024, monitoring transects were consistent with 2022. Along each transect, 1-meter by 1-meter quadrats were placed at 10-meter intervals. Data collected at each plot along the belt transects included absolute cover of each plant species present as well as the cover of all vegetation, bare soil, and water using the California Native Plant Society (CNPS) method for estimating cover values. This method uses a "bird's eye view" looking from above, and only living plants are included in the vegetation cover estimate (CNPS 2022). A total of 4 belt transects were sampled in SW-02 and 2 were sampled in SW-03. Two belt transects were sampled in the seasonal wetland reference site. Monitoring transects locations are shown in Figure 4.

The vegetation data were analyzed to determine vegetative cover of container plants, vegetative cover of cuttings, cover of seeded areas, cover of weed species, absolute cover of wetland species, relative cover of native species, and target species richness.

Total cover contributed by invasive weed species was calculated for each created seasonal wetland. Invasive weeds were defined as California Invasive Plant Council (Cal-IPC) ranked Moderate or High (Cal-IPC 2019). As is standard practice in habitat restoration monitoring, several non-native annual grasses that have a Moderate Cal-IPC rank and are naturalized throughout California were not included as invasive weeds, as these species are ubiquitous throughout annual grasslands, and they contribute substantial cover in the grassland communities on site. These species include foxtail fescue (*Festuca myuros**), hare barley (*Hordeum murinum* subsp. *leporinum**), Italian ryegrass (*Festuca perennis**), Mediterranean barley (*Hordeum marinum* subsp. *gussoneanum**), ripgut brome (*Bromus diandrus**), red brome (*Bromus rubens**), slender oats (*Avena barbata**), and wild oats (*Avena fatua**).

The National Wetland Plant List version 3.5 was used to determine wetland indicator status for each species (USACE 2020). The predicted frequency of occurrence in wetlands represented by each wetland indicator status category is presented in Table 19. Several previous project reports incorrectly defined wetland species as consisting of OBL and FACW species. This report and all subsequent reports define wetland species by the indicators OBL, FACW, and FAC, in accordance with the USACE's wetland delineation methodology.

Table 19. Categories of Wetland Plant Indicators

Indicator Categories	Codes	Comments
Obligate	OBL	Almost always is a hydrophyte, rarely in uplands
Facultative Wetland	FACW	Usually is a hydrophyte but occasionally found in uplands
Facultative	FAC	Commonly occurs as either a hydrophyte or non-hydrophyte
Facultative Upland	FACU	Occasionally is a hydrophyte but usually occurs in uplands
Upland	UPL	Occurs in wetlands in another region, but occurs almost always (estimated probability 99%) under natural conditions in non-wetlands in the regions specified.
Not Listed	NL	Plant species does not have a listed wetland indicator status.

Source: Environmental Laboratory 1987

Stream and Riparian Buffer Vegetation – Point Intersect Transects

Stream and riparian buffer vegetation sampling was conducted on May 6 and 8, 2024 by Nomad Ecology principal vegetation ecologist Erin McDermott and botanist Leanne Feely. Data for stream and riparian restoration areas were collected using the line intercept transect method of vegetation sampling to document achievement of the performance standards on the project site. In Year 2, permanent vegetation transect sampling stations were established by Dudek within the project site to measure year-to-year changes in plant cover and species composition (Dudek 2020b). In Year 4, transects were adjusted to center on restoration features and to be a consistent length of 20 meters. In Year 5, a transect was added in ephemeral drainage habitat where additional plantings were installed. Data collection points were distributed evenly along the transect (every 25 cm) so the number of points along each transect were sufficient to provide adequate resolution of cover values. Monitoring transects and points are shown in Figure 4. At each sampling point, all of the species present were recorded, and if no vegetation was present then bare ground was recorded. Cover values were calculated by dividing the number of hits by the total number of sampling points and multiplying by 100.

The vegetation data were analyzed to determine vegetative cover of container plants, vegetative cover of cuttings, cover of seeded areas, cover of weed species, relative cover of native species, total cover contributed by invasive weed species, and target species richness.

3.5.2 Hydrologic Monitoring

All hydrologic monitoring methods are taken from the Year 6 Geomorphic and Hydrologic Monitoring Report for San Felipe Creek Restoration Project prepared by Balance (Donaldson et al. 2024, Appendix C), which summarizes the annual geomorphic and hydrologic monitoring results for Water Year[1] 2024 (WY2024). In Year 6, hydrologic and geomorphic monitoring visits were conducted on October 3, 2023, February 19, 2024, April 9, 2024, September 13 and 18, 2024, and October 8, 2024.

[1] A Water Year (WY) is defined as that period from October 1st of a preceding year through September 30th of the following year and is named according to the following year. For example, WY2023 occurred from October 1, 2022, through September 30, 2023.

Rainfall

To provide context for the hydrologic and geomorphic data collected at the project site, rainfall data from the University of California Berkeley Blue Oak Ranch Reserve (UCBO) rain gage[2,] located 4.5 miles northwest of the site at approximately 1800 feet MSL elevation is presented. Average annual rainfall at the UCBO station is approximately the same as at the Project site (Santa Clara County Drainage Manual, Schaaf and Wheeler, 2007).

Water Levels and Streamflow Monitoring

A network of gauges to monitor stream, wetland, and groundwater-level was established following completion of restoration work and prior to significant winter rainfall in December 2018 by Balance. Further details of this effort are available in the Geomorphic and Hydrologic Monitoring Report (Donaldson et al. 2024, Appendix C). The following list describes the gaging methods for each type of gage:

Stage (Water Level) and Estimated Streamflow

To monitor water levels and estimate streamflow in San Felipe and Boyds Creek, Balance installed continuous-recording water level sensors which collect and record 15-minute stage measurements within the designed wetland features and nearby channels and wetlands. Balance staff visited the site multiple times during the rainy season and during the dry season to calibrate, repair, and download water level recorders. Water level data were used to create 15-minute stage hydrographs at stream stage and streamflow stations.

Balance established three stage and streamflow gages, two on San Felipe Creek (gages SFUS and SFDS) and one on Boyds Creek (gage BCUS)[3]. Periodic staff plate readings were used to calibrate the 15-minute depth data recorded by the logger and convert the raw water level record to a stage record, according to the local datum. To develop an estimated record of streamflow, periodic streamflow measurements were taken during Year 1 monitoring in accordance with practices outlined in the U.S. Geological Survey Techniques of Water Resources Investigations[4]. The manual streamflow measurements were used to establish Manning's roughness coefficients at streamflow gage sites. A rating curve was then developed to convert stage to streamflow using the Manning's calculator in USACE Hydraulic Engineering Center River Analysis System (HEC-RAS) 5.0. The stage-discharge rating was then calibrated using additional manual flow measurements. For the purpose of evaluating the performance standards, the estimated streamflow record is considered to be sufficient. Additional measurements are required to develop a more accurate streamflow record and will be taken opportunistically. The gage SFDS has required re-location multiple times, including during 2023 when it became disconnected from flow, and 2024 when it was blown out and lost in a storm, therefore, no rating curve has been developed at that station.

Groundwater Monitoring

To monitor groundwater levels near constructed floodplain features, channels, and wetlands, Balance installed continuous-recording water level sensors in 4 of the 5 piezometers which were used during the pre-project evaluation. Water level data were calibrated against periodic manual depth-to-water readings

[2] Long-term data are available through the Western Regional Climate Center (https://wrcc.dri.edu/weather/ucbo.html), and 10-minute interval preliminary data are used here with permission from University of California at Berkeley (http://sensor.berkeley.edu/index_ucnrs.html).
[3] Note that Boyds Creek Downstream (BCDS) is a stage-only gage.
[4] https://pubs.usgs.gov/twri/index090905.html

to develop 1-hour depth-to-groundwater (below the ground surface) records. The ground surface and top of each piezometer were also surveyed and used to convert the depth-to-water records to groundwater elevation records.

Surface Ponding in Wetlands

To monitor inundation duration within wetland areas, Balance installed continuous-recording water level sensors in stilling wells along with staff plates. Water level data were calibrated to periodic manual stage readings to develop hourly wetland stage records.

Peak Stage near Floodplains

To record peak stage and document whether floodplains were inundated, Balance installed six additional water level recorders at select locations across the project site (BCA1, BCA2, BCA3, BCA4, BCDS, SFDF). Data from these supplemental stations are archived along with manual stage and high-water mark readings.

3.5.3 QUALITATIVE MONITORING

Nomad Ecology principal vegetation ecologist Erin McDermott and botanist Leanne Feely visited the project site on May 6 and 8, June 20 and 21, 2024, and Nomad Ecology senior restoration ecologist Jaclyn Inkster and Leanne Feely visited the site on July 29, 2024, to qualitatively assess conditions throughout the site. Per the MMP, qualitative monitoring includes overall assessment of container plant and seedling establishment and survival (vigor); assessment of wildlife usage of the restoration site through incidental observation of presence, nests, scat, and other sign; assessment of container plant health, including reviewing for pests and disease; assessment of weeds and exotic non-native species and recommendations for control; and an assessment of soil moisture and plant stress. Routine site maintenance visits conducted by Confluence included general site assessments on plant establishment and health, and weed assessments within the planting effort.

Balance qualitatively assessed geomorphic conditions on site during site visits in the wet and dry season to observe streamflow conditions and areas of surface ponding, document evidence of runoff patterns, and inspect the stability of constructed features (Donaldson et al. 2024, Appendix C). Hydrologic data and observations were catalogued in field observer logs. When practical and safe, a small unmanned aerial vehicle (UAV, or drone) was used to collect oblique aerial photos and repeat vertical aerial photographs (Donaldson et al. 2024; Appendix C).

3.5.4 TOPOGRAPHIC MONITORING

Per the MMP, post-storm topographic surveys should occur after years in which the 2-year recurrence streamflow is met or exceeded. Estimated peak streamflow was used at gage SFUS and compared to the calculated peak flow recurrence estimates according to regional regression relationships developed by Gotvald et al. (2012), (Donaldson et al. 2024, Appendix C – Table 3). Because the annual peak flow was estimated to be equal to or slightly more than the 2-year recurrence threshold in WY2024, topographic data were collected during Year 6 monitoring. Channel evolution monitoring metrics are intended to identify whether channel bed and banks, large wood, and floodplain benches evolved and if aggradation or scour took place over the year.

Geomorphic change surveys were conducted using a UAV, which was flown over the project area to collect detailed overlapping aerial photography. These flights were ground point controlled based on the NAD83 California zone 3 (US ft) datum (EPSG:2227). Using Agisoft™ software and photogrammetry methods, orthoimages and digital elevation models (DEM) were produced from each flight. To check the quality of the generated DEM, Balance compared manually collected survey elevations of ground control points to corresponding DEM elevations (Donaldson et al. 2024, Appendix C).

The as-built (Year 0) flight occurred on December 21, 2018, and the Year 6 flight occurred on October 8, 2024. The Year 6 DEM was subtracted from the Year 0 DEM to create a DEM-of-difference (DOD) which produced a spatially explicit map of change (aggradation and degradation) that occurred over 6-year period, which allows for a detailed understanding of change and potentially early detection of issues that may threaten the function of the Project. This method does not allow monitoring under tree canopy or dense vegetation; those areas are limited to a few short reaches which were supplemented with direct field and photo observations.

3.5.5 PHOTO POINT MONITORING

All photo points were visited and photos taken on May 8, 2024, by Nomad Ecology senor vegetation ecologist Erin McDermott and botanist Leanne Feely. Forty permanent photo-documentation stations were established by Dudek during Year 1 monitoring to record the progress of the revegetation program and the status of plant establishment over the 10-year period, and eight additional photo points were established in Year 3. GPS coordinates and the direction of view were recorded for each photo point location. Photo documentation methods included replicating the permanent photos of the restoration features for each photo documentation site visit. A subset of photos taken during the photo point monitoring are included in Appendix D.

Section 4. MONITORING RESULTS

This section provides the results of the Year 6 monitoring in relation to the performance standards outlined in the MMP (Dudek 2019), as well as in relation to the proposed revised performance standards outlined in Appendix A .

4.1. ANNUAL RAINFALL

Annual precipitation in the vicinity of the Project site was 29.1 inches during WY2024, as recorded at the UCBO station (Donaldson et al. 2024, Appendix C – Figure 3), which is above the long-term average of 24 inches, as reported in the Santa Clara County drainage manual. The UCBO station has been operating since 2011, and the average annual rainfall at UCBO over the 12-year period of record is 24.3 inches.

Annual precipitation during WY2024 was characterized by many medium-sized storms spread out fairly consistently across the wet season from December 2023 to April 2024. January was the wettest month, with the largest storms falling on January 10, and January 22, 2024. The period of January 31 through February 8, 2024, was the wettest week, with 5.0 inches of total rainfall, and 1.9 inches of that falling on February 4, 2024. Additionally, there were a couple of storms recording over 1.0 inches of rainfall in the spring (March 22-24, and May 4, 2024). Overall rainfall totals and temporal distribution were similar to WY2019, which occurred immediately after implementation of the Project (Donaldson et al. 2024, Appendix C).

4.2. WETLAND RE-ESTABLISHMENT PERFORMANCE

4.2.1 WETLANDS RE-ESTABLISHMENT AREAS MUST MEET ALL THREE WETLAND PARAMETERS (WETLAND DELINEATION)

The MMP required that a wetland delineation be conducted in Year 5 to document acreages of wetland habitats present in the wetland re-establishment areas. The wetland delineation was completed in 2023 (Year 5). Details can be found in the Year 5 Annual Monitoring Report (Nomad Ecology 2023).

Four areas that meet the definition of three-parameter USACE-jurisdictional wetlands were observed within the wetland re-establishment areas, and total 0.17 acre (Nomad Ecology 2023; Figure 4). Table 20 shows the acreage of re-established wetlands mapped during Year 5 monitoring, and the wetland re-establishment project goals.

Hydrophytic Vegetation

During Year 5 monitoring, within the wetland re-establishment areas, seasonal wetlands were present adjacent to the wetland rehabilitation area and the ponded ephemeral drainage features (Nomad Ecology 2024). Dominant wetland species within the wetland re-establishment areas included hyssop loosestrife (*Lythrum hyssopifolia**, OBL), spreading rush (*Juncus patens*, FACW), Italian ryegrass* (FAC), creeping wildrye (*Elymus triticoides*, FAC), curly dock* (FAC), dense sedge (*Carex densa*, OBL) and toad rush (*Juncus bufonius* subsp. *bufonius;* FACW). Other dominant species included coyote brush (NL), hoary mustard* (NL), medusahead grass* (NL), soft chess ((*Bromus hordeaceous**, NL), and coast tarweed (*Madia sativa*, NL).

Hydric Soil

Hydric soil indicators were difficult to observe in the wetland re-establishment areas, however they were present and are expected to develop further over time as the site develops. Soils on site are very dark grayish brown (10YR 3/2), which obscures redox features. The wetland re-establishment areas are early

in development (five years old) therefore visible hydric soil indicators may not have developed yet, particularly in seasonal wetlands that are saturated for only a portion of the growing season. Hydric soil indicators that were observed in wetland re-establishment areas include redox depressions, and redox dark surface; redox features were faint and hard to see (Nomad Ecology 2023).

Wetland Hydrology

Wetland hydrology indicators observed in the wetland re-establishment areas included saturation and surface water, water marks, and surface soil cracks (Nomad Ecology 2023).

Table 20. Summary of Wetland Re-Establishment On Site

Seasonal Wetland Re-Establishment Area	Project Goal	Acreage 5-Years Post-Project (2023)
SW04	0.38	0.17*
Total	**0.38**	**0.17***

*Due to a miscalculation, the total acreage was reported as 0.11 acre in the Year 5 monitoring report (Nomad Ecology 2023). The correct acreage was confirmed and updated in this report.

4.2.2 Wetlands Re-Establishment Areas Must Be Self-Sustaining

The wetland re-establishment mitigation areas must be self-sustaining (i.e., able to survive on their own without artificial support) by the end of the 10-year maintenance and monitoring period. Wetland re-establishment areas are on track to be self-sustaining with several planted and seeded wetland species growing in and showing evidence of natural growth cycles. Wetland re-establishment areas have not been irrigated since 2022. Planted and seeded species observed in 2024 include spreading rush and dense sedge.

4.2.3 Wetlands Re-Establishment Areas Must Show Evidence of Natural Recruitment

Wetland re-establishment areas show evidence of natural recruitment of native wetland species and/or riparian species. Planted, seeded, and naturally occurring native species are colonizing the wetland years. By year 10, wetland re-establishment areas will likely include many new native wetland recruits. Naturally recruited native species observed in 2024 include creeping wildrye and toad rush.

4.3. Wetland Rehabilitation and Enhancement Area Performance

The results of vegetation monitoring of the wetland rehabilitation and enhancement areas, and how they compare to the performance standards outlined in the MMP as well as the proposed revised performance standards detailed in Appendix A, are discussed in the following sections. Performance standards for wetlands based on hydrology are discussed in Section 4.5. There are no proposed revisions to hydrology performance standards.

Based on vegetation monitoring in Year 6, the wetland rehabilitation and enhancement areas met four of seven of the interim performance standards as detailed in the MMP. They met: maximum cover by weed species, absolute cover of wetland species (OBL, FACW, and FAC), target species richness performance standards, and hydrology. They did not meet: container plant cover, seeded area cover, or relative cover of native species performance standards, however these parameters are increasing each year and the site is continuing to grow and develop. These results are consistent with monitoring in Year 4 (2022) and Year 5 (2023).

Based on vegetation monitoring in Year 6, the wetland rehabilitation and enhancement areas met all of the proposed revised performance standards, including those performance standards that are proposed to remain unchanged. They met: absolute cover of native species compared to references site, maximum cover by weed species, absolute cover of wetland species (OBL, FACW, or FAC), relative cover of native species, target species richness performance standards, and hydrology.

The performance standards and monitoring results for vegetation and hydrology in the wetland rehabilitation and enhancement areas are outlined in Table 21 and discussed further below.

Table 21. Wetland Rehabilitation and Enhancement Area Performance – Year 6

Performance Metric	Year 6 (2024) Target	Wetland Feature Monitoring Results		Overall Site Performance (Average)
		SW02	SW03	
Original Vegetative Performance Standards				
Container Plants (Minimum Performance)	40% vegetated cover	16% Not Met	2% Not Met	9% Not Met
Cuttings (Minimum performance)[1]	30% vegetated cover	N/A	N/A	N/A
Seeded Areas (Minimum % of Plants)	70% cover	43% Not Met	30% Not Met	37% Not Met
Maximum Cover by Weed Species	10% cover	1% **Met**	2% **Met**	2% **Met**
Absolute Cover of Wetland Species (OBL, FACW, or FAC)[2]	≥75% reference absolute cover of wetland species Reference site had 31% wetland species cover; restoration areas require a minimum of 23% wetland species cover.	36% **Met**	26% **Met**	31% **Met**
Relative Cover of Native Species	≥75% relative cover of native species	56% Not Met	59% **Met**	58% Not Met For comparison, reference wetland had 33% relative native cover.
Target Species Richness	≥75% of reference site Reference site has 11 native species present; restoration areas require a minimum of 8 native species to meet the minimum performance standard.	13 species **Met**	6 species Not Met	14 species **Met**
Proposed Revised Vegetative Performance Standards				
Absolute Cover of Native Species Compared to Reference Site	≥ 21% of reference site absolute cover Reference site had 14% absolute cover of native species; restoration areas require a minimum of 10% absolute native species cover.	26% **Met**	18% **Met**	22% **Met**
Maximum Cover by Weed Species	10% cover	1% **Met**	2% **Met**	2% **Met**

Performance Metric	Year 6 (2024) Target	Wetland Feature Monitoring Results		Overall Site Performance (Average)
		SW02	SW03	
Absolute Cover of Wetland Species (OBL, FACW, or FAC)[2]	≥75% reference absolute cover of wetland species Reference site had 31% wetland species cover; restoration areas require a minimum of 23% wetland species cover.	36% **Met**	26% **Met**	31% **Met**
Relative Cover of Native Species	≥40% relative cover of native species	56% **Met**	59% **Met**	58% **Met**
Target Species Richness	≥75% of reference site Reference site has 11 native species present; restoration areas require a minimum of 8 native species to meet the minimum performance standard.	13 species **Met**	6 species Not Met	14 species **Met**
Hydrologic Performance Standards				
Hydrology	≥14 days of ponding or saturated soils in an average or above-average precipitation year	**Met**	**Met**	**Met**

Source: San Felipe Creek Restoration Year 3 Monitoring Report (Dudek 2021) and (MMP) Success Criteria Amendment Proposal (Habitat Agency and Nomad Ecology 2024).
[1] No cuttings were installed within wetland rehabilitation and enhancement areas (SW02 and SW03).
[2] Prior project reports mistakenly defined wetland species as consisting of OBL and FACW species, and they measured and reported wetland species' cover accordingly. This report and all subsequent reports define wetland species by the indicators OBL, FACW, and FAC, in accordance with USACE's wetland delineation methodology.

4.3.1 Container Plants (Minimum Performance)

Percent cover was recorded for all species along the belt transects. For any species that were planted, the cover was assumed to be from a planted individual. Initial planting included field sedge (*Carex praegracilis*), common rush (*Juncus effusus*), spreading rush, and iris-leaved rush (*Juncus xiphioides*), and replanting efforts included Baltic rush (*Juncus balticus* ssp. *ater*) and California bulrush (*Schoenoplectus californicus*). Planted species observed in SW02 and SW03 included field sedge, spreading rush, Baltic rush, and iris-leaved rush.

Planted container plants had a cover of 16% in SW02 and 2% in SW03, with an average of 9% which is less than the 40% Year 6 target. While the performance standard is not met, the overall goal of the wetland restoration is to develop native and wetland species cover, and the wetland is on track to meet these goals as detailed below.

This performance standard is revised as part of the proposed revised performance standards, as accounting of just the planted species is not a useful indicator of seasonal wetland performance. The goal of the project is to develop native and wetland species cover, and container plantings, seeded plants, and any naturally recruited species that are subsequently managed for, all provide highly suitable contributions to habitat values.

Results as Compared to the Revised Performance Standards

The revised performance standard is absolute cover of native species compared to the reference site. As detailed in the MMP Success Criteria Amendment Memo (Appendix A), the Habitat Agency proposes one performance standard to capture the performance of total native cover in wetland rehabilitation and enhancement areas rather than three (cover of container plants, cover of cuttings, and seeded area

minimum cover of native plants). The minimum cover of cuttings performance standard is not applicable to the wetland rehabilitation and enhancement areas since cuttings were not planted there; the minimum cover of container plants performance standard does not accurately reflect the vegetation development within the restoration site since the planted areas are made up of a mosaic of container plants, seeded plants, and natural recruitment of planted and seeded species.

The revised performance standard is based on comparison to the reference site, and restored wetlands must have at least 21% cover of the reference site native species cover. The reference site had 14% absolute cover of native species, meaning wetland rehabilitation and enhancement areas require a minimum of 10% absolute native species cover. Absolute cover of native species in SW02 was 26% and 18% in SW03, with an average of 31% for the site overall, which meets the proposed revised performance standard.

4.3.2 Cuttings (Minimum Performance)

No cuttings were installed in the wetland rehabilitation or enhancement areas. This performance standard is not applicable.

4.3.3 Seeded Areas (Minimum Cover of Plants)

SW02 had an average absolute vegetation cover of 43%. SW03 had an average absolute vegetative cover of 30%. Overall site vegetative cover was 37%, which does not meet the Year 6 performance target of 70% cover of plants.

Native species that were regularly encountered in SW02 and SW03 include winter cress (*Barbarea orthoceras*), meadow barley (*Hordeum brachyantherum* subsp. *brachyantherum*), creeping spikerush (*Eleocharis macrostachya*), Baltic rush, spreading rush, iris-leaved rush, creeping wildrye, field sedge, dense sedge, and umbrella sedge (*Cyperus eragrostis*). All native species observed along sampling transects are listed in the discussion of species richness in Section 4.3.7.

SW02 and SW03 are seasonal wetlands that flood and pond in the winter, particularly in 2023 and 2024 when above normal rainfall was received. Annual inundation and ponding leads to areas with low vegetation cover as they dry down. Vegetation monitoring was conducted in May 2023 and 2024 to be consistent with prior years and capture spring blooming species, however because of the high precipitation received the prior winter and cool temperatures received in spring of 2023 and 2024, many plant species were still actively growing. In subsequent monitoring years an additional site visit may be conducted later to capture total vegetation growth after vegetation reaches maximum growth and cover, Later site visits will miss earlier blooming species including annuals, so species should continue to be recorded in May.

This performance standard is revised as part of the proposed revised performance standard, as accounting of just the seeded cover is not a useful indicator of seasonal wetland performance. The goal of the project is to develop native and wetland species cover, and container plantings, seeded plants, and any naturally recruited species that are subsequently managed for, all provide highly suitable contributions to habitat values. This performance standard would be replaced by absolute cover of native species compared to the reference site, which the site met as detailed in Section 4.3.1.

4.3.4 Maximum Cover by Invasive Weed Species

Invasive weed species had absolute cover of 1% in SW02 and 2% in SW03, with an average of 2% cover, which meets the performance standard of 10% or less. Invasive weed species observed in the wetland rehabilitation and enhancement areas include black mustard*, bull thistle*, Italian thistle, yellow star-thistle*, poison hemlock*, Fuller's teasel*, medusahead grass*, hoary mustard*, perennial pepperweed*, and pennyroyal*. In order to keep invasive weed cover below the 10% threshold and continue to meet

performance standards, continued weed control is recommended. Further details about invasive weeds found on site are in Section 4.6 Qualitative Monitoring.

4.3.5 Absolute Cover of Wetland Species (OBL, FACW or FAC)

The performance standard for absolute cover of wetland species (OBL, FACW, or FAC) is based on comparison to the reference site, and restored wetlands must have 75% or more compared to the reference site. Based on quantitative data collected in Year 6, the reference site had 31% wetland species cover, therefore the restoration areas require a minimum of 23% wetland species cover (75% of 31% cover) to meet the minimum performance standard.

The absolute cover of wetland species was 36% in SW02 and 26% in SW03, with an average of 31%, which meets the performance standard. The wetland species observed in the wetland rehabilitation and enhancement areas include mugwort (FAC), winter cress (FACW), dense sedge (OBL), field sedge (FACW), umbrella sedge (FACW), creeping spikerush (OBL), fringed willow-herb (*Epilobium ciliatum* subsp. *ciliatum*, FACW), meadow barley (FACW), Baltic rush (FACW), spreading rush (FACW), iris-leaved rush (OBL), little quaking grass (*Briza minor**, FAC), hyssop loosestrife* (OBL), pennyroyal*(OBL), creeping wildrye (FAC), clustered dock* (FACW), Italian rye grass* (FAC), and Mediterranean barley* (FAC).

This performance standard was revised to include FAC species starting in 2023 which is consistent with wetland delineation monitoring methodology.

4.3.6 Relative Cover of Native Species

SW02 had 56% relative cover of native species and SW03 had 59% relative cover of native species, for an average of 58% relative cover which does not meet the performance standard of greater or equal to 75% relative cover of native species.

For comparison purposes, the reference site had 33% relative native species cover, which is much less than the average relative native cover of rehabilitated and enhanced wetlands. Native species observed in the enhanced and rehabilitated seasonal wetlands and reference site during quantitative monitoring are shown in Table 22.

In the MMP, the target for this performance standard is currently ≥75% relative cover of native species for Years 3-10. This target is not realistic for habitat development following restoration; natural development of vegetation in restoration projects follows a natural growth curve, which shows development of native cover starting gradually and increasing over time. The proposed revised performance standard—based on applied riparian habitat development—increases gradually every year starting at Year 4, with the target for Year 6 being ≥40% relative cover of native species, and with ≥75% relative cover of native species as the final Year 10 target.

Results as Compared to the Revised Performance Standards

For Year 6, the proposed revised performance standard target is ≥40% relative cover of native species. SW02 had 56% relative cover of native species and SW03 had 59% relative cover of native species, for an average of 58% relative cover which meets the revised performance standard.

4.3.7 Target Species Richness

The performance standard for species richness is based on comparison to the reference site, and restored wetlands must have 75% native species or more compared to the reference site. Based on quantitative data gathered in Year 6, the reference site has 11 native species present, therefore the restoration areas require a minimum of 8 native species (75% of 11 species) to meet the minimum performance standard. SW02 had 13 native species captured in sampling quadrats and SW03 had 6 species captured in sampling

quadrats. Combined the restoration areas had 14 unique native species present, which surpasses the performance standard of 8 species required. Native species recorded in both the reference site and restoration areas during vegetation monitoring are listed in Table 22.

Table 22. Native Species Recorded in Wetland Reference and Restoration Sites During Year 6 Vegetation Monitoring

Scientific Name[1]	Common Name	Present in Restoration Site	Present in Reference Site
Acmispon americanus var. *americanus*	Spanish clover	X	X
Artemisia douglasiana	mugwort	X	-
Barbarea orthoceras	winter cress	X	-
Callitriche palustris	vernal water-starwort	-	X
Carex densa[2]	dense sedge	X	-
Carex praegracilis[2]	field sedge	X	-
Cyperus eragrostis	umbrella sedge	X	-
Eleocharis macrostachya	creeping spikerush	X	X
Elymus triticoides	creeping wildrye	X	X
Epilobium brachycarpum	tall annual willow-herb	-	X
Epilobium ciliatum subsp. *ciliatum*	fringed willow-herb	X	-
Hemizonia congesta subsp. *luzulifolia*	hayfield tarweed	-	X
Hordeum brachyantherum subsp. *brachyantherum*[2]	meadow barley	X	X
Juncus balticus subsp. *ater*[2]	Baltic rush	X	-
Juncus patens[2]	speading rush	X	X
Juncus xiphioides[2]	iris-leaved rush	X	-
Limnanthes douglasii subsp. *nivea*	snow white meadowfoam	-	X
Madia sativa	coast tarweed	-	X
Plagiobothrys stipitatus	stalked popcornflower	-	X
Solidago cf. *velutina* ssp. *californica*	California goldenrod	X	-
	Total Species	**14 species total**	**11 species total**

[1] These species were recorded during monitoring site visits and annual vegetation monitoring. Comprehensive botanical surveys were not conducted. Other native species may be present in the restoration area.
[2] Species that were included in the container planting or seed mixes from all planting efforts.

4.3.8 Hydrology

The standard states that hydrology will consist of a minimum of 14 days of ponding or saturated soils in an average or above-average precipitation year. Rainfall totals for WY2024 was approximately 117 percent of average annual rainfall from the UCBO rain gage. The abundant rainfall supported on-site wetlands and resulted in the wetland sufficiency criteria being met during WY2024. Based on observations during site visits, all of the agricultural ditch wetlands held water for more than 14 days. Water levels in ED03-02 within the agricultural ditch persisted for at least 7 months (Donaldson et al. 2024, Appendix C – Figure 11).

During the April 9, 2024 site visit, Balance observed approximately 2 inches of ponded water in the vicinity of Piezometer 16-3 which is directly adjacent and upslope from wetland SW02 (Donaldson et al. 2024). Correlating this to the Piezometer 16-3 water level record, it can be inferred that ponding/soil saturation within six inches of the ground surface occurred within SW02 for most of the wet season between February 4, 2024 through the end of the third week of April 2024 (Donaldson et al. 2024). Surface ponding in in the seasonal wetland at SW03, (the Corral Trail Seasonal Wetland station, CTSW) lasted for approximately 59 days and again for 29 days in the spring (Donaldson et al.2024, Appendix C – Figure 12). On-site wetland areas appear to have met the hydrologic criteria for seasonal wetlands during WY2024.

A more detailed discussion of the site's hydrology performance can be found in the Geomorphic and Hydrologic Monitoring Report (Donaldson et al. 2024, Appendix C).

4.4. Non-Wetland Waters (Stream) and Riparian Buffer Performance - Vegetation

The results of vegetation monitoring of the stream and riparian buffer areas, and how they compare to the performance standards outlined in the MMP as well as the proposed revised performance standards detailed in Appendix A, are discussed in the following sections. Performance standards for streams based on hydrology are discussed in Section 4.5. There are no proposed revisions to hydrology performance standards.

Based on vegetation monitoring in Year 6, the stream and riparian buffer met three of the six interim performance standards as detailed in the current MMP. They met: minimum cover of plants, maximum cover by weed species and target species richness. They nearly met relative cover of native species and are anticipated to meet it in Year 7. They did not meet: container plant cover or cuttings cover.

Based on vegetation monitoring in Year 6, the stream and riparian buffer met all of the proposed revised performance standards, including performance standards that are proposed to remain unchanged, . They met: absolute cover of native perennial species compared to the reference site, minimum cover of non-invasive plants in seeded only areas, maximum cover by weed species, relative cover of native species, and target species richness performance standards.

The performance standards and monitoring results for vegetation in the stream and riparian buffer areas are outlined in Table 23 and discussed further below.

Table 23. Non-Wetland Waters (Stream) and Riparian Buffer Performance – Year 6 Vegetation

Performance Metric	Year 6 (2024) Target	Stream and Riparian Buffer Feature							Overall Site Performance
		ID03-01A	ID03-01B[1]	ID03-02	ID03-03	ID03-04	ID03-05	ED-03-03[2]	
Original Performance Metrics									
Container Plants (Minimum Performance)	40% vegetated cover	30% Not Met	N/A	38% Not Met	42% **Met**	35% Not Met	21% Not Met	N/A	33% Not Met
Cuttings (Minimum performance)	30% vegetated cover	1% Not Met	N/A	6% Not Met	4% Not Met	5% Not Met	17% Not Met	75% **Met**	18% Not Met

Performance Metric	Year 6 (2024) Target	Stream and Riparian Buffer Feature							Overall Site Performance
		ID03-01A	ID03-01B[1]	ID03-02	ID03-03	ID03-04	ID03-05	ED-03-03[2]	
Seeded Areas (Minimum % cover of plants)	70% cover	94% **Met**	85% **Met**	91% **Met**	82% **Met**	77% **Met**	77% **Met**	75% **Met**	83% **Met**
Maximum Cover by Weed Species	10% cover	0% **Met**	1% **Met**	2% **Met**	2% **Met**	4% **Met**	2% **Met**	0% **Met**	2% **Met**
Relative Cover of Native Species	≥75% relative cover of native species	70% Not Met	50% Not Met	70% Not Met	68% Not Met	74% Not Met	76% **Met**	100% **Met**	73% Not Met
Target Species Richness	≥75% of reference site Reference site had 8 native species present; restoration areas require a minimum of 6 species	19 species **Met**	9 species **Met**	15 species **Met**	18 species **Met**	16 species **Met**	10 species **Met**	2 species Not Met	**Met** 36 species among all the restoration areas
Revised Performance Metrics									
Absolute Cover of Native Perennial Species Compared to Reference Site	≥ 20% of reference site absolute cover Reference site had 62% native perennial species cover; restoration areas require a minimum of 12% native perennial species cover.	55% **Met**	16% **Met**	18% **Met**	57% **Met**	61% **Met**	62% **Met**	76% **Met**	49% **Met**
Seeded Areas (Minimum Cover of Non-Invasive Plants), Seeded-only Riparian Areas	70% cover	N/A	85% **Met**	N/A	N/A	N/A	N/A	N/A	85% **Met**
Maximum Cover by Weed Species	10% cover	0% **Met**	1% **Met**	2% **Met**	2% **Met**	4% **Met**	2% **Met**	0% **Met**	2% **Met**
Relative Cover of Native Species	≥40% relative cover of native species	70% **Met**	50% **Met**	70% **Met**	68% **Met**	74% **Met**	76% **Met**	100% **Met**	73% **Met**
Target Species Richness	≥75% of reference site Reference site had 8 native species present; restoration areas require a minimum of 6 species	19 species **Met**	9 species **Met**	15 species **Met**	18 species **Met**	16 species **Met**	10 species **Met**	2 species Not Met	**Met** 36 species among all the restoration areas

Source: San Felipe Creek Restoration Year 3 Monitoring Report (Dudek 2021).
1 No container plants or cuttings were installed within stream and riparian buffer area ID03-01B.
[2] ED01 did not have sampling transects established in it when transects were set up by Dudek. The transect in ED03-03 was not sampled in 2022 because the ephemeral drainage is very narrow and the transect extends into adjacent habitats and does not represent the stream channel. A suitable transect was established in ED-03 In Year 5 2023 to capture these areas.

4.4.1 CONTAINER PLANTS (MINIMUM PERFORMANCE)

Container plant performance in the riparian buffer was assessed during vegetation monitoring by data collection along transects. Container plant cover in the riparian buffer areas ranged from 21% to 42% and averaged 33% based on transect data.

Container plants did not meet the performance standard of 40% vegetated cover but may meet 2025 criteria as plants are increasing rapidly each year, which is consistent with how restoration plantings grow. In 2023, container plants had 20% cover, which is a 65% increase in size between 2023 and 2024. The Year 7 (2025) performance standard is 45% cover of container plants. If the plantings grow and increase by 36% between 2024 and 2025 then they will meet the performance standard. Additional container plantings are not recommended due to the density of plantings in the planted areas. The riparian buffer and stream habitat is on track toward meeting the final goal of this performance standard.

This performance standard is revised as part of the proposed revised performance standards, because accounting of only the container planted species is not an ecologically useful indicator of stream and riparian buffer performance where other native species on site contribute to the health of the stream and riparian buffer habitat. The goal of the project is to develop native riparian species cover, and all perennial native riparian species—including species that were seeded, installed as cuttings, and naturally recruited from existing vegetation or planted individuals—contribute to the growth and health of this habitat.

Results as Compared to the Revised Performance Standards

The revised performance standard is absolute cover of native perennial species compared to the reference site. As detailed in the MMP Success Criteria Amendment Memo (Appendix A), the Habitat Agency proposes one performance standard to capture the performance of total native cover in stream and riparian buffer areas rather than three (cover of container plants, cover of cuttings, and seeded area minimum cover of native plants). The separate performance standards do not accurately reflect the vegetation development within the restoration site since the planted areas are made up of a mixture of container plants, willow cuttings, seeded plants, and natural recruitment of planted and seeded species.

The revised performance standard is based on comparison to the reference site. The Year 6 performance standard is for the stream and riparian buffer areas to have at least 20% cover of the reference site native perennial species cover. The reference site had 63% absolute cover of perennial native species, meaning stream and riparian buffer areas require a minimum of 12% absolute native perennial species cover. Absolute cover of native perennial species ranged from 16% to 76%, with an average of 49% for the site overall, which meets the proposed revised performance standard.

4.4.2 CUTTINGS (MINIMUM PERFORMANCE)

Performance of willow cuttings in the riparian buffer was assessed during vegetation monitoring and site visits. Willow cutting cover in the riparian buffer areas ranged from 1% to 75% and averaged 18% based on transect data. Willow cover does not meet the performance standard of 30%. The cover of willow cuttings increased slightly from 2023 from an average of 15%, which shows these are not increasing in size rapidly along the transects.

This performance standard is revised as part of the proposed revised performance standards, as accounting of just the cover of willow cuttings is not a useful indicator of stream and riparian buffer

performance. The goal of the project is to develop native riparian species cover, and container plantings, seeded plants, and any naturally recruited species that are subsequently managed all provide highly suitable contributions to habitat values. This performance standard would be replaced by absolute cover of native perennial species compared to the reference site, which the site met as detailed in Section 4.4.1.

4.4.3 SEEDED AREAS (MINIMUM COVER OF PLANTS)

Vegetative cover in riparian buffer enhancement and restoration areas ranged from 75% to 94%, with an average vegetative cover of 83%, which meets the minimum requirement of 70%. All riparian buffer features, ID03-01A, ID03-01B, ID003-02, ID03-03, ID03-04, ID03-05, and ED03-03 met the performance standard.

Native species that were regularly encountered along riparian transects include yarrow (*Achillea millefolium*), Spanish clover (*Acmispon americanus*), California buckeye, California mugwort, coyote brush, mulefat, blue wildrye (*Elymus glaucus* subsp. *glaucus*), California poppy (*Eschscholzia californica*), California coffeeberry, meadow barley, dove lupine (*Lupinus bicolor*), coast tarweed, California brome (*Bromus sitchensis* var. *carinatus*), umbrella sage, valley oak, Fremont cottonwood, California gooseberry (*Ribes californicum* var. *californicum*), California wild rose, California blackberry (*Rubus ursinus*), willow dock (*Rumex salicifolia*), red willow, arroyo willow, blue elderberry, snowberry (*Symphoricarpos albus* var. *laevigatus*) and blue-eyed grass (*Sisyrinchium bellum*).

While this performance standard has been met at all restoration features, this performance standard is revised as part of the proposed revised performance standards, as outlined in Appendix A in order to better account for the success of stream and riparian buffer performance. The proposed revised performance standard adjusts the measure of seeded cover to apply only to the stream and riparian buffer restoration area (ID03-01B) that was seeded-only to better reflect erosion control goals rather than high native canopy cover at this location.

Results as Compared to the Revised Performance Standards

For Year 6, the proposed revised performance standard target is ≥70% cover of non-invasive species at the seeded-only riparian area. Absolute cover of non-invasive species within the seeded-only stream and riparian area (ID-03-01B) was 85%, which meets the revised performance standards.

4.4.4 MAXIMUM COVER BY WEED SPECIES

Invasive weed species were present in the stream and riparian buffer restoration areas with an overall average cover of 2%, ranging between 0% and 4% cover, which meets the performance standard of less than 10% cover. Non-native invasive weed species observed in the stream and riparian buffer restoration areas include black mustard*, yellow star-thistle*, harding grass*, poison hemlock*, medusahead grass*, hoary mustard*, and perennial pepperweed*. Although cover of weed species was below the performance standard, these species will continue to be monitored and managed to ensure the site stays on track to continue to meet performance standards. Further details about invasive weeds found on site are in Section 4.6 Qualitative Monitoring.

4.4.5 RELATIVE COVER OF NATIVE SPECIES

Relative cover of native species within the stream and riparian buffer rehabilitation and enhancement areas ranged from 50% to 100%, with an average of 73%, which does not meet the performance standard of at least 75%. Two of the riparian buffer features, including ID-03-05 and ED03-03, met the minimum cover, however a majority of the features did not. The performance standard for Year 7 (2025) is also 75% and it is anticipated that the cover of native species will continue to grow and will meet this threshold in 2025. Native species observed during vegetation monitoring are listed in Table 24.

In the MMP, the target for this performance standard is ≥75% relative cover of native species for Years 3-10. This target is not realistic for habitat development following restoration, which develop native cover over time. The proposed revised performance standard increases gradually every year starting at Year 4, with the target for Year 6 being ≥40% relative cover of native species, and ≥75% relative cover of native species as the Year 10 target.

Results as Compared to the Revised Performance Standards

For Year 6, the proposed revised performance standard target is ≥40% relative cover of native species. Relative cover of native species within the stream and riparian areas ranged from 50% to 100%, with an average of 73% which meets the revised performance standards.

4.4.6 TARGET SPECIES RICHNESS

Based on quantitative data gathered in Year 6, the reference site had 8 native species present; therefore, the restoration areas require a minimum of 6 native species present to meet the performance standard. There were 36 native species among all the riparian restoration areas, which meets the performance standard. Native species recorded in both the reference site and restoration areas during vegetation monitoring are listed in Table 24.

Table 24. Native Species Recorded in Riparian Buffer Reference and Restoration Sites During Year 6 Vegetation Monitoring

SCIENTIFIC NAME[1]	COMMON NAME[1]	RESTORATION SITE	REFERENCE SITE
Achillea millefolium[2]	yarrow	X	-
Acmispon americanus var. *americuanus*	Spanish clover	X	-
Acmispon wrangelianus	Chilean trefoil	X	-
Aesculus californica[2]	California buckeye	X	-
Artemisia douglasii[2]	mugwort	X	-
Baccharis pilularis subsp. *consanguinea*[2]	coyote brush	X	-
Baccharis salicifolia[2]	mule fat	X	-
Barbarea orthoceras	winter cress	X	-
Bromus sitchensis var. *carinatus*[2]	California brome[2]	X	-
Carex praegracilis[2]	field sedge	X	-
Centromadia sp.	tarweed	X	-
Cyperus eragrostis	umbrella sedge	X	-
Elymus glaucus subsp. *glaucus*[2]	blue wildrye[2]	X	-
Elymus triticoides	creeping wildrye	-	X
Eplobium brachycarpum	willow herb	X	-
Equisetum arvense	common horsetail	-	X
Eschscholzia californica[2]	California poppy	X	-
Festuca microstachys	Eastwood fescue	X	-
Frangula californica[2]	coffeeberry	X	-

SCIENTIFIC NAME[1]	COMMON NAME[1]	RESTORATION SITE	REFERENCE SITE
Galium aparine	common bedstraw	-	X
Heteromeles arbutifolia[2]	toyon	X	-
Hordeum brachyantherum subsp. *brachyantherum*[2]	meadow barley[2]	X	-
Juncus patens[2]	spreading rush	X	-
Juncus xiphioides	iris-leaved rush	X	-
Lupinus bicolor[2]	dove lupine	X	-
Madia elegans	common madia	X	-
Madia sativa	coast tarweed	X	-
Populus fremontii[2] subsp. *fremontii*	Fremont cottonwood	X	-
Quercus agrifolia[2] var *agrifolia*	coast live oak	X	X
Quercus lobata[2]	valley oak	X	-
Ribes californicum[2] var. *californicum*	California gooseberry	X	-
Rosa californica[2]	California wild rose	X	-
Rubus ursinus[2]	California blackberry	X	-
Rumex salicifolius	willow dock	X	-
Salix laevigata[2]	red willow	-	X
Salix lasiolepis[2]	arroyo willow	X	X
Sambucus mexicana[2]	blue elderberry	X	-
Sisyrinchium bellum[2]	blue eyed grass[2]	X	-
Symphoricarpos albus var. *laevigatus*[2]	snowberry	X	-
Toxicodendron diversilobum	poison oak	-	X
Umbellularia californica	California bay	-	X
Verbena lasiostachys	western vervain	X	-
Total		**36 species**	**8 species**

[1]These species were recorded during monitoring site visits and annual vegetation monitoring. Comprehensive botanical surveys were not conducted. Other native species may be present in the restoration area.
[2]Species that were included in the container planting, stake planting, and/or seed mixes from all planting efforts.

4.5. NON-WETLAND WATERS (STREAM) AND RIPARIAN BUFFER PERFORMANCE - HYDROLOGY AND GEOMORPHOLOGY

Based on hydrology and geomorphology monitoring in Year 6 conducted by Balance, the stream and riparian buffers are performing as intended, and meeting all performance standards (Donaldson et al. 2024, Appendix C). A summary of stream performance for each hydrology metric during Year 6 is presented in Table 25. WY2024 was above the average annual precipitation, with many wet periods starting in December and continuing into early May. Detailed hydrologic data can be found in the Geomorphic and Hydrologic Monitoring Report (Donaldson et al. 2024; Appendix C) and information below is taken from this report.

Table 25. Stream Feature Performance – Year 6

Performance Metric	Year 6 (2026) Target	Stream Feature					Overall Site Performance
		San Felipe Creek	Boyd's Creek	Corral Trail	Lower Hotel Trail	Eastern Tributary	
Hydrology – Inset Floodplains on San Felipe Creek	Inset Floodplain inundation if peak flows exceed a 2-year event.	**Met**	N/A	N/A	N/A	N/A	**Met**
Hydrology – Boyds Creek Alluvial Fan – Living Log Jams	Flow in 2 or more channels during the winter season	N/A	**Met**	N/A	N/A	N/A	**Met**
Channel Form	There will be less than 1 foot of channel bed elevation loss averaged over reach and absent of a significant knickpoint.	**Met**	**Met**	N/A	N/A	N/A	**Met**
Corral Trail Drainage Lenses	During and post-storm, if the Corral Trail was overtopped, positive flow off road will be maintained with no significant erosion of road or fill prism. Pipes will not be plugged in the dry season.	N/A	N/A	**Met**	N/A	N/A	**Met**
Lower Hotel Trail Arizona Crossing	Articulated mat is stable and no significant knickpoints have formed.	N/A	N/A	N/A	**Met**	N/A	**Met**
Staked Wood Jams	Staked material is intact and in such a condition to capture sediment and organic material transported by creek.	N/A	N/A	N/A	N/A	**Met**	**Met**

4.5.1 Hydrology – Inset Floodplains on San Felipe Creek

The 2-year streamflow event magnitude was exceeded during WY2024; direct and indirect evidence of inundation on inset floodplains during WY2024 was observed. Site floodplains features are considered inundated if creek flow rose high enough to inundate the created floodplain feature at any location. Water levels at gage SFUS appear to have inundated the ID03-01 floodplain multiple times during late January 2024 and early February 2024, suggesting that the ID03-01 floodplain may have been partially or completely inundated during multiple storm events (Donaldson et al. 2024, Appendix C – Figure 5). Observations made during site visits from February 19 and April 9, 2024, indicate at least partial inundation of ID-03-02 based on the presence of wracked debris and fresh deposition. Balance infers at least partial inundation at ID03-01, ID03-02, ID03-03 and ID03-04, where freshly deposited sediment and/or organic debris were also observed (Donaldson et al. 2024, Appendix C – Figure 15).

4.5.2 Hydrology – Boyds Creek Alluvial Fan – Living Log Jams

The performance standard states that streamflow from Boyds Creek should occupy at least two of the existing or created channels (located at area ED01-01) across the Boyds Creek alluvial fan during the monitoring year. WY2024 was an above average year, and three of the four distributary channels received

streamflow (BCA2, BCA3 and BCA4), as well as the mainstem of Boyds Creek downstream (BCDS). Water level data was recorded from gages in the distributary channels, and water level recorded in BCDS indicate that at least two of the channels were activated (Donaldson et al. 2024, Appendix C – Figure 9a, 9b, 10). This success criterion was met during WY2024.

Based on surveys conducted during Year 5, it appeared that the streamflow threshold required to activate distributary channels BCA1 through BCA4 has increased since installation. In coordination with the SCVHA, Balance prepared adaptive management design recommendations for Boyds Creek to increase channel roughness and encourage aggradation in Boyds Creek, and also lower the distributary channel inlet elevations to encourage more frequent inundation of the Boyds Creek distributary channels at lower flows (Donaldson et al. 2024, Appendix C).

The Boyds Creek adaptive management designs were implemented by SCVHA and Helix Environmental Construction Group (Helix) in coordination with the Balance project design and monitoring team, as discussed in Section 2.

It should be noted that between project completion in 2018 and Water Year 2023 (WY2023), four logs appear to have been dislodged along from living log jams A, G, J-1 and J-2. No additional logs that were originally installed on Boyds Creek appeared to be dislodged during WY2024. It appears that the dislodged logs were moved downstream during high-flow events but remain on Boyds Creek. Movement of logs is expected in dynamic channels, and these dislodged logs do not currently pose a threat to the site performance and will be monitored in future years.

4.5.3 CHANNEL FORM

The intent of this performance standard is to avoid ongoing reach-wide channel incision but allow for localized deposition, scour, and habitat complexity. With the addition of wood at project construction, new pools have formed and deepened the channel by more than 1 foot. Pools that have developed on site are expected, provide habitat complexity, and do not threaten the function of the channel. "Significant" knickpoints should be defined here as longitudinal profile dis-continuities where the average slope up and downstream of the knickpoint over some distance is the same, but offset by a vertical or near-vertical drop of more than one foot and not located at or stabilized by large wood (Donaldson et al. 2024).

Because 2-year flows were exceeded, and field observations suggested geomorphic change had occurred, Balance collected supplemental topographic data during Year 6 monitoring to evaluate this success criterion during WY2024.

Boyds Creek Alluvial Fan (ED01-01)

In WY2023, two logs from two separate living log jams moved downstream. Logs placed as part of the living log jams were intentionally not anchored so that active channel dynamics and migration could occur. Therefore, movement of logs was anticipated. In many cases, Balance observed localized scour and deposition within 1 to 10 feet of the placed logs, with localized deposition upstream, and scouring of pools downstream of logs (Donaldson et al. 2024, Appendix C). All of the living log jams installed on the abandoned branch of Boyds Creek (BCA4), are stable and remain largely buried. It appears that localized scour has occurred at the historic knickpoint on BCA4 between Year 0 and Year 6, but incision has not migrated upstream to intercept the buried grade control log. Though localized scour and deposition greater than one foot occurred locally, no net degradation or lowering of the streambed was observed across the reach. This is consistent with the expected response described in the MMP; the living log jams are functioning as intended.

The DEM of difference does show natural geomorphic processes taking place; on the lower reaches of Boyds Creek, for example (Donaldson et al. 2024; Appendix C – Figure 14c), lateral channel migration

processes, with bank erosion on the outside of the channel bend and deposition on the inside of the channel bend can be observed.

Based on a collaborative review at the end of WY2020, the Project Team decided to replace one log in an effort to protect three oak plantings (Donaldson et al. 2024, Appendix C – Figure 16). This adaptive management measure was executed on November 4, 2020, and is presented in the adaptive management as-built memorandum (Donaldson et al., 2021b). Though some minor erosion has occurred around the log, the log has not moved since being installed, and planted oaks continue to grow. Balance will continue to monitor placed logs and make adaptive management recommendations if floodplain inundation or bed elevation performance standards are not met, or if vegetative survivorship performance standards are threatened.

Graded Swale (ID03-01a)

This swale allows overland stormflows from the Corral Trail drainage lenses and the Boyds Creek alluvial fan to return to San Felipe Creek without causing excess erosion. Hydrologic conditions were sufficiently wet to generate runoff through the ID01-01a swale; no erosion was noted at the graded swale (Donaldson et al. 2024, Appendix C – Figure 14a), and the feature appears to be functioning as intended.

San Felipe Creek Graded Floodplain (ID03-01)

Very little erosion or deposition was noted on or adjacent to the graded floodplain feature (Donaldson et al. 2024, Appendix C – Figure 14b). A small amount of erosion occurred between Year 0 and Year 6 where return flows formed a small channel approximately 10 feet long and one foot wide. The erosion was noted in the Year 1 monitoring report and does not appear to compromise the function of the floodplain. The DEM comparison (Donaldson et al. 2024, Appendix C – Figure 14b) shows a few small areas of erosion within a short reach of San Felipe Creek near the middle of the graded floodplain feature, and some scour associated with natural widening and migration of a small channel step towards the downstream end of the floodplain feature. This channel dynamism does not threaten the function of the floodplain, since the channel bed elevation has not lowered significantly. The channel and floodplain morphology are within the expected range of outcomes and the channel through this reach is meeting the performance standard.

“Reference Reach”

During the design phase, the design team referred to the reach between the Boyds Creek-San Felipe Creek confluence downstream to ID-03-02 (Donaldson et al. 2024, Appendix C – Figure 14c) as the reference reach because the reach displayed geomorphic indicators of a dynamic channel-floodplain system with a floodplain that was regularly inundated. Balance noted that the DEM of difference indicates ongoing channel dynamism occurred between Year 0 and Year 6. Many areas where greater than one foot or deposition has taken place locally, Balance noted from the DEM of difference (Donaldson et al. 2024, Appendix C – Figure 14c) that in the middle of the “reference reach”, the channel has migrated north (hot colors) and deposited a new channel bar (cool colors). This reach is similar to the geomorphic change that has occurred along the ID03-02, ID03-03 and ID03-04 reaches.

San Felipe Creek Graded Floodplains (ID03-02, ID03-03, and ID03-04)

At graded floodplains along San Felipe Creek (ID03-02, ID03-03, and ID03-04), the designed floodplain was reconfigured by high flows during WY2019, which inundated and flowed across the created floodplain features with enough velocity to both deposit sediment and form new channels. At these locations, minimal net change in channel bed elevation occurred, and physical habitat complexity appears to have increased. Other portions of the abandoned channel features formed backwater pools/channels at low flows.

Year 1 topographic data (Donaldson et al., 2021a) indicated that some areas of the ID03-02 floodplain along San Felipe Creek experienced over 1 foot of incision where the new cutoff channel formed through the created floodplain during the first year after construction. The new channel thalweg elevation was within one foot of the former channel elevation, suggesting limited or no vertical instability. Thus, it is interpreted that the performance standard was met at this location.

In order to reduce the potential for downcutting along the created (and steeper) new primary channel, adaptive management activities were initiated during WY2021 and consisted of installing a bioengineered debris jam during WY2021 in the inlet of the new channel to encourage increase sinuosity, reduce channel slope, and encourage streamflow to spread across the created floodplain area. This work was completed on August 26, 2021, and is shown in Balance Hydrologics' 2024 report (Appendix C – Figure 17) and the adaptive management as-built memorandum (Donaldson et al., 2021b). Following high flows of WY2023, the new channel thalweg has migrated, with sediment deposition filling the inside of the channel bend, scour and migration occurring along the outside of the channel bend, and periodic inundation of the original channel (now a secondary high-flow channel). Conditions at the end of WY2024 were observed to be similar to those observed after WY2023. These observations suggest that the new channel is laterally dynamic, with limited vertical instability, and this metric for success continues to be met at Floodplain ID03-02.

Similar to ID03-02, the constructed floodplains at ID03-03 and ID03-04 were inundated and modified by WY2023 high flows, but channel avulsion did not occur at these locations. Rather, a set of shallow channels and backwater features developed within the riparian corridor. Conditions in WY2024 appeared similar to WY2023. Balance noted that the ID03-03 and ID03-04 constructed floodplain areas have been aggraded between Year 0 and Year 6, with the exception of cutbank erosion on the right bank between ID03-02 and ID03-03 (Donaldson et al. 2024, Appendix C – Figure 14d). The observed dynamism of the channel is within the expected outcomes for the design and the site is functioning as expected, with less than 1 foot of vertical elevation change over the reach and active channel dynamics within the inset and widened floodplain corridors. This metric for success is being met at ID03-03 and ID03-04.

Created Channel ID03-05

During WY2019, Balance observed 1 to 3 feet of erosion at the confluence of ID03-05 and San Felipe Creek, which appears to have resulted from the focusing of scour on the left bank of San Felipe Creek during high flows at the outside of the bend, exacerbated by the downstream site boundary exclusion fence which crosses San Felipe Creek at this location. The fence was improved following WY2019. During the high flows of WY2023, minor additional erosion was noted at the bank along the fence. The downstream-most buried log step structure along ID03-05 experienced some erosion along the downstream side of the step due to streamflow in San Felipe Creek, not streamflow emanating from the agricultural ditch wetland. The erosion appears to have only uncovered the top-most log, and the majority of the structure remains buried, stable, and intact. Conditions at this location appeared relatively unchanged in WY2024. Thus, the channel morphology is within the expected range of outcomes and is meeting this performance standard at this location.

Agricultural Ditch Sediment Plugs

Balance inspected the agricultural ditch sediment plugs ED03-01 through ED03-05 and did not observe deleterious erosion. DEM-of-difference surveys also showed no significant signs of erosion. Apparent ground-level lowering observed in the 2024 DEM-of-difference has resulted from change in vegetation canopy, not erosion, based on field confirmation.

4.5.4 CORRAL TRAIL DRAINAGE LENSES

During end-of-year site visit observations, no deleterious erosion or deposition was observed in or around the drainage lenses and Corral Trail (Donaldson et al. 2024, Appendix C – Figure 18). The PVC pipes in the drainage were not clogged and water was observed flowing through multiple pipes during the winter. There was no evidence that the Corral Trail was overtopped during WY2024. The performance standard is being met.

4.5.5 LOWER HOTEL TRAIL ARIZONA CROSSING

As discussed in the Geomorphic and Hydrologic Monitoring Report (Donaldson et al. 2024, Appendix C), the articulated mat Arizona Crossing constructed on the Lower Hotel Trail is performing as designed and no deleterious erosion or deposition was noted (Donaldson et al. 2024; Appendix C – Figure 18). The performance standard is being met.

4.5.6 STAKED WOOD JAMS

Staked debris jams were installed in the Incised Tributary (ID02-01), including four timber[5] staked debris jams and two hand-built staked debris jams utilizing slash and cobbles. Based on direct observations and the DEM of difference (Donaldson et al. 2024, Appendix C - Figure 14d), the staked debris jams appeared to both retain and release sediment between Year 0 and Year 6. In the same timeframe the channel appears to have widened (Donaldson et al. 2024, Appendix C - Figure 14d).

Erosion occurred at the downstream-most timber staked debris jam (Debris Jam 6) (Donaldson et al. 2024, Appendix C - Figure 19) during WY2023. Debris wracked on an improperly installed fence (which was installed along the top of Debris Jam 6) caused streamflow to erode the banks adjacent to the staked debris jam on both the right and left sides and created scour holes adjacent and just downstream of the staked debris jam. The recommended repair was completed by SCVHA and Triangle Properties in coordination with the Balance project design and monitoring team on November 6, 2023, as detailed in Section 2. The bank remained stable during WY2024, with no further considerable bank erosion observed in this area. During WY2024, following winter high flows Balance observed that all of the staked debris jams were functioning as intended, serving to capture episodic sediment delivered during high flows (Donaldson et al. 2024, Appendix C - Figures 19).

As outlined in the MMP, a second course of staked debris jams was recommended to continue to promote additional aggradation to elevate the alluvial aquifer and work toward a long-term goal of reversing incision. Balance provided design recommendations for these structures as part of the 2024 adaptive management effort (Goodwin et al. 2024). The additional course of staked debris jams was installed in September and October 2024 by SCVHA and Helix Environmental Construction Group (Helix) in coordination with the Balance project design and monitoring team. Helix installed three more timber-staked debris jams, and three hand-built staked debris jams throughout the reach (Donaldson et al., Appendix C). The timber staked debris jams were constructed with 20 foot long 6 by 6-inch redwood timbers, built to 2.5 feet above the existing channel bed. The hand-built debris jams were constructed with wood and brush material of differing sizes held together with wooden posts driven into the substrate to mimic natural wood accumulations, similar to the jams constructed on Boyds Creek, and were built to be 1 to 2.5 feet above the channel bed elevation. This reach and newly constructed features will be monitored at various flow levels throughout WY2025 (Year 7) and over the rest of the monitoring period (Years 8-10).

[5] "timber" was added to the nomenclature of these features to distinguish them from other hand-built staked debris jams.

The as-built memorandum for the project can be found in Appendix F of the Geomorphic and Hydrologic Monitoring Report (Donaldson et al. 2024, Appendix C), which includes photos of the newly installed staked debris jams.

4.6. QUALITATIVE MONITORING

On May 6 and 8, June 20 and 21, and July 29, 2024, Nomad Ecology principal vegetation ecologist Erin McDermott, senior restoration ecologist Jaclyn Inkster, and botanist Leanne Feely visited the project site to qualitatively assess site-wide conditions. Qualitative monitoring included surveys for invasive weeds, wildlife observations, and visual assessment of vegetation during each site including surveying for natural recruits. Habitat Agency staff also made wildlife observations including through the use of motion sensor wildlife cameras and permitted dip netting of the created ponds of the site.

4.6.1 INVASIVE WEEDS

Per the MMP (Dudek 2019), plants were considered non-native invasive weeds if they are Cal-IPC ranked as Moderate to High threat level, or if they were included on the CDFA list of invasive species. Naturalized non-native annual grasses with the Cal-IPC rank of Moderate (such as wild oats*, ripgut brome*, Italian ryegrass*, and hare barley*) were not mapped or controlled since they are ubiquitous throughout the site and not subject to the criterion.

On July 29, 2024, Nomad restoration ecologist Jaclyn Inkster and botanist Leanne Feely mapped invasive weeds throughout the site. Twelve invasive weed species were observed in the Restoration Area (Table 26), including black mustard*, Italian thistle*, yellow star-thistle*, bull thistle*, poison hemlock*, stinkwort*, Fuller's teasel*, medusahead grass*, hoary mustard*, perennial pepperweed*, tocalote (*Centaurea melitensis**), pennyroyal*, and harding grass*. These weed species varied in distribution from widespread to limited to just a few or more populations. Confluence conducted weed management and control during maintenance visit including hand removal, which are described in detail in Section 2.

Table 26. Invasive Weed Species Recorded in the Restoration Area in Year 6

COMMON NAME *SPECIES NAME*	CAL-IPC RATING[1]	DISTRIBUTION IN RESTORATION AREA	TREATMENT IN 2024	RECOMMENDED TREATMENT FOR 2025
black mustard *Brassica nigra*	Moderate	Scattered throughout the site.	Hand pulled and mowed in planted areas, and dense patches near planted areas.	Hand pull around plantings. Mow large stands. Localized goat grazing if feasible.
Italian thistle *Carduus pycnocephalus* subsp. *pycnocephalus*	Moderate	Scattered patches throughout the site.	Hand pulled and mowed in planted areas, and dense patches near planted areas.	Hand pull around plantings. Mow large stands. Localized goat grazing if feasible.
tocalote *Centaurea melitensis*	Moderate	Isolated patch along southeast perimeter outside of SW02	None	Hand pull or mow stand to prevent infestation in to SW02.
Yellow star-thistle *Centaurea solstitialis*	High	Scattered throughout the site.	Hand pulled and mowed in planted areas, and dense patches near planted areas.	Hand pull around plantings. Mow large stands. Localized goat grazing if feasible.

Common Name *Species Name*	CAL-IPC Rating[1]	Distribution in Restoration Area	Treatment in 2024	Recommended Treatment for 2025
Bull thistle *Cirsium vulgare*	Moderate	Isolated patches throughout the site.	Hand pulled and mowed in planted areas, and dense patches near planted areas.	Hand pull around plantings. Localized goat grazing if feasible.
Poison hemlock *Conium maculatum*	Moderate	Scattered patches throughout the site.	None.	Hand pull as feasible or mow to prevent seeding.
Stinkwort *Dittrichia graveolens*	Moderate	Individuals scattered along San Felipe Creek and Boyds Creek	Mapped and hand pulled throughout	Hand pull individuals.
Fuller's Teasel *Dipsacus fullonum*	Moderate	Scattered within SW02 and SW03 and San Felipe Creek	None.	Hand pull in planted areas.
Medusahead grass *Elymus caput-medusae*	High	Scattered throughout the site.	Targeted and timed mowing in SW02 and SW03.	Hand pull around plantings. Timed mowing in SW02 and SW03.
Hoary mustard *Hirschfeldia incana*	Moderate	Scattered throughout the site.	Hand pulled and mowed in planted areas, and dense patches near planted areas.	Hand pull around plantings. Mow large stands. Localized goat grazing if feasible.
perennial pepperweed *Lepidium latifolium*	High	Isolated patches within SW03.	Mowed and treated with herbicide.	Hand pull and mow in SW03. Herbicide treatment.
pennyroyal *Mentha pulegium*	Moderate	Isolated patches within SW03.	None.	Hand pull around plantings.
Harding grass *Phalaris aquatica*	Moderate	Scattered patches with few individuals. throughout the site.	None.	Excavate before flowering.

[1]California Invasive Plant Council rating as listed in the California Invasive Plant Inventory Database (Cal-IPC 2024).
[2]California Department of Food and Agriculture noxious weeds are included on the CDFA California Noxious Weeds List (CDFA 2024).

4.6.2 Wildlife Observations

Trail cameras were deployed throughout the year to detect wildlife, including feral pigs that may gain access to the site through breeches in the perimeter fence or through vehicle gates unintentionally left open by other Park user groups. Native mammals documented accessing the restoration area included bobcat (*Lynx rufus*), mountain lion (*Puma concolor*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), mule deer (*Odocoileus hemionus*), striped skunk (*Mephitis mephitis*), black-tailed jack rabbit (*Lepus californicus*), and brush rabbit (*Sylvilagus bachmani*).

Qualified biologist Matthew Fogarty conducted a daytime visual encounter survey (VES) of the restoration ponds and San Felipe Creek corridor on May 9, 2024. The ponds were also dip-netted to detect the presence of larval amphibians and reptiles. During this survey, adult California red-legged frogs, western pond turtle, Western toads (*Anaxyrus boreas boreas*), and American bullfrogs (*Lithobates catesbeianus*) were observed. Sierran treefrog (*Pseudacris sierra*) and Western toad larvae were

abundant. Additionally, restoration ecologist, Nathan Hale, observed one adult California red-legged frog in the created ponds of the project site on both September 4 and 19, 2024.

A nest survey of the site was not conducted in 2024.

4.6.3 Feral Pig Control

A Santa Clara County Parks-sponsored pig control project and remedial actions implemented by Wildlife Detections in Year 4 reduced the prevalence of feral pigs within the site. Installation of a new pig exclusion fence along the Corral Trail in the fall of 2023 ensured pigs were not inadvertently allowed to access the site in 2024 during activities where gates were left open (e.g., control burns or recreational use of Grant Park). Santa Clara County Parks and the United States Department of Agriculture (USDA) continued trapping feral pigs throughout Grant Park. More than 40 feral pigs were dispatched in the park in 2024 during approximately 6 months of trapping.

Feral pigs had been absent from the site from May 23, 2023, through mid-November 2023, until the Corral Trail cattle gate on the west side of the property was left open, presumably after a prescribed burn performed by CalFire. This pig did not apparently stay within the site going into 2024. Pigs appear to have been absent from the project through 2024. The new fence line installed along the Corral Trail appears to have worked as designed.

4.6.4 Plant Health and Vigor

Plant health was regularly monitored in Year 6 by Confluence during their routine maintenance visits, detailed in section 2. Nomad Ecology staff surveyed the plantings during site visits. Overall, the plantings appeared vigorous and healthy, although several plantings in all planting areas experience deer and vole browsing, which has caused mortality on some plantings. Cages were well maintained and upgraded to larger sizes as needed to allow for continued growth. Cages were installed on a portion of the uncaged plantings.

4.6.5 Natural Recruitment

Natural recruitment of willows was observed along San Felipe Creek, as was natural recruitment of coyote brush in all stream and riparian buffers. No sycamores seedlings were observed; if sycamore plants do recruit within the restoration area and survive for several years, they will be included in the Habitat Agency's next genetic sampling effort to test sycamore trees within the reserve system for genetic purity/hybridization. If the recruited trees show a high degree of hybridization with London plane tree genetics, they may be culled and replaced during the Long Term Monitoring Phase of the project.

Natural recruitment in the wetland re-establishment areas is reported in Section 4.2.3.

4.7. Photo Point Monitoring

Photos were taken at each of the 48 permanent photo point locations on May 8, 2024, replicating photo points established in Year 1. An informative subset from the photo-documentation views is presented in Appendix D. Year 1 and current year (Year 6) photos are shown for contrast. Intervening years' photos and photo points 1, 7, 11, 13, 19, 22*, 23, 28, 33, 35, 35*, 37, 39, and 40 can be furnished upon request and are found in the 2019-2022 monitoring report. These photo points were removed for file size reduction and due to the limited information and/or redundant nature of the photos compared to those included in Appendix D.

Section 5. SUMMARY AND RECOMMENDATIONS

5.1. SUMMARY

Overall, the site is performing very well looks excellent, with high cover of native vegetation and diverse native species present in the restored wetlands and stream/ and riparian buffer areas. Although up to 21% of the original container plantings have been replaced in 2020 (Year 2) and 2021 (Year 3), the strong maintenance effort and above-average precipitation years of 2023 and 2024 have resulted in high survivorship and rapid growth. Many of the original plantings are present, are healthy and vigorous, and no longer receiving irrigation. The challenges with plant survivorship in Years 2 and 3 of monitoring haves been successfully overcome with increased attention to maintenance, strategic addition of planting materials as part of adaptive management, and pig management including fencing improvements and pig trapping in Grant Park. Most importantly, the hydrologic design of the project, which is the foundation of the restoration project, has been consistently successful with the geomorphic and hydrologic performance standard being met every year. The restored hydrology is driving increased floodplain connectivity and increased groundwater availability which is likely increasing the availability of groundwater from allowing the site to take advantage of good natural precipitation. Good rain years (2023 and 2024) have likely further to expedited establishment of replacement plants. This outcome mimics natural cycles where years with abundant precipitation bring higher levels of recruitment, growth, and survivorship than drought years in these similar systems.

The Habitat Agency has proposed revised performance standards, which are adjustments to a subset of the performance standards related to vegetation cover. These changes are proposed due to the observation by current restoration ecology staff working on the project, including the authors of the MMP Success Criteria Amendment Memo (Appendix A), that a subset of the current MMP performance standards/success criteria are inconsistent with the principles of restoration ecology and habitat development, they do not reflect the site-specific installation design of native plants for the project, and/or they do not accurately reflect the specific ecology of the project site. The goal with these changes is to ensure that ongoing management of the project, while being held to a high level of restoration success, is focused on creating and enhancing the intended developing habitats.

A summary of Year 6 (2024) annual monitoring results as compared to the original and the proposed revised performance standards, and recommendations are included in Tables 27-29. The wetland rehabilitation and enhancement areas and the stream and riparian buffer areas have met all of the proposed revised performance standards for Year 6 (2024).

Table 27. Summary of Wetland Re-Establishment Year 6 Results and Recommendations

Success Criteria	Year 6 Performance Metric	Year 6 Monitoring results	Recommendations
Wetland Delineation	None	Year 5 delineated wetland acreage within the wetland re-establishment areas was 0.17 acre, which is less than the project goal of 0.38 acre.	Repeat wetland delineation in Year 7 or 8 to see if wetlands on site have increased.
Wetland re-establishment areas must be self-sustaining by Year 10	N/A	On track	None
Wetland re-establishment areas must show evidence of natural recruitment by Year 10	N/A	On track	None

Table 28. Summary of Wetland Rehabilitation and Enhancement Year 6 Results and Recommendations

Performance Metric	Year 6 Performance Metric	Year 6 Monitoring results	Recommendations
Vegetative Results and Recommendations as Compared to the Original Performance Standards			
Container Plants (minimum performance)	40% vegetated cover	9% Vegetative Cover **Did not meet Performance Standard**	The Habitat Agency has proposed revised performance standards for the project that are ecologically meaningful and is in the process of working with the permitting agencies to finalize these revised standards. Additional planting is not recommended.
Cuttings (minimum performance)	30% vegetated cover	N/A	N/A
Seeded Areas (minimum percent of cover of plants)	70% cover	37% cover **Did not meet Performance Standard**	Monitor total vegetation cover later in the season when seasonal wetland species have achieved full growth and cover.
Maximum Cover by Weed Species	10% cover	2% cover **Met Performance Standard**	Continue to monitor and control weeds on site.
Absolute Cover of Wetland Species (OBL, FACW and FAC)[1]	≥75% reference absolute cover of wetland species Minimum 23% required to reach ≥75% of reference wetland cover.	31% cover **Met Performance Standard**	None
Relative Cover of Native Species	≥75% relative cover of native species	58% relative native cover **Did not meet Performance Standard** For comparison, reference wetland had 33% relative native cover.	The Habitat Agency has proposed revised performance standards for the project that are ecologically meaningful and is in the process of working with the permitting agencies to finalize these revised standards.

Performance Metric	Year 6 Performance Metric	Year 6 Monitoring results	Recommendations
Target Species Richness	≥75% of reference site Minimum of 8 native species to reach ≥75% of reference wetland.	14 species **Met Performance Standard**	None
Vegetative Results and Recommendations as Compared to the Proposed Revised Performance Standards			
Absolute Cover of Native Species Compared to Reference Site	≥ 21% of reference site absolute cover Minimum of 10% absolute native species cover to reach 21% of reference native species cover.	22% **Met Performance Standard**	None
Maximum Cover by Weed Species	10% cover	2% **Met Performance Standard**	Continue to monitor and control weeds on site.
Absolute Cover of Wetland Species (OBL, FACW, or FAC)[1]	≥75% reference absolute cover of wetland species Minimum of 23% wetland species cover to reach 75% reference wetland species cover.	31% **Met Performance Standard**	None
Relative Cover of Native Species	≥40% relative cover of native species	58% **Met Performance Standard**	None
Target Species Richness	≥75% of reference site Minimum of 8 native species to reach ≥75% of reference wetland.	14 species **Met Performance Standard**	None
Hydrologic Results and Recommendations as Compared to the Performance Standards			
Hydrology	≥14 days of ponding or saturated soils in an average or above-average precipitation year	**Met Performance Standard**	None

[1]Prior project reports mistakenly defined wetland species as consisting of OBL and FACW species, and they measured and reported wetland species' cover accordingly. This report and all subsequent reports define wetland species by the indicators OBL, FACW, and FAC, in accordance with USACE's wetland delineation methodology

Table 29. Summary of Stream and Riparian Buffer Enhancement Year 6 Results and Recommendations

Performance Metric	Year 6 Performance Metric	Year 6 Monitoring results	Recommendations
Vegetative Results and Recommendations as Compared to the Original Performance Standards			
Container Plants (minimum performance)	40% cover	33% cover **Did not meet Performance Standard**	The Habitat Agency has proposed revised performance standards for the project that are ecologically meaningful and is in the process of working with the permitting agencies to finalize these revised standards. Plants will likely meet this performance standard in Year 7 (2025) as plants are increasing in size more rapidly as they mature. Additional planting is not recommended.

Performance Metric	Year 6 Performance Metric	Year 6 Monitoring results	Recommendations
Cuttings (minimum performance)	30% cover	18% cover **Did not meet Performance Standard**	The Habitat Agency has proposed revised performance standards for the project that are ecologically meaningful and is in the process of working with the permitting agencies to finalize these revised standards. Additional planting is not recommended. Continue to monitor plantings and replace cages with larger ones as necessary to allow plantings to grow outward and increase in cover.
Seeded Areas (minimum percent of cover of plants)	70% cover	83% cover **Met Performance Standard**	Continue to monitor plantings and replace cages with larger ones as necessary to allow plantings to grow outward and increase in cover.
Maximum Cover by Weed Species	10% cover	2% cover **Met Performance Standard**	Continue to monitor and control weeds on site.
Relative Cover of Native Species	≥75% relative cover of native species	73% cover **Did not meet Performance Standard**	The Habitat Agency has proposed revised performance standards for the project that are ecologically meaningful and is in the process of working with the permitting agencies to finalize these revised standards. Continue to monitor plantings and replace cages with larger ones as necessary to allow plantings to grow outward and increase in cover.
Target Species Richness	≥75% of reference site Minimum of 6 native species to reach 75% of reference riparian habitat.	36 species **Met Performance Standard**	None
Vegetative Results and Recommendations as Compared to the Proposed Revised Performance Standards			
Absolute Cover of Native Perennial Species Compared to Reference Site	≥ 20% of reference site absolute cover Minimum of 12% native perennial species cover to reach 20% reference perennial species cover.	49% cover **Met Performance Standard**	Continue to monitor plantings and replace cages with larger ones as necessary to allow plantings to grow outward and increase in cover.
Seeded Areas (Minimum Cover of Non-Invasive Plants), Seeded Only Riparian Areas	70% cover	85% cover **Met Performance Standard**	Continue to monitor plantings and replace cages with larger ones as necessary to allow plantings to grow outward and increase in cover.
Maximum Cover by Weed Species	10% cover	2% cover **Met Performance Standard**	Continue to monitor and control weeds on site.
Relative Cover of Native Species	≥40% relative cover of native species	73% cover **Met Performance Standard**	Continue to monitor plantings and replace cages with larger ones as necessary to allow plantings to grow outward and increase in cover.

Performance Metric	Year 6 Performance Metric	Year 6 Monitoring results	Recommendations
Target Species Richness	≥75% of reference site Minimum of 6 native species to reach 75% of reference riparian habitat.	36 species **Met Performance Standard**	None
Hydrologic Results and Recommendations			
Hydrology – Inset Floodplains on San Felipe Creek	Inset Floodplain inundation if peak flows exceed a 2-year event*	**Met Performance Standard**	None
Hydrology – Boyds Creek Alluvial Fan – Living Log Jams	Flow in 2 or more channels during the winter season	**Met Performance Standard**	None
Channel Form	There will be less than 1 foot of channel bed elevation loss averaged over reach and absent of a significant knickpoint.	**Met Performance Standard**	None
Corral Trail Drainage Lenses	During and post-storm, if the Corral Trail was overtopped, positive flow off road will be maintained with no significant erosion of road or fill prism. Pipes will not be plugged in the dry season	**Met Performance Standard**	None
Lower Hotel Trail Arizona Crossing	Articulated mat is stable and no significant knickpoints have formed	**Met Performance Standard**	None
Staked Wood Jams	Staked material is intact and in such a condition to capture sediment and organic material transported by creek.	**Met Performance Standard**	None

5.2. RECOMMENDATIONS

5.2.1 CAGE REPLACEMENT TO INCREASE NATIVE COVER

Many plantings on site are inside caging to protect them from herbivory; however, the size of the original cages is restricting canopy growth on a few of the plantings. Confluence will continue to monitor plantings and replace cages that are too small with larger cages to allow plantings more space to grow outward and increase in cover.

5.2.2 CONTINUED INVASIVE WEED CONTROL

Invasive weeds should continue to be controlled on site. This will keep the site on track to meet the goals of the project as well as help maintain and increase native cover and decrease invasive cover to meet these performance standards. Control recommendations are included in Table 24. Highest priority areas for control of invasive weeds are directly around plantings and within planting areas, and in SW02, SW03, and Spring01Any herbicide application should be under the direction of a Certified Pest Control Advisor. All herbicide labels and regulations should be followed. All weed control activities will avoid impacts to plantings.

Targeted goat grazing is recommended to occur if feasible in target areas to control invasive weeds including medusahead, mustard, and yellow starthistle. Goat grazing should occur in late spring, after medusahead stems begin to elongate and before the seed milk stage, which is just prior to exposure of the inflorescence (DiTomaso et al. 2008), as outlined above. The most effective results occur when grazing is high density for a short duration (DiTomaso et al. 2008). Goat grazing on site requires coordination with County parks and the grazers to ensure grazing is timed appropriately.

5.2.3 CONTINUED FERAL PIG CONTROL

The following actions will continue to reduce feral pig impacts to the site:

- Support feral pig trapping and removal efforts throughout the region, including the ongoing collaboration between County Parks and USDA.
- Continue opportunistic perimeter fence inspection and repair to prevent pig entry into the site.
- Continue camera trapping to monitor areas where pigs have been most prevalent on site in the past, particularly the seasonal wetland.

5.2.4 REVISED PERFORMANCE STANDARDS

The Habitat Agency is currently working with the permitting agencies to revise some of the performance standards and targets in the MMP to more accurately measure project success, as outlined in Appendix A. Performance standards to be revised include improved parameters for measuring success of container plants and cuttings, thresholds for relative cover of native species, and thresholds for minimum vegetation cover in both wetland rehabilitation and enhancement areas, and stream and riparian buffer enhancement areas.

The wetland rehabilitation and enhancement areas and the stream and riparian buffer areas have met all of the proposed revised performance standards for Year 6 (2024).

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APPENDIX A MMP SUCCESS CRITERIA AMENDMENT PROPOSAL

MEMORANDUM

San Felipe Creek Riparian Restoration Mitigation Monitoring Plan (MMP) Success Criteria Amendment Proposal

To: Brenda Blinn, CDFW
Sara Firestone, USACE
Joseph Terry, USFWS
Brian Wines, RWQCB

From: Nathan Hale, Santa Clara Valley Habitat Agency
Erin McDermott, Nomad Ecology

Subject: **Proposed Revisions to the San Felipe Creek Restoration Project's Performance Standards for Wetland and Riparian/Non-wetland Stream Habitats**

Date: February 22, 2024

Overview: The purpose of this memo is to present the Santa Clara Valley Habitat Agency's proposed revisions to the performance standards of the San Felipe Creek Restoration Project Mitigation and Monitoring Plan (Dudek 2019; "MMP") as presented during the meeting on this topic held on September 11, 2023. The proposed changes include adjustments to a subset of the performance standards related to vegetation cover of the MMP for 1) Wetland Rehabilitation and Enhancement Areas and 2) Non-wetland Waters (Streams) and Riparian Buffer Areas. These changes are proposed due to the observation by current restoration ecology staff working on the project, including the authors of this memo, that a subset of the current MMP performance standards/success criteria are inconsistent with the principles of restoration ecology and habitat development, they do not reflect the site-specific installation design of native plants for the project, and/or they do not accurately reflect the specific ecology of the project site. The goal with these changes is to ensure that ongoing management of the project, while being held to a high level of restoration success, is focused on creating and enhancing the intended developing habitats rather than being focused on meeting the current unsuitable criteria (e.g., cutting out native trees or shrubs that provide desirable habitat values in order to meet subjective cover targets for other species, such as willows).

In addition, this memo includes a summary of the project history, including project construction and replanting efforts, and a broad summary of the current status of the restoration project (for a more detailed status please refer to the Year 5 monitoring report).

Affected Permits:

The following permits were secured for this project and are held by the Santa Clara Valley Habitat Agency:

- U.S. Army Corps of Engineers (USACE) File Number: 2017-00322S, and RGP 18, File Number: SPN-2012-00302S
- San Francisco Bay Regional Water Quality Control Board, Water Quality Certification, CIWQS Place ID 836012
- California Department of Fish and Wildlife Lake or Streambed Alteration Agreement, Notification Number 1600-2017-0309-R3
- Santa Clara Valley Habitat Agency Reporting File Number SCVHA-2-18-01

Project Status Summary:

The project consists of the restoration, establishment, and enhancement of aquatic resources along San Felipe Creek and its tributaries between the Corral and Cañada de Pala trails in the Joseph D. Grant County Park in unincorporated Santa Clara County, California. The restoration project generates habitat restoration credits and contributes to recovery per the requirements of the Santa Clara Valley Habitat Plan (ICF International 2012) and Regional General Permit 18 (USACE 2016). Restoration credits are also sought to satisfy requirements associated with 401 Water Quality Certifications issued by the Regional Water Quality Control Board. Restoration of San Felipe Creek will mitigate impacts from historical land uses and disturbances, enhance aquatic and upland habitats, make San Felipe Creek more resilient to climate change, and provide educational opportunities for the public.

Overall, the project will result in increased aquatic resource functions and services by restoring, establishing, and enhancing wetland and non-wetland waters of the United States, including improving functions within an existing on-site ditch and incised channel, and restoring riparian woodland adjacent to San Felipe Creek. These restoration actions are expected to benefit special-status species such as California tiger salamander *(Ambystoma californiense*) and California red-legged frog (*Rana draytonii*) by providing upland habitat and refugia. The project will also increase the diversity of native wetland and riparian vegetation, as well as improve the functional capacity of existing on-site streams by increasing the potential for addition of allochthonous material (i.e., organic matter and nutrients imported into an ecosystem), providing flood protection benefits, and providing increased groundwater recharge.

Implementation of the restoration plantings began in fall 2018, once grading of the channel areas and installation of the intended improvements were complete. Initial restoration implementation included planting container plants, willow stakes, and seeding with native seed mixes. This planting effort included installation of 7,624 container plants in the wetland rehabilitation and enhancement areas, 1,871 tree and shrub container plants in the stream and riparian buffer areas, and 400 willow cuttings installed along living log jams and in the riparian enhancement areas (Dudek 2020b, 2021, 2023).

Per the San Felipe Creek Restoration Project Mitigation and Monitoring Plan (MMP) (Dudek 2019), monitoring began in 2018 following the completion of construction and restoration implementation activities and will extend for a 10-year period through October 2028 or until success criteria have been achieved. Results from the first two monitoring years revealed that restoration plantings were not meeting the performance standards for survival as outlined in the MMP (Dudek 2019, Dudek 2020a, Dudek 2020b). Plant loss and mortality occurred shortly after plant installation, which was attributed to high rainfall and heavy flows, with additional plant loss over time due to feral pig activity, irrigation malfunction, and drought (Dudek 2020b). A Remedial Plan (Dudek 2020c) was developed to correct performance deficiencies of the project, with the intent to bring the project back into conformance with performance standards. Recommendations from the Remedial Plan (Dudek 2020c) included installation of replacement plants.

The replacement planting effort was completed in two phases over the course of two years. Phase 1 of the remedial planting effort occurred in November 2020, and included 751 container plants installed in the stream and riparian buffer habitats where sediment accretion/deposition occurred (Dudek 2023). Select seeded areas that were degraded by feral pig activity were reseeded in December 2020; seed mixes differed from the original seed mixes due to species availability, but the mix was deemed suitable by the Habitat Agency and project team. An additional 100 willow cuttings were installed in January 2021 in select locations where soil moisture and hydrology would most likely be conducive to success (Dudek 2023). Phase 2 of the remedial planting effort occurred in fall 2021, and it included an additional 1,273 contract-grown container plants and 50 willow cuttings (Dudek 2023). In addition to plantings, a dislodged log jam was replaced in an attempt to protect plantings on an outside bank, and a debris jam structure was built to redirect flows into the pre-project channel alignment where a cutoff channel had formed.

Following the remedial planting effort, there has been continued care to maintain planting health and success. Irrigation was transitioned from sprinkler to drip irrigation throughout 2020 and 2021, and it has been regularly maintained to ensure the plantings received sufficient water. Additional maintenance has included regular weeding efforts to reduce competition from other plants, plant cage maintenance to ensure protection from browsing animals, and maintenance and upgrade retrofitting of the pig exclusion fence to prevent widespread pig activity. In recent years, crews have installed larger cages around plantings that are performing well in order to promote growth and success. Planting and cuttings from the remedial planting effort continue to grow and show more health and success with the regular maintenance.

Despite routine maintenance efforts, the winter of 2022/2023 had very high rainfall which led to additional plant loss, primarily along stream and riparian areas where high flow occurred. Smaller scale supplemental planting efforts have been subsequently installed to continue to benefit habitat restoration effort and ensure the site tracks toward meeting the planted species restoration goals. Willow cuttings were planted in the stream and riparian buffer habitat in February 2023. Direct seeding efforts of coast live oak (*Quercus agrifolia*) and California buckeye (*Aesculus californica*), and cuttings/transplants of woody species thriving on the site including coffeeberry (*Frangula californica*), California rose (*Rosa californica*) and arroyo willow (*Salix lasiolepis*) occurred in November 2023. Up to 100 additional plants, comprised of these and additional species, will be installed in the early spring of 2024 within habitat gaps and empty plant cages.

The most recently completed monitoring year is Year 5 (2023). The site is overall in excellent shape with vigorous plants that will continue to grow and increase in cover. Based on Year 5 vegetation monitoring, the wetland rehabilitation and enhancement areas met four of seven of the vegetation interim performance standards. Based on Year 5 vegetation monitoring, the stream and riparian buffer met three of the six vegetation interim performance standards. All hydrogeomorphology performance standards are being met and the site is functioning as designed. The vegetation performance standards are discussed in detail below.

Vegetation Performance Standards:

Wetland Rehabilitation and Enhancement Areas

Wetland rehabilitation and enhancement areas vegetation performance standards currently include seven standards: cover of container plants, cover of cuttings, seeded area minimum cover of native plants, maximum cover of weed species, absolute cover of wetland species (OBL or FACW), relative cover of native species, and target species richness (Table 1). The Habitat Agency proposes modifications to five of these standards (Table 1).

The Habitat Agency proposes one performance standard to measure the success of native vegetation cover on site instead of the three separate standards: cover of container plants, cover of cuttings, and seeded area minimum cover of native plants. The performance standard of cover of cuttings is not applicable to the wetland rehabilitation and enhancement areas since cuttings were not (and should not be) planted there, so the Habitat Agency proposes to remove this performance standard. The performance standard of cover of container plants does not accurately reflect the development of the restoration site since the planted areas are made up of a mosaic of container plants, seeded plants, and natural recruitment of the restoration species. Natural recruitment is an important part of restoration, signifying suitable conditions for natural regeneration have been achieved and managed for during site maintenance. The Habitat Agency proposes one revised performance standard to capture the total native cover in wetland rehabilitation and enhancement areas: absolute cover of native species compared to the reference site.

The existing performance standard: absolute cover of wetland species (OBL or FACW), which compares enhanced wetland vegetation to reference site vegetation, does not include FAC species. This criterion was originally derived from the USACE Uniform Performance Standards prepared by the USACE 2012 for “dominance of hydrophytes” which is based more on marsh-type wetland vegetation rather than seasonal wetlands typical of the project region (L. Monarres, pers. comm. August 2023). The Habitat Agency proposes to include species listed as FAC in the definition of wetland species as this is consistent with wetland delineation methodology, and both the restored and reference seasonal wetlands on site have a significant component of FAC species and a significantly lower percentage of OBL and FACW species. Therefore, making this change provides for a more relevant comparison between the project seasonal wetlands to reference wetlands rather than basing the comparison to the reference wetlands on a minority subset of the onsite vegetation.

Relative cover of native species, which captures the proportion of native species compared to total plant cover, is an existing performance standard. The Habitat Agency proposes new interim targets for relative cover of native species without changing the final success criterion for this metric. The reason for this change is that the proposed interim targets will better reflect how restoration sites develop over time, with lower increases in cover during the early years of site development and more rapid increases in cover as the site approaches Year 10. The current performance standards for interim relative cover depict a linear annual cover trend, which is atypical for natural growth curves. Again, this proposal does not affect the final 10-year target for this criterion.

In summary, the original seven vegetation performance criteria for wetland rehabilitation and enhancement areas would be revised to five vegetation performance criteria: absolute cover of native species compared to the reference site, maximum cover of weed species, absolute cover of wetland species (OBL, FACW, or FAC), relative cover of native species, and target species richness (Table 2).

Non-Wetland Waters (Streams) and Riparian Buffer Areas

Non-wetland waters (streams) and riparian buffer vegetation performance standards currently include six standards: cover of container plants, cover of cuttings, seeded area minimum cover of native plants, maximum cover of weed species, relative cover of native species, and target species richness (Table 3). The Habitat Agency proposes modifications to four of these standards (Table 3).

Similarly to the proposal for native cover in the seasonal wetland habitats, the Habitat Agency proposes one performance standard to measure the success of native vegetation on site instead of the three separate standards: cover of container plants, cover of cuttings, and seeded area minimum cover of native plants. These separate performance standards do not accurately reflect the development of the restoration site since the planted areas are made up of a mosaic of container plants, cuttings, seeded plants, and natural recruitment of planted and seeded species. Under the current set of standards, management of the site may require cutting back some of the desirable native vegetation if it becomes too robust and crowds-out a different category of vegetation (e.g., if cutting-grown willows grow too well in an area and start to reduce the cover of container plantings), which is not management for restoration, but rather management for meeting success criteria. To avoid this, and to enable natural competition to resolve microsite suitability between native planting species, the Habitat Agency proposes one revised performance standard to capture the total native perennial cover in the riparian habitats of the site in areas that were planted: absolute cover of perennial native species compared to the reference site. This proposed criterion has been designed to be consistent with a high cover goal so as to ensure robust restoration for these habitats.

There is one non-wetland waters (streams) and riparian buffer area that was only seeded with no planting. The function of this seeding and lack of additional planting was to restore a exposed soils following grading of the floodplain connectivity shelf lowering and to ensure sufficient cover was present to avoid erosional issues. The goal of seeding this feature was not to ensure that a high level of native canopy was present. Planting of native species other than seeded species was excluded from the original design due to the lack of accessible ground water in this location. The

current performance standard, seeded area minimum cover of native plants, currently applies to this area; however, the Habitat Agency proposes to augment this performance standard to be: seeded areas minimum cover of non-invasive plants, while keeping the same cover targets. Aiming for high native cover in a small island patch of what is essentially grassland covered floodplain

Relative cover of native species, which captures the proportion of native species compared to total plant cover, is an existing performance standard. Similarly to this proposal for seasonal wetland vegetation monitoring, the Habitat Agency proposes new interim targets for relative cover of native species that will better reflect how restoration sites develop over time, with lower cover increases in the early years of site development and increasing more rapidly as the site approaches year 10, with the final 10 year target remaining the same as in the original MMP.

The original six vegetation performance criteria for non-wetland waters (streams) and riparian buffer areas would be revised to five vegetation performance criteria: absolute cover of native perennial species compared to the reference site, seeded area minimum cover of non-invasive plants (seeded only riparian areas only), maximum cover of weed species, relative cover of native species, and target species richness (Table 2).

Summary:

In summary, the Santa Clara Valley Habitat Agency believes these revised performance standards more accurately capture the restoration site development and ecology, and they continue to hold the project to a high level of required effort and attention to ensure restoration success. In addition, the proposed metrics concentrate the monitoring effort and resultant maintenance effort on meaningful aspects of native habitat development without creating scenarios wherein maintenance is forced to manage for the success criteria.

All of the project success criteria are shown in the tables below, with the current success criteria (Tables 1 & 3) subtended by the proposed success criteria (Tables 2 & 4). Yellow highlighting identifies the cells that are subject to proposed changes.

References Cited

Dudek. 2019. San Felipe Creek Restoration Project Mitigation and Monitoring Plan. Prepared for Santa Clara Valley Habitat Agency. August 2019.

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_____. 2021. San Felipe Creek Restoration Project Mitigation Monitoring Annual Report, Year 3 – 2021. Prepared for Santa Clara Valley Habitat Agency. December 2021.

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ICF International. 2012. Santa Clara Valley Habitat Plan. Final. Prepared for City of Gilroy, City of Morgan Hill, City of San José, County of Santa Clara, Santa Clara Transportation Authority, and Santa Clara Valley Water District. August 2012.

U.S. Army Corps of Engineers (USACE). 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. ed. J.S. Wakely, R.W. Lichvar, and C.V. Noble. ERDC/ELTR-06-16. MS: U.S. Army Engineer Research and Development Center.

_____. 2016. Regional General Permit 18 Santa Clara Valley Habitat Plan Regional General Permit. January 2016.

Table 1. Original MMP Wetland Rehabilitation and Enhancement - Vegetation Performance Standards

Performance Metric[1]	Year of Monitoring									
	1 (2019)	2 (2020)	3 (2021)	4 (2022)	5 (2023)	6 (2024)	7 (2025)	8 (2026)	9 (2027)	10 (2028)
Container Plants (Minimum Performance)	90% plant survivorship	85% plant survivorship	25% vegetated cover	30% vegetated cover	35% vegetated cover	40% vegetated cover	45% vegetated cover	50% vegetated cover	55% vegetated cover	60% vegetated cover
Cuttings (Minimum Performance)	70% plant survivorship	65% plant survivorship	15% vegetated cover	20% vegetated cover	25% vegetated cover	30% vegetated cover	35% vegetated cover	40% vegetated cover	45% vegetated cover	50% vegetated cover
Seeded Areas (Minimum Cover of Native Plants)	50% cover	55% cover	60% cover	65% cover	70% cover	70% cover	70% cover	70% cover	70% cover	70% cover
Maximum Cover by Weed Species[2]	20% cover	15% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover
Absolute Cover of Wetland Species (OBL, FACW)	≥50% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species
Relative Cover of Native Species	≥50% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species
Target Species Richness	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site

[1]Cells highlighted in gray are revised in the Revised Wetland Rehabilitation and Enhancement Vegetation Performance Standards (Table 2).

[2]Weed species are those categorized as highly invasive by the California Invasive Plant Council (Cal-IPC), and/or those identified by the monitoring restoration ecologist as having the potential to interfere with meeting project goals.

Table 2. Revised MMP Wetland Rehabilitation and Enhancement - Vegetation Performance Standards

Performance Metric	Year of Monitoring									
	1 (2019)	2 (2020)	3 (2021)	4 (2022)	5 (2023)	6 (2024)	7 (2025)	8 (2026)	9 (2027)	10 (2028)
Absolute Cover of Native Species Compared to Reference Site	90% plant survivorship	85% plant survivorship	≥ 6% of reference site absolute cover	≥ 10% of reference site absolute cover	≥ 15% of reference site absolute cover	≥ 21% of reference site absolute cover	≥ 29% of reference site absolute cover	≥ 40% of reference site absolute cover	≥ 55% of reference site absolute cover	≥ 75% of reference site absolute cover
Maximum Cover by Weed Species[2]	20% cover	15% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover
Absolute Cover of Wetland Species (OBL, FACW, or FAC)	≥50% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species	≥75% reference[3] absolute cover of wetland species
Relative Cover of Native Species	≥15% relative cover of native species	≥15% relative cover of native species	≥15% relative cover of native species	≥20% relative cover of native species	≥30% relative cover of native species	≥40% relative cover of native species	≥50% relative cover of native species	≥60% relative cover of native species	≥70% relative cover of native species	≥75% relative cover of native species
Target Species Richness	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site	≥75% of reference[4] site

[1]Cells highlighted in gray are revised.

[2]Weed species are those categorized as highly invasive by the California Invasive Plant Council (Cal-IPC), and/or those identified by the monitoring restoration ecologist as having the potential to interfere with meeting project goals.

Table 3. Original MMP Non-Wetland Waters (Streams) and Riparian Buffer Areas - Vegetation Performance Standards

Performance Metric	Year									
	1 (2019)	2 (2020)	3 (2021)	4 (2022)	5 (2023)	6 (2024)	7 (2025)	8 (2026)	9 (2027)	10 (2028)
Container Plants (Minimum Performance)	90% plant survivorship	85% plant survivorship	25% vegetated cover	30% vegetated cover	35% vegetated cover	40% vegetated cover	45% vegetated cover	50% vegetated cover	55% vegetated cover	60% vegetated cover
Cuttings (Minimum performance)	70% plant survivorship	65% plant survivorship	15% vegetated cover	20% vegetated cover	25% vegetated cover	30% vegetated cover	35% vegetated cover	40% vegetated cover	45% vegetated cover	50% vegetated cover
Seeded Areas (Minimum % of Native Plants)	50% cover	55% cover	60% cover	65% cover	70% cover	70% cover	70% cover	70% cover	70% cover	70% cover
Maximum Cover by Weed Species[2]	20% cover	15% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover
Relative Cover of Native Species	≥50% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species	≥75% relative cover of native species
Target Species Richness	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]

[1]Cells highlighted in gray are revised in the Revised Non-Wetland Waters (Streams) and Riparian Buffer Vegetation Performance Standards (Table 4).

[2]Weed species are those categorized as highly invasive by the California Invasive Plant Council (Cal-IPC), and/or those identified by the monitoring restoration ecologist as having the potential to interfere with meeting project goals.

Table 4. Revised MMP Non-Wetland Waters (Streams) and Riparian Buffer Areas - Vegetation Performance Standards

Performance Metric	Year									
	1 (2019)	2 (2020)	3 (2021)	4 (2022)	5 (2023)	6 (2024)	7 (2025)	8 (2026)	9 (2027)	10 (2028)
Absolute Cover of Native Perennial Species Compared to Reference Site[1]	90% plant survivorship	85% plant survivorship	≥ 6% of reference site absolute cover	≥ 10% of reference site absolute cover	≥ 15% of reference site absolute cover	≥ 20% of reference site absolute cover	≥ 25% of reference site absolute cover	≥ 35% of reference site absolute cover	≥ 55% of reference site absolute cover	≥ 75% of reference site absolute cover
Seeded Areas (Minimum Cover of Non-Invasive Plants) (Seeded only riparian areas only)	50% cover	55% cover	60% cover	65% cover	70% cover	70% cover	70% cover	70% cover	70% cover	70% cover
Maximum Cover by Weed Species[2]	20% cover	15% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover	10% cover
Relative Cover of Native Species	≥15% relative cover of native species	≥15% relative cover of native species	≥15% relative cover of native species	≥20% relative cover of native species	≥30% relative cover of native species	≥40% relative cover of native species	≥50% relative cover of native species	≥60% relative cover of native species	≥70% relative cover of native species	≥75% relative cover of native species
Target Species Richness	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]	≥75% of reference site[3]

[1]Cells highlighted in gray are revised.

[2]Weed species are those categorized as highly invasive by the California Invasive Plant Council (Cal-IPC), and/or those identified by the monitoring restoration ecologist as having the potential to interfere with meeting project goals.

APPENDIX B CONFLUENCE MAINTENANCE LOG

San Felipe Creek Maintenance Log

Gate Code: 4210

County lock (green stripe), 8240

Date	Staff	Hours on-site (travel)	Field Conditions	Task Descriptions and Location	Mileage	Materials Furnished	Plant Mortaility	Weeds controlled	Fenceline Patrol	Irrigation Inspection	Water Tank Level
1/18/2024	KL, KB, FA 6.5 (1.5) each	19.5 (4.5)	Moderate temp, overcast	RTV battery is still holding voltage when unconnected to RTV, 12.25 volts upon arrival. Used lead caps to make a better battery connection. Brought battery back to central after using RTV today. *Dirt roads into the site are relatively dry; only a few muddy spots. Site roads are moist but no muddy spots. Water levels in the ponds are low, only 1-2 feet of standing water in the pond with the most water. San Felipe creek and all other drainages onsite are dry. Plants are very dormant but, noticed new growth on mugwort and elderberry. *Harvested and planted 24 willows, in 4 clusters, at the upper floodplain; ID03-02. Planted 7 rose transplants from creek bank just downstream. Also planted an experimental sycamore cutting. Only worked in upper floodplain today. New willow clusters, sycamore and rose are flagged with green flags. *Most downstream flood gate on San Felipe creek is getting worked on today by others. *Checked the spring for evidence of pig activity, no rooting found	85	RTV					
2/2/2024	KL	1		New planting coordination							
2/12/2024	KL	1		New planting coordination, water feed restored to site, inquiries regarding road conditions		•Flags (purchased 2/14/2024): $30.50*					
2/15/2024	MB,HE,KB, CL 6.5 (1.5) each	26(6) each	Cool, partly cloudy	Installed 50+ willow cuttings in lower floodplain, 3-4 ft apart, in clusters of 3-7, primarily on edges of creek with a few in flat area in center of floodplain. Flagged each cluster with pink flag. Appears to be a large leak at bottom of turbulator(?) tank inside pump house. Appears to have been leaking since the water was turned back on. Closed ball valve before tanks as well as valve right outside pump house. Water was flowing through creek at lower floodplain.	85						
2/16/2024	GS, MB, CL 6.5 (1.5) each	19.5 (4.5)	Cloudy, wet	Road into site was passable but a bit sloshy. Water flowing in San Felipe and Boyd creeks. Harvested 20 willows from stand near pump house. Made sure to only take a few from each tree. Installed 20 willows in the upper floodplain. Marked with 1 flag per cluster. Performed perimeter walk and inspected fence line. No signs of damage. Did find pig remains on the other side. Decided not to fiddle with pump house leak as it would require removing the tank in the corner. Rinsed off truck and some tools at the maintenance yard. Green waste bin no longer blocking storage container with RTV.	85						
2/22/2024	GS	1		Plant pickup. 19 elderberry	45	•TWSN: $206.44*	215				
3/4/2024	KL	1.5		Planting prep and material purchase		•Rebar (176 pieces): $868.40*					
3/6/2024	KL	3.5		Pick up wire, rebar and plants from CCW. Plants from CCW paid for by SCVHA	30	•103 x 5 gal gopher baskets: $650.04* •600 feet 4' x 100' welded wire (2 receipts): $767.80 *	2286.24				
3/7/2024	KL, CL 6.5 (1.5) each	13(3)	Cloudy/wet	Drove RTV into the site with 100 pieces of rebar and 3 rolls of wire. Access trails/roads were muddy but RTV left little impact. Checked the three flap gates and removed two old fence post stuck under upstream SF flap gate. Downstream SF flap gate appears that it will have a gap underneath when water goes down due to channel down cutting. Boyd flap has water flowing through it with not much sediment built up behind it. Standing water is present in the flow line at the pump house and both creek crossings in the site have water flowing through. *Flagged 60 new plant locations in the lower floodplain and 40 new plant locations in the upper floodplain. Folded 40 gopher baskets. Sambucus are very green throughout and found many buckeye seedlings sprouting. No signs of acorn sprouts yet. Lower floodplain has a lot of mugwort regrowth again this year. *The middle two gates were unlocked; one gate had no locks or chain present. Site gate and first gate near bathrooms were locked	170	RTV					50%

San Felipe Creek Maintenance Log

Gate Code: 4210

County lock (green stripe), 8240

Date	Staff	Hours on-site (travel)	Field Conditions	Task Descriptions and Location	Mileage	Materials Furnished	Plant Mortaility	Weeds controlled	Fenceline Patrol	Irrigation Inspection	Water Tank Level
3/8	KL 6.5 (1.5) CL 5.5 (1.5)	12 (3)	Sunny warm afternoon	Drove the rest of the rebar and wire into the site with RTV, still pretty muddy. Water is slightly lower today but there is still flow coming out ED01 leaving a foot of water in the that creek crossing. Folded more gopher baskets and made 75 deer cages; 4 feet tall by 2 feet diameter. Prepped materials are staged at the upper and lower floodplain. Tanks are almost 100% full, closed the ball valve just upstream up the tanks before leaving	85	RTV					90%
3/18/2024	KL 6 (1.5) KB 4.5 (1.5) GS, MB, CL 6.5 (1.5 each)	30 (7.5)	Sunny warm afternoon	Access road are drier today but, still muddy in spots. *Planted, watered and caged approximately 35 plants in gopher baskets in the lower floodplain. * No cages on Coyote Bush. 100 total container plants to be planted. 300 total new plants will need drip split between the 2 floodplain planting areas; New seeds, new willow cuttings and new containers. Took apart irrigation system in Pump house and found the source of the leak, it was a cracked PVC to metal fitting at the base of the pressure tank. Started pulling field mustard in the lower floodplain because it is already in full bloom. KL time includes preparation and organization time from last week	170	RTV					
3/19/2024	KL, GS, MB, CL, HE, KB 6.5 (1.5) each	39 (9)	Sunny warm afternoon	Finished planting the lower floodplain ~ 25 plants planted today here. Planted 20 plants in the upper floodplain, after folding 40 gopher baskets and making the last 15 cages. *The gravely planting basins, mostly mule fat and sambucus, slowed down the process. All plants were caged and watered today. 20 more plants left. *Flagged all the new willows in the two floodplain plantings with red Ewing flags, 100 total. Fixed the plumbing in the pump house	170	Ewing: $96.92					100%
3/20/2024	GS, MB, KB, CL 6.5 (1.5) each	26 (6)		Finished installing last 20 plants in upper floodplain. Harvested 2 mule fat and 1 sambuucas cuttings for installation. Watered in and caged all plants besides Coyote brush. Hand weeded field mustard in both floodplains as well as some thistle rosets. Washed mud deposits off of the truck from two days of driving in	85						
4/18/2024	KL	1		Purchased 1000 linear feet (10 rolls) of wire for browse cage upsizing. This will make about 120 cages that are 2.5 diameter	20	•4 rolls wire: $431.64* •6 rolls wire: $647.46*					
4/23/2024	KL, GS 6.5 (1.5) each	13 (3)	Cloudy cool	The herbicide on the pepper weed patch in the SW03 wetland was pretty successful with about 25% regrowth. Small new pepper weed plants are currently 6-8” tall. The ground in the wetland is slightly muddy but is easily accessible on foot. *New buckeyes from seed are coming up but no signs of acorn sprouts yet. *Found new fitting cracked at the pump house; replaced. Float valve is very sticky which makes it difficult for the float to fully turn off; float is good. Pressurized system and flushed air from the lines. *Upper Floodplain. Soil moisture is still medium to high in most basins. Plants on the center “island” are considerably drier due to gravely soil here. Plants are very healthy throughout will a lot of new native recruits but, also a lot of weeds. Weeded Italian thistle and curly dock from this site and removed small cages from 7 snowberry. Wire was badly intertwined with the snowberry and the plants are spreading. No plans to recaged snowberry since there are a lot of trees and shrubs here already flagged for cage upgrade, yellow flags. Will need 1000+ feet of drip tubing to run to the new plants in the Upper floodplain; probably need a similar amount of new drip tubing in the lower floodplain as well. Weeded thistle and mustard around the water tanks. Marked the hose bib near Boyd with a t stake and red ribbon. *Roads in are much drier. Ponds are still full and have recently spilled over into the side channel. Flap gates are pig secure at this time	85	17	April Hours				
5/1/2024	KL 5.5 GS, KB 6.5 each (1.5 each)	18.5 (4.5)	Sunny warm	Bought drip supplies from Ewing. Built a new valve assembly at the Upper Floodplain, ID03-02, with materials already onsite. Laid out mainline drip tubing to all of the new plants in the upper floodplain, approximately 160 total planting locations cuttings, container plants, transplants and seeded basins. Buckeyes seeds are growing pretty good, only found one acorn basin with a seedling.	170	Ewing: $524.19					

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Gate Code: 4210

County lock (green stripe), 8240

Date	Staff	Hours on-site (travel)	Field Conditions	Task Descriptions and Location	Mileage	Materials Furnished	Plant Mortaility	Weeds controlled	Fenceline Patrol	Irrigation Inspection	Water Tank Level
5/2/2024	KL 4.5 GS, KB 6.5 each (1.5 each)	17.5 (4.5)	Sunny warm	Added emitters to the upper floodplain drip and ran for two hours to test. Everything working very well. Basin moisture varied from high moisture, on some of the willows on the creek edge, to low moisture/dry on the plants in the areas with the most gravel/high drainage. Removed drip creek crossing for now and turned timer off. Site is ready for weeding and cage upgrading on the yellow flagged plants. *Lower Floodplain: installed drip plus emitters on plants on the west side above floodplain. Moisture is still adequate here for now. Started installing drip in the floodplain. Moisture varies from high to dry here as well. New plants are very young so drip will be completed soon after the little bit of rain that is coming	170						
5/10/2024	KL	5.5 (2.5)	Sunny warm to hot	Fixed break in 2” PVC mainline. Connected the PVC creek crossings in the upper and lower floodplain planting areas. These were removed for overwintering since they cross the flow line. Finished drip in the lower floodplain planting area and watered the new plants for 2 hours delivering 8 gallons per plant. Cleaned filters in both floodplain zones and set timers, on the new plants, to run weekly on Thursdays from 8am-1230 pm. *Older plants in the Lower floodplain are pretty well established, will monitor for irrigation needs. *Older plants in Upper floodplain will get irrigation activated to them soon, separate valve. Pump House and both Floodplain zones are ready for weeding and cage upsizing. Access roads will need to be mowed soon as well. * Water to the tanks is currently shut off. I will contact parks to ask for it back on	85	•Ewing (5/9): $194.64*					90%
5/16/2024	KL 5.5 (1.5) GS, CL, KB 6.5 (1.5 each)	25 (6)	Overcast then warm	Checked the phenology of Medusa head in the seasonal wetlands SW03, north, and SW02, south. SW03 Medusa head is still mostly in the vegetative stage with approximately 15% beginning to flower. SW02 Medusa Head is still small and in the vegetative growth stage. Medusa Head is much more progressed along the Coral Trail road where it is all in the flowering stage, awns emerged. *Mowed along the Coral trail road focusing on flowering Medusa head and Yellow star thistle. (16 hours including checking wetlands) *Started weeding and spot mowing in the upper floodplain planting area. Also repaired and unburied the drip to the older plants, separate valve, in the upper floodplain and ran this valve manually to give these plants some water. *Return next week to mow Medusa head in SW03, northern wetland, and check development of the Medusa head in the southern wetland, SW02	170						80%
5/23/2024	KL 5 (1.5) CL, KB 6.5 (1.5 each)	18 (4.5)	Sunny warm	Checked Medusa head phenology in both wetlands. The patch of Medusa head in the northern wetland SW03 is now in the flowering stage. The fringes of the southern wetland, SW02, has flowering Medusa head but the Medusa head is still in the vegetative stage in majority of the lower/wetter parts of this wetland. *Mowed the entire patch in SW03 and spot mowed around the fringe of SW02 (21 hours). The patch was larger than anticipated in SW03. Irrigation to the newest plants was scheduled for today, performed a thorough irrigation check while zones were running. *Opened ball valve to last years plantings, mostly willows, in the lower floodplain. System is able to water all of these plants at the same time. *Tanks are now at 60% and no water flowing in. Will contact the parks again regarding when water will be restored	170	107	May Hours				60%
6/3/2024	CL, GS 6.5 (1.5) each	13 (3)	Overcast	Mowed in both wetlands SW03 and SW02, considerable amount of flowering Medusa head came up between last mowing event. Focused on middle of wetlands. Ran upper floodplain irrigation for older plants for 2 hours. Checked water tanks were not overflowing at pump house.	85	955					
6/10/2024	MB, SM,KB, FA(8 each)	26 (6)	Sunny, warm, light breeze	Mowed road ways along upper and lower floodplain (parking areas included) mowed boyd access road but left area where there was heavy yarrow population. Continued mowing medusa head patch in juncus field parrallel to upper floodplain. Mowed around pump house. Began pulling mustard from pump house planting area. Tank was overflowing, adjusted float. A 131 mower is broken, (piston?)	85						

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6/13/2024	KB, MB (8 each)	13 (3)	Sunny, warm, light breeze	Fixed chew/ breaks in spaghetti on two basins in the upper flood plains while irrigation was running 8-10am. Walked the fence line, noticed the fence could be closed up a bit better where the recent repair was at the far end of the ponds in the river with the corrugated metal material. Stacked rocks closer to fence line near the road by the pump house to prevent intruding animals from entering. No holes in the fence line were found. Ran irrigation in zone 2 in upper flood plains for 2 hours. Built cages at the pump house.	85						
6/14/24	MB,BF,FA(8 each)	19.5 (4.5)	Sunny	Upsized roughly 45 cages in upper floodplain?	85						
6/19/24	MB, SM, KB (8 each) KL (1.5)	21 (4.5)	Sunny	Hand pulled yellow star thistle and mustard around cages/ basin. Mowed denser patches in between cages. Cleaned filters in upper and lower floodplains. Ran zone 2 upper floodplain for 2 hours, repaired cut in drip line. Site walk tomorrow in morning, weed pump house.	85						100%
6/20/2024	MB, KB (8 each) KL (2)	14.5 (3.5)		Potential to mow lower flood plain during next visit. Performed fence walk, no repairs needed but the SF flap gate on the south side does have a significant gap underneath from the stream down cutting. Ran the drip irrigation to the older plants in the upper floodplain for 2 hours delivering 8 gallons per plant; repaired two chewed spaghetti tubings. Started building new cages in the pump house zone	115	540			Yes		
7/5/2024	KL (5)	2.5 (2.5)	Hot	Water Flow from parks to tanks is off and tank level is at 60%. *Ball valve upstream of our tanks was turned OFF upon departure*. Goat herder is getting water from 2" cam between tanks and the pump house; separate ball valve. Appears goat work is done in the site and the goats are now north of the site near the second gate as you drive in. *New plants in upper and lower floodplain are moist from yesterday's irrigation event. Cleaned the 3 filters today, the lower floodplain filter had significant buildup. *Set timer to the older plants in the upper floodplain, valve 1, to run every 14 days (every other Friday) 8-10am. Ran this zone manually today for 2.5 hours/~10 gallons per plant. Lower floodplain is ready for basin work on the new plants (plants with flags), hand weeding of high invasive plants and spot mowing. Start applying deer spray to the new willows, red flags, in the upper and lower floodplain planting areas next time. A few new plant deaths noted but, overall the site is doing well. Inspect Boyd and Mother Oak zones next time. Pond level in the uppermost plug and pond is about 30% full. * Stopped by park maintenance yard office to discuss turning water feed to tanks back on but, no one was there; holiday weekend	85						~60%
7/10/2023	KL (8)	5 (3)	Hot	Confirmed with parks, in person, at the beginning of the day that water is turn back on but, still only a trickle is coming into the tanks at the end of the day. Removed old float valve and assembly and purchased plus installed a new float valve assembly. Goat herder is now even further away from the site adjacent to the access road on the way in. He is still filling his water tank is the site. Ran lower floodplain irrigation manually for 30 minutes. Upper floodplain plants are okay without water for now. Turned off timers and shut off ball valve before the tanks. Tanks level is very close to pump cut off switch so, no much usable water on site until tanks are filled. Return soon to fill tanks, confirm new float valve function, water plants and turn timers back on. *Took a picture of the gap under downstream SF Flood gate and emailed Julie	110	•Float valve assembly: $210.10*					~35%
7/15/2024	KB, SM 6.5 (1.5) each KL 4.5 (1.5)	17.5 (4.5)	Sunny nice	Met with Alex and Tyler from parks and went out to the tanks to show them our system. Water is flowing into the tanks at a good rate. Watered older plants in the lower floodplain for 1 hour fixing the drip irrigation while running. Water these plants more next week. Also watered the new plants in the upper and lower floodplain for 30 minutes each. *Weeded basins, the planting area and spot mowed in the lower floodplain. Focused on dittrichia, YST and pepper weed. *Sprayed repellent on the new willows, red flags, in the upper and lower floodplain. Float valve still needs some adjustments and we used more water then was filled today so, water feed to tanks is OFF at our ball valve until we can confirm that the float works correctly	105						

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7/16/2024	KL	2.5 (1.5)	Sunny nice	Turned on water and adjusted the float valve assembly. Inspected the recently new found plant deaths in the pump house zone and noticed these plants to have their bark stripped away. The majority of these plants are in cages, some with 1" mesh, so suspect rats/rodents chewing on the bark. *Sprayed repellent on other plants with chewed bark, ~50% of the plants. *Turned on pump house zone for a little bit and started finding leaks. Flagged the end caps with blank orange flags. The plants in the pump house zone are presenting with typical summer dormancy but, a deep watering may help the chewed plants rebound or send up stump sprouts and help the smaller/weaker plants. We will irrigate this zone next week	24						80%
7/24/2024	KB 7 (1.5) CL, BF, LMW, SM 6.5 (1.5 each)	33 (7.5)	Hot	Work in the Pump House Zone today. Temperature: hot and sunny 85-95 degrees. Soil moisture: very low. Found at least 10 breaks in the irrigation from rabbits chewing the line. Fixed the breaks as well as replaced emitters and spaghetti. The break was near the main line and fed to the plants closest to the road from the creek to tallest Sam bucas. This area of plants had not been receiving water and looked very dry. ;Mowed mustard on willow/ stream side of the pump house. Hand pulled yellow star thistle around water tanks. Hand pulled dry grasses and mustard in the basins on the left side of the pump house, began weeding basins on the right side. Turned on water from ball valve to tanks, was about 50% full. At end of day tanks were about 80% full, shut ball valve and made sure pump house node was set to off.	170					Yes	
7/25/2024	CL, LMW 6.5 (1.5 each) KL (1.5)	14.5 (3)	Hot & Breezy	Turned on ball valve to start filling tanks upon arrival. Upper flood plain irrigation just turned on and pump in pump house was running. Inspected upper flood plain while irrigation was running, found a T coupler had popped out, fixed that and system was running well after that. Mowed Boyd road, section of 1" at the end of Boyd road cracked at coupler, flagged with blank orange flags since we didn't have pvc supplies to fix. Inspected lower flood plain when irrigation turned on, no signs of leaks. Applied deer repellent to all willow cutting flagged with red flags in lower and upper flood plain. Began to mow right side of pump house, about 60% remains to be mowed. Made 6 cages out of roll of caging wire that was already opened on site. Caged 3 coffee berry, 2 toyon, 1 sambucus on the right side of pump house. Still a handful of remaining plants to be up sized but majority is done. Turned ball valve to tanks back off before leaving, it was about 85% full.	85						
7/29/2024	KL, SM 4.5 (1.5) each	9(3)	Warm sunny	Pump House: Hand weeded star thistle on the north side of the tanks. Spoke with Leanne from Nomad and she suspects the bark damage to be from voles. Sprayed repellent on the chewed on plants. Upgraded 7 cages here, some more small cages ready for removal on mugwort, Coyote brush and snowberry. **Watered Pump House for 3 hours, deep soak, delivering 10-12 gallons per plant.** Fixed 4 more chew holes in the drip line. Confirmed new float valve shut off on water tanks and replaced pressure gauge in the pump house. *Uppermost pond has only one foot of water in it. *Added an inline pressure reducer to the new plants in the lower floodplain. *Pepper weed, on the north end of the site, is ready for another round of herbicide. The main pepper weed area has spotty regrowth towards the middle but the fringes have more regrowth. Pepper weed Herbicide is recommended by Nomad as well	85	•Ewing (2 receipts): $178.42*					100%
7/31/2024	KL, MQ 2.5 (1) each	5 (2)	Warm to hot	Site check in all zones. Confirmed complete shut off on water feed to tanks; new float valve working good. Watered older plants in the lower floodplain for 1.5 hours. Side Channel and Ponds zones ready for weeding pass. Mother Oak and Boyd creek ready for some spot mowing and cage upgrading on smaller trees. Lots of small cages on empty basins and larger plants to be removed in these zones,	45						

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Date	Staff	Hours on-site (travel)	Field Conditions	Task Descriptions and Location	Mileage	Materials Furnished	Plant Mortaility	Weeds controlled	Fenceline Patrol	Irrigation Inspection	Water Tank Level
8/15/2024	KL, DS, FA, BF, SH (8 each)	32.5 (7.5)	Warm	Side Channel & Ponds: ID03-05 & ED03-01 thru 05: Weeded yellow star thistle, bull thistle and mustard. Mowed larger stands of drier mustard and raked it up. All weeds were consolidated into one forfeit pile in the middle of this area. Flagged 30 plus trees to receive larger cages. Many smaller cages on large plants and empty basins are ready for removal. Noticed a few other dead trees in these areas with bark chewed off. *Irrigation check in upper and lower floodplains, with Doug, during scheduled irrigation events. A drip tee was popped off in the upper floodplain; repaired. Went over irrigation schedules and drip zones referencing timer and log entries. Doug sprayed the pepper weed patches in SW03 with herbicide. Pepperweed Herbicide with 1 gal Polaris mix(4oz Polaris).	255	(3 trucks)					
8/16/2024	KL, FA, BF, SH (8 each)	26 (6)	Warm	Upsized 28 cages in the ponds and side channel planting areas. Still 5 more trees, flagged with yellow flags, ready for cage upgrade here. Need to purchase more wire. Finished the weeding pass in this area including weeding around the ponds and into the SW02 wetland area. Began removing small cages off of bigger plants, green flags, and off of dead plants/empty basins. *Sprayed repellent on red flagged new willows in the lower and upper floodplain planting areas. Browsing has slowed down on these willows so deer spray is proving to be effective. Sprayed all trees in the pump house planting area with repellent. Continue to see more vole chewing on bark here so, repellent spray was focused on the lower portions of the trunk where chewed bark is present. *Ran irrigation to older plants in the lower floodplain for 1.5 hours. *Repaired cracked ball valve in the 2” PVC mainline at the lower floodplain valve cluster.	170	•Deer spray: $50*					
8/29/24	LMW, SH (8 each) KL (6)	17.5 (4.5)	Warm	Hand weeded mustard and yellow star thistle in and around basins at upper flood plains. Checked irrigation lines for leaks or damage in both floodplain planting areas, no repairs needed. Also removed dittrichia from the stream channel and stream banks in these areas. Mowed the remaining areas of dry grass around pump house to try and prevent voles from eating plants. Deer sprayed all plants at pump house and the new red flagged willows in both floodplain areas. Flagged 20 plants in Boyd Creek for cage upgrade, weeding and watering. Noticed more vole deaths in this area as well, especially on the sambucus. Purchased 3 rolls of wire	170	•300' of Wire: $357.66*					
8/30/2024	SH,FA,BF,SM (8 each) KL (4)	28.5 (7.5)	Warm	Recaged 21 plants at Boyd mowed atleast 10ft around all plants, watered all recaged plants with 10 gallons each. These 21 plants in Boyd were also sprayed with repellent. Recaged 5 plants in ponds and side channel zone. Put extra wire roll next to pump house. Still some tall plants that need to have their cages removed. Older plant irrigation ran today in the upper floodplain. No breaks or leaks found	170						
9/5/2024	See habitat agency oncall sheet for notes- wood gathering										
9/6/2024	SM, BF, SH, FA (8 each) KL (1)	27 (6)	Hot	Mowed both sides of the creek in ID02, raked yellow star thistle and tarped it to a dump site in north east corner of site. Hand pulled yellow star thistle in the creek and dumped in north east corner. All Mulefat plants are looking healthy. Removed 12 green flagged cages in side channel and pond area.	85						
9/10/2024	DS, KL, LMW, KB, SH (8 each)	32.5 (7.5)	Warm	Removed all of the PVC and drip laterals in the Boyd Creek irrigation zone and all of the small cages on empty basins and large plants. Upsized the cages on 6 more medium sized plants in Boyd. Materials are staged for off haul at the pump house. Helix is on site today preparing for the grading work. *Weeded dry grass from the basins and sprayed repellent on the plants in the Pump house zone to deter vole activity. Seeing some improvement in plant health, but minimal. Watered this zone for 3 hours through the drip system. Fixed a few spaghetti lines and a damaged piece of mainline drip tubing. At Pepperweed patch seed heads were bagged. Herbicide treatment fairly effective but some green rosettes are present and ready for treatment.	255						

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9/12/2024	KL, SM, FA, LMW, SH (8 each)	32.5 (7.5)	Warm	Checked on some trees for acorn harvesting; acorns aren't quite ready for picking yet. Finished removing small cages from dead plants and large plants in the Ponds and Side channel areas. The Ponds still have standing water in them. *Cleaned filters and confirmed irrigation event on all new plants in the two floodplain planting areas plus watered the old plants in the lower floodplain through their dedicated drip system. *Reset timers to 10 day interval on the new plants; next irrigation event is 9/22.* Some vole damage on cottonwoods in upper floodplain and new plants in the lower floodplain. Pulled dittrichia and tobacco from creek beds. Sprayed red flagged willows, newest willows, with repellent. Started cage removal and cage up sizing plus mowing in the mother oak irrigation zone. This area is the ED01 drainage and the two most downstream planting locations on Boyd Creek, around the mapped log structures. Purchased 3 more rolls of wire (16 • 100' rolls total this year)	170	•300' of Wire: $357.66*					
9/12/2024	DS(6)	4(2)		Detailed respray of Pepperweed in usual location. Pepperweed ranged from brown/yellow herbicide damaged to green. Harvested Mandell's/Coyote mint seed from adjacent area to Pepperweed (wetland)for late fall broadcast (confirm species ID). Crew check in. 1.5 gallons used (6oz Polaris)	85						
9/18/2024	SH, FA, SM (8each)	19.5 (4.5)	Mild	Recaged 23 plants, pulled drip line from 9 pvc connections, left 3 feet of drip line and capped connection, marked with pink flags. Pulled orange and blue flags that were marking ends of drip lines. Mowed around the living plants and weeded dry grass from the basins. One of the drip line connections was chewed off right at the pvc line. Removed cages from dead and large plants that didn't need a cage anymore.	85						
9/19/2024	See habitat agency oncall sheet for notes- wood gathering										
9/20/2024	KL	2.5		Dump run of old PVC and drip irrigation lines previously removed from the site plus site visits coordination	16	•Dump Fee: $40.75*					
9/24/2024	See habitat agency oncall sheet for notes- wood gathering										
9/25/2024	DS	0.5		Herbicide reportinmg to County Ag	696						
10/2/2024	KL (7)	4.5 (2.5)	Hot	Tanks were spilling over upon arrival. Had to jiggle the float valve to get it to fully turn off. *One more fix needed in the Mother Oak PVC pipe before it is ready for hand watering. *Upper floodplain: Weed star thistle mustard, tabacoo, white top, prickly lettuce, and any remaining dittrichia next time and consolidate weeds into one pile under the large bay at the base of the hill. All of the dead 2024 plants, most new toyon have died, are sky flagged. Only one or two acorns survived, most did not sprout, but almost all of the new buckeye seedlings are still alive and doing well. Found Sticky monkey, narrow leaf milkweed, western vivian, native nightshade, hota, willow herb, coyote mint, california everlasting, vinegar weed, California poppy, bee plant, stinging nettle, yarrow, and sage brush filling in. Flagged most of these with small blank white flags. Native dock and curly dock are also both present and have gone to seed. Use remaining wire to upsize small plants in the upper floodplain. *Sprayed red flagged willows, in both floodplain planting areas, with repellent and confirmed irrigation in both of these zones, no leaks. All new plants were irrigated on program today. Next watering scheduled for 10/12. *Collected Valley oak and Live oak acorns. They are still mostly green but the caps are now removing cleanly from the acorn. Harvest more in 1-2 weeks. Bay nuts will be ready then also, if wanted. * Wasps are back in the pump house	85						

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10/7/2024	KL (8)	5.5 (2.5)	Hot	Tanks were overflowing again, pulled up on float rod to achieve full shut off. The valve might be getting clogged by sediment build up. Watered the older plants, through drip, in the lower floodplain. These plants are getting fairly mature and will most likely need minimal water next year. *Collected coffee berry seed from the one mother plant on the dirt access road to Boyd Creek. *Removed dittrichia from the drainages south of the mother oak tree in the middle of the site. Dittrichia is now blooming. *Removed the remaining drip irrigation tubing and cages plus fixed the PVC pipe in the lowest 3 planting zones on Boyd Creek next to the mother oak. Watered the surviving plants, except Coyote brush, in these 3 areas with 10 gallons each. 4 more new cages needed here on the yellow flagged plants; wire is at the upper floodplain planting area. *Sprayed repellent on vole damage plants in the pump house planting area. Bark chewing has decreased and many heavily damaged plants are now recovering with new growth and stump sprouts. Water this zone in the next week or two if no rain. Car wash at EZ Clean on the way back	85						
10/16/2024	KL (8)	5.5 (2.5)	Cloudy	Built and installed the last 4 cages around the mother oak. *Hand water all living plants, except coyote brush, in ED01 with 10-12 gallons each using the pink flagged hose threads connected to valve V8. Picked up rebar, flags, remaining small cages and drip parts throughout this area while watering. *Ran drip in pump house zone for 3 hours. Pump running slow today because of cloud cover. Repaired two chewed spaghetti. Sprayed repellent in the pump house zone. Helix is still onsite working in the southern most section of the site. *Tanks were not overflowing today; flushed float valve and cleaned rubber seat with fingers	85						
10/22/2024	KL (8)	5.5 (2.5)	Warm	Removed 13 small cages from the Upper floodplain planting area; 11 were plants growing out of the cage and 2 were empty basins. Built 11 new 2.5 diameter cages with the remaining wire onsite and installed on these plants using 2 rebar each. *Irrigation check in the Upper and Lower floodplain planting areas; all good. New plants in these zones were successfully watered today from previously programmed watering event. **Watered the old plants in the lower floodplain via drip, made one repair. *Sprayed repellent on the new willows, red flags. *Acorns are just starting to turn brown and drop; collect the second harvest soon. *Cleared Boyd drainage of dittrichia, 12 individuals found, and remove 6 more Dittrichia from the lower floodplain planting area. *Beaver Dams and grading is now finished in Boyd; 1-2 trailers full of logs remain where dropped. Picked up a removed cage in Boyd and installed at the pump house.	85						
10/31/2024	KL (8)	5.5 (2.5)	Cool, partly cloudy	Rain last night only wet the ground 1-2” deep so will leave the automatic irrigation ON, set to run tomorrow, to the new plants for now. *Watered the older plants in the Upper floodplain via drip for 2.5 hours. This zone is now *OFF* on the timer. *Sky Flagged dead New plants basins in the Lower floodplain, about 40 empty basins total. Half of these empty basins are acorns that never sprouted; buckeye seeding from last year are very successful. Most of the container plant deaths are vole related. These locations will be used for 2024 replants: acorns (live and valley oak), coffee berry seeding; mainly willow and maybe mule fat, cotton wood and sycamore cuttings; bare root rose and other transplants. All 2024 replant material will be collected on site or very nearby. Upper floodplain has 40 empty basins also. Same scenarios as the Lower floodplain. There is also room for 50-100 new plants at the pump house since this planting area was hit the hardest by voles. *So 120-180 Replants for 2024. Pump house will need new drip installed to new plants. *Harvested hundreds more live oak and valley oak acorns. Acorns are now starting to turn brown and release easily from their cap. Buckeye seeds have not started splitting open yet. *Fence walk; no repairs needed. Inspected work on ID02 drainage at the south end of site. PVC laterals and drip are damaged here, but the planted mule fat in the drainage are well established; no need for repair. *Photos of earth work in ID02 taken. Walked the northern half of SF Creek, no dittrichia found	85				Yes		

San Felipe Creek Maintenance Log

Gate Code: 4210

County lock (green stripe), 8240

Date	Staff	Hours on-site (travel)	Field Conditions	Task Descriptions and Location	Mileage	Materials Furnished	Plant Mortaility	Weeds controlled	Fenceline Patrol	Irrigation Inspection	Water Tank Level
11/7/2024	KL, SM, SH, LMW (8 each)	26 (6)	Warm, dry	Loaded trailer and off hauled metal wire after removing the remaining small cages from dead plants/empty basins. There is a lot of usable rebar still on site. Weeded the upper floodplain planting area. Winterized the irrigation by removing the creek crossing PVC pipes and draining the the 3” mainline. Pump power and *water to tanks is OFF; tanks are full. Started and drove the RTV; all good. Checked on the pepper weed, the herbicide treatment was very successful. Found a few small green pepper weed individuals right next to the willows on SF creek near the main spray area. Watered the pump house zone and the older plants in the upper and lower floodplain zones for ~1 hour before turning off watering system	170	RTV					
11/12/2024	KL	1		Dump run of metal. One trailer full, free recycling	20						

APPENDIX C YEAR 6 GEOMORPHIC AND HYDROLOGIC MONITORING REPORT

YEAR 6 GEOMORPHIC AND HYDROLOGIC MONITORING, SAN FELIPE CREEK RESTORATION PROJECT, JOSEPH D. GRANT PARK, SANTA CLARA COUNTY, CALIFORNIA

Report prepared for:

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Reviewed by:
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Balance Hydrologics, Inc.

December 2024

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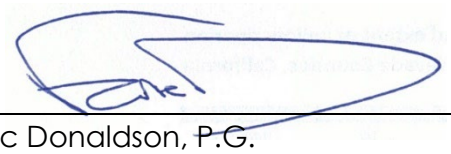
Year 6 Geomorphic and Hydrologic Monitoring, San Felipe Creek Restoration Project, Joseph D. Grant Park, Santa Clara County, California

 Project Assignment: 222108

By

Emma Goodwin, Project Manager
Hydrologist



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December 5, 2024

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EXECUTIVE SUMMARY

This report summarizes the annual geomorphic and hydrologic monitoring results for Year 6 monitoring (Water Year[1] 2024, WY2024) of the San Felipe Creek Restoration Project (project), located along San Felipe and Boyds Creeks in Joseph D. Grant Park, Santa Clara County. This project was designed to further the objectives of the Santa Clara Valley Habitat Plan Conservation Strategy and to provide advanced mitigation credit to be enrolled into the Santa Clara Valley Habitat Plan In-Lieu Fee program.

The project was completed in November 2018. Geomorphic and hydrologic monitoring began in October 2018, shortly after earthwork and structures were completed. This work is being conducted by Balance Hydrologics, Inc. (Balance) staff geomorphologists and hydrologists. This report presents a brief description of the project, the hydro-geomorphic performance standards set forth in the project Mitigation and Monitoring Plan (MMP, Monarres and others 2018), monitoring methods, monitoring results for WY2024, and conclusions and recommendations based on all monitoring years.

WY2024 was a year with above-average annual precipitation. Due to the high frequency and regular timing of storm events, the valley-fill aquifer at the project area experienced abundant recharge over the course of the wet season. Shallow groundwater data suggest that the valley-fill aquifer became saturated and remained saturated for the second longest period of time since construction (WY2023 being the longest). Streamflow in San Felipe Creek and Boyds Creek occurred for 108-days and 87-days, respectively—relatively long durations compared to previous years. Annual peak flow occurred in February 2024 and was slightly higher than the 2-year event, and thus, we collected and interpreted post-storm topographic data via UAV ("drone") aerial survey and photogrammetry methods.

Based on WY2024 monitoring, the site appears to meet the hydrologic and geomorphic performance standards for the site as laid out in the MMP.

In 2020, the design and monitoring team agreed upon strategic adaptive management actions for select areas. These actions were completed by Santa Clara Valley Habitat Agency (SCVHA) and Habitat Restoration Sciences (HRS) in coordination

[1] A Water Year (WY) is defined as that period from October 1st of a preceding year through September 30th of the following year and is named according to the following year. For example, WY2024 occurred from October 1, 2023, through September 30, 2024.

with the Balance and Dudek project design and monitoring team. Balance was primarily involved in two adaptive management actions: 1) on November 4, 2020, HRS replaced a log on Boyds Creek in an attempt to protect plantings on an outside bank, and 2) on August 26, September 20 and September 21, 2021, HRS constructed a debris jam structure at wetland feature ID03-02 to reduce flow and encourage sediment deposition in a cutoff channel that had formed at ID03-02 in 2019. During WY2023, a new low-flow channel formed across the floodplain feature at ID03-02 and remains in a similar condition in WY2024. Despite this change, these two areas of adaptive management appear to be performing within an acceptable range of conditions.

In 2023, the Balance monitoring team observed bank erosion in the Eastern Incised Tributary, caused by an improperly placed fence across the downstream end of the channel that facilitated debris wracking. Bank stabilization work was completed by SCVHA and Triangle Properties in coordination with the Balance project design and monitoring team on November 6, 2023. This work consisted of the removal of fencing installed across the tributary (on top of Staked Debris Jam #6), and layering of large rock, slash, and compacted soil, as well as planting willow stakes and adding a staked debris jam along the right bank to prevent future erosion. The repair performed well over WY2024, with no further considerable erosion observed in this area.

In 2024, the SCVHA moved forward with additional strategic adaptive management actions for select areas, which Balance recommended in the Year 5 monitoring report (Donaldson and others, 2023). The project site is already meeting all hydrologic and geomorphic success criteria, so these actions were designed with stewardship in mind, to enhance the hydrologic performance of the site. The effort was completed by SCVHA and Helix Environmental Construction Group (Helix) in coordination with the Balance project design and monitoring team. First, as proposed in the original design basis report (Donaldson and others, 2017), Helix installed three additional timber debris jams, and three staked debris jams in the Incised Eastern Tributary (ID02), to continue to promote channel aggradation through this reach and elevate the alluvial aquifer. Second, Helix lowered the Boyds Creek distributary channel inlets and constructed eleven Type 1 debris jams throughout the Boyds Creek mainstem, to promote more regular activation and inundation of the distributary channels and further restore the alluvial fan function in this area. In channel grading activities occurred between September 5 and October 15. Minor adjustments to debris jams (i.e., placement of rock and wood), seeding, and demobilization were implemented on October 16 and 17, 2024.

The monitoring team will continue to monitor the site and evaluate conditions in the context of the performance standards laid out in the MMP.

1. SITE DESCRIPTION AND MONITORING CRITERIA

The San Felipe Creek Restoration Project (Project) site is located along San Felipe Creek in Halls Valley at an elevation of approximately 1300 feet (NAVD88), within Joseph D. Grant Park County Park (**Figure 1**) in the headwaters of Coyote Creek. San Felipe Creek drains Halls Valley and has a watershed area of approximately 3.1 square miles at the upstream project boundary. Boyds Creek is tributary to San Felipe, flows into Halls Valley within the Project site from the flanks of Mount Hamilton to the east, and has a watershed area of approximately 2.6 square miles. The purpose of the Project was to restore approximately 1 mile of stream channel by restoring hydrologic function, modifying in-channel habitat, and restoring dynamic channel and floodplain functions along San Felipe and Boyds Creeks between the Corral Trail and Cañada de Pala Trail.

The Project was intended to mitigate impacts from historical land uses and disturbances, enhance aquatic and upland habitats, and make San Felipe Creek and Boyds Creek more resilient to climate change. Legacy agricultural activities influenced overland flow pathways and channel morphology. The site conditions, impairments and restoration actions are described in the project conceptual design and feasibility study report (Donaldson and others, 2017). The impairment map assembled for that report is attached as **Appendix A**.

Restoration activities consisted of the following:

- Re-establishment of dispersed flow paths across eroded portions of the Corral Trail and across the Boyds Creek alluvial fan,
- re-connection of distributary channels on the Boyds Creek alluvial fan and placement of instream wood to disperse flows and establish dynamic flow paths,
- excavation of inset floodplains on San Felipe Creek,
- partial filling of an eroded Agricultural Ditch to create ponded areas and slow subsurface drainage of adjacent desiccated wetland areas,
- placement of wood debris structures to reverse incision on an unnamed tributary to San Felipe Creek, the "Incised Eastern Tributary", and
- Planting and seeding of native plant species suited to the wetland, riparian, ponds, and upland habitats of the site.

The San Felipe Creek Restoration Project MMP (Monarres and others, 2018) establishes hydrologic and geomorphic performance standards and monitoring requirements for the project. Relevant hydrologic and geomorphic performance standards and associated monitoring approaches are catalogued in **Table 1**. Monitoring station locations are shown in **Figure 2**.

2. MONITORING METHODS

The MMP requires at least 10 years of hydrologic and geomorphic monitoring to establish project success and establish the restoration and enhancement credits. Creek stage (water level) and streamflow, wetland inundation duration, and qualitative geomorphic monitoring will occur every year. Repeat topographic surveys are planned for years in which a 2-year flow or greater has occurred. A minimum of three topographic surveys are required over the course of the 10-year monitoring period, and one topographic survey will be conducted during Year-10 monitoring. In Year 6, hydrologic and geomorphic monitoring visits were conducted on October 3, 2023, February 19, 2024, April 9, 2024, September 13 and 18, 2024, and October 8, 2024.

2.1 Hydrologic Monitoring

2.1.1 Rainfall

To provide context for the hydrologic and geomorphic data collected at the project site, we present rainfall data from the University of California Berkeley Blue Oak Ranch Reserve (UCBO) rain gage[2], located 4.5 miles northwest of the site at approximately 1800 feet MSL elevation. Average annual rainfall at the UCBO station is approximately the same as at the Project site (Santa Clara County Drainage Manual, Schaaf and Wheeler, 2007).

2.1.2 Water Levels and Streamflow Monitoring

We established a stream, wetland, and groundwater-level monitoring network following completion of restoration work and prior to significant winter rainfall in December 2018 (**Figure 2**). The following list describes the gaging methods for each type of gage:

> **Stage (water level) and estimated streamflow**: To monitor water levels and estimate streamflow in San Felipe and Boyds Creek, we installed continuous-recording water level sensors which collect and record 15-minute stream stage measurements within the designed wetland features and nearby channels and wetlands. Balance staff visited the site multiple times during the rainy season and during the dry season to calibrate, repair, and download water level recorders.

[2] Long-term data are available through the Western Regional Climate Center (https://wrcc.dri.edu/weather/ucbo.html), and 10-minute interval preliminary data are used here with permission from University of California at Berkeley (http://sensor.berkeley.edu/index_ucnrs.html).

Water level data were used to create 15-minute stage hydrographs at stream stage and streamflow stations.

We established three stage and streamflow gages, two on San Felipe Creek (SFUS and SFDS) and one on Boyds Creek (BCUS)[3]. Periodic staff plate readings are used to calibrate the 15-minute depth data recorded by the logger and convert the raw water level record to a stage record, according to the local datum. To develop an estimated record of streamflow, periodic streamflow measurements were taken during Year 1 monitoring in accordance with practices outlined in the U.S. Geological Survey Techniques of Water Resources Investigations[4]. The manual streamflow measurements were used to establish Manning's roughness coefficients at streamflow gage sites. A rating curve was then developed to convert stage to streamflow using the Manning's calculator in United States Corps of Engineers Hydraulic Engineering Center River Analysis System (HEC-RAS) 5.0. The stage-discharge rating was then calibrated using additional manual flow measurements. For the purpose of evaluating the performance standards outlined above and in **Table 1**, the estimated streamflow record is considered to be sufficient. Additional measurements are required to develop a more accurate streamflow record and will be taken opportunistically. The station SFDS has required re-location multiple times, including during 2023 when it became disconnected from flow, and 2024 when it was blown out and lost in a storm, therefore, no rating curve has been developed at that station.

Groundwater monitoring: To monitor groundwater levels near constructed floodplain features, channels, and wetlands, we installed continuous-recording water level sensors in 4 of the 5 piezometers which were used during the pre-project evaluation. Water level data were calibrated against periodic manual depth-to-water readings to develop 1-hour depth-to-groundwater (below the ground surface) records. The ground surface and top of each piezometer were also surveyed and used to convert the depth-to-water records to groundwater elevation records.

Surface ponding in wetlands: To monitor inundation duration within wetland areas, we installed continuous-recording water level sensors in stilling wells along

[3] Note that Boyds Creek Downstream (BCDS) is a stage-only gage.

[4] https://pubs.usgs.gov/twri/index090905.html

with staff plates. Water level data were calibrated to periodic manual stage readings to develop hourly wetland stage records.

Peak stage near floodplains: To record the peak stage and document whether floodplains were inundated, we installed six additional water level recorders at select locations across the project site (BCA1, BCA2, BCA3, BCA4, BCDS, SFDF). Data from these supplemental stations are archived along with manual stage and high-water mark readings.

2.1.3 Monitoring Locations

A complete list of hydrologic monitoring stations and location descriptions are included in **Table 2** and station locations are shown in **Figure 2**. We present relevant site observations in station observer logs. The WY2024 station observer log for surface water stations is presented in **Appendix D** and the station observer log for groundwater stations is presented in **Appendix E**.

For the purposes of this monitoring program, 3 types of features are considered:

- Excavated or constructed restoration elements on ephemeral drainages (ED) and intermittent drainages (ID). Excavated features are named according to their identifying symbols in the project plans and the project MMP: ID03-01, ID03-01A, ID03-02, etc. In some cases, informal nomenclature is also used for ease of communication. At the restored Agricultural Ditch (ED03), a series of five ponds separated by sediment plugs were constructed.
- Names for pre-existing enhanced and restored seasonal wetlands that are within or near the project area are the same as those initially given to them in the MMP, prior to project construction: SW02, SW03, and SW04.
- The Corral Trail and drainage lenses.

2.2 Geomorphic Monitoring

2.2.1 Qualitative Observations

Balance staff visited the site during the wet and dry season to observe streamflow conditions and areas of surface ponding, document evidence of runoff patterns, and inspect the stability of constructed features. Hydrologic data and observations were catalogued in field observer logs. When practical and safe, a small unmanned

aerial vehicle (UAV, or drone) was used to collect oblique aerial photos and repeat vertical aerial photographs.

2.2.2 Topographic Surveys

Channel evolution monitoring metrics are intended to identify whether channel bed and banks, large wood, and floodplain benches evolved as expected and if aggradation or scour took place over the year. As stated above, the MMP dictates that surveys should occur after years in which the 2-year recurrence streamflow is met or exceeded. We use estimated peak streamflow at SFUS and compare this to calculated peak flow recurrence estimates according to regional regression relationships developed by Gotvald and others (2012), as summarized in **Table 3**. Because the annual peak flow was estimated to be equal to or slightly more than the 2-year recurrence threshold in WY2024, topographic data were collected during Year 6 monitoring.

Geomorphic change surveys were conducted using a UAV, which was flown over the project area to collect detailed overlapping aerial photography. These flights were ground point controlled based on the NAD83 California zone 3 (US ft) datum (EPSG:2227). Using Agisoft™ software and photogrammetry methods, orthoimages and digital elevation models (DEM) were produced from each flight. To check the quality of the generated DEM, we compared manually collected survey elevations of ground control points to corresponding DEM elevations.

The as-built (Year-0) flight occurred on December 21, 2018, and the Year-6 flight occurred on October 8, 2024. The Year-6 DEM was subtracted from the Year-0 DEM to create a DEM-of-difference (DOD) which produced a spatially explicit map of change (aggradation and degradation) that occurred over 6-year period, which allows for a detailed understanding of change and potentially early detection of issues that may threaten the function of the Project. This method does not allow us to monitor under tree canopy or dense vegetation, however those areas are limited to a few short reaches which we have evaluated with direct field and photo observations.

3. MONITORING RESULTS

3.1 Overview of Annual Conditions

3.1.1 Rainfall

Annual precipitation in the vicinity of the Project site was 29.1 inches during WY2024, as recorded at the UCBO station (**Figure 3**), more than the long-term average of 24 inches, as reported in the Santa Clara County drainage manual. The UCBO station has been operating since 2011, and the average annual rainfall at UCBO over the 13-year period of record is 24.3 inches.

Annual precipitation during WY2024 was characterized by many medium-sized storms spread out fairly consistently across the wet season from December to April. January was the wettest month, with the largest storms falling on January 10, and January 22, 2024. The period of January 31 through February 8, 2024, was the wettest week, with 5.0 inches of total rainfall, and 1.9 inches of that falling on February 4, 2024. Additionally, there were a couple of storms recording over 1.0 inches of rainfall in the spring (March 22-24, and May 4, 2024). Overall rainfall totals and temporal distribution were similar to WY2019, which occurred immediately after implementation of the Project.

3.1.2 Site Hydrologic Response

3.1.2.1 Streamflow Gaging

Stage and estimated streamflow records for the Boyds Creek upstream station (BCUS) and the San Felipe upstream (SFUS) and downstream (SFDS) stations are presented in **Figure 4** through **Figure 6**.

Streamflow at the Boyds Creek upstream station (BCUS) initiated in response to rainfall on January 16, 2024, after about 9.7 inches of cumulative seasonal rainfall at the Blue Oak Preserve. It is unclear whether streamflow continued uninterrupted after initiation on January 16th, but streamflow at BCUS responded to the next storm on January 22, 2024, and persisted through at least March 17, 2024. During March, streamflow was intermittent. It is unclear exactly how long surface flows persisted; water level and flow data suggest there was water in Boyds Creek at or near the surface for most of March, but there is uncertainty with the streamflow record since natural sediment and debris transport processes affect the stage-discharge rating curve. Late-March through April storms caused an additional series of flow events on Boyds Creek, however, stage and streamflow peaks during this period were lower than in January and February.

Seasonal streamflow commenced along San Felipe Creek after about 12.5 inches of seasonal rainfall, with no measured response to the January 16, 2024, rain event. Streamflow at the San Felipe Creek upstream station (SFUS) occurred in response to rainfall on January 22, 2024, and continued uninterrupted through May 3, 2024, with a storm occurring on May 4 which extended streamflow through May 8, 2024. Streamflow in San Felipe Creek receded but persisted during the March 2024 drier period, before responding to the late-March through early May storms.

At the San Felipe Creek downstream station (SFDS), streamflow occurred in response to rainfall on January 22, 2024, but the gage was blown out and lost during the high flows on February 4, 2024, and equipment was not recovered until found in September 2024. We expect that the overall pattern of streamflow over the season will be similar to that of the upstream stations, SFUS and BCUS.

The annual peak flow on San Felipe Creek was recorded on February 4, 2024, at the upstream station (SFUS) and is estimated to have been 82 cfs. The annual peak flow on Boyds Creek also occurred on February 4, 2024, and is estimated to have been approximately 72 cfs (**Figure 4**, **and 5**). Calibration data at SFDS are not sufficient to generate streamflow estimates from the record of stage, but a reasonable approximation can be made by summing BCUS and SFUS peak flows, since they effectively occurred at the same time. Based on this method, peak annual streamflow at Station SFDS is estimated at approximately 150 to 155 cfs.

Water levels (stage) at San Felipe Creek at the "downstream floodplain" (SFDF), adjacent to created floodplains ID03-03 and ID03-04, are shown in **Figure 7**. The stage data show several instances during which the floodplains were inundated over the course of the WY2024 rainy season. The estimated annual peak flow from the February 4, 2024, storm was around a 2-year flow on San Felipe Creek and Boyds Creek (**Table 3**; Gotvald and others, 2012).

3.1.2.2 Groundwater and Surface Water Interactions

Groundwater and surface water levels were measured in the central portion of the project site in the vicinity of San Felipe Creek (**Figures 8a** and **8b**) and Boyds Creek (**Figure 9a and 9b**). Water level data from Piezometer 16-2 suggest that groundwater levels in the alluvial aquifer underlying the site began slowly rising[5] in response to rainfall

[5] Piezometers range from 6 to 7 feet depth below ground surface, thus water level changes which occur deeper than 6 to 7 feet are not detected.

on January 21, 2024, after approximately 11 inches of cumulative seasonal rainfall, and rose more quickly starting on January 22, 2024, in response to rainfall and streamflow within San Felipe Creek. Filling of the gaging pool in San Felipe Creek occurred approximately 2 hours prior to the measured peak response in Piezometer 16-2 and approximately 5 hours before a response was detected in Piezometer 19-1.

Boyds Creek Alluvial Fan

Water levels in Piezometer 16-5 began rising on January 22, 2024, shortly after streamflow was detected in Boyds Creek and BCUS and BCDS. Storm peaks generally matched closely between BCDS and Piezometer 16-5. Briefly after late January storms, and from early February through mid-March, the water table elevation is slightly higher than the water surface elevation in the creek, indicating that groundwater may be draining to the creek and supporting streamflow during these times. During the late-March 2024 wet period, which was less intense than during January and February 2024, water levels at BCDS were lower than water levels in Piezometer 16-5 suggesting that the reach was "gaining" during storm and inter-storm periods (**Figures 9a** and **9b**), and **Figure 10** shows activation in 3 of the 4 distributary channels.

San Felipe Creek, Upstream of the Confluence with Boyds Creek

Similar to previous years, groundwater and surface water gages (SFUS, Piezometer 16-2 and 19-1) in the vicinity of San Felipe Creek upstream of the confluence with Boyds Creek tends to demonstrate "losing stream" (i.e. groundwater recharge) characteristics initially with the onset of streamflow, which transitions within a few days or weeks to a partially "gaining stream" (groundwater discharge to the creek) during and just after periods of regular rainfall, with groundwater discharge dominated by slightly higher groundwater on the west (right) side of the channel at Piezometer 16-2. The groundwater is typically higher than the stream on the west side (Piezo 16-2), and lower than the stream on the east side (Piezo 19-1), with a few exceptions. This would seem to indicate that San Felipe Creek is fed from upstream runoff and minor inputs from groundwater inflows from the west and is likely recharging the alluvial aquifer to the east. This condition persists through most of the rainy season, and as rainfall comes to an end, groundwater to the west recedes below the stream, indicating a "losing stream" condition.

Lower San Felipe Creek

Groundwater and surface water gages (Piezometer 16-3 and ADWW, respectively) in the vicinity of the restored Agricultural Ditch (ED03) are presented in **Figure 11**. Similar to most prior years[6], groundwater conditions adjacent to the restored Agricultural Ditch appeared to respond after approximately 8.0 inches of cumulative rainfall. The Ditch began to fill with water on January 12, 2024, and completely filled during the wet week in early February, after cumulative rainfall reached 16.7 inches on February 4, 2024. Based on the water level data collected at ADWW, it appears that the restored Agricultural Ditch filled completely and spilled into the ID03-05 drainage channel for a period of time between February 4, 2024, and April 18, 2024. Ponding at ADWW extended through the summer and at least until August 27, 2024 (**Figure 11**). ADWW was observed dry on September 13, 2024, but the pond just downstream was still ponded with approximately 0.5-1.0 feet of water; so, it is likely that ADWW dried in early September, even though the water level dropped below our monitoring equipment on August 27, 2024.

At Piezometer 16-3, which measures groundwater levels in the vicinity of seasonal wetland SW-02 (just east of ADWW), the groundwater response is about the same magnitude as ADWW, with slightly delayed timing; we see the peak in water levels in Piezometer 16-3 on February 4, 2024, about 6 hours after peak water levels in ADWW. There does look to be a period of response before the peaks in ADWW prior to any response at piezometer 16-3. Though less pronounced than in previous drier years, the slightly delayed response in Piezometer 16-3, and comparatively lower water levels in the agricultural ditch wetland, suggest that upgradient contributions from adjacent hillslopes, and possibly the Boyds Creek alluvial fan contribute to filling the underlying aquifer in the area of SW02 during wet periods. In addition, it appears that the created wetland ponds "hold back" water within the shallow sub-surface at the SW-2 wetland area and may slow the timing of drainage from the aquifer underlying SW02. We infer that the wetland was likely fully saturated during periods when Piezometer 16-3 water levels were at or near the ground surface. Water levels in Piezometer 16-3 were within 1 foot of the ground surface for 96 days between February 4, 2024, and May 9, 2024, before slowly receding through the summer.

[6]During the previous monitoring year, WY2021, Piezometer 16-3 appeared to respond earlier in the wet season. It is likely that the rapid response to initial wet season rainfall during WY2021 was a result of more intense site irrigation prior to the onset of winter rains.

Surface ponding in the seasonal wetland at SW03, (the Corral Trail Seasonal Wetland station, CTSW) was detected between January 22 and March 20, 2024, and again between March 22 and April 19, 2024 (**Figure 12**). Similar to previous years, ponding was initiated after 12.5 inches of seasonal rainfall. Surface ponding in this wetland lasted for approximately 59 days and again for 29 days in the spring.

3.1.3 Geomorphic Monitoring Results

Balance staff visited the project site on February 19, 2024, April 9, 2024, September 13 and 17, 2024 and after the end of the water year on October 8, 2024, to make visual observations of the constructed project elements. Aerial photographs were taken on October 8, 2024, and were stitched together to create an orthorectified mosaic aerial photograph of the entire site (**Appendix B**). Aerial orthomosaic photos for Years 1 through 3 can be seen in the Year 3 monitoring report (Donaldson and others, 2021a). For comparison, as-built drawings can also be seen in Donaldson and others (2021a). Supplemental topographic survey data taken in Years 0 and 5 can be seen in the Year 5 monitoring report (Donaldson and others, 2023; **Appendix F**).

Figures 13 and **Figure 14a - Figure 14d** present the DEM of difference and photographs of key areas of interest. It should be noted that differences in vegetation growth between aerial surveys performed in December 2018 and October 2024 show an increase in elevation of over one foot in some meadow areas and coyote brush scrub which is not associated with sediment deposition. The areas in blue show that much of the site has experienced vegetation growth not associated with deposition.

3.2 Performance Standards

3.2.1 Performance Standard 1: More Than 14 Days of Inundation/Saturation at Seasonal Wetlands in an Average or Above-average Precipitation Year

The MMP defines wetland success as 14 days of inundation/saturation in normal to wet years. WY2024 rainfall was approximately 117 percent of average annual rainfall. The abundant rainfall supported on-site wetlands and resulted in the wetland sufficiency criteria being met during WY2024.

Water levels in ED03-02 within the agricultural ditch persisted for at least 7 months (**Figure 11**). Based on observations during site visits, all of the agricultural ditch wetlands held water for more than 14 days.

During the April 9, 2024, site visit, staff observed approximately 2 inches of ponded water in the vicinity of Piezometer 16-3 which is directly adjacent and upslope from wetland SW02. Correlating this to the Piezometer 16-3 water level record, we infer that ponding or soil saturation within six inches of the ground surface occurred within SW02 for most of the wet season between February 4, 2024, through the third week of April 2024.

Surface ponding in the seasonal wetland at SW03, (the Corral Trail Seasonal Wetland station, CTSW) lasted for approximately 59 days and again for 29 days in the spring (**Figure 12**).

On-site wetland areas appear to have met the hydrologic criteria for seasonal wetlands during WY2024.

3.2.2 Performance Standard 2: Inset Floodplains Inundated By 2-Year Event

The 2-year streamflow event magnitude was exceeded during WY2024, and we made direct and indirect observations of inundation on inset floodplains during WY2024. Site floodplains features are considered inundated if creek flow rose high enough to inundate the created floodplain feature at any location.

Figure 5 demonstrates that water levels at SFUS inundated the ID03-01 floodplain multiple times during late January 2024 and early February 2024 suggesting that the ID03-01 floodplain was partially or completely inundated during multiple storm events. Photos and notes from our February 19 and April 9, 2024, site visits indicate at least partial inundation of ID03-02 based on observations of wracked debris and fresh deposition. **Figure 15** shows freshly deposited sediment and/or organic debris across ID03-01, ID03-02, ID03-03 and ID03-04, from which we infer at least partial inundation.

3.2.3 Performance Standard 3: Streamflow in Two or More Boyds Creek Channels During Winter Season

Performance Standard 3 (**Table 1**) states that streamflow from Boyds Creek should occupy at least two of the existing or created channels (located at area ED01-01) across the Boyds Creek alluvial fan during the monitoring year. WY2024 was an above average year, and three of the four distributary channels received streamflow (BCA2, BCA3, BCA4), as well as the mainstem of Boyds Creek downstream (BCDS). **Figure 10** shows recorded water level data from gages in the distributary channels,

and **Figures 9a** and **9b** show water level in BCDS, indicating that at least two of the channels were activated. Performance Standard 3 was met during WY2024.

Based on surveys conducted during Year 5, it appeared that the streamflow threshold required to activate distributary channels BCA1 through BCA4 has increased since installation. In coordination with the SCVHA, Balance prepared adaptive management design recommendations for Boyds Creek to increase channel roughness and encourage aggradation in Boyds Creek, and also lower the distributary channel inlet elevations to encourage more frequent inundation of the Boyds Creek distributary channels at lower flows (**Appendix F, Attachment 1**) (Goodwin and others, 2024).

The Boyds Creek adaptive management designs were implemented by SCVHA and Helix Environmental Construction Group (Helix) in coordination with the Balance project design and monitoring team. Helix performed minor grading to lower the distributary channel inlets (BCA2, BCA3, and BCA4) and additional grading to lower the upstream channel inlet and expand the swale (BCA1). Helix also constructed eleven debris jams along the Boyds creek mainstem. These debris jams (Type 1 jams, see plans in Goodwin and others, 2024) were constructed with wood and brush material of differing sizes held together with wooden posts driven into the substrate to mimic natural wood accumulations. Eight of the eleven debris jams were strategically located near the existing distributary channel junctions with Boyds Creek, and three additional debris jams are located throughout the reach for redundancy and to encourage aggradation and potential additional break-out points where the floodplain could be activated. In channel grading activities occurred between September 5 and October 15, 2024. Minor adjustments to debris jams (i.e., placement of rock and wood), seeding, and demobilization were implemented on October 16 and 17, 2024. Boyds Creek and newly constructed features will be monitored at various flow levels throughout WY2025 (Year 7) and over the rest of the monitoring period (Years 8-10). The as-built memorandum for the project can be found in **Appendix F**.

It should be noted that between project completion in 2018 and WY2023, four logs appear to have been dislodged along from living log jams A, G, J-1 and J-2.
No additional logs that were originally installed on Boyds Creek appeared to be dislodged during WY2024. It appears that the dislodged logs were moved downstream during high-flow events but remain on Boyds Creek. Movement of logs is expected in dynamic channels, and these dislodged logs do not currently pose a threat to the site performance and will be monitored in future years.

3.2.4 Performance Standard 4: Less Than One Foot of Elevation Loss in Stream Channels, Averaged Over the reach[7] and Absence of a Significant Knick Point

The intent of this performance standard is to avoid ongoing reach-wide channel incision but allow for localized deposition, scour, and habitat complexity. With the addition of wood at project construction, new pools have formed and deepened the channel by more than 1 foot. Pools that have developed on site are expected, provide habitat complexity, and do not threaten the function of the channel. "Significant" knick points should be defined here as longitudinal profile dis-continuities where the average slope up and downstream of the knickpoint over some distance is the same but offset by a vertical or near-vertical drop of more than one foot and not located at or stabilized by large wood.

Because 2-year flows were exceeded, we collected supplemental topographic data during 2024 to evaluate Performance Standard 4 during WY2024.

3.2.4.1 ED01-01 – Boyds Creek Alluvial Fan

In WY2023, two logs from two separate living log jams moved downstream. Logs placed as part of the living log jams were intentionally not anchored so that active channel dynamics and migration could occur. Therefore, movement of logs was anticipated. In many cases, we observed localized scour and deposition within 1 to 10 feet of the placed logs, with localized deposition upstream, and scouring of pools downstream of logs. All of the living log jams installed on the abandoned branch of Boyds Creek (BCA4), are stable and remain largely buried. It appears that localized scour has occurred at the historic knickpoint on BCA4 between Year 0 and Year 6, but incision has not migrated upstream to intercept the buried grade control log. Though localized scour and deposition greater than one foot occurred locally, no net degradation or lowering of the streambed was observed across the reach. This is consistent with the expected response described in the MMP; the living log jams are functioning as intended.

The DEM of difference does show natural geomorphic processes taking place; on the lower reaches of Boyds Creek, for example (**Figure 14c**), we observed lateral channel

[7] Reaches are shown in the project impairment map (**Appendix A**). For Boyds Creek, we take reach to be defined as the length of Boyds Creek within the project boundary.

migration processes, with bank erosion on the outside of the channel bend and deposition on the inside of the channel bend.

Based on a collaborative review at the end of WY2020, the Project Team decided to replace one log in an effort to protect three oak plantings (**Figure 16**). This adaptive management measure was executed on November 4, 2020, and is presented in the adaptive management as-built memorandum (Donaldson and others, 2021b). Though some minor erosion has occurred around the log, the log has not moved since being installed, and planted oaks continue to grow. We will continue to monitor placed logs and make adaptive management recommendations if floodplain inundation or bed elevation performance standards are not met, or if vegetative survivorship performance standards are threatened.

3.2.4.2 Graded Swale (ID03-01a)

This swale allows overland stormflows from the Corral Trail drainage lenses and the Boyds Creek alluvial fan to return to San Felipe Creek without causing excess erosion. Hydrologic conditions were sufficiently wet to generate runoff through the ID01-01a swale; no erosion was noted at the graded swale (**Figure 14a**), and the feature appears to be functioning as intended.

3.2.4.3 San Felipe Creek Graded Floodplain ID03-01

Very little erosion or deposition was noted on or adjacent to the graded floodplain feature (**Figure 14b**). A small amount of erosion occurred between Year 0 and Year 5 where return flows formed a small channel approximately 10 feet long and one foot wide. The erosion was noted in the Year 1 monitoring report and does not appear to compromise the function of the floodplain. **Figure 14b** shows a few small areas of erosion within a short reach of San Felipe Creek near the middle of the graded floodplain feature. **Figure 14b** shows some scour, associated with natural widening and migration of a small channel step towards the downstream end of the floodplain feature. This channel dynamism does not threaten the function of the floodplain, since the channel bed elevation has not lowered significantly. The channel and floodplain morphology are within the expected range of outcomes and the channel through this reach is meeting Performance Standard 4.

3.2.4.4 "Reference Reach"

During the design phase, the design team referred to the reach between the Boyds Creek-San Felipe Creek confluence downstream to ID03-02 (**Figure 14c**) as the reference reach because the reach displayed geomorphic indicators of a dynamic channel-floodplain system with a floodplain that was regularly inundated. We note that the DEM of difference indicates ongoing channel dynamism occurred between Year 0 and Year 6. We note many areas where greater than one foot of scour or deposition has taken place locally; we note in **Figure 14c** that in the middle of the "reference reach" the channel has migrated north (hot colors) and deposited a new channel bar (cool colors). This reach is similar to the geomorphic change that has occurred along the ID03-02, ID03-03 and ID03-04 reaches.

3.2.4.5 San Felipe Creek Graded Floodplains ID03-02, ID03-03, and ID03-04

At these locations, the designed floodplain was reconfigured by high flows during WY2019, which inundated and flowed across the created floodplain features with enough velocity to both deposit sediment and form new channels. At these locations, minimal net change in channel bed elevation occurred, and physical habitat complexity appears to have increased. Other portions of abandoned channel features formed backwater pools/channels at low flows.

Year 1 topographic data (Donaldson and others, 2020) indicated that some areas of the ID03-02 floodplain along San Felipe Creek experienced over 1 foot of incision where the new cutoff channel formed through the created floodplain during the first year after construction. The new channel thalweg elevation was within 1 foot of the former channel elevation, suggesting limited or no vertical instability. Thus, we interpreted that Performance Standard 4 was being met at this location, where both a primary and secondary channel now exist.

In order to reduce the potential for downcutting along the 2019 created (and steeper) new primary channel, adaptive management activities were initiated during WY2021 and consisted of installing a bioengineered debris jam during WY2021 in the inlet of the new channel to encourage increase sinuosity, reduce channel slope, and encourage streamflow to spread across the created floodplain area. This work was completed on August 26, 2021, and is shown in **Figure 17** and the adaptive management as-built memorandum (Donaldson and others, 2021b). Following high flows of WY2023, the new channel thalweg migrated, with sediment deposition filling the inside of the channel bend, scour and migration occurring along the outside of

the channel bend, and periodic inundation of the original (now a secondary high flow) channel. Conditions at the end of WY2024 were observed to be similar to those observed after WY2023. These observations suggest that the new channel is laterally dynamic, with limited or no vertical instability, and Performance Standard 4 continues to be met at Floodplain ID03-02.

Similar to ID03-02, the constructed floodplains at ID03-03 and ID03-04 were inundated and modified by WY2023 high flows, but channel avulsion did not occur at these locations. Rather, a set of braided shallow channels and backwater features developed within the riparian corridor. Conditions in WY2024 appeared similar to WY2023. We note that the ID03-03 and ID03-04 constructed floodplain areas have been aggraded between Year 0 and Year 6, with the exception of cutbank erosion on the right bank between ID03-02 and ID03-03 (**Figure 14d**). The observed dynamism of the channel is within the expected outcomes for the design and the site is functioning as expected, with less than 1 foot of vertical elevation change over the reach and active channel dynamics within the inset and widened floodplain corridors. Performance Standard 4 is being met at ID03-03 and ID03-04.

3.2.4.6 Created Channel ID03-05

During WY2019, we observed 1 to 3 feet of erosion at the confluence of ID03-05 and San Felipe Creek, which appears to have resulted from the focusing of scour on the left bank of San Felipe Creek during high flows at the outside of the bend, exacerbated by the downstream site boundary exclusion fence which crosses San Felipe Creek at this location. The fence was improved following WY2019. During the high flows of WY2023, minor additional erosion was noted at the bank along the fence. The downstream-most buried log step structure along ID03-05 experienced some erosion along the downstream side of the step due to streamflow in San Felipe Creek, not streamflow emanating from the agricultural ditch wetland. The erosion appears to have only uncovered the top-most log, and the majority of the structure remains buried, stable, and intact. Conditions at this location appeared relatively unchanged in WY2024. Thus, the channel morphology is within the expected range of outcomes and is meeting Performance Standard 4 at this location.

3.2.5 Performance Standards 5 and 6: Corral Trail and Lower Hotel Arizona Crossing Stability (R-01)

During end-of-year site visit observations, no deleterious erosion or deposition was observed in or around the drainage lenses and Corral Trail (**Figure 18**). The PVC pipes in

the drainage were not clogged and water was observed flowing through multiple pipes during the winter. There was no evidence that the Corral Trail was overtopped during WY2024. The articulated mat Arizona Crossing constructed on the Lower Hotel Trail is performing as designed and no deleterious erosion or deposition was noted (**Figure 18**). Performance standards 5 and 6 are being met.

3.2.6 Performance Standard 7: Staked Debris Jams at ID02-01 Intact and Capturing Sediment

Staked debris jams were installed in the Incised Tributary (ID02-01), including four timber[8] staked debris jams and two hand-built staked debris jams utilizing slash and cobbles. Based on direct observations and **Figure 14d** the staked debris jams appeared to both retain and release sediment between Year 0 and Year 6. In the same timeframe the channel appears to have widened (**Figure 14d**). These processes are to be expected.

Erosion occurred at the downstream-most timber staked debris jam (Debris Jam 6, **Figure 19**) during WY2023. Debris wracked on an improperly installed fence (which was installed along the top of Debris Jam 6) caused streamflow to erode the banks adjacent to the staked debris jam on both the right and left sides and created scour holes adjacent and just downstream of the staked debris jam. The recommended repair was completed by SCVHA and Triangle Properties in coordination with the Balance project design and monitoring team on November 6, 2023. This work consisted of the removal of the fence installed across the tributary (on top of Staked Debris Jam 6), and stabilization of the erosional area that was caused by the placement of the fence. The area was stabilized by layering of large rock, slash, and compacted soil, as well as planting willow stakes and adding a debris jam along the right bank to prevent future erosion (**Figures 20**, **21**, and **22**). The bank remained stable during WY2024, with no further considerable bank erosion observed in this area.

During WY2024, following winter high flows we observed that all of the staked debris jams were functioning as intended, serving to capture episodic sediment delivered during high flows (**Figure 19**).

As outlined in the MMP, a second course of staked debris jams was recommended to continue to promote additional aggradation to elevate the alluvial aquifer and work toward a long-term goal of reversing incision. Balance provided design

[8] "timber" was added to the nomenclature of these features to distinguish them from other hand-built staked debris jams.

recommendations for these structures as part of the 2024 adaptive management effort (Goodwin and others, 2024). The additional course of staked debris jams was installed in September and October 2024 by SCVHA and Helix Environmental Construction Group (Helix) in coordination with the Balance project design and monitoring team. Helix installed three more timber-staked debris jams, and three hand-built staked debris jams throughout the reach (Goodwin and others, 2024). The timber staked debris jams were constructed with 20 foot long 6 by 6-inch redwood timbers, built to 2.5 feet above the existing channel bed. The hand-built debris jams were constructed with wood and brush material of differing sizes held together with wooden posts driven into the substrate to mimic natural wood accumulations, similar to the jams constructed on Boyds Creek, and were built to be 1 to 2.5 feet above the channel bed elevation. This reach and newly constructed features will be monitored at various flow levels throughout WY2025 (Year 7) and over the rest of the monitoring period (Years 8-10). The as-built memorandum for the project can be found in **Appendix F**, which includes photos of the newly installed staked debris jams.

4. CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS

From a hydrologic and geomorphic perspective, the San Felipe Creek Restoration Project is performing as intended. In WY2024 the Project is meeting all the hydrologic and geomorphic performance standards described in the MMP.

Based on Year 1 through Year 6 observations, we note the following:

- Streamflow from Boyds Creek and San Felipe Creek appear to have been the primary sources of groundwater recharge to the alluvial aquifer at the confluence of the Boyds Creek alluvial fan and San Felipe Creek. Shallow groundwater entering the alluvial aquifer from the west side of the valley also appears to contribute to recharge. To the degree that flow paths are dispersed across the alluvial fan, recharge should increase.

- Floodplain features appear to be more stable during Year 6 (WY2024), when compared to Year 1 (WY2019). WY2019 and WY2024 experienced similar rainfall patterns with similar peak flow magnitudes around a 2-year event, however, during WY2024 we observed much less channel dynamism.

- Year 1 through 6 monitoring data suggested the restoration project increases the rate of groundwater recharge and the volume of groundwater storage. Pre-project data collected during WY2017 suggests about 15 inches of rainfall was required for aquifer saturation and the initiation of streamflow. After restoration, the aquifer appeared to be nearly full after significantly less cumulative seasonal rainfall. We have observed the aquifer to be nearly full (as indicated by Piezometer 16-2) after 11 inches in Year 1, 17 inches in Year 2, aquifer was not filled in the extremely dry year of Year 3, 10 inches in Year 4, 10 inches in Year 5 and 13 inches in Year 6. Notably, during WY2023, a year with very similar rainfall timing and magnitude as WY2017, the aquifer appeared to be nearly full after significantly less cumulative seasonal rainfall.

- Based on WY2017 and WY2023 data, water appears to persist in the vicinity of Piezometer 16-3 for a similar length of time in pre- and post-construction, suggesting that ponding within the ED03 ponds is supporting wetland characteristics directly adjacent to the ponds. This is supported by observations of coyote brush die-off (coyote brush was expanding in the area of ED03 prior to project implementation) directly adjacent to ED03 following implementation which we attribute to a more persistently high water table. Creation of the ED03

ponds does not appear to be substantially increasing the duration of saturated soils in portions of SW02 that are more distal or upslope from ED03.

- Estimated annual peak flow in WY2024 is approximated as a 2-year flow event in San Felipe Creek, and we observed all hydrologic performance standards to have been met.

- The Corral Trail and Lower Hotel Trail Arizona crossing are performing as intended, dispersing flows across the alluvial fan, with no observed road erosion or flow capture.

- Flows circumvented the downstream-most staked debris jam 6 located in ID02-01 during WY2023 and caused an erosional feature. Repairs were performed on November 6, 2024, during WY2024. The resulting repair performed well throughout WY2024 and has effectively ameliorated the erosional issue thus far.

- Adaptive management recommendations from Year 5 were designed and implemented during September and October of 2024. A second course of staked debris jams was installed in the Incised Eastern Tributary, and we expect continued aggradation of this channel in future years to promote elevation of the alluvial aquifer and reverse incision of this channel. Additionally, in Boyds Creek, eleven hand-built staked debris jams were constructed, and sediment was removed from distributary channel inlets with the goal of more regular activation and inundation of the distributary channels to further promote alluvial fan functions in this area, disperse flows, and replenish the alluvial aquifer.

This monitoring program is scheduled to continue through Year 10, and monitoring will continue with respect to the performance standards, with additional attention on the processes affecting the above areas of interest and adaptive management projects.

5. LIMITATIONS

Data and conclusions presented in this report are based on available observations and measurements. New data or changes in regulatory guidance could influence the plans and/or recommendations, perhaps fundamentally. If additional data should become available, or if we find that observations, measurements, or calculations were in error, we reserve the right to correct and update the data based on new information. To aid in revisions, we ask that readers who have additional pertinent information/data, who observed changed conditions, or who may note material errors in facts, dates or computations should contact us with their findings as early as possible, so that changes may be made.

Many sources of uncertainty can influence the data, such as transient physical changes to the monitoring location. Balance Hydrologics has prepared this report for the client's exclusive use on this project. Use of this data by others and for other purposes without the written consent of Balance Hydrologics, Inc. is not permitted and could lead to significant error and/or environmental damage.

6. REFERENCES

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TABLES

Table 1. San Felipe Creek Restoration Project Performance Standards and Associated Monitoring Approaches, Santa Clara County, California

Crit. #	MMP Section	Area	Performance Standards	Monitoring Approach
			Hydrologic Performance Standards	
1	12.2 (Table 15)	Wetland rehabilitation and enhancement areas	14 days of ponding or saturated soils in an average or above-average rainfall year	Surface water gaging and shallow groundwater gaging in and adjacent to wetland features
2	12.3 (Table 16)	Inset floodplains on San Felipe Creek	Inset floodplain inundation if peak flows exceed a 2-year event	Surface water gaging and post-storm observations of high-water marks
3	12.3 (Table 16)	Boyds Creek alluvial fan	Flow in 2 or more channels during each winter season	Stage and estimated flow gages in break-out channels, and post-storm observations of high-water marks
			Geomorphic Performance Standards	
4	12.3 (Table 16)	Boyds and San Felipe Creeks	Less than 1 foot of channel bed elevation loss	End-of-water year topographic surveys following years when the 2-year flow is exceeded. No fewer than 3 topographic surveys will occur over the 10-year monitoring surveys
5	12.3 (Table 16)	Corral Trail drainage lenses	During- and post-storm: If Corral Trail is/was overtopped, positive flow off of road maintained with no significant erosion of road or fill prism. Dry season: pipes are not plugged	Visual inspection during and after wet-season
6	12.3 (Table 16)	Lower Hotel Trail Arizona crossing	Articulated mat is stable and no significant knickpoints have formed	Visual inspection during and after wet-season
7	12.3 (Table 16)	Staked debris jams	Staked material is intact and in such a condition to capture sediment and organic material transported by creek	Visual inspection during and after wet-season

Table 2. Hydrologic Monitoring Stations and Descriptions, San Felipe Creek Restoration Project, Santa Clara County, California

Station Name	Gage type	Station Description
Seasonal wetland water level gages and piezometers		
Piezometer 16-2	Piezometer	Formerly Piezometer A, west of San Felipe Creek near station SFUS (adjacent to project area ID03-01)
Piezometer 19-1	Piezometer	East of San Felipe Creek near station SFUS (adjacent to project area ID03-01)
Piezometer 16-5	Piezometer	Formerly Piezometer C, north of Boyds Creek near station BCDS
Piezometer 16-3	Piezometer	Formerly Piezometer E, east side of SW04 (Agricultural Ditch Wetland) (adjacent to project area ED03)
ADWW	Seasonal wetland water level	In ED03-02 (relocated during WY2021)
CTSW	Seasonal wetland water level	Southeast side of SW03, Corral Trail seasonal wetland (north of Corral Trail)
Stream water level and flow gages		
BCUS	Stage and estimated flow	Boyds Creek upstream of project site
SFUS	Stage and estimated flow	San Felipe near upstream end of site (adjacent to project area ID03-01)
SFDS	Stage and estimated flow	San Felipe Creek upstream of project area ID03-02, SFDS was moved upstream on 3/18/19 after the original location was cutoff from flow, and has been subsequently moved on 10/3/23 after being cutoff, and 9/5/24 after being blown out during a storm.
BCDS	Stage	Boyds Creek near the confluence with San Felipe Creek
BCA1	Stage	Boyds Creek distributary channels (in project area ED01-01)
BCA2	Stage	Boyds Creek distributary channels (in project area ED01-01)
BCA3	Stage	Boyds Creek distributary channels (in project area ED01-01)
BCA4	Stage	Boyds Creek distributary channels (in project area ED01-01)
ADDC	Stage	Stage gage in SW04 (Agricultural Ditch Wetland) drainage channel (in project area ID03-05)
Rainfall		
U.C. Berkeley Blue Oak Rainfall gage (Data courtesy of U.C. Berkeley)		

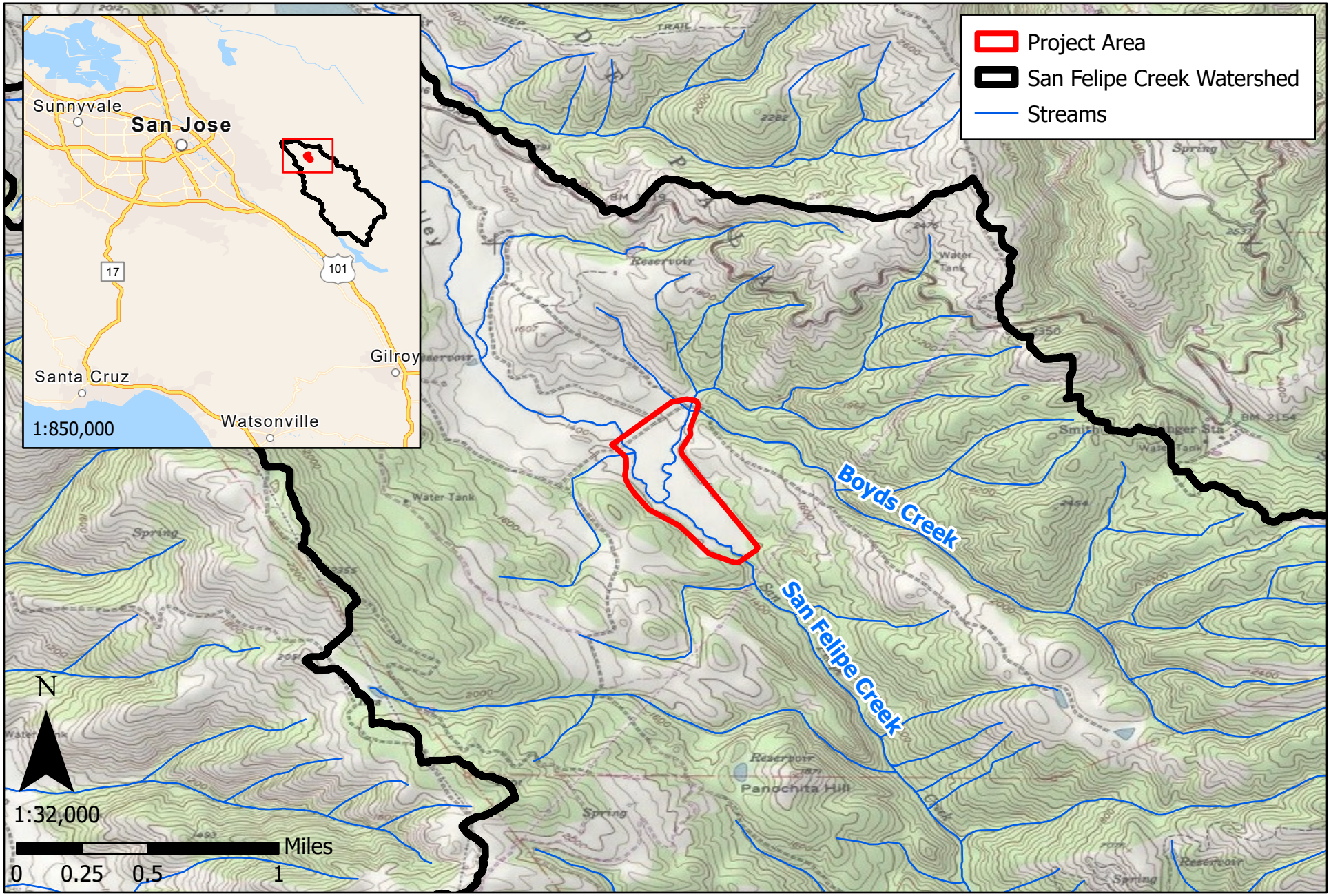
Table 3. Estimated peak flow recurrence on San Felipe and Boyds Creek, San Felipe Creek Restoration Project, Santa Clara County, California

USGS Regional Regression Equations, Discharge Estimates

USGS Regional Regression equations for
Central Coast (Region 4) and North Coast (Region 1) of California
(Gotvald et al., 2012)

	(SFUS) San Felipe upstream of Boyds Creek	*(BCUS) Boyds Creek*	*(ED03) Incising Agricultural Channel*	*(ID02-01) Incising Southern Tributary*	*Sa San Felipe-Boyds downstream Project boundary*
A = Drainage Area (mi^2)	3.1	2.6	0.07	0.08	5.8
P = Mean Annual Precipitation (in/yr)	24	24	24	24	24
	cfs	*cfs*	*cfs*	*cfs*	*cfs*
Central Coast (Region 4)					
$Q_2 = 0.00459A^{0.856}P^{2.58}$	44	37	2	2	75
$Q_5 = 0.0984A^{0.852}P^{1.97}$	135	114	5	6	231
$Q_{10} = 0.460A^{0.846}P^{1.66}$	234	199	9	11	398
$Q_{25} = 2.13A^{0.842}P^{1.34}$	391	332	16	18	662
$Q_{50} = 5.32A^{0.840}P^{1.15}$	532	452	21	25	901
$Q_{100} = 11.0A^{0.84}P^{0.994}$	670	569	27	31	1,135
North Coast (Region 1)					
$Q_2 = 1.82A^{0.904}P^{0.983}$	115	97	4	4	203
$Q_5 = 8.11A^{0.887}P^{0.772}$	257	217	9	10	449
$Q_{10} = 14.8A^{0.88}P^{0.696}$	366	308	13	15	636
$Q_{25} = 26.0A^{0.874}P^{0.628}$	512	432	18	21	884
$Q_{50} = 36.3A^{0.870}P^{0.589}$	632	533	23	26	1,090
$Q_{100} = 48.5A^{0.866}P^{0.556}$	756	639	27	32	1,302
Q_2 average	**80**	**67**	**3**	**3**	**139**

FIGURES



Balance Hydrologics

Figure 1. Location Map, San Felipe Creek Restoration Project, Joseph D. Grant County Park, Santa Clara County, California

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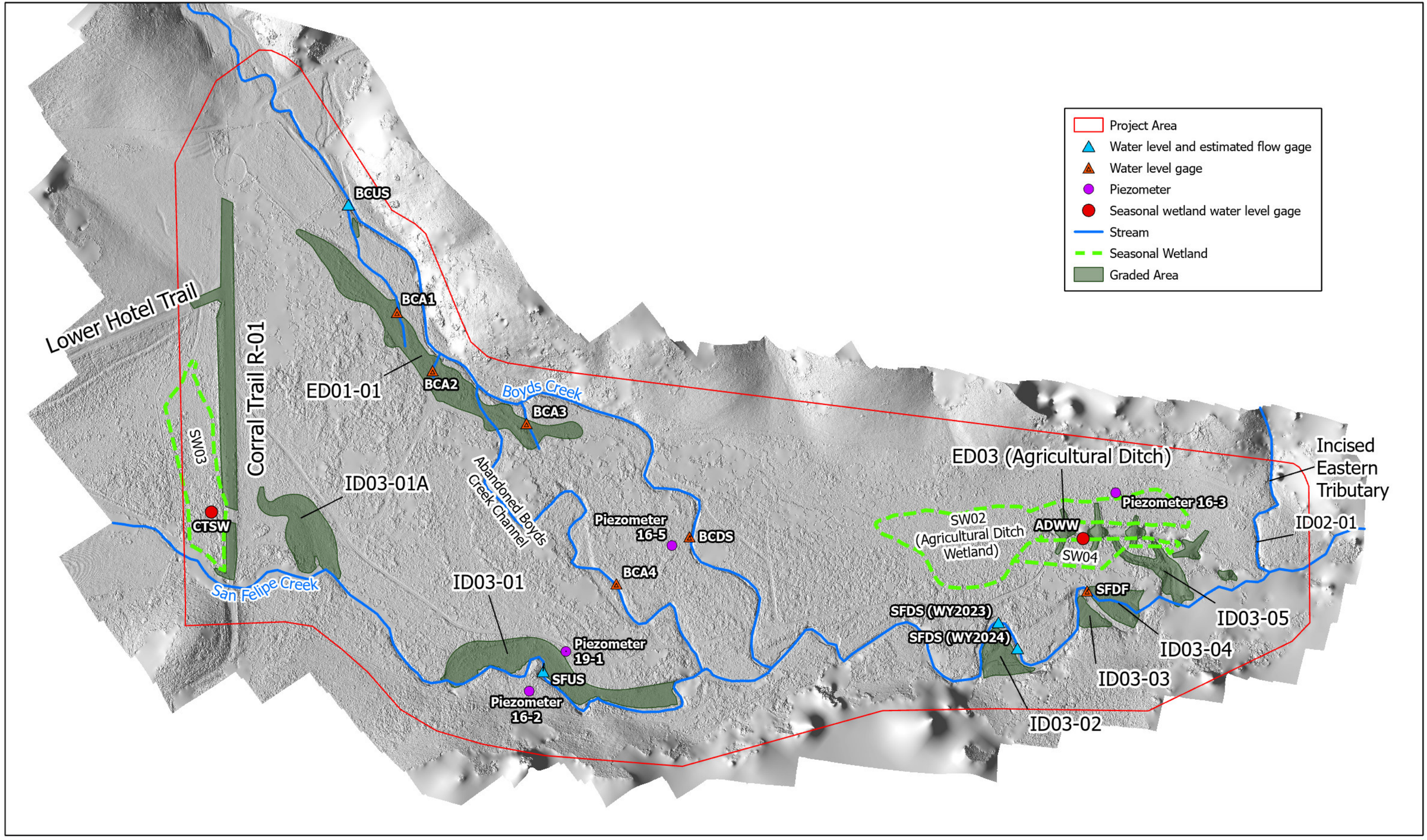
Source: ESRI 2021, Balance Hydrologics 2021



Balance Hydrologics™

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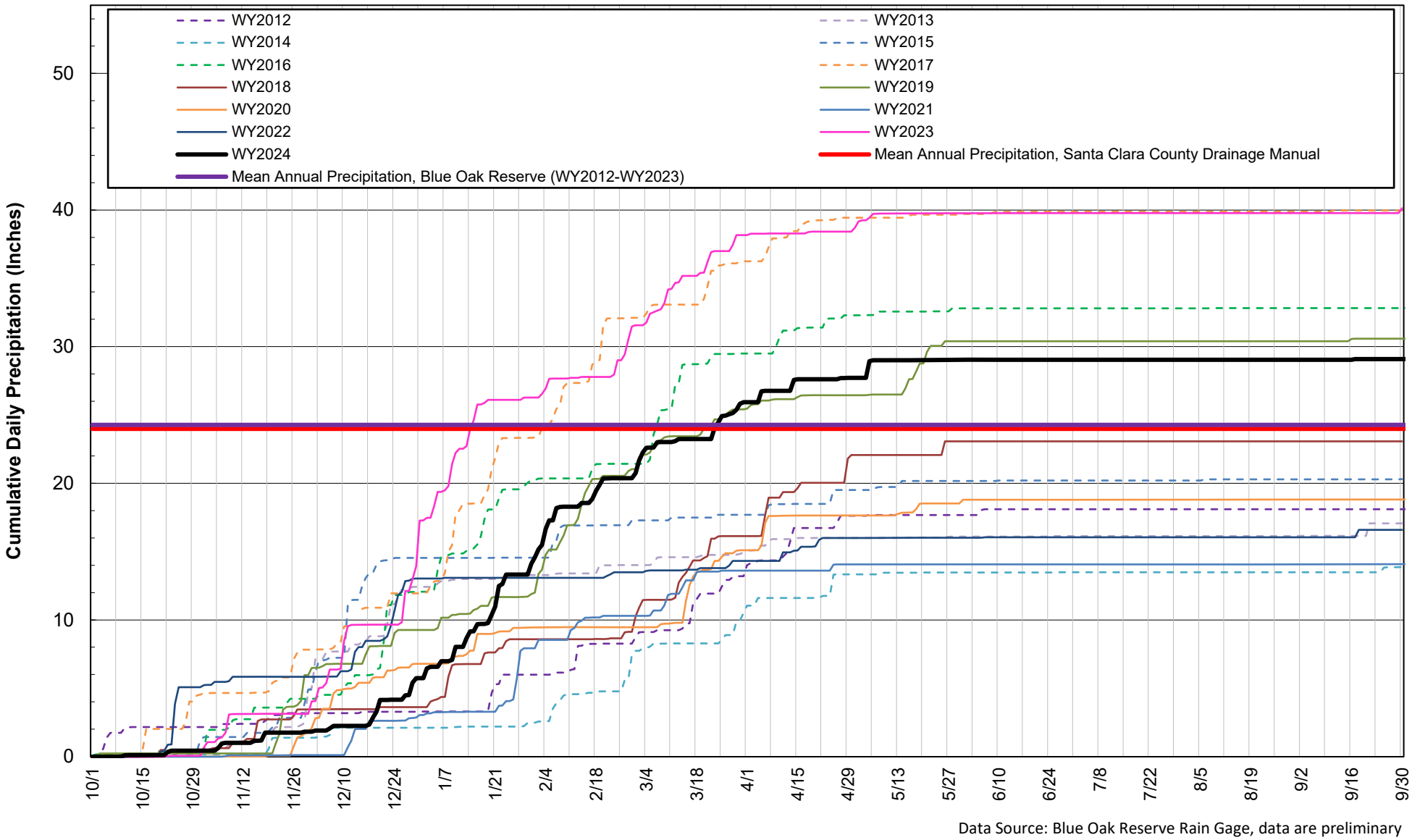
Figure 2. Monitoring station locations, San Felipe Creek Restoration Project, Joseph D. Grant Park, Santa Clara County, California

0 200 400 800 Feet

SCALE: 1:3,000

N



Data Source: Blue Oak Reserve Rain Gage, data are preliminary

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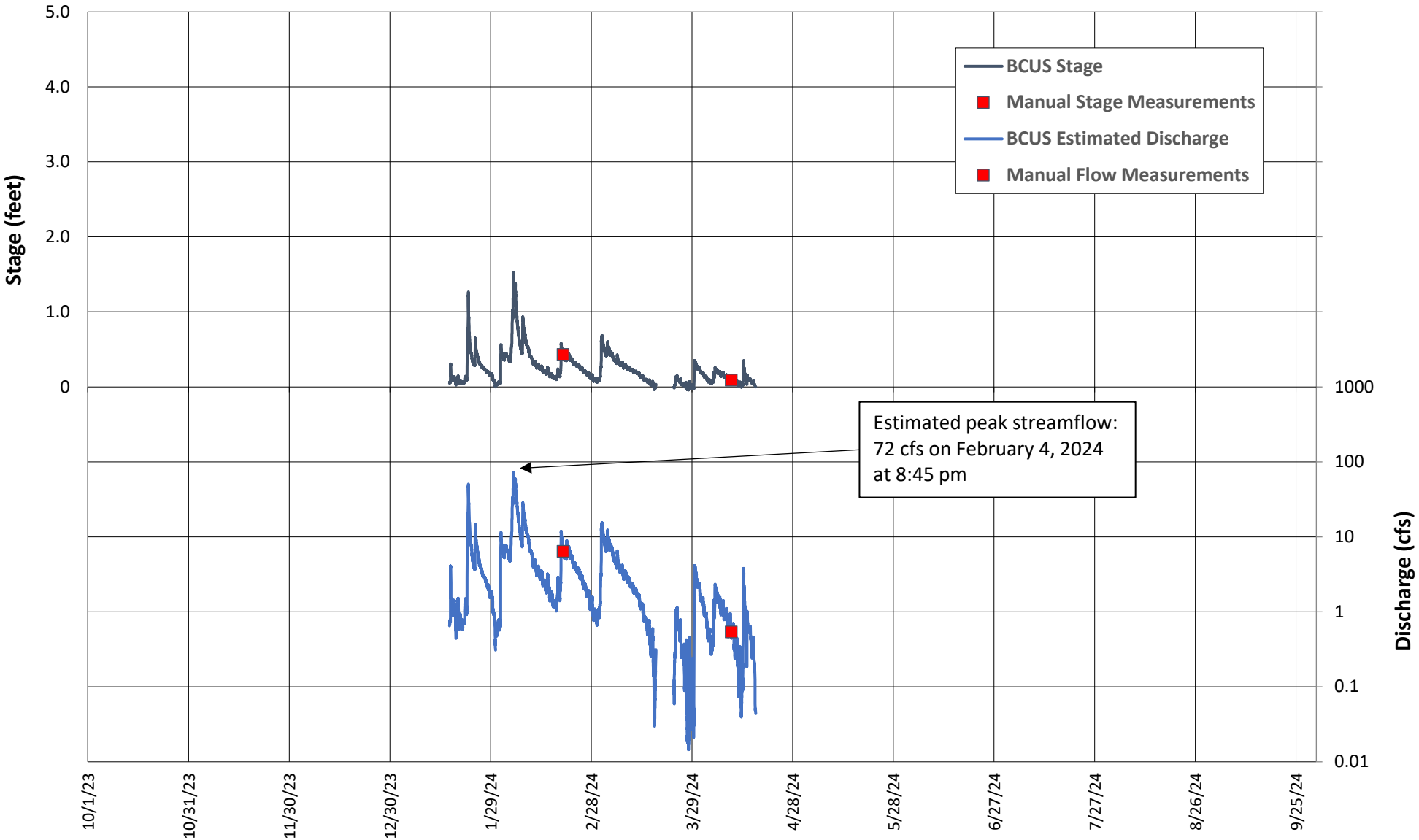
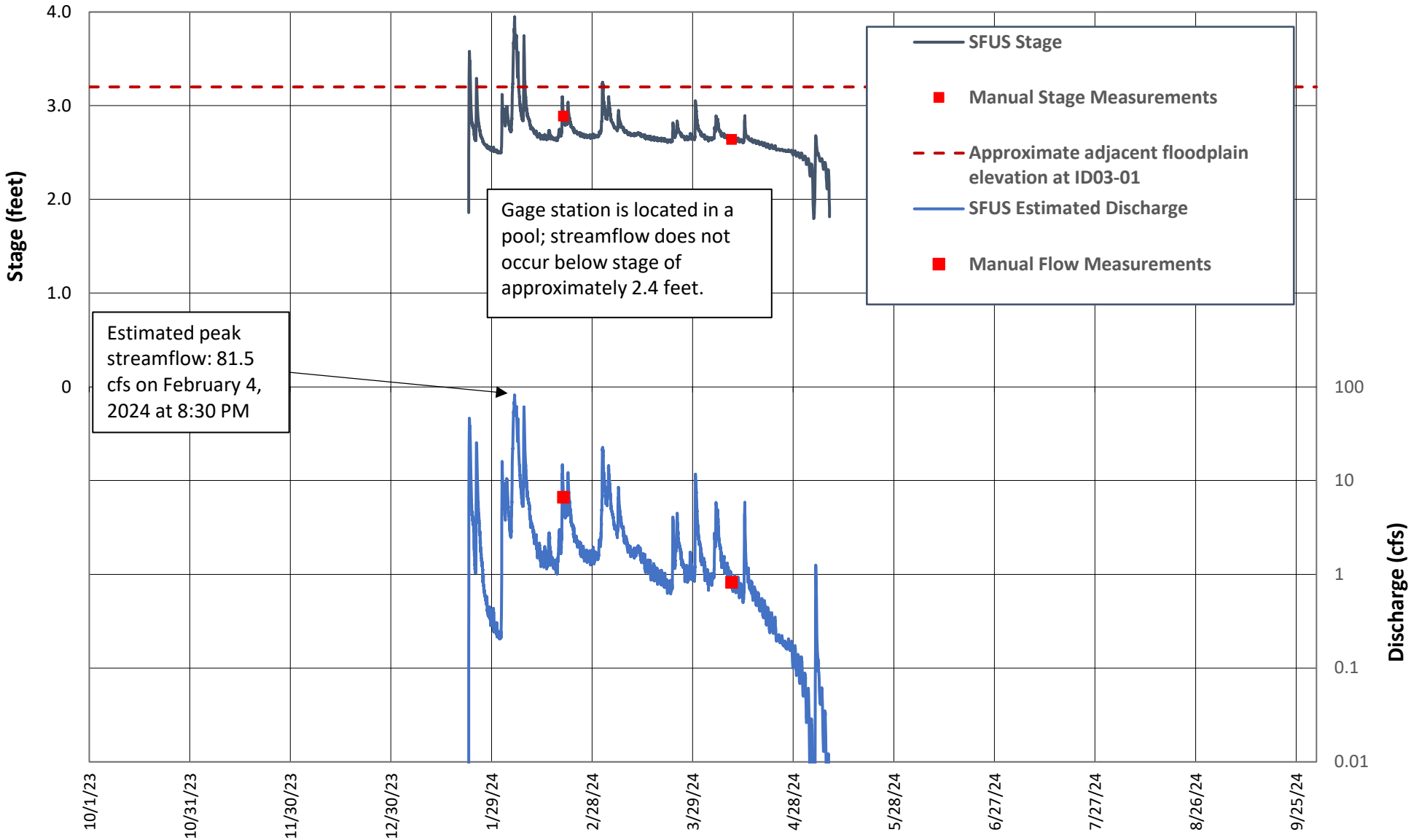
Figure 3. **Cumulative daily precipitation, Blue Oak Reserve (UCBO), San Jose, California, water years 2012 - 2024.** Total annual rainfall in WY2024 was above the long-term mean annual precipitation (approximately 24 inches per Santa Clara County Drainage Manual), and the 13-year average at the Blue Oak Reserve (24.3 inches). Since construction (WY2019-WY2024), mean annual precipitation has been 24.9 inches, similar to the long-term mean annual precipation.



Balance Hydrologics

222108 WY24 All Figures.xlsx

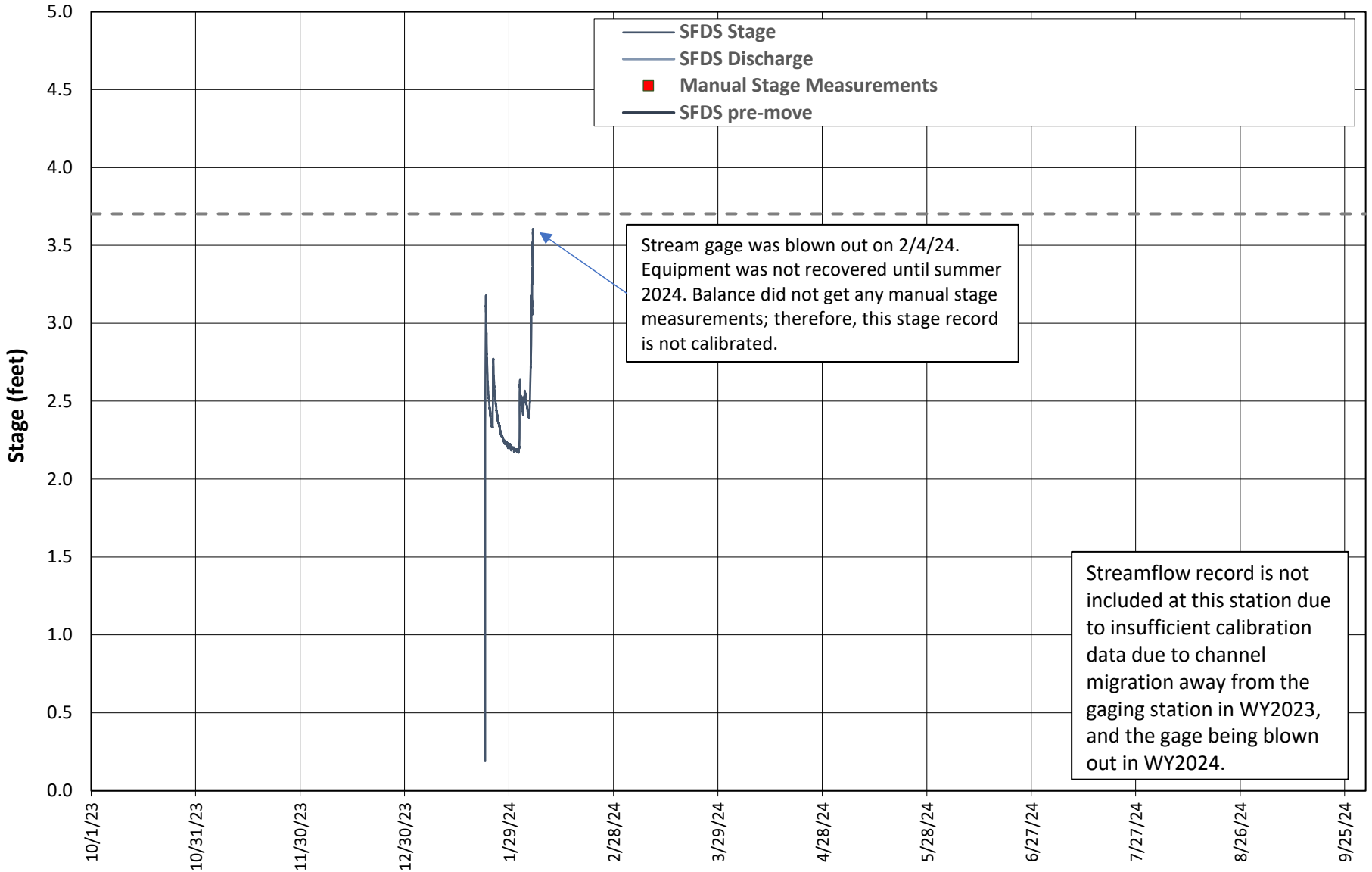
Figure 4. Stage and estimated streamflow at the Boyds Creek upstream station (BCUS), water year 2024, San Felipe Creek Restoration Project, Santa Clara County, California. The streamflow record is estimated based on limited calibration measurements.



Balance Hydrologics

222108 WY24 All Figures.xlsx

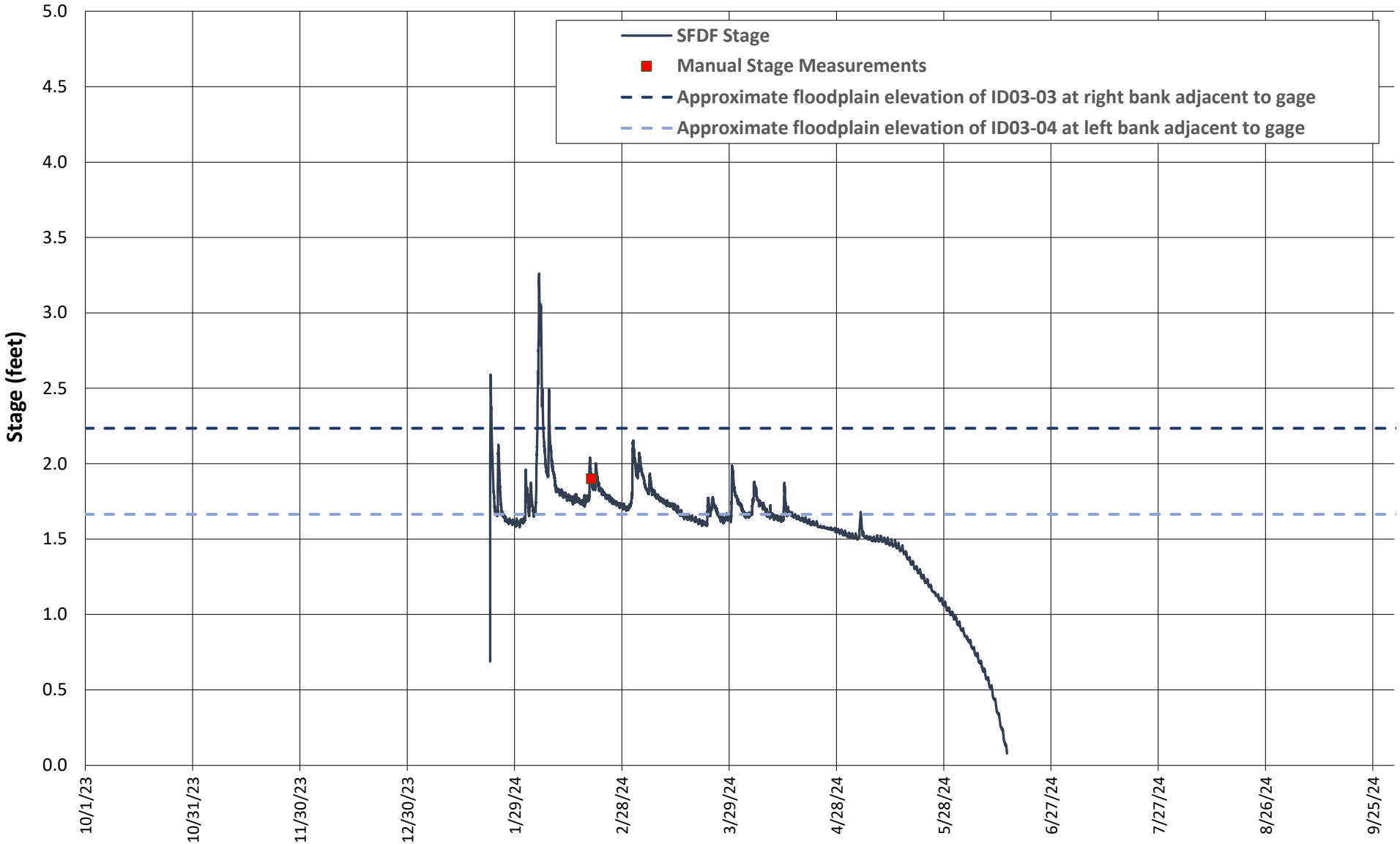
Figure 5. Stage and estimated streamflow at the San Felipe Creek upstream station (SFUS), adjacent to floodplain area ID03-01, water year 2024, San Felipe Creek Restoration Project, Santa Clara County, California. The streamflow record is estimated based on limited calibration measurements.



Balance Hydrologics

222108 WY24 All Figures.xlsx

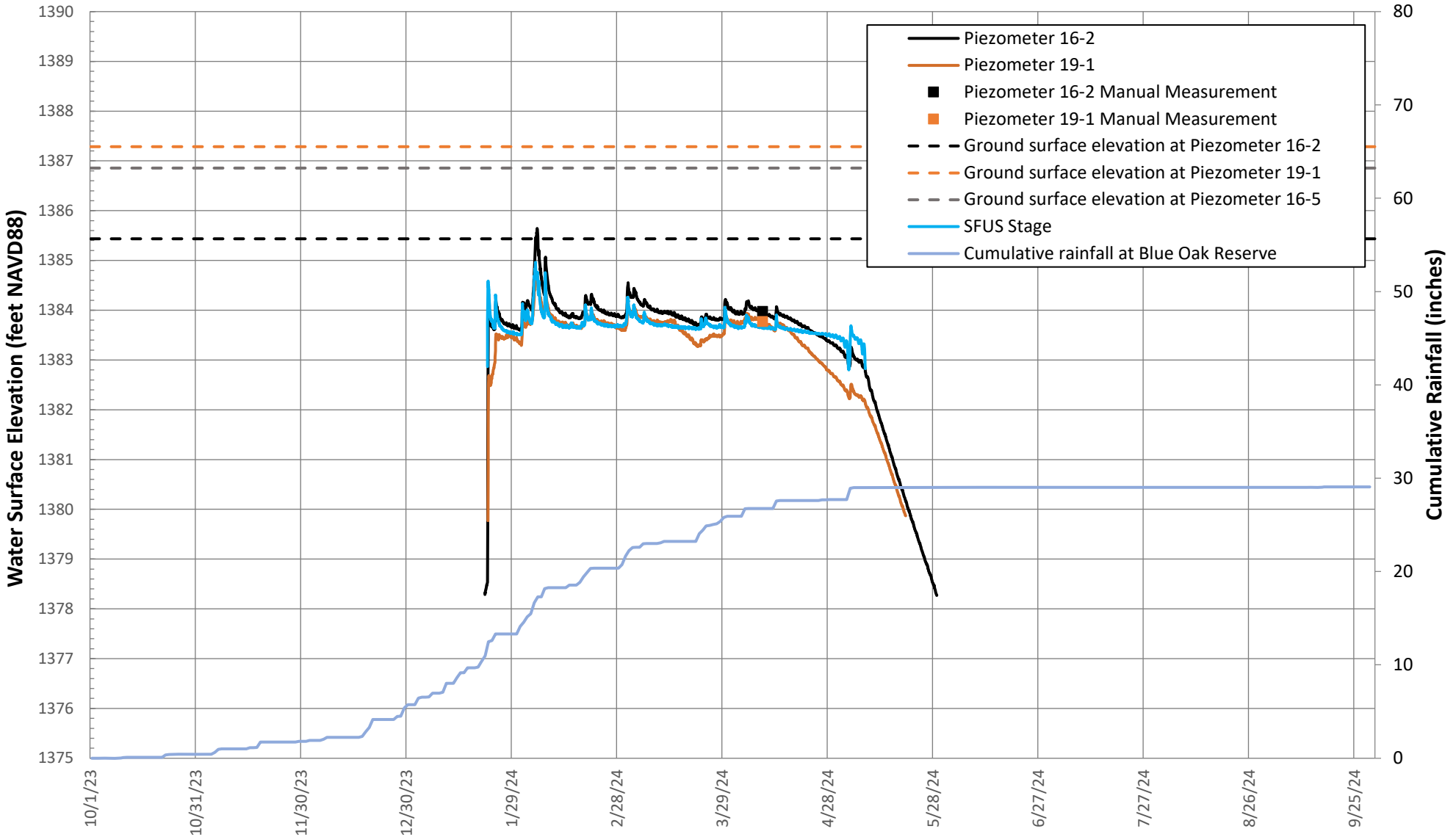
Figure 6. **Stage at the San Felipe Creek downstream station (SFDS), water year 2024, San Felipe Creek Restoration Project, Santa Clara County, California.** On December 10, 2021, SFDS was relocated to the northeast apex of the channel bend at ID03-02. During January, 2023 storms, the channel migrated away from the gage location. The gage was moved to a new location in October, 2023. In February, 2024, the gage was blown out in a storm, and was reinstalled in a new location in September 2024.



Balance Hydrologics

222108 WY24 All Figures.xlsx

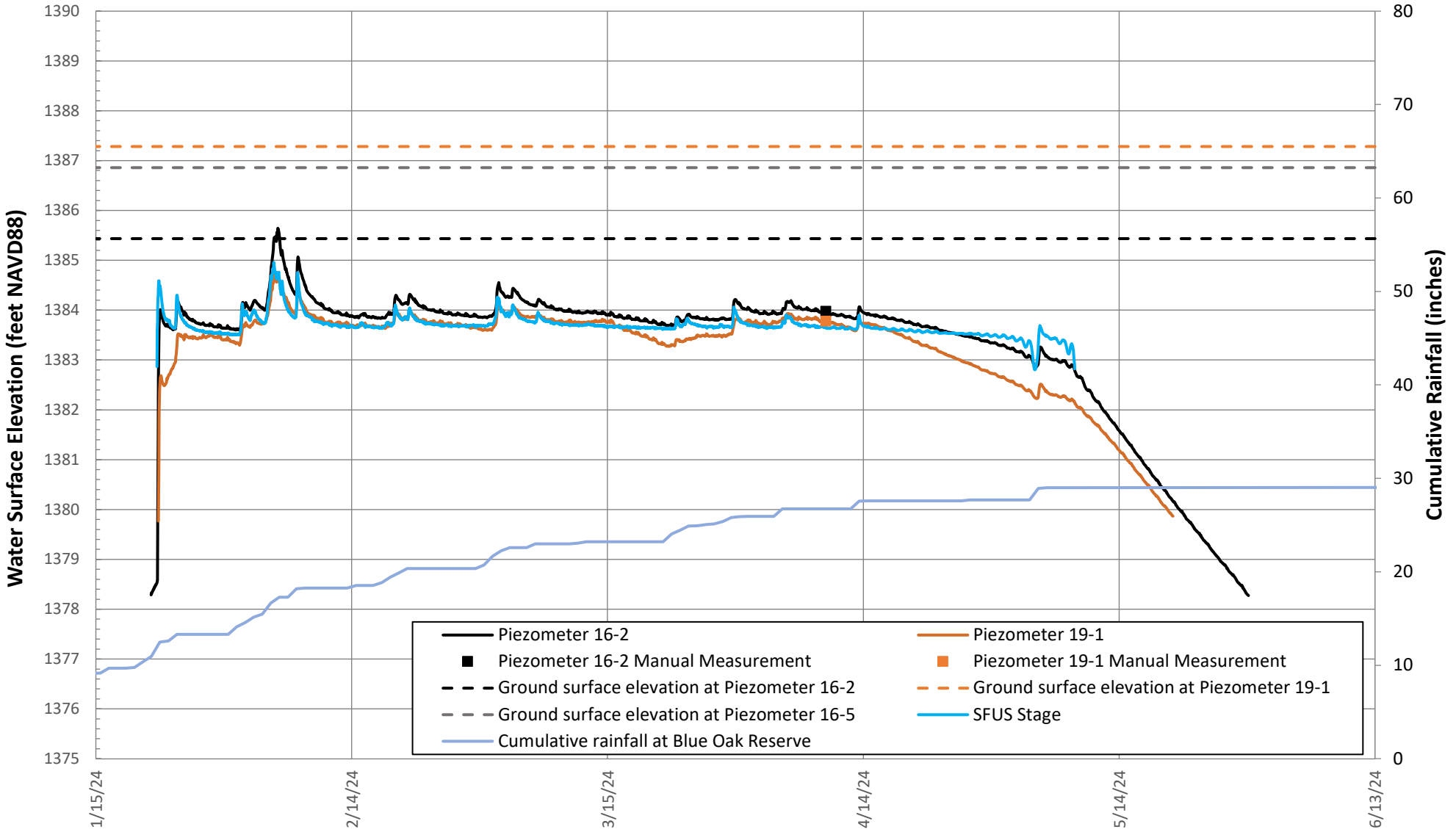
Figure 7. Stage at the San Felipe Creek downstream floodplains station (SFDF), water year 2024, San Felipe Creek Restoration Project, Santa Clara County, California. On December 10, 2021, SFDF was installed between ID03-03 and ID03-04 to evaluate timing and duration of floodplain inundation at ID03-03 and ID03-04.



Balance Hydrologics

222108 WY24 All Figures.xlsx

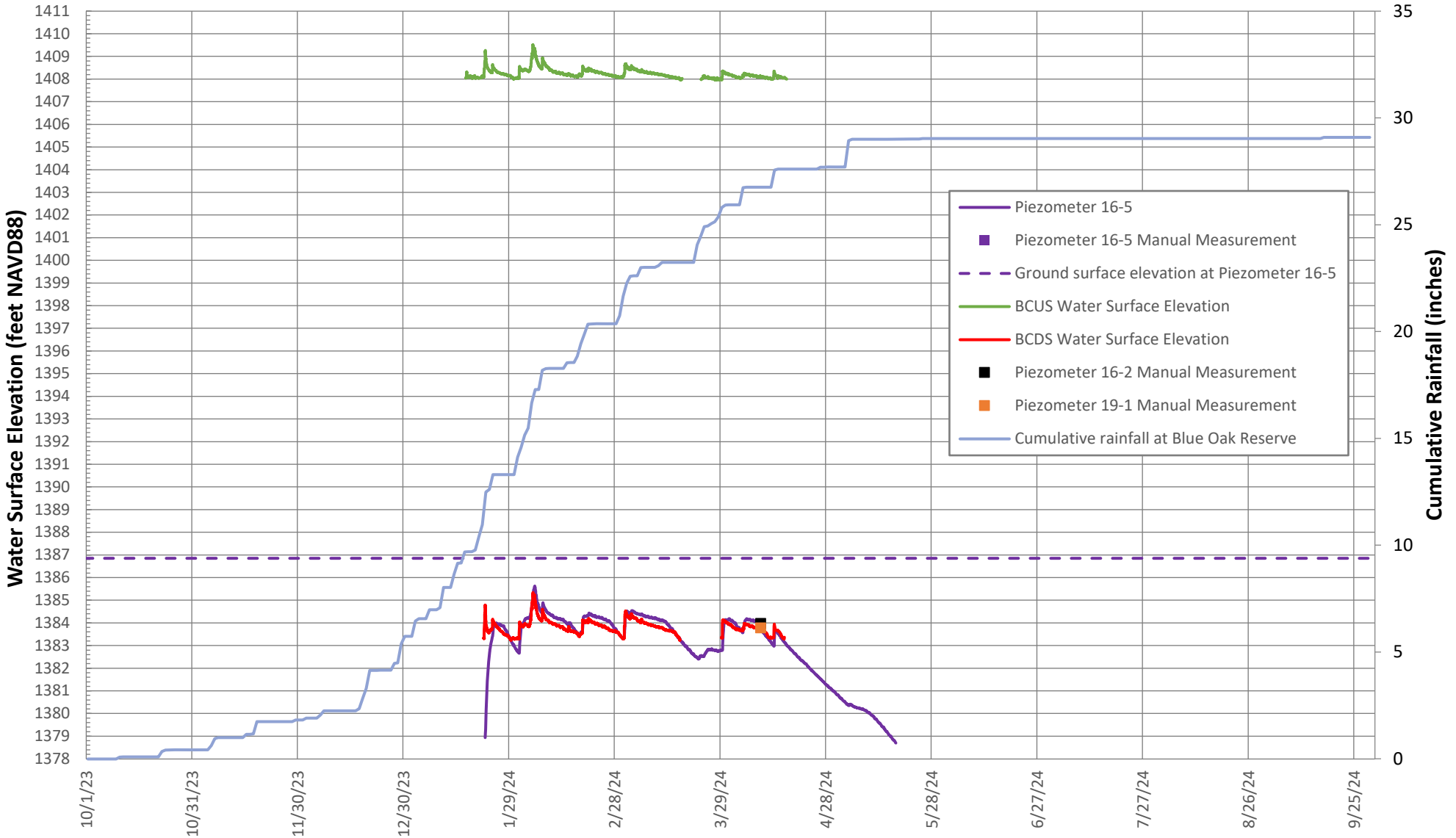
Figure 8a. **Shallow groundwater levels at Piezometers 16-2 and 19-1, and surface water level in San Felipe Creek (SFUS) for WY2024. San Felipe Creek Restoration Project, Santa Clara County, California.**



Balance Hydrologics

222108 WY24 All Figures.xlsx

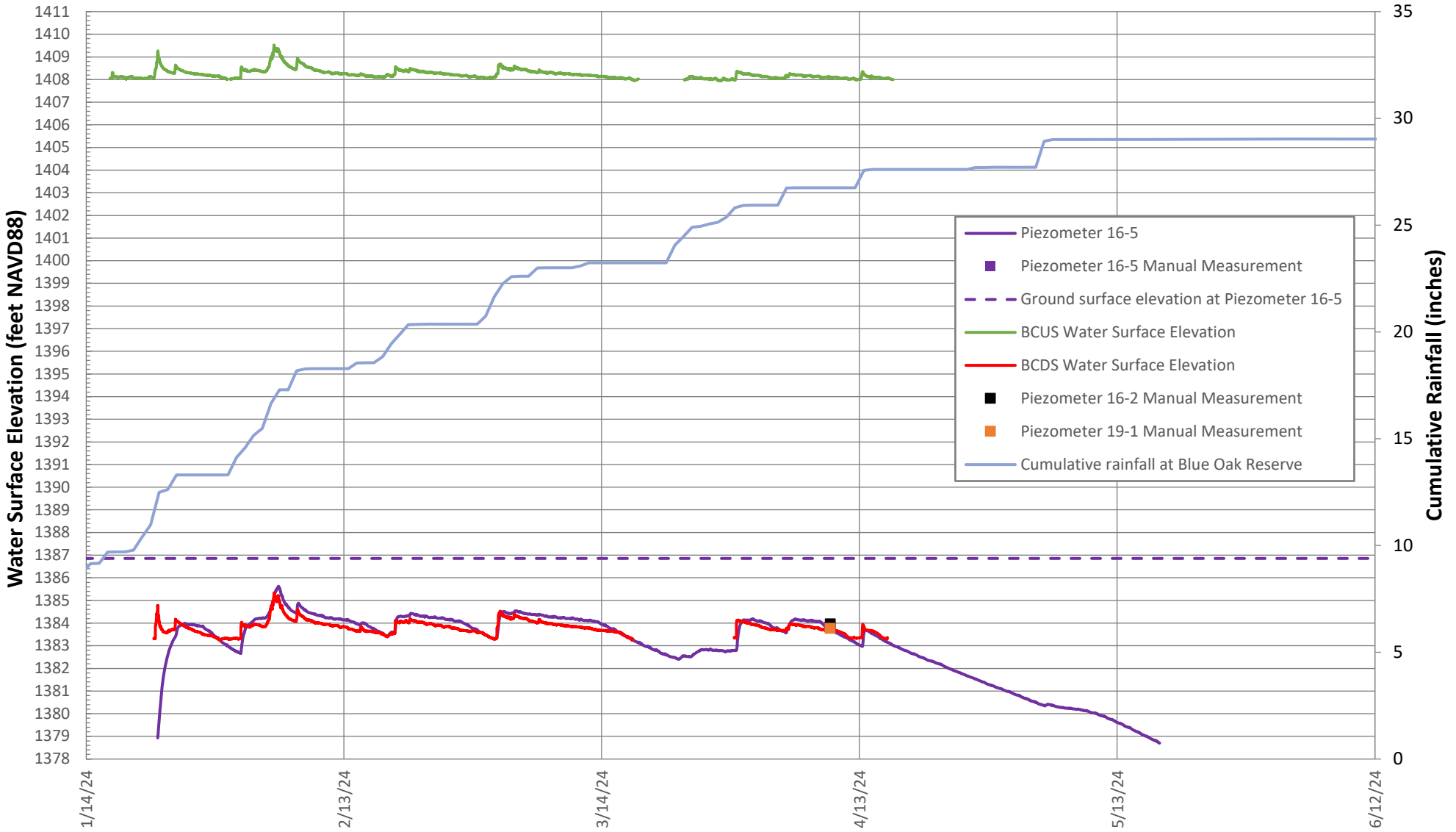
Figure 8b. Shallow groundwater levels at Piezometers 16-2 and 19-1, and surface water level in San Felipe Creek (SFUS) for WY2024. San Felipe Creek Restoration Project, Santa Clara County, California.



Balance Hydrologics

222108 WY24 All Figures.xlsx

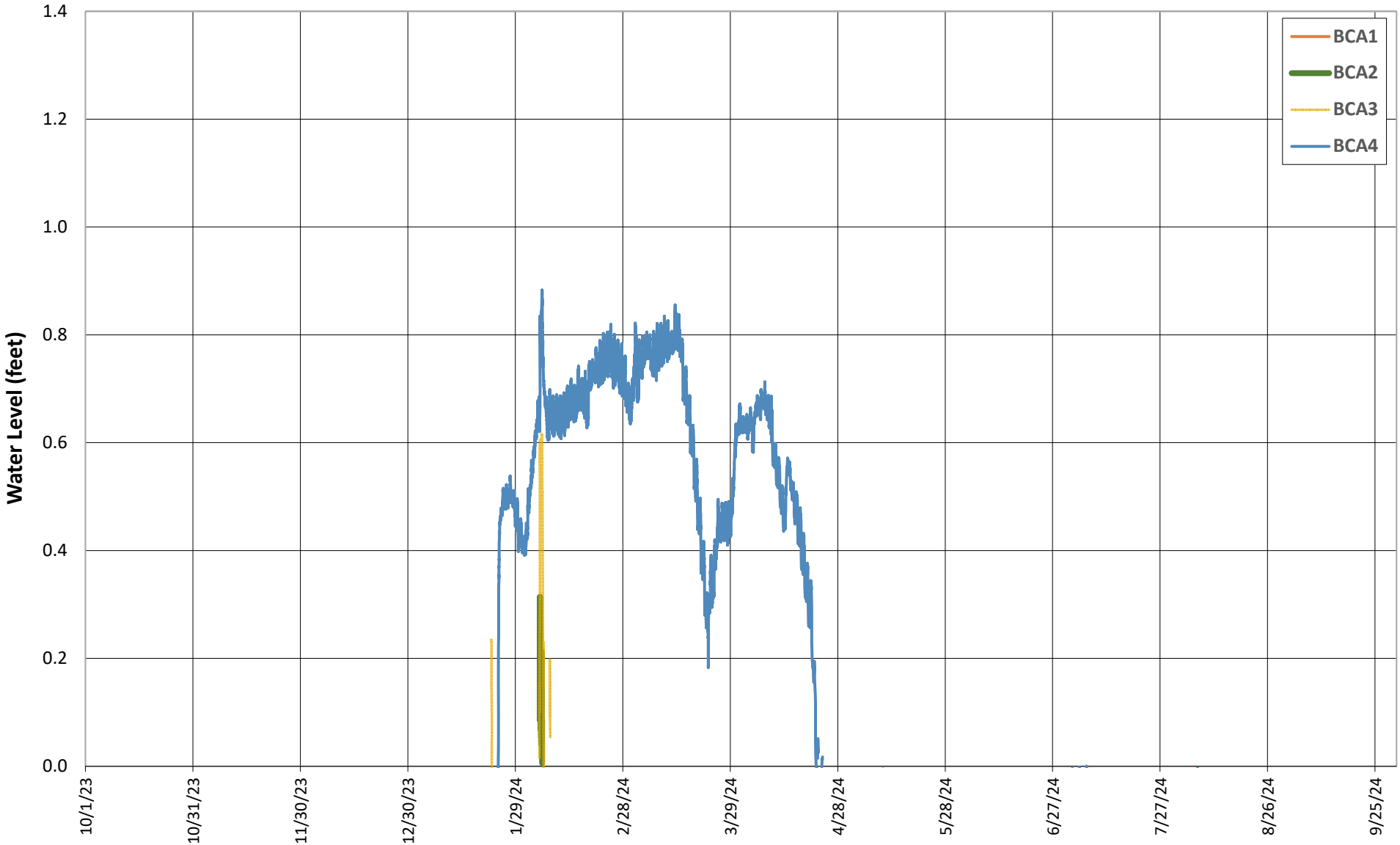
Figure 9a. **Shallow groundwater levels at Piezometer 16-5 and surface water stage in Boyds Creek upstream station (BCUS) and Boyds Creek downstream (BCDS), WY2024. San Felipe Creek Restoration Project, Santa Clara County, California.**



Balance Hydrologics

222108 WY24 All Figures.xlsx

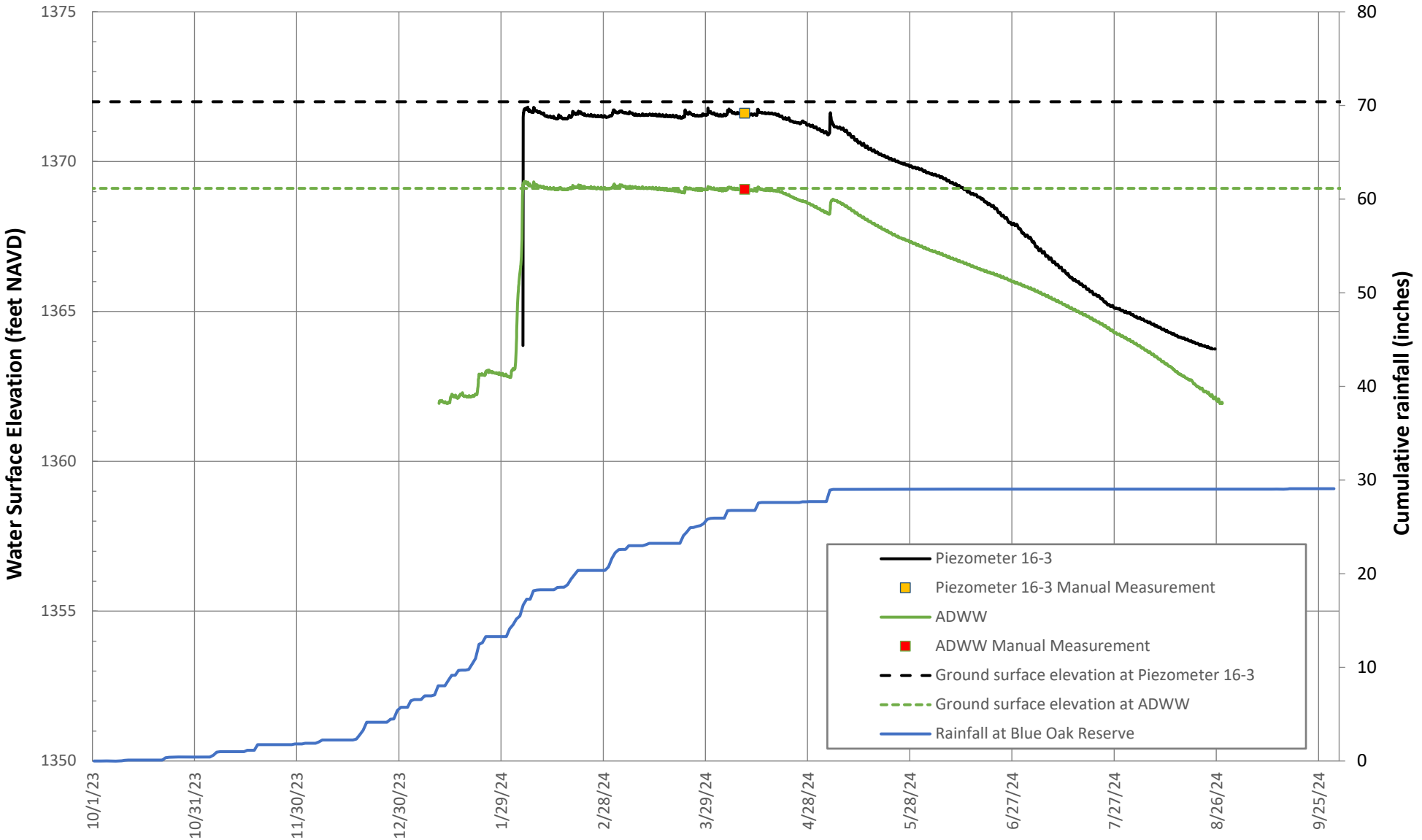
Figure 9b. Shallow groundwater levels at Piezometer 16-5 and surface water stage in Boyds Creek upstream station (BCUS) and Boyds Creek downstream (BCDS), WY2024. San Felipe Creek Restoration Project, Santa Clara County, California.



Balance Hydrologics

222108 WY24 All Figures.xlsx

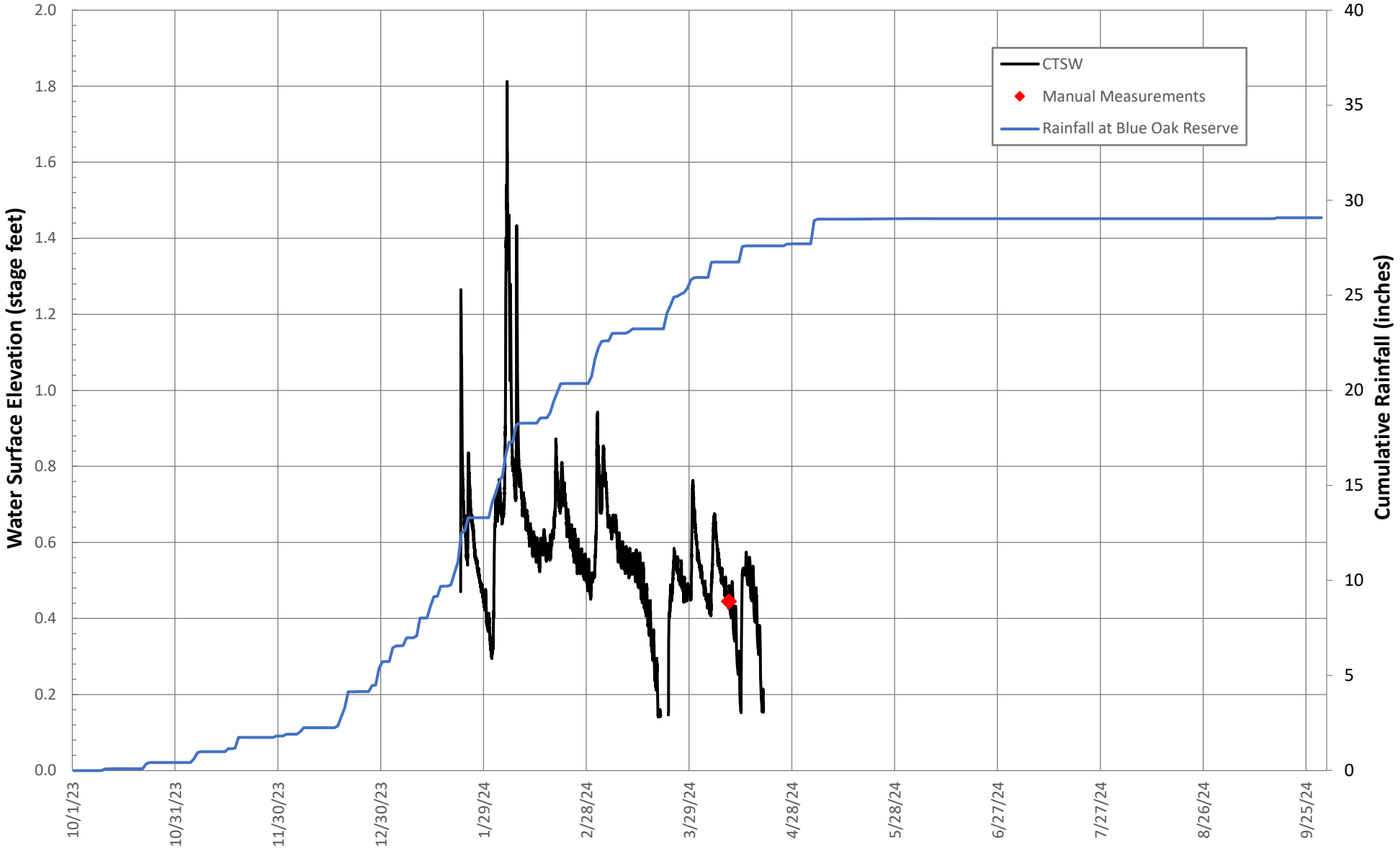
Figure 10. Water Level at the Boyds Creek distributary channel stations, water year 2024, San Felipe Creek Restoration Project, Santa Clara County, California.



Balance Hydrologics

222108 WY24 All Figures.xlsx

Figure 11. WY2024 water levels in the agricultural ditch (ADWW) and Piezometer 16-3 near Seasonal Wetlands SW02 and SW04, San Felipe Creek Restoration Project, Santa Clara County, California.



Balance Hydrologics

222108 WY24 All Figures.xlsx

Figure 12. Corral Trail seasonal wetland CTSW water levels during WY2024, San Felipe Creek Restoration Project, Santa Clara County, California. Wetland ground surface varies, but is located at a stage of approximately 0.2 feet.

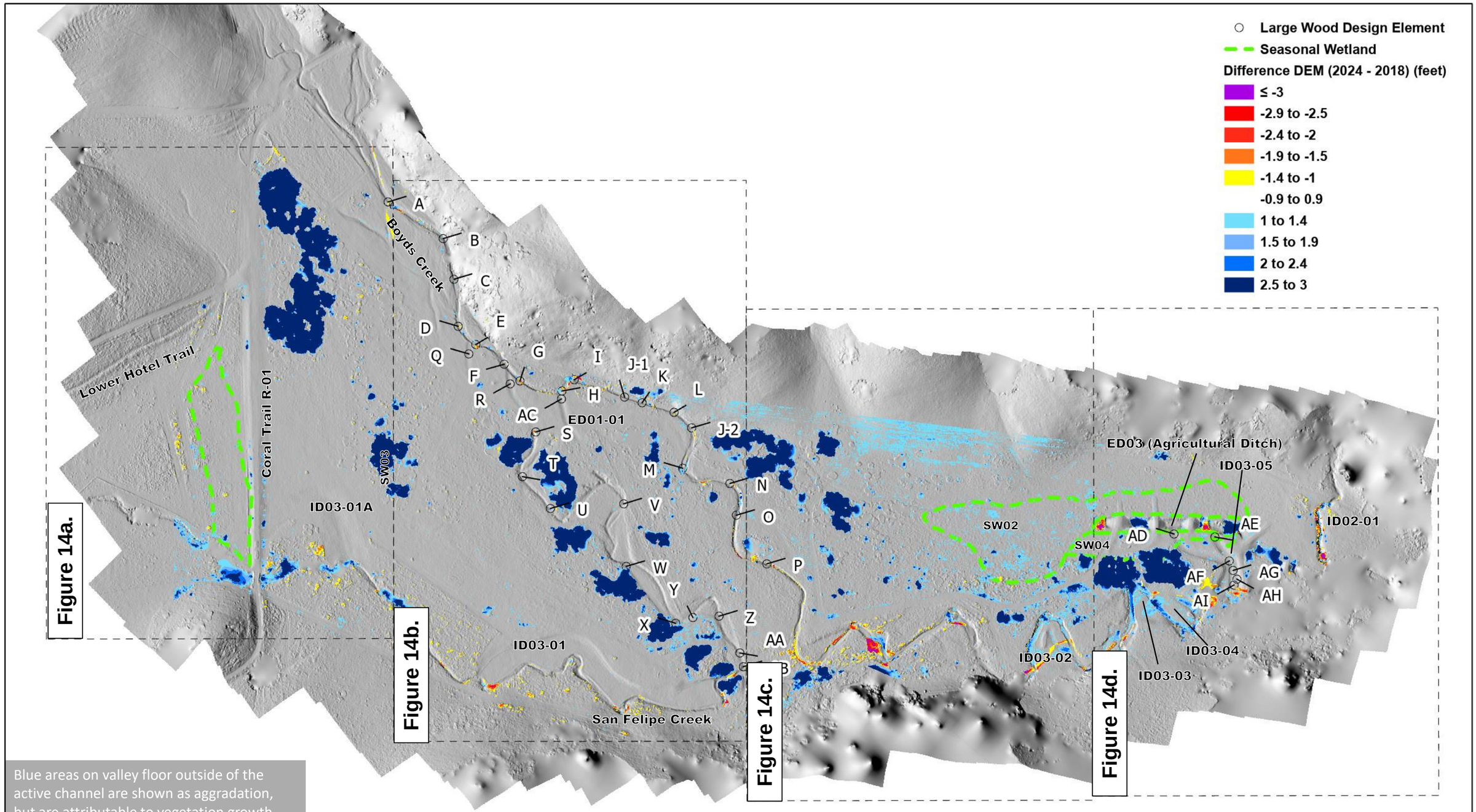


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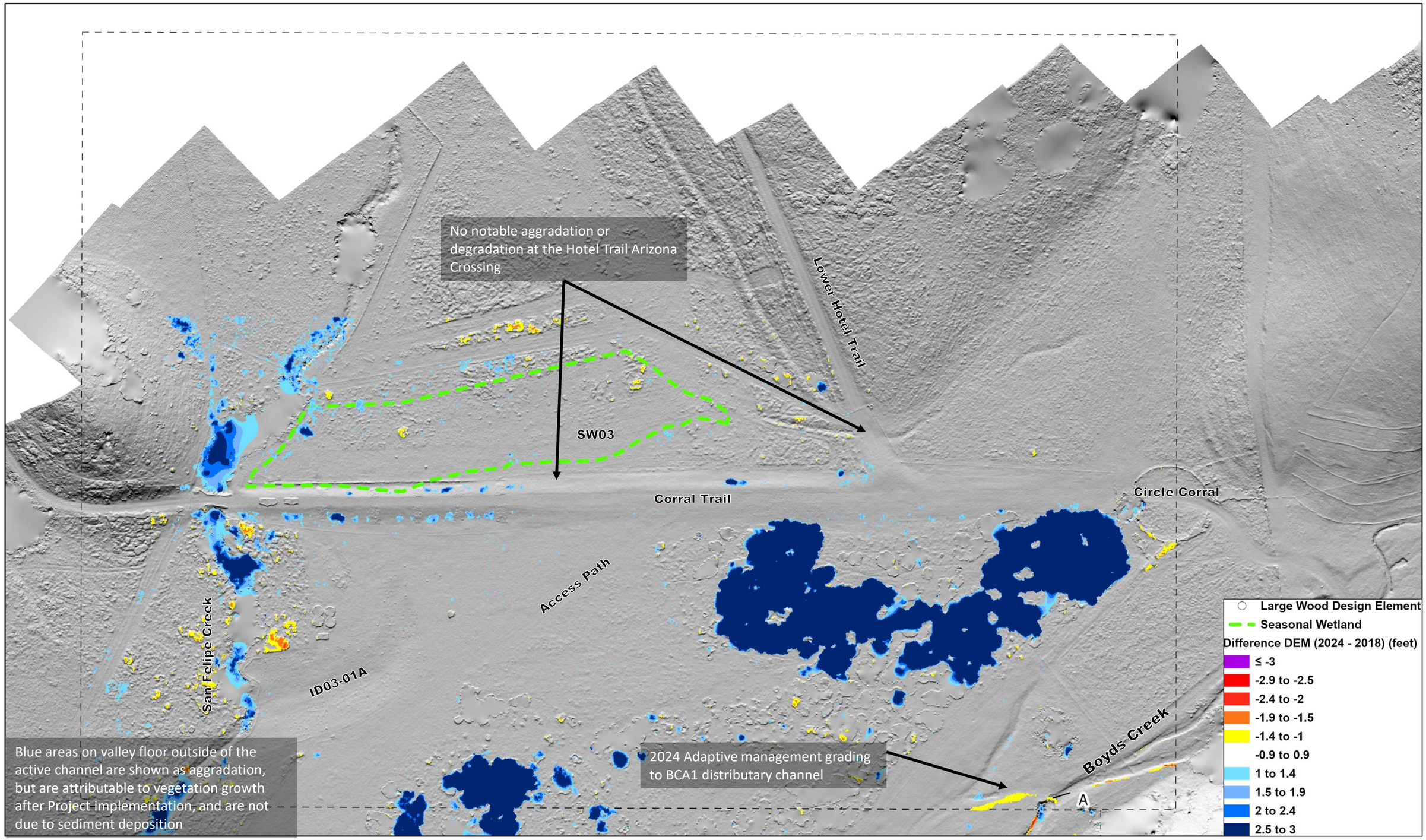
Figure 13. **2024 and 2018 DEM comparison, San Felipe Creek Restoration, Joseph D. Grant Park, Santa Clara County, California**

0 200 400 800 Feet

SCALE: 1:3,000

N

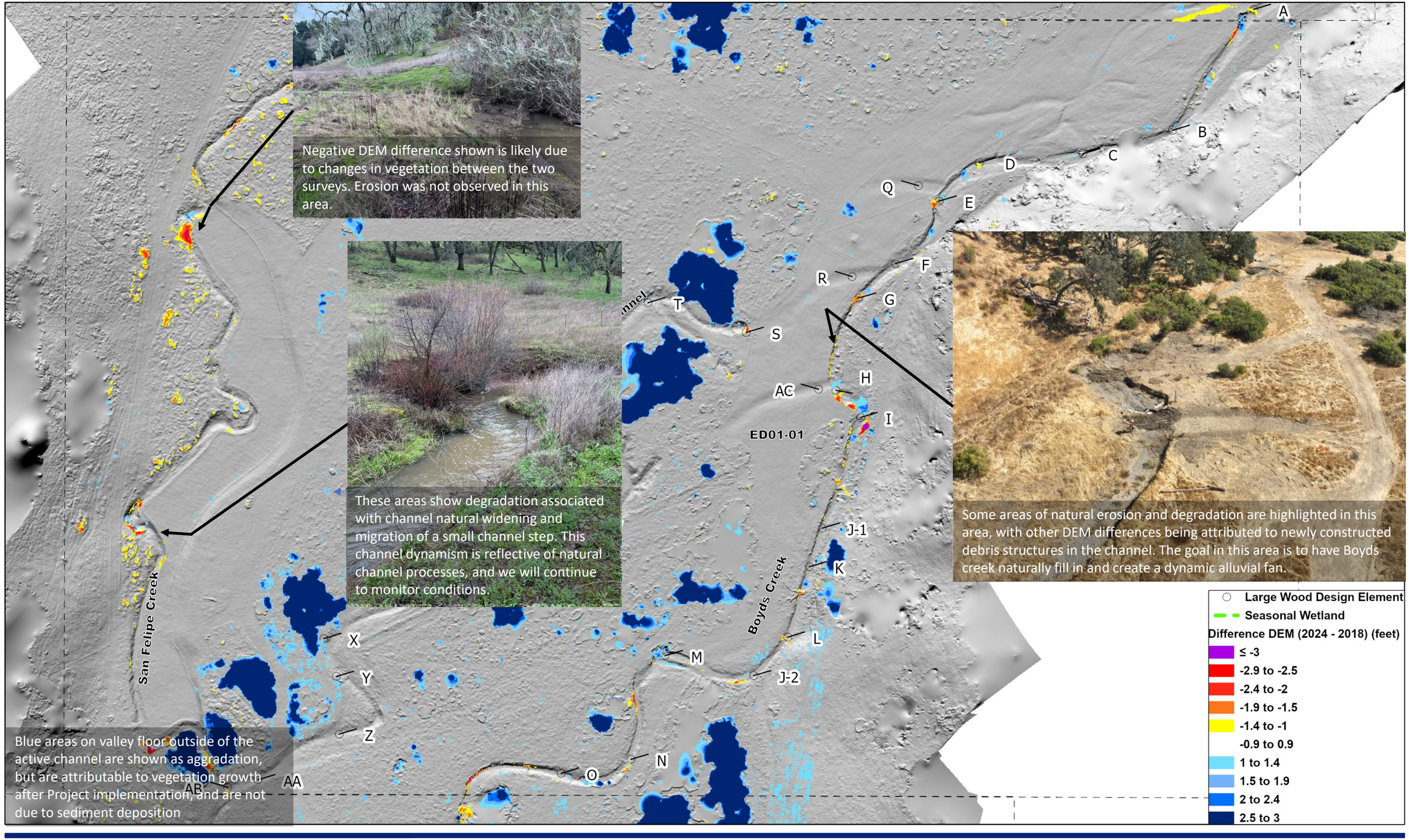


Balance Hydrologics™

Figure 14a. **2024 and 2018 DEM comparison, San Felipe Creek Restoration, Joseph D. Grant Park, Santa Clara County, California**

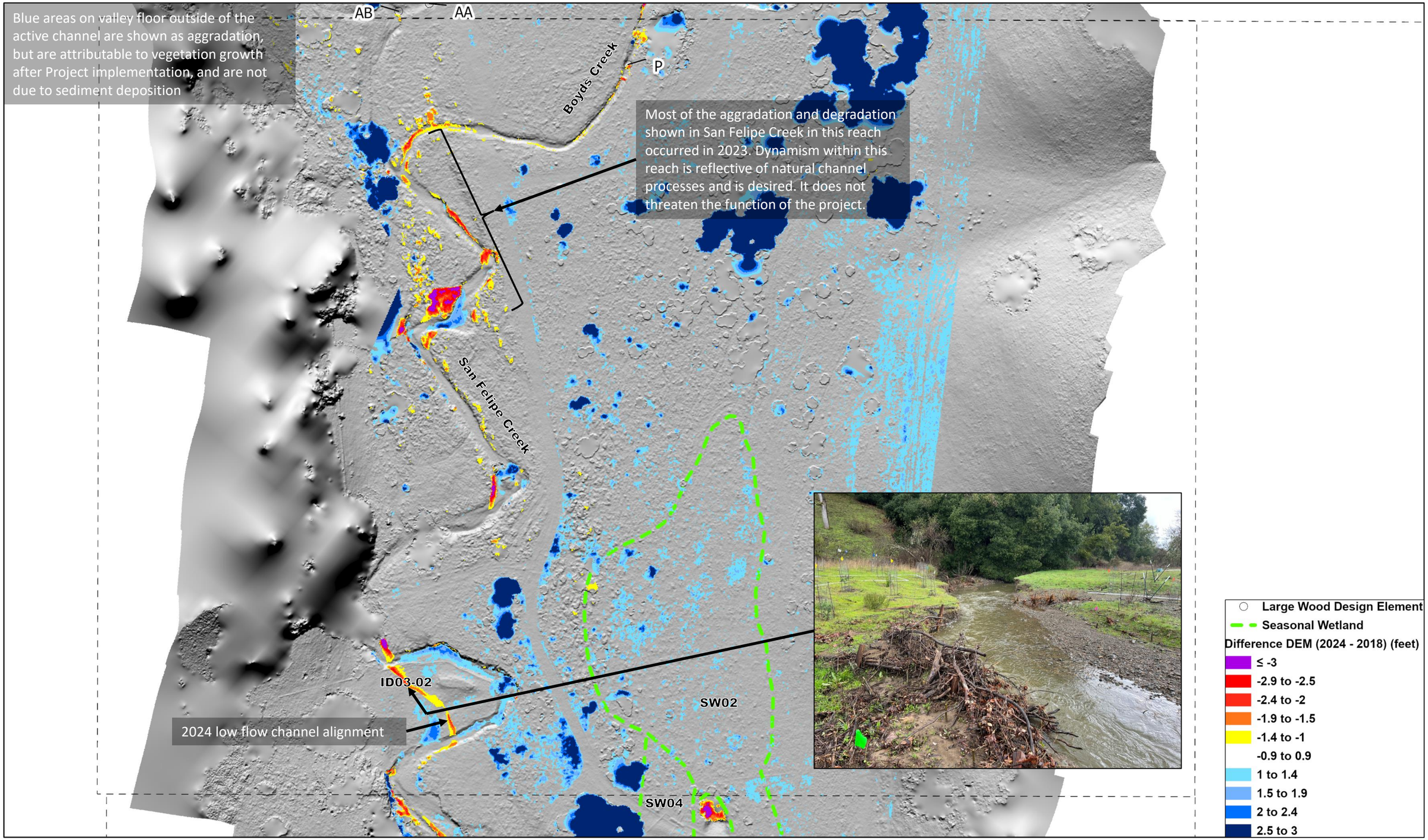
0 100 200 400 Feet

SCALE: 1:1,300



Balance Hydrologics™

Figure 14b. **2024 and 2018 DEM comparison, San Felipe Creek Restoration, Joseph D. Grant Park, Santa Clara County, California**

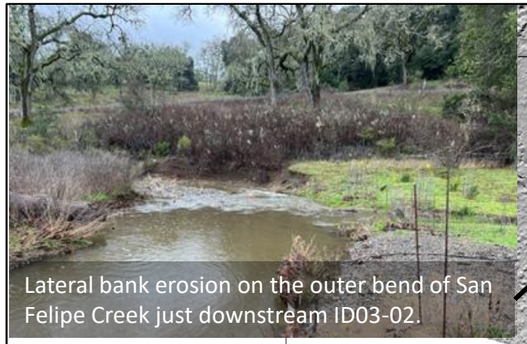


Balance Hydrologics™

Figure 14c. **2024 and 2018 DEM comparison, San Felipe Creek Restoration, Joseph D. Grant Park, Santa Clara County, California**

0 100 200 400 Feet

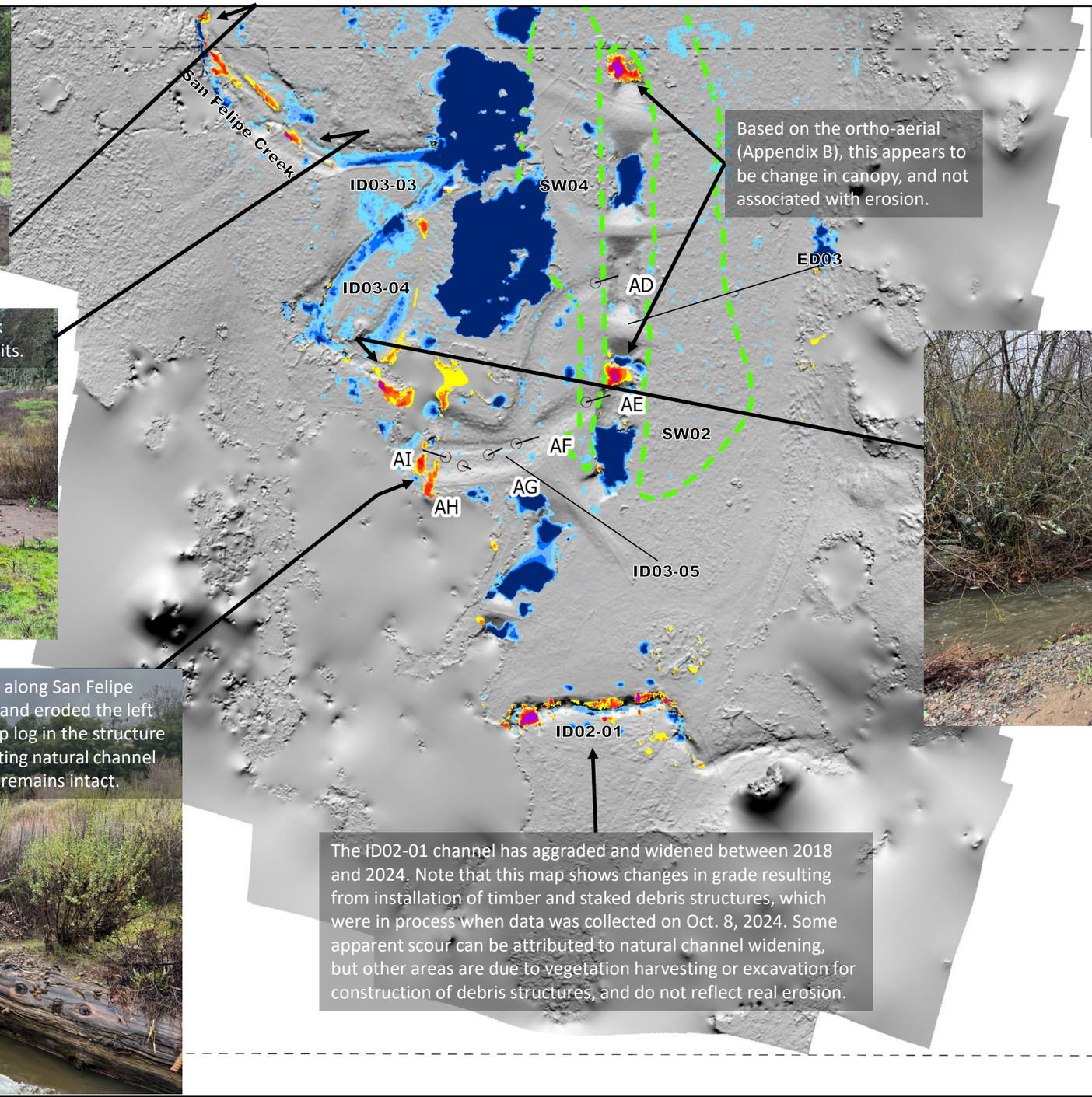
SCALE: 1:1,300



Lateral bank erosion on the outer bend of San Felipe Creek just downstream ID03-02.

Lateral channel migration, with right (cut) bank erosion and left bank bar and floodplain deposits.

Log Step Structure AI shown, looking upstream along San Felipe Creek. San Felipe Creek has naturally migrated and eroded the left bank (right in photo), and the bottom of the top log in the structure is exposed. Although San Felipe Creek is exhibiting natural channel dynamics, the integrity of the ID03-05 channel remains intact.



Blue areas on valley floor outside of the active channel are shown as aggradation, but are attributable to vegetation growth after Project implementation, and are not due to sediment deposition

Based on the ortho-aerial (Appendix B), this appears to be change in canopy, and not associated with erosion.

The ID02-01 channel has aggraded and widened between 2018 and 2024. Note that this map shows changes in grade resulting from installation of timber and staked debris structures, which were in process when data was collected on Oct. 8, 2024. Some apparent scour can be attributed to natural channel widening, but other areas are due to vegetation harvesting or excavation for construction of debris structures, and do not reflect real erosion.

Large Wood Design Element

Seasonal Wetland

Difference DEM (2024 - 2018) (feet)

- ≤ -3
- -2.9 to -2.5
- -2.4 to -2
- -1.9 to -1.5
- -1.4 to -1
- -0.9 to 0.9
- 1 to 1.4
- 1.5 to 1.9
- 2 to 2.4
- 2.5 to 3

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Figure 14d. **2024 and 2018 DEM comparison, San Felipe Creek Restoration, Joseph D. Grant Park, Santa Clara County, California**

0 100 200 400 Feet

SCALE: 1:1,300

N

ID03-01: 2/19/2024 Evidence of floodplain inundation near upstream end of created floodplain feature.

ID03-02: 2/19/2024. Partial floodplain inundation likely occurred based on wracked leaves on floodplain

ID03-03/04: 2/19/2024. Flows partially inundating ID03-03 and ID03-04 (background).

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Figure 15. San Felipe Creek on February 19, 2024 at created floodplain ID03-01 (Top), ID03-02 (Right top and bottom) and ID03-03/04 (Bottom left) WY2024. San Felipe Creek Restoration Project, Joseph D. Grant Park, Santa Clara County, California. The created floodplain areas pictured here were at least partially inundated during WY2024.

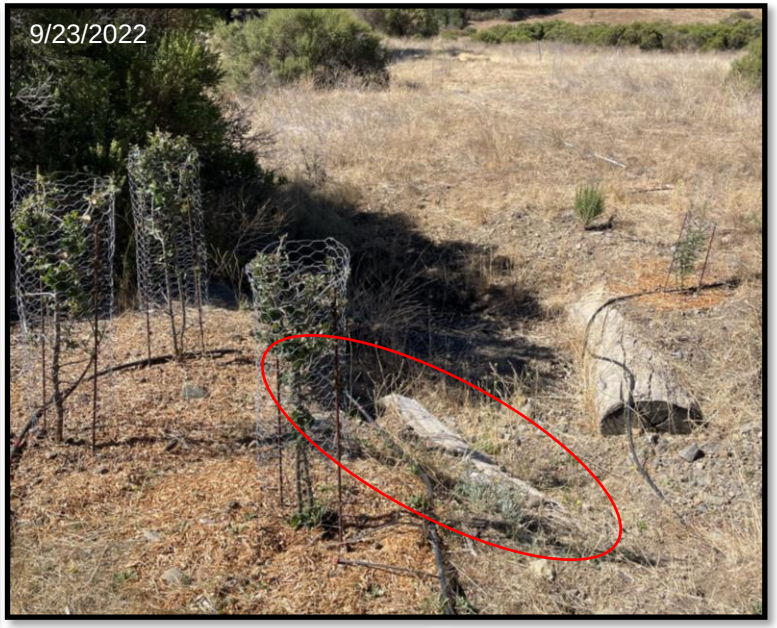

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Figure 16. Plantings at living log jams, September 23, 2020 (top left), April 28, 2021, September 23, 2022, October 3, 2023, and October 8, 2024. Year 6 San Felipe Creek Restoration Project, Joseph D. Grant Park, Santa Clara County, California. See replaced log in red oval in 2021-2024 photos

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Figure 17. Comparison of San Felipe Creek at created floodplain ID03-02 between Year 1,Year 2 and post-adaptive management repair in Year 3, Year 4, Year 5, and Year 6, looking downstream. San Felipe Creek Restoration Project, Joseph D. Grant Park, Santa Clara County, California.

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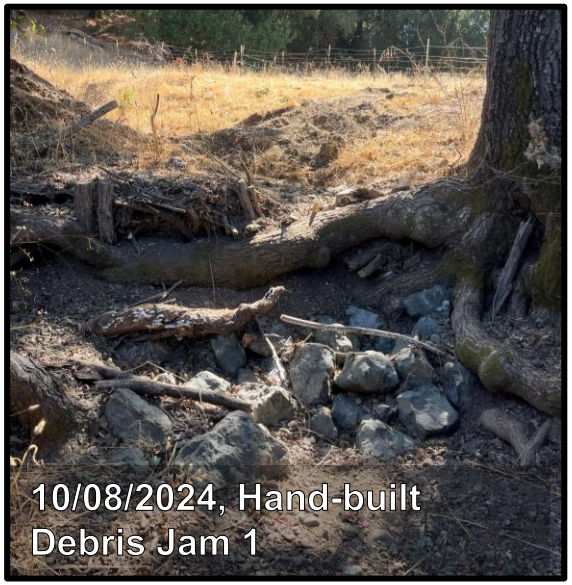
Figure 18. Corral Trail and drainage lens and Lower Hotel Trail Arizona crossing, October 8, 2024. San Felipe Creek Restoration Project, Joseph D. Grant Park, Santa Clara County, California.



Note: Staked debris jams are numbered in downstream order, upper left to lower right.

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222108 Photo Figures

Figure 19. Staked debris jams at ID02-01, October 8, 2024, San Felipe Creek Restoration Project, Joseph D. Grant Park, Santa Clara County, California. All photos are taken looking upstream except Debris Jam 6. Photos were taken during construction to install another round of timber debris jams, which can be seen in progress behind Debris Jam 5.

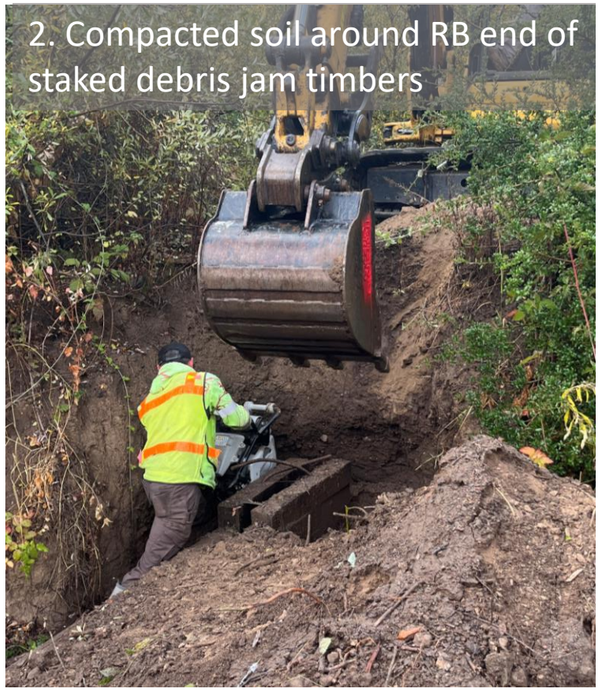

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Figure 20. Eastern Tributary Repair, Right Bank at erosional area, November 6, 2023
San Felipe Restoration Project Adaptive Management 2023, Santa Clara County, California.

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Figure 21. Eastern Tributary Repair, Left Bank at erosional area, November 6, 2023
San Felipe Restoration Project Adaptive Management 2023, Santa Clara County, California.

Figure 22. Eastern Tributary Repair, Final results, November 6, 2023
San Felipe Restoration Project Adaptive Management 2023, Santa Clara County, California.

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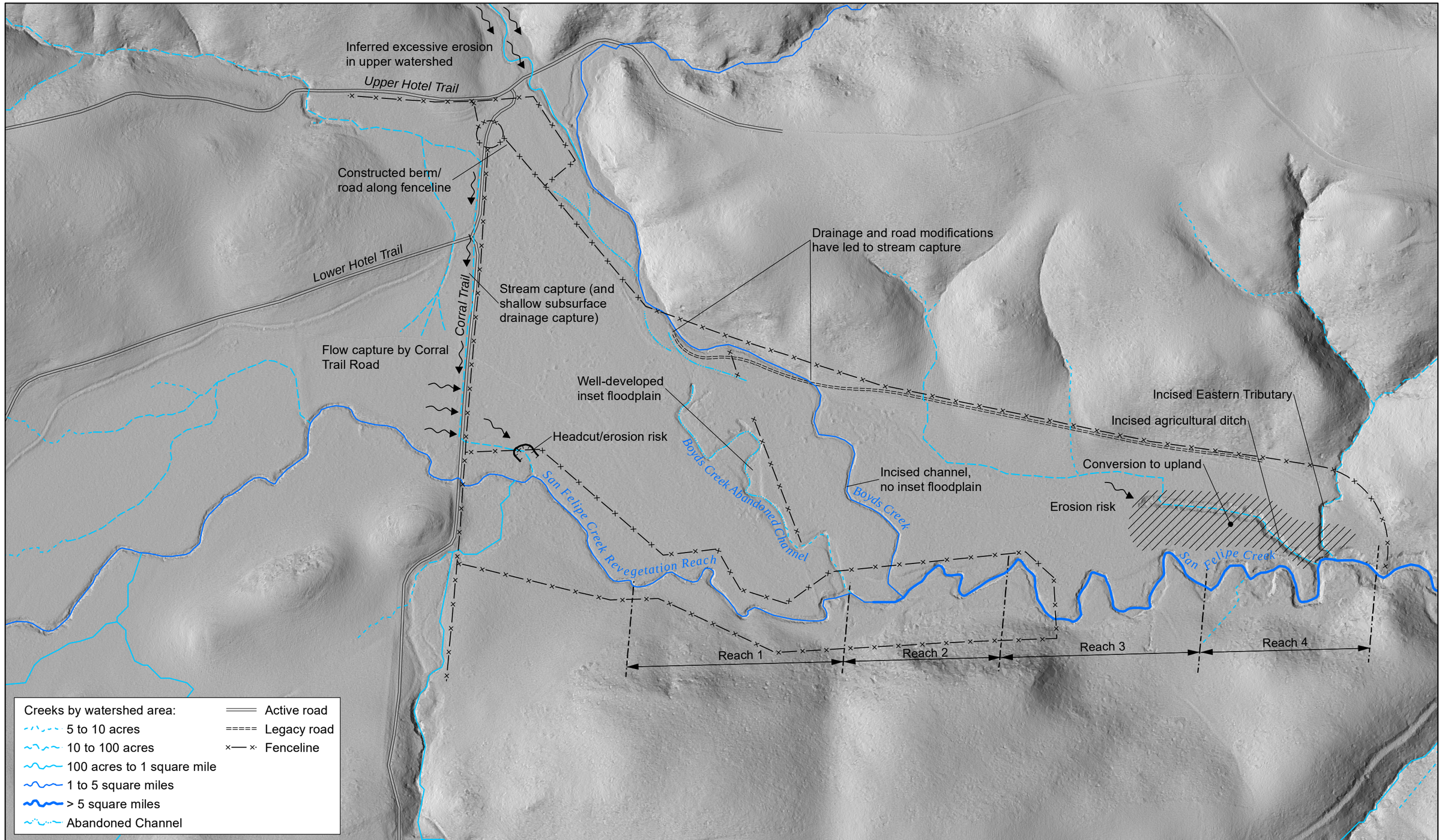
APPENDICES

APPENDIX A

Hydrologic Impairment Map

Note: Map was created pre-restoration in 2017 using 2007 Lidar



Balance Hydrologics, Inc.

Y:\GIS\Projects\215108 San Felipe Creek\FIGURES\215108 impairment map.mxd

Plate 2. San Felipe Creek Hydrologic Impairment Map, Santa Clara County, California

Note: impairment map was created pre-restoration.

Basemap source: EarthScope LiDAR mapping (2007)

0 150 300 600 Feet

APPENDIX B

October 8, 2024, Ortho-Aerial Photograph

Source: Balance Hydrologics, 2023

Balance Hydrologics™

Figure B1. Orthomosaic image, October 8, 2024, San Felipe Creek Restoration, Joseph D. Grant Park, Santa Clara County, California

0 200 400 800 Feet

SCALE: 1:3,000

N

Source: Balance Hydrologics, 2023

Balance Hydrologics™

Figure B2a. Orthomosaic image, October 8, 2024, San Felipe Creek Restoration, Joseph D. Grant Park, Santa Clara County, California

0 100 200 400 Feet

SCALE: 1:1,300

N

Source: Balance Hydrologics, 2024

Balance Hydrologics™

Figure B2b. Orthomosaic image, October 8, 2024, San Felipe Creek Restoration, Joseph D. Grant Park, Santa Clara County, California

0 100 200 400 Feet

SCALE: 1:1,300

Source: Balance Hydrologics, 2024

Balance Hydrologics™

Figure B2c. Orthomosaic image, October 8, 2024, San Felipe Creek Restoration, Joseph D. Grant Park, Santa Clara County, California

0 100 200 400 Feet

SCALE: 1:1,300

N

Source: Balance Hydrologics, 2024

Balance Hydrologics™

Figure B2d. Orthomosaic image, October 8, 2024, San Felipe Creek Restoration, Joseph D. Grant Park, Santa Clara County, California

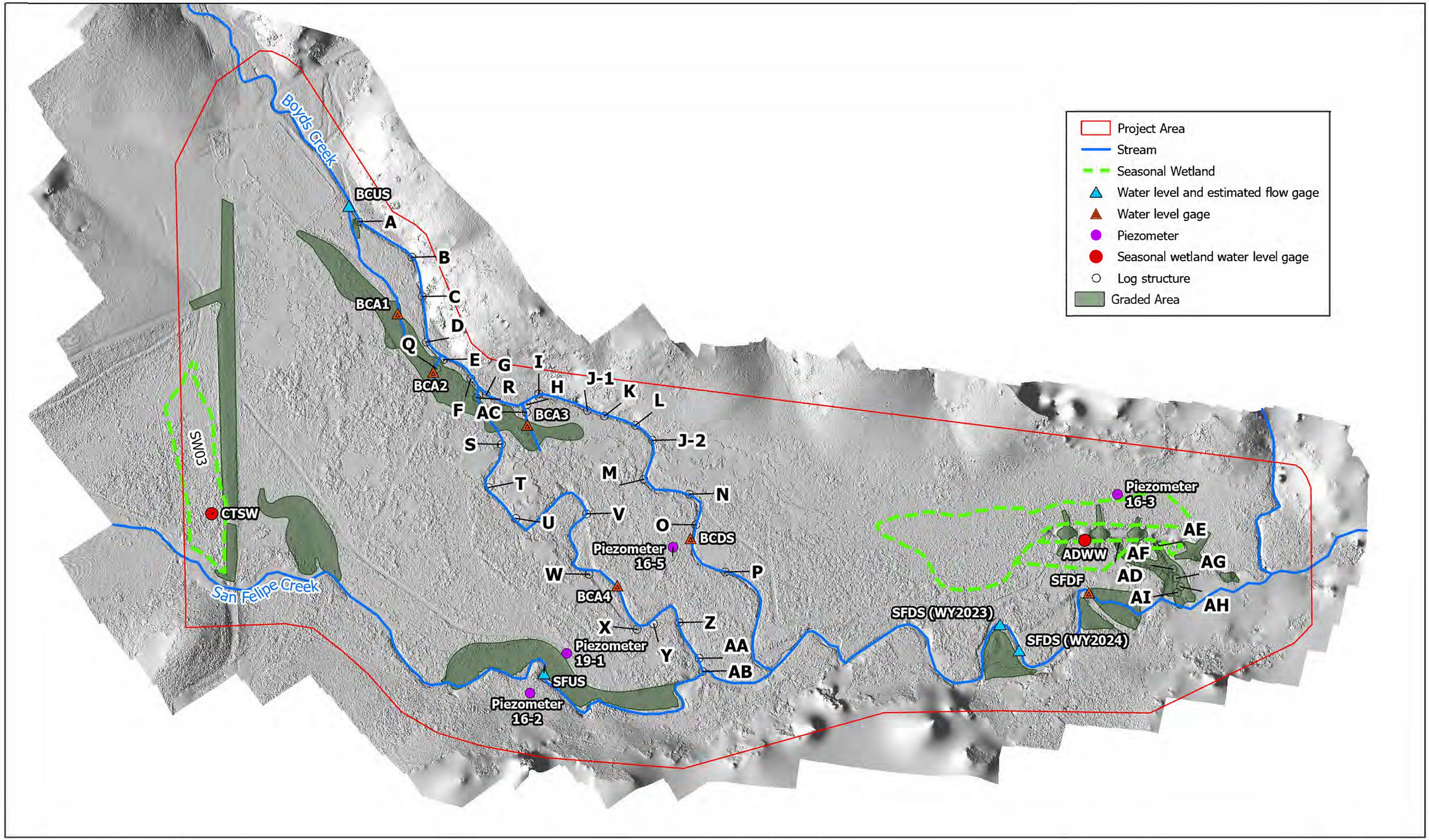
0 100 200 400 Feet

SCALE: 1:1,300

N

APPENDIX C

Log Structure Locations



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Appendix C. Log structure locations,
San Felipe Creek Restoration Project,
Joseph D. Grant Park,
Santa Clara County, California

0 200 400 800 Feet

SCALE: 1:3,000

N

APPENDIX D

Surface Water Station Observer Log, WY2024

Appendix D. Surface water station observer log: San Felipe Creek Restoration Project
Water Year 2024

Site Conditions				Streamflow				High-Water Marks		Remarks
Date/Time (mm/dd/yr)	Observer(s) [1]	Stage (staff) [2] (feet)	Hydrograph [3] (R/F/S/B)	Measured Discharge (cfs)	Estimated Discharge (cfs)	Instrument Used [4] (AA/PY/Hach)	Estimated Accuracy [5] (e/g/f/p)	Estimated stage at staff plate [6] (feet)	Inferred dates? (mm/dd/yr)	
SFUS										
10/3/2023 17:11	em	…	D	…	…	…	…	2.62	…	Dry at gage
2/19/2024 10:40	dj	2.89	F	6.52	…	HACH	f	…	…	Light rain, mild wind
4/9/2024 14:47	eg	2.64	S	0.82	1	Hach	f	…	…	Lots of in-stream vegetation, had to pull out for measurement, stream gage is in deep pool, downloaded after measurement
9/17/2024 12:27	eg	…	D	…	…	…	…	3.6 - 3.7 ft on staff	Winter 24	Downloaded logger at 12:30
SFDS										
10/3/2023 12:01	eg	…	D	…	…	…	…	…	…	Moved from abandoned meander to just downstream of ID03-02 into main channel
2/19/2024 11:30	dj	…	F	11.89	…	HACH	f	~4.5 ft	2/4/2024	Gage was blown out, could not find equipment. HWM around 4.5 on stadia where staff plate would have been.
4/9/2024 13:47	eg	…	S	…	1.25	…	p	…	…	Gage blown out over winter, could not locate equipment
9/5/2024 15:00	eg, dj	…	D	…	…	…	…	…	…	Installed new gage in the backwater area of cutoff channel. Confluence may have found equipment and brought back to this location.
SFDF										
10/3/2023 12:22	eg	…	D	…	…	…	…	…	…	Logger returned to stlling well with some sediment in well, ~0.3 ft higher than when removed
2/19/2024 11:56	dj	1.90	F	…	…	…	…	3.00	2/4/2024	Gage is in meander bend- new side channel, which is currently inundated. HWM of leaves.
4/9/2024 13:00	eg	…		…	…	…	…	3.00	Winter 24	ground moist at stilling well, but gage disconnected from low flow; pool at where the meander bend meets new low flow channel, stilling well is full of sediment, did not clean.
9/13/2024 13:27	eg	…	D	…	…	…	…	…	…	Not connected to low-flow channel. A lot of gravels deposited on floodplain by gage, no distinct HWM at gage.
BCUS										
10/3/2023 15:55	em	dry	D	…	…	visual	…	2.80	unknown	
2/19/2024 13:40	dj	0.43	F	6.38	…	HACH	f	1.6-1.8	2/18 or 2/19/24	Leaves wracked on staff plate up to 1.6-1.8 on staff plate.
4/9/2024 16:12	eg	0.09	S	0.54	0.60	Hach	f	1.2 - 1.7 ft	Winter 24	cleaned stilling well and downloaded in AM, came back in afternoon for flow measurment. Staff plate almost out of water, some algae growing throughout channel, water clear and cold
9/13/2024 12:10	eg	dry	D	…	0.00	visual	…	1.0-1.3 ft on staff	Winter 24	Downloaded logger at 12:10

	Site Conditions			Streamflow				High-Water Marks		Remarks
Date/Time (mm/dd/yr)	Observer(s) [1]	Stage (staff) [2] (feet)	Hydrograph [3] (R/F/S/B)	Measured Discharge (cfs)	Estimated Discharge (cfs)	Instrument Used [4] (AA/PY/Hach)	Estimated Accuracy [5] (e/g/f/p)	Estimated stage at staff plate [6] (feet)	Inferred dates? (mm/dd/yr)	
BCA1										
10/3/2023 16:15	eg	dry	D	…	0	visual	…	…	…	
2/19/2024 12:00	dj	dry	D	…	0	visual	…	…	…	No evidence of flow. HWM at BCUS indicates this channel did not activate.
4/9/2024 10:02	eg	dry	D	…	0	visual	…	…	…	No clear evidence of flow in channel. Lots of wildflowers growing in channel. Clear depression/channel at staff plate, less so u/s and d/s
9/13/2024 10:00	eg	dry	D	…	0	visual	…	…	…	No HWM visible, doesn't appear to have activated. Downloaded logger at 10:08
BCA2										
10/3/2023 16:05	eg	dry	D	…	0	visual	…	…	…	dirt in stilling well, levelogger is slightly higher when returned to well
2/19/2024 13:16	dj	dry	D	…	0	visual	…	0.60	2/4/2024	Evidence of flow at the inlet of the channel, leaves and sticks deposited.
4/9/2024 09:48	eg	dry	D	…	0	visual	…	0.65 - 0.7 ft	Winter 24	Evidence of flow in channel, woody debris wracked on staff plate, flow continous through Boyds mainstem at this location, grasses and wildflowers growing in channel
9/13/2024 09:15	eg	dry	D	…	0	visual	…	0.60	Winter 24	Downloaded logger at 9:14
BCA3										
10/3/2023 15:55	eg	dry	D	…	0	visual	…	…	…	dirt in stilling well, levelogger is slightly higher when returned to well
2/19/2024 13:12	dj	dry	D	…	0	visual	…	…	…	Evidence of flow through channel, leaves and debris deposited in channel across width. No flow now.
4/9/2024 10:40	eg	dry	D	…	0	visual	…	0.9 - 1.0 ft	Winter 24	Evidence of flow through channel, wood and sediment wracked on staff plate; lots of fines deposited at mouth of BCA3, deposition at gage- very soft ground. Boyds Ck goes subsurface in pool at BCA3, with several stranded pools downstream
9/13/2024 10:30	eg	dry	D	…	0	visual	…	1.0 ft	Winter 24	Downloaded logger at 10:33.
BCA4										
10/3/2023 16:34	em		D	…	…	visual	…	…	…	Dry
2/19/2024 13:30	dj		F	…	…	…	…	…	…	Did not visit staff plate, channel flowing, observed at road crossing near San Felipe confluence.
4/9/2024 11:10	eg		S	…	0.3	visual	p	1.0 - 1.5 ft above channel bed	2/4/2024	No staff plate at this gage- may have been blown out over the winter; water depth at probe approximately 0.5 ft. Downloaded at 11:10
9/13/2024 11:00	eg		D	…	0	visual		1.0 - 1.5 ft above channel bed	WY24	Evidence of flow 0.4-0.5 above thalweg, evidence of water in channel with dried algae in bed

	Site Conditions			Streamflow				High-Water Marks		Remarks
Date/Time (mm/dd/yr)	Observer(s) [1]	Stage (staff) [2] (feet)	Hydrograph [3] (R/F/S/B)	Measured Discharge (cfs)	Estimated Discharge (cfs)	Instrument Used [4] (AA/PY/Hach)	Estimated Accuracy [5] (e/g/f/p)	Estimated stage at staff plate [6] (feet)	Inferred dates? (mm/dd/yr)	
BCDS										
10/3/2023 14:55	eg	…	D	…	…	…	…	3.00	unknown	
2/19/2024 12:58	dj	0.77-0.78	F	…	…	…	…	1.90	2/18 or 2/19/24	Leaves wracked on stilling well up to 1.9 feet on the staff plate
4/9/2024 11:24	eg	0.39	S	…	0.10	visual	p	2.0 ft, 3.0 ft, 0.6 ft	Winter 24	Flow resurfaced just upstream of gage, trickle through gage reach; multiple HWM's; air bubbles coming up in pool just u/s staff plate
9/13/2024 11:15	eg	dry	D	…	0.00	visual	…	1.8-2.0 ft	Winter 24	No clear debris racked on staff plate, some potential HWM's at 1.8 and 2.0 ft. Downloaded at 11:18
ADDW										
10/3/2023 14:09	eg	…	…	…	…	…	…	…	…	logger is muddy and wet in stilling well
2/19/2024 12:11	dj	…	…	…	…	…	…	…	…	Ponds are full and spilling
4/9/2024 12:27	eg	6.55-6.58	…	…	…	…	…	…	…	Plug ponds full to the brim; 0.5 ft below levee; Staff plate just above water, hard to read from bank.
9/13/2024 13:53	eg	…	D	…	…	…	…	…	…	Pond is dry, but next d/s pond is still wet/ponded. Downloaded logger at 13:53
CTSW										
10/3/2023 10:29	eg	…	D	…	…	…	…	…	…	no water ponded, tip of logger was moist when removed
2/19/2024 14:30	dj	…		…	…	…	…	…	…	Did not visit gage, ponding throughout wetland.
4/9/2024 15:48	eg	0.44-0.45		…	…	…	…	0.55 - 0.60	Winter 24	Standing water in wetland, downloaded at 15:52, faint lines on staff plate with algae growth HWM's
9/18/2024 14:57	eg	…	D	…	…	…	…	…	…	Downloaded logger at 14:57

Notes:

1. Observer Key: dj = Dana Jepsen, eg = Emma Goodwin, em = Ella Myr, cp = Camille Pauley
2. Stage: Water level observed at outside staff plate
3. Hydrograph: Describes stream stage as rising (R), at peak (P), falling (F), steady (S), baseflow (B), no flow (NF), dry (D), or uncertain (U).
4. Instrument: If measured, typically made using a standard (AA) or Pygmy (PY) bucket-wheel ("Price-type") current meter or 5 gallon bucket (bkt), plastic bag (bag), If estimated, from rating curve (R) or visual (V).
5. Estimated measurement accuracy: Excellent (E) = +/- 2%; Good (G) = +/- 5%; Fair (F) = +/- 9%; Poor (P) estimated percent accuracy given
6. High-water mark (HWM): Measured or estimated at location of the staff plate

APPENDIX E

Ground Water Station Observer Log, WY2024

Appendix E. Groundwater station observer log: San Felipe Creek Restoration Project
Water Year 2024

	Site Conditions			Water Quality Observations			Remarks
Date/Time (mm/dd/yr)	Observer(s) [1]	Depth to Water [2] (feet)	Water Surface Elevation [3] NAVD88 (feet)	Water Temperature (°C)	Specific Conductance at field temp. [8] (µmhos/cm)	Specific Conductance at 25 °C (at 25 °C)	
Piezometer 16-2							
10/3/2023 17:35	em	n/a	…	…	…	…	dry
4/9/2024 14:26	eg	4.13	1383.98	…	…	…	Downloaded logger at 14:32, SC meter is dead
9/17/2024 12:35	eg	n/a	…	…	…	…	Bottom of well is wet, no reading on sounder. Downloaded logger at 12:35
Piezometer 19-1							
10/3/2023 17:01	em	n/a	…	…	…	…	dry
4/9/2024 14:14	eg	6.01	1383.78	…	…	…	Downloaded logger at 14:18, new LL5
9/17/2024 12:07	eg	9.95	…	21	329	358	Likely just moisture at bottom of stilling well. Downloaded logger at 12:12
Piezometer 16-5							
10/3/2023 15:02	em	n/a	…	…	…	…	dry
4/9/2024 11:36	eg	4.98	1383.84	…	…	…	Downloaded logger at 11:41, SC meter is dead
9/13/2024 11:27	eg	n/a	…	…	…	…	Small bit of water/moisture at bottom of piezometer, approx. 1 inch. Downloaded logger at 11:28.
Piezometer 16-3							
10/3/2023 12:19	eg	n/a	…	…	…	…	dry
4/9/2024 12:36	eg	2.01	1371.62	…	…	…	Water ponded around stickup, water was ponded throughout microtopography in the wetland; downloaded at 12:38
9/13/2024 13:36	eg	9.97	…	…	…	…	Likely just moisture at bottom of stilling well. Downloaded logger at 13:42

Notes:

1. Observer Key: eg = Emma Goodwin, em = Ella Myr

2. Depth to Water: Depth to surface of water level from reference point of piezometer, measured with a well sounder

3. Water surface elevation based on auto level survey to site benchmarks

8. Specific conductance: Measured in micromhos/cm in field; then adjusted to 25°C by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

APPENDIX F

Adaptive Management 2024 As-built Memo

MEMO

To: Nathan Hale, Santa Clara Valley Habitat Agency

From: Emma Goodwin, Eric Donaldson

Date: November 18, 2024

Subject: San Felipe Creek Restoration Project 2024 adaptive management as-built summary

This memo presents the as-built condition following adaptive management at two location at the San Felipe Restoration Project site during 2024. The first location is on Boyds Creek and is highlighted in **Sheet 1**, an annotated version of design specifications for the project. The second location is the Incised Eastern Tributary (ID02), which can be seen in the annotated version of **Sheet 2**. More detailed text related to each design can be seen in **Attachment 1**, the design basis memorandum for the adaptive management actions.

Construction began on September 5, 2024, and was carried out by Helix Environmental Construction Group (Helix) and was completed by October 17, 2024. Balance was on-site for construction observation on September 5, 13, 17, 18, 20, 23, and October 4, 8, 14, and 17, 2024.

*1. Boyds Creek Debris Jams (**Sheet 1**)*

Helix installed eleven debris jams, as recommended, through the reach. Design specifications as detailed in **Sheet 1** were followed closely. Some minor changes were made to the specifications based on field conditions and field-fit decisions either made by Balance or Helix. Photos of the completed structures can be seen in **Figure 1** and **Figure 2**. The changes to the design specs were as follows:

a) Based on availability and supply of wooden posts, Helix sourced 3-inch round fir fence posts for construction of the Type 1 debris jams.

b) Due to varying lengths of collected channel-spanning wood, structures have different sizes of logs, and many are not channel-spanning. When logs were not long enough to span the channel, the log was keyed into one bank by burying 1-2 feet of the log into the bank and compacting the surrounding soil, and the other end was secured with bracing posts, fit into already installed posts, or secure with twine.

c) For structures 1.04, 1.05, and 1.06, the channel was shallow, so post elevations were cut to equal the top of bank (TOB) elevation (of the lower bank), rather than follow the 0.2-foot below bank specifications.

d) For structure 1.08, post elevations were cut to TOB elevation of the lower bank, and later, distributary grading was matched to the elevation of these cut posts.

e) Structure 1.11 was built upstream of the existing log, rather than having posts on either side of the channel-spanning log. This change was made due to limited access for equipment around the existing log. Due to equipment failure, soil could not be jetted or compacted at this location.

*2. Boyds Creek Distributary Channel Grading (**Sheet 1**)*

Helix graded three distributary channel inlets (BCA2-BCA4) and a larger swale area for distributary channel 1 (BCA1). Design specifications as detailed in **Sheet 1** were followed closely. Some minor changes were made to the specifications based on field. Photos of the completed work can be seen in **Figure 3**. Deviations to the design specifications were as follows:

a) In distributary channels BCA2 and BCA4, Helix was able to find the channel spanning buried logs that were installed in the original project construction in 2019. The construction team graded these two distributary channels slightly more than described in the specifications (6-8" rather than 4"); but the channel spanning logs are still in place to control the grade.

b) In distributary channel BCA3, Helix was not able to find the channel spanning buried log, which led to over-excavation in this distributary channel. The channel was then backfilled and compacted to be approximately the same height as the adjacent mid-channel posts in debris jam structure 1.08. The construction team re-graded the channel to be slightly lower than the posts (by approximately 0.10'), so a layer of slash was added to the first 30 feet of the channel. The slash will likely help to slow water down and help the channel naturally aggrade slightly.

c) In distributary channel BCA1 (Note 5, **Sheet 1**), Helix graded a larger swale area. As-built survey data collected by Balance show the slope was graded slightly steeper than specifications (1.6% rather than 1%).

*3. Incised Eastern Tributary Debris Jams (**Sheet 2**)*

Helix installed three Type 2 timber debris jams, three Type 1 staked debris jams, and added rock to the existing terminal jam, as recommended. Design specifications as detailed in **Sheet 2** were followed closely. Some minor changes were made to the specifications based on field conditions. Photos of the completed work can be found in **Figure 4** and **Figure 5**. Deviations to the design specifications were as follows:

a) No large channel-spanning logs were used in structures 1.12, 1.13, or 1.14.

b) For Jam 1.12, only one course of stakes was installed.

c) For Jam 1.13, only one course of stakes was installed, in order to avoid negatively affecting the roots of the large oak tree on the left bank.

d) On the middle Type 2 debris jam, a rough sawn redwood 2x6 support was split during construction. Another board was installed on the downstream side of the structure for extra support.

e) Extra rock was placed upstream and downstream of structure 1.14 and downstream of structure 1.13.

f) The soil that was added to structures 1.12, 1.13, and 1.14 was not jet or compacted with water due to equipment failure.

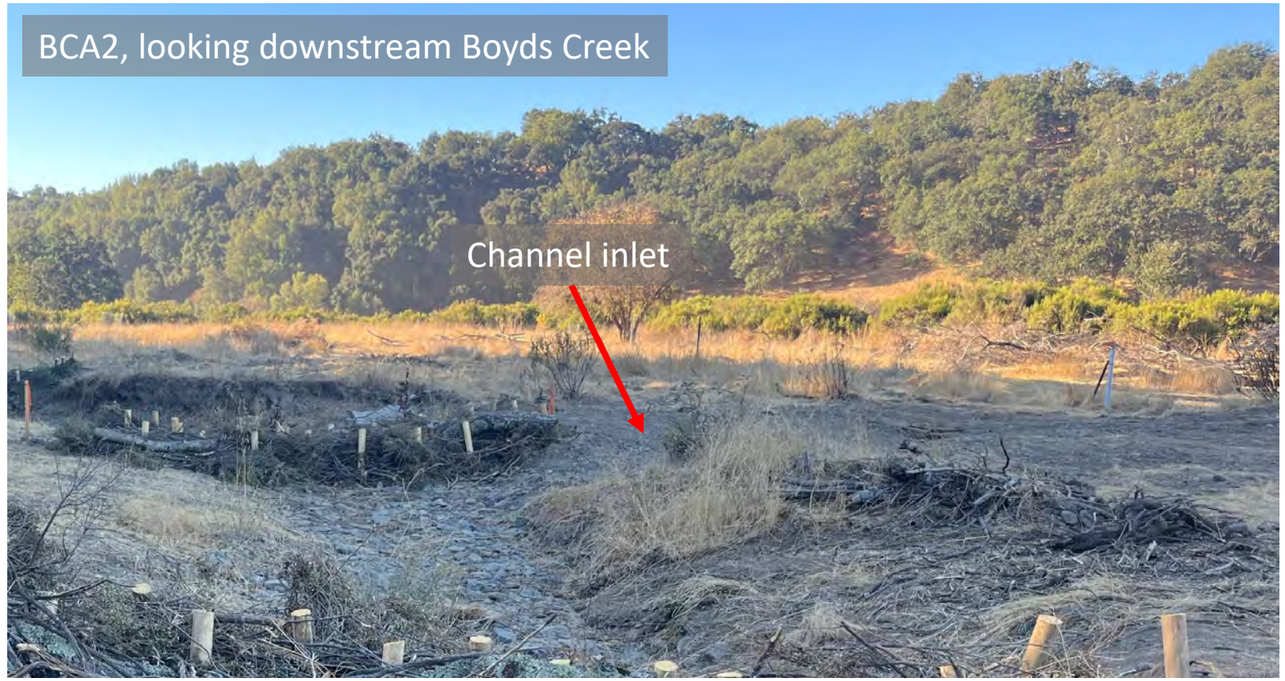
Enclosures: **Figures 1-5**. Photo figures of as-built conditions
Sheet 1 with as-built locations
Sheet 2 with as-built locations
Attachment 1. Design Basis Memo: San Felipe Restoration Project Adaptive Management 2024: Boyds Creek and Incised Eastern Tributary work

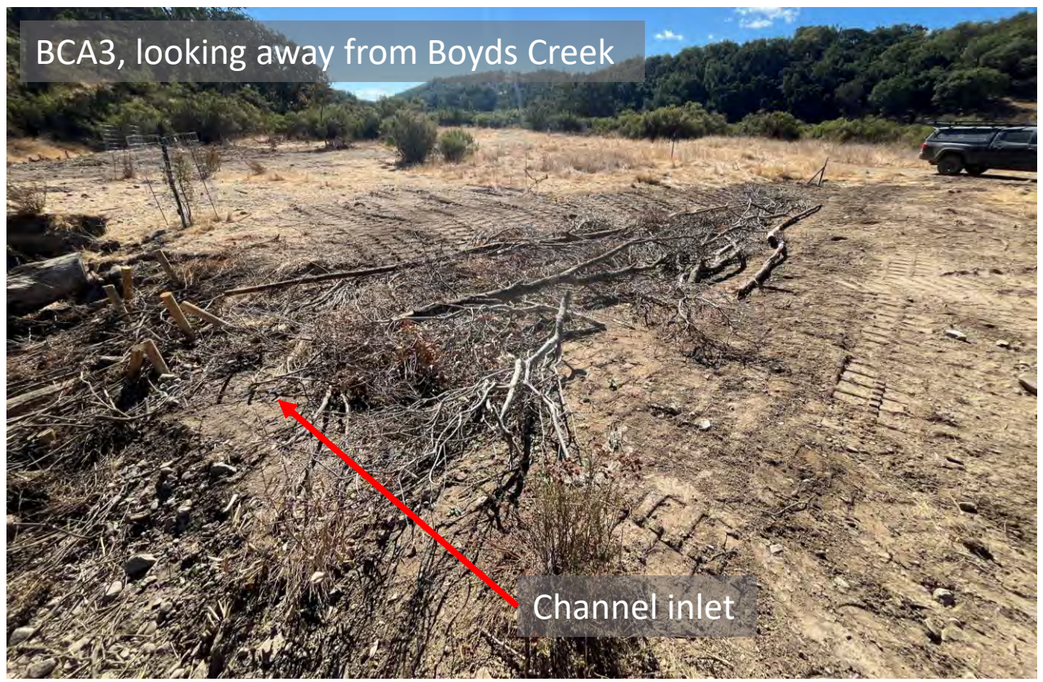
Balance Hydrologics

Figure 1. Boyds Creek Type 1 Debris Jams 1.01-1.06, As-built photos, October 2024, San Felipe Restoration Project 2024 Adaptive Management, Santa Clara County, California.

Balance Hydrologics

Figure 2. Boyds Creek Type 1 Debris Jams 1.07-1.11, As-built photos, October 2024, San Felipe Restoration Project 2024 Adaptive Management, Santa Clara County, California.





Balance Hydrologics

Figure 3. Boyds Creek Distributary Channel Grading, As-built photos, October 2024, San Felipe Restoration Project 2024 Adaptive Management, Santa Clara County, California.

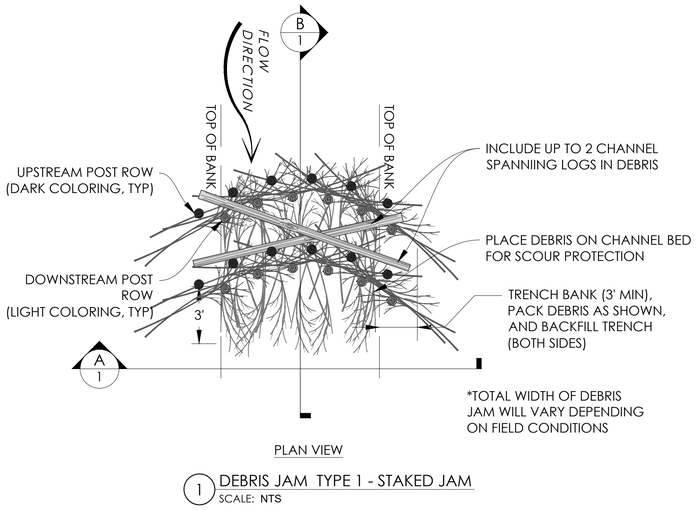
Balance Hydrologics

Figure 4. Incised Eastern Tributary Type 1 Debris Jams, As-built photos, October 2024, San Felipe Restoration Project 2024 Adaptive Management, Santa Clara County, California.

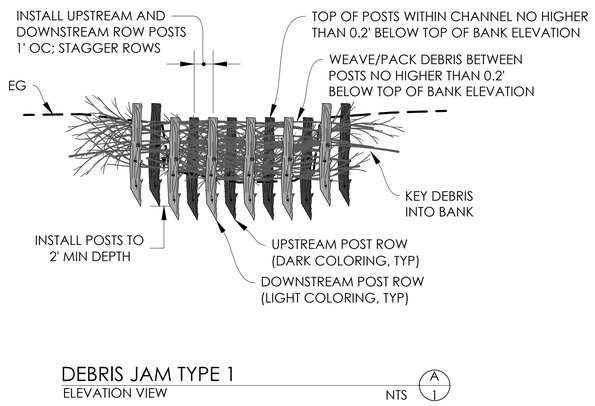
Balance Hydrologics

Figure 5. **Incised Eastern Tributary Type 2 Debris Jams, As-built photos, October 2024,** San Felipe Restoration Project 2024 Adaptive Management, Santa Clara County, California.

BOYDS CREEK



1 DEBRIS JAM TYPE 1 - STAKED JAM
SCALE: NTS



DEBRIS JAM TYPE 1
ELEVATION VIEW
NTS A 1

NOTES:

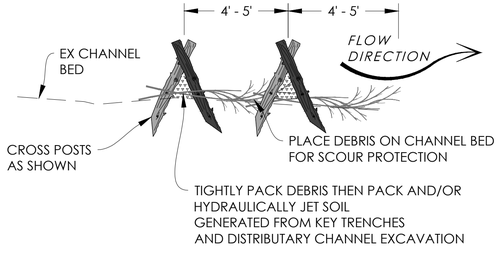
(1.xx) CONSTRUCT DEBRIS JAM TYPE 1 NO. xx

(3) EXPOSE 6' OF (EXISTING) BURIED LOG AT CENTER OF DISTRIBUTARY CHANNEL

(4) REMOVE SEDIMENT FROM DISTRIBUTARY CHANNELS THAT HAS DEPOSITED SINCE 2018 CONSTRUCTION APPROX QUANTITIES / DIMENSIONS FOR ALL THREE AREAS: 150 LF, 6' WIDE, 700 SQ FT, 4" DEEP, 4:1 SIDE SLOPES, 13 CY USE ALL EXCAVATED MATERIAL TO CONSTRUCT DEBRIS JAMS

(5) EXCAVATE DISTRIBUTARY SWALE. 110 LF, 6' BOTTOM WIDTH, 1% SLOPE, 10:1 SIDE SLOPES, AVERAGE DEPTH = 9" AT CENTERLINE, APPROX 60 CY

(6) PLACE AND COMPACT MATERIAL GENERATED FROM DISTRIBUTARY CHANNEL EXCAVATION. APPROX 20 CY. PLACE AND COMPACT REMAINING MATERIAL ON HILLSIDE NORTH EAST OF CORRAL OR AS PART OF DEBRIS DAMS, WITH APPROVAL OF ENGINEER'S REPRESENTATIVE. RESEED WITH MATERIALS AND METHODS APPROVED BY RESTORATION ECOLOGIST.



DEBRIS JAM TYPE 1
PROFILE VIEW
NTS B 1

(7) PRIOR TO GRADING ACTIVITIES, CONSTRUCT TEMPORARY TREE PROTECTION ZONE (TPZ) FENCING AT THE DRIPLINE OF TWO EXISTING NATIVE TREES IN IMMEDIATE VICINITY OF EXCAVATED DISTRIBUTARY SWALE, DEBRIS JAMS, AND SPOILS LOCATION. PROJECT RESTORATION ECOLOGIST OR QUALIFIED ARBORIST SHALL APPROVE TPZ FENCE ALIGNMENT PRIOR TO INSTALLATION. CONTACT THE PROJECT RESTORATION ECOLOGIST OR ARBORIST IF ANY BRANCHES OR ROOTS THAT HAVE A DIAMETER 2" OR GREATER ARE DISTURBED DURING THE WORK SO THAT ANY NEEDED MONITORING OR ADJUSTMENTS TO METHODS CAN BE AGREED. ROOTS SHOULD BE RETAINED AND REDIRECTED IF FEASIBLE. ALL PRUNING SHALL BE DONE WITH A CLEAN, SHARP HAND SAW. WRAP EXPOSED OR CUT ROOTS GREATER THAN 2" IN DIAMETER WITH BURLAP OR SOIL AND IRRIGATE WITHIN 1 HOUR OF EXPOSURE.

JAM TYPE 1 QUANTITIES

JAM NO.	NUMBER OF POSTS	NOTES
1	28	
2	32	
3	34	
4	38	
5	26	
6	28	
7	26	
8	40	PARTIAL SPAN
9	36	
10	32	
11	26	INSTALL THE TWO COURSES OF POSTS ON THE UPSTREAM AND DOWNSTREAM SIDES OF EXISTING FALLEN LOG
12	20	
13	10	
14	24	
TOTAL	400	

CONCEPTUAL DESIGN - NOT FOR CONSTRUCTION

SANTA CLARA COUNTY PARKS
SANTA CLARA VALLEY HABITAT AGENCY

Balance Hydrologics
800 Bancroft Way • Suite 101 • Berkeley, CA 94710
(510) 704-1000 • (510) 704-1001
www.BalanceHydro.com

SUBMITALS / REVISIONS	DATE	BY
ISSUED FOR REVIEW	04-19-24	EG

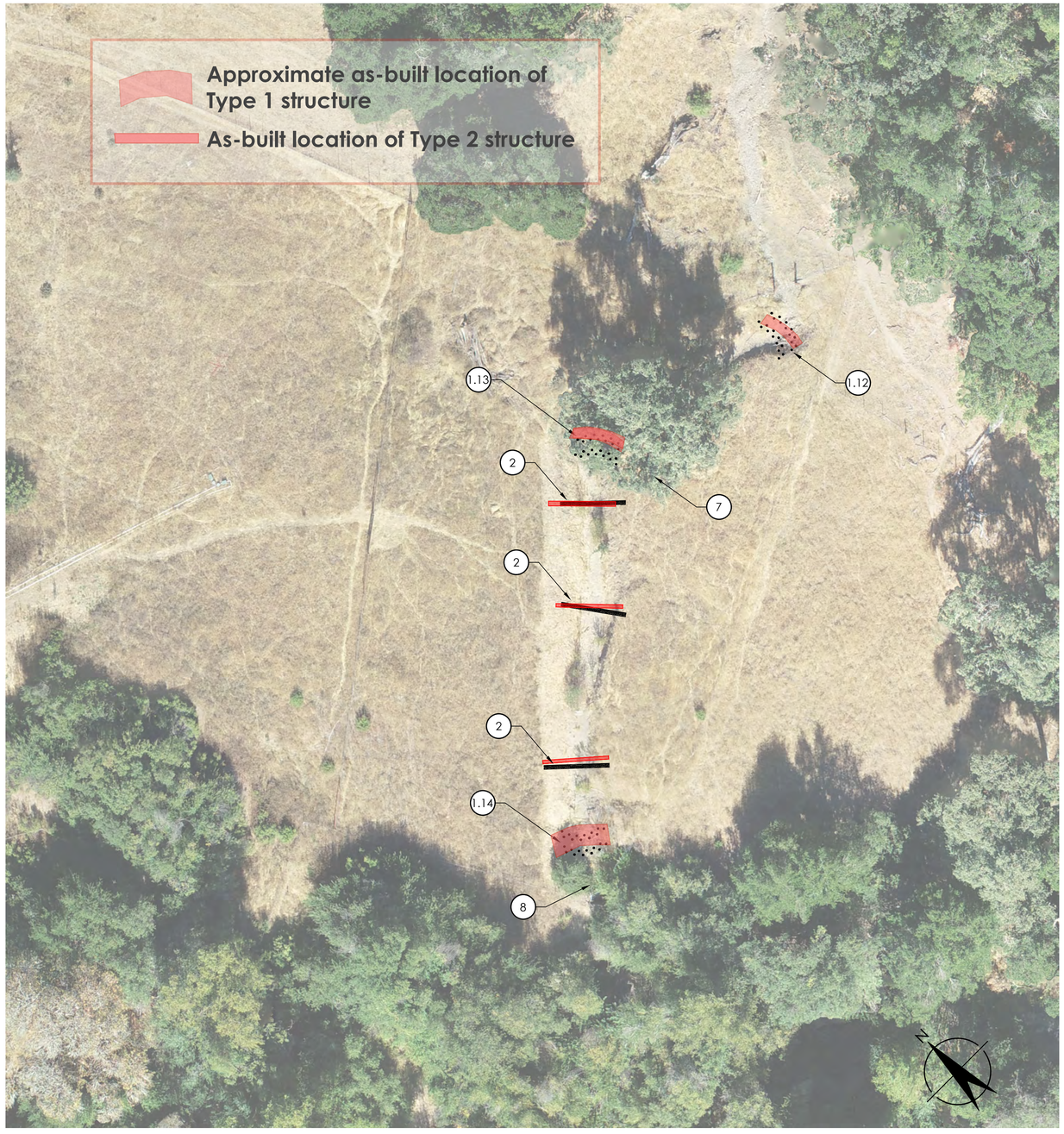
DESIGNED BY	DRAWN BY	CHECKED BY	IN CHARGE	DATE
ED, EG	DJ	DS	DS	04-19-2024

BOYDS CREEK

SAN FELIPE CREEK RESTORATION ADAPTIVE MANAGEMENT 2024

SANTA CLARA COUNTY, CALIFORNIA
SANTA CLARA COUNTY VALLEY HABITAT AGENCY

PROJECT NUMBER 222108
SCALE (AT 22" X 34") AS NOTED
SHEET 1
AS-BUILT LOCATIONS



PLAN

0' 10' 20' 40'
SCALE: 1" = 20'

JAM TYPE 1 HEIGHT	
JAM NO.	HEIGHT ABOVE EXISTING INVERT
12	1.0'
13	2.5'
14	2.5'

NOTES:

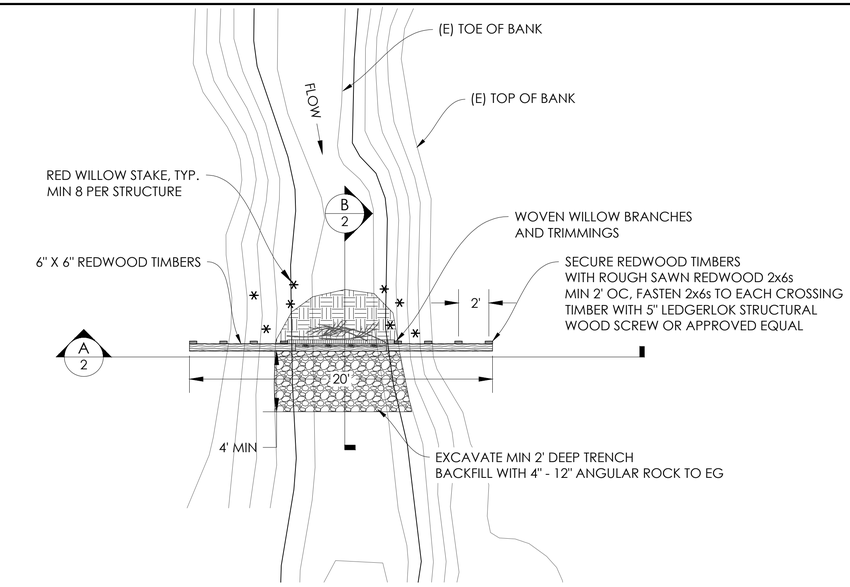
(1.xx) CONSTRUCT DEBRIS JAM TYPE 1 NO. xx (SEE DETAIL, SHEET 1 AND TABLE THIS SHEET)

(2) CONSTRUCT DEBRIS JAM TYPE 2 (SEE DETAIL, THIS SHEET)

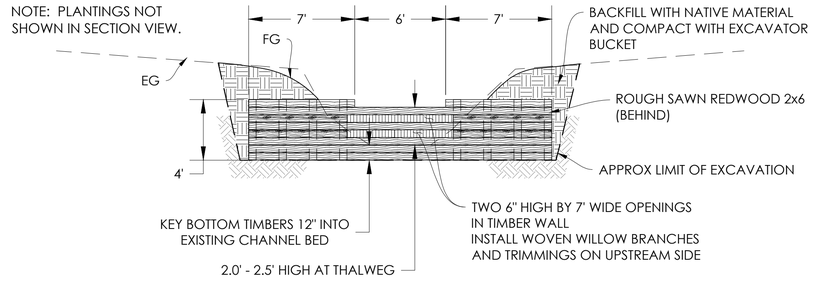
(7) SEE NOTE 7 ON SHEET 1

(8) HAND WORK AT MINOR EROSION AROUND (EXISTING) TERMINAL JAM PLACE SLASH DEBRIS ALONG BANKS. PLACE ADDITIONAL ROCK IMMEDIATELY DOWNSTREAM AND ADJACENT TO TERMINAL STRUCTURE, PER DIRECTION OF ENGINEER'S REPRESENTATIVE. ESTIMATED QUANTITY: 4 TONS OF CLASS II ROCK.

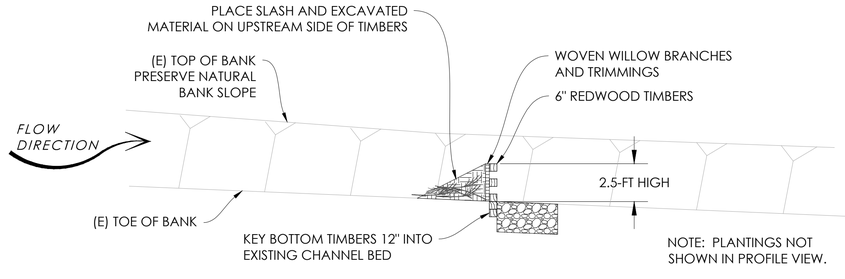
CONCEPTUAL DESIGN - NOT FOR CONSTRUCTION



(2) DEBRIS JAM TYPE 2 - REDWOOD TIMBERS
SCALE: 1" = 5'



DEBRIS JAM TYPE 2
ELEVATION VIEW
1" = 5'
A 2



DEBRIS JAM TYPE 2
PROFILE VIEW
1" = 5'
B 2

SANTA CLARA COUNTY PARKS
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(510) 704-1000 • (510) 704-1001
www.BalanceHydro.com

SUBMITTALS / REVISIONS	DATE	BY
ISSUED FOR REVIEW	04-19-24	EG

DESIGNED BY	DRAWN BY	CHECKED BY	IN CHARGE	DATE
ED, EG	DJ	DS	DS	04-19-2024

INCISED EASTERN TRIBUTARY (ID02-01)

SAN FELIPE CREEK RESTORATION ADAPTIVE MANAGEMENT 2024

SANTA CLARA COUNTY, CALIFORNIA
SANTA CLARA COUNTY VALLEY HABITAT AGENCY

PROJECT NUMBER 222108

SCALE (AT 22" X 34") AS NOTED

SHEET 2

AS-BUILT LOCATIONS

ATTACHMENT 1.

San Felipe Restoration Project Adaptive Management 2024: Boyds Creek and Incised Eastern Tributary work

Design Basis Memo

MEMO

To: Nathan Hale

From: Emma Goodwin, Eric Donaldson, David Shaw

Date: April 26, 2024

Subject: San Felipe Restoration Project Adaptive Management 2024: Boyds Creek and Incised Eastern Tributary work

This memo describes proposed adaptive management actions for 2024 in the Boyds Creek area, and along the Incised Eastern Tributary (ID02-01, See Attachment A for feature locations and labels).

1. Boyds Creek

Along Boyds Creek, we recommend installing 11 debris jams (Type 1, see Sheet 1, attached) to encourage channel aggradation and more frequent inundation of the 4 previously constructed distributary channels. Additionally, we recommend excavating the northern most distributary channel to a lower elevation, to allow more frequent inundation. The San Felipe Restoration Project includes a success criterion for inundation of the four distributary channels, which has been reliably met every year of monitoring; nevertheless, as more deposition occurs in these distributary channels, and the bed elevation of Boyds Creek varies, we anticipate they could become less connected to the Boyds Creek main channel.

1.1. Boyds Creek Debris Jams

The proposed Type 1 debris jams will be constructed with wood and brush material of differing sizes held together with wooden posts driven into the substrate to mimic natural wood accumulations. The intent of installing additional debris jams is a) to encourage continued development of complex channel morphology (e.g. longitudinal changes in channel width and depth by encouraging additional natural wood recruitment and dynamic channel evolution (Shahverdian et. al., 2019), and b) encourage flow into distributary channels to increase recharge of the alluvial aquifer. We expect the installed debris jams to trap additional debris that is transported down Boyds Creek, and to evolve as the channel evolves.

Eight of the eleven debris jams are strategically located near the existing distributary channel junctions with Boyds Creek, and three additional debris jams are located throughout the reach for redundancy and to encourage potential additional break-out points where the floodplain could be activated. Most of these structures would be channel-spanning, except for structure 1.08, which is located at an existing large wide reach with an existing floodplain. One proposed structure (1.11) would enhance an existing channel-spanning log by installing posts and debris under and around the existing log.

Posts for the construction of the staked debris jams should be split rail fence posts with a diameter of 3 to 4 inches, and length of 8-10 feet. One end of each post should be sharpened to a point to be driven into the substrate. Pre-fabricated posts are preferred, as they will be straight and therefore easier to drive. Pre-fabricated posts should be untreated pine, fir, redwood, or cedar, unless otherwise approved by the field representative. Posts should not have weaknesses such as cracks and splits through more than 25 percent of the post diameter and should be installed a minimum of 2 feet into the channel bed or bank. Packed debris should be no higher than either adjacent bank.

Prior to installation, the engineer's representative will stake the endpoints of each proposed structure. Larger material, such as the channel spanning logs (ideally, minimum 6-inch diameter) may need to be sourced from off-site. We assume that smaller woody debris will be sourced on-site and will mainly consist of Coyote brush, which is abundant on-site, along with limited live willow stakes, as available.

1.2. Boyds Creek Distributary Channel Grading

Minor grading in the first 50 feet of distributary channels 2, 3, and 4 should take place to remove the sediment that has been deposited in these channels since construction in 2018 (Sheet 1, Note 4). There are buried logs located across these three distributary channels, which should be exposed by no more than 1 inch (vertically) when these areas are graded. Approximately 13 cubic yards of material would be produced from this grading and should be used in the construction of the Type 1 debris jams installed throughout the reach or placed and compacted on the hillside near the circle corral, as directed by the Engineer's Representative, Habitat Agency, or Santa Clara County Parks.

In addition to the minor grading at Distributary Channels 2, 3 and 4, we recommend additional grading at the northern-most distributary channel (Distributary Channel 1). This channel should be excavated as shown in the attached Sheet 1, lowering the channel bed by approximately 1 foot at the inlet with an approximately 1 percent slope. This proposed grading will result in around 60 cubic yards of excavated material, which can be spread and compacted where shown in Sheet 1 (see also Note 6), used in the construction of the staked debris jams, deposited on-site north of the circle corral where spoils were previously deposited during project construction in 2018, or as directed by the Engineer's Representative, Habitat Agency, or Santa Clara County Parks.

2. Incised Eastern Tributary

As part of the original project construction in 2018, four timber-constructed debris jams were installed, as well as two additional hand-constructed debris jams further upstream. Since installation, the channel has successfully aggraded behind the debris jams in the channel reach, achieving near-full burial of the four timber jams. The downstream-most debris jam (Jam 1) was modified in November 2023 with a combination of rock, dirt, and wood debris to fill and reinforce eroded areas. In accordance with the phased approach for aggradation of the incised eastern tributary channel, we recommend moving forward with the planned second round of debris jams. Specifically, we recommend adding three more Type 2 channel-spanning timber-

constructed debris jams, three Type 1 debris jams, and additional modification to Jam 1 (See Sheet 2, attached).

2.1. Incised Eastern Tributary Debris Jams

Each debris jam should be constructed with 20 foot long 6 by 6-inch redwood timbers. Each timber-constructed debris jam will consist of five 20-foot, two 7-foot, and four 6.5-foot 6 by 6-inch redwood timbers, that will be secured to each other with 2 by 6-inch rough sawn redwood pieces. The bottom timbers should be embedded at least 12 inches into the existing channel bed, resulting in each structure being a maximum of 2.5 feet above the thalweg of the channel.

On the upstream edge of the timber structure, willow branches and trimmings should be woven through the structure resulting in two 6-inch by 7-foot wide openings in the structure with woven willow branches acting to slow water down and encourage sediment deposition. The upstream end of the structure should be backfilled with slash and excavated material, and the downstream edge of the timber structure should have a trench excavated at least 2 feet deep backfilled with 4-inch to 12-inch angular rock (see Sheet 2). We estimate 10 cubic yards of angular rock will be required. On each bank, the excavated area will be backfilled and compacted with native material. Each timber-constructed debris jam will have a minimum of 8 willow stakes planted upstream of the structure on the toe of the banks, with watering and irrigation as needed to maintain survival.

We recommend installing three Type 1 debris jams within the Incised Eastern Tributary. The Type 1 debris jams will be constructed the same as they will be in Boyds creek (see above Section 1.2 for specifications and materials); however, the structures in the Incised Eastern Tributary should be built to be approximately 2.0 to 2.5 feet above the channel bed (rather than relative to the adjacent bank), and structure 1.12 should be built approximately 1 foot above the channel bed. Logs may need to be sourced from off-site. We assume that smaller woody debris will be sourced on-site and will mainly consist of Coyote Brush and other abundant vegetation. Each Type 1 debris jam will have 8 or more willow stakes planted upstream of the structure on the toe of the banks, with watering and irrigation as needed to maintain survival.

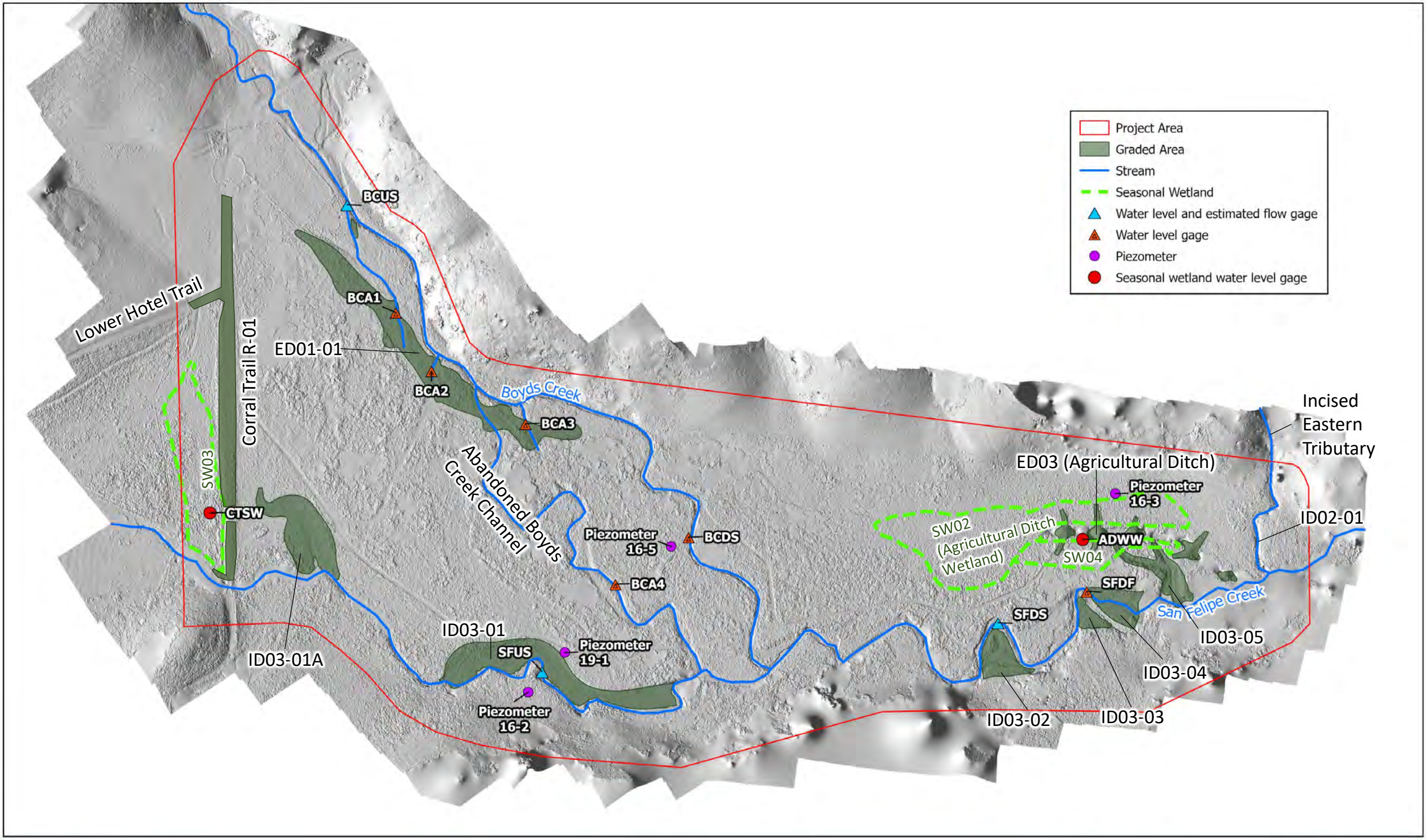
Finally, we recommend additional hand work at minor erosion that has occurred at Jam 1 (Sheet 2, Note 7). This proposed work consists of placing slash along the banks and placing additional rock (approximately 4 tons of class II rock) immediately downstream and adjacent to the terminal structure.

Enclosures: Attachment A: Figure 2 from the WY2023 monitoring report: Monitoring station locations, showing the features and labels used for the project.
Sheet 1. Boyds Creek
Sheet 2. Incised Eastern Tributary

References

Shahverdian, S.M., Wheaton, J.M., Bennett, S.N., Bouwes, N., Camp, R., Jordan, C.E., Portugal, E. and Weber, N., 2019. Chapter 4 – Mimicking and Promoting Wood Accumulation and Beaver Dam Activity with Post-Assisted Log Structures and Beaver Dam Analogues. In: J.M. Wheaton, S.N. Bennett, N. Bouwes, J.D. Maestas and S.M. Shahverdian (Editors), Low-Tech Process-Based Restoration of Riverscapes: Design Manual. Utah State University Wheaton Restoration Consortium, Logan, Utah. 66 pp. DOI 10.13140/RG.2.2.22526.64324

Attachment A.



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W:\Projects\215108 San Felipe Creek\monitoring locations.aprx

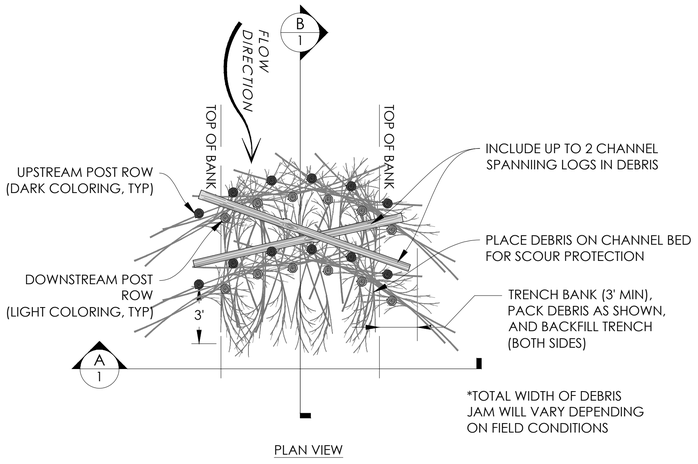
Attachment A, Figure 2. Monitoring station locations, San Felipe Creek Restoration Project, Joseph D. Grant Park, Santa Clara County, California

0 200 400 800 Feet

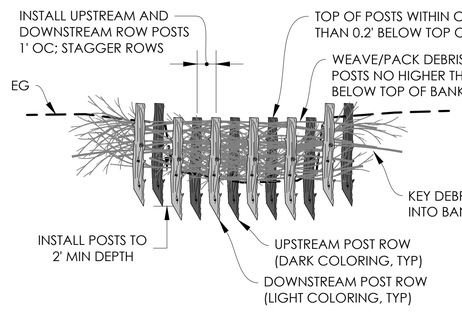
SCALE: 1:3,000

N

BOYDS CREEK



1 DEBRIS JAM TYPE 1 - STAKED JAM
SCALE: NTS



DEBRIS JAM TYPE 1
ELEVATION VIEW
NTS A 1

NOTES:

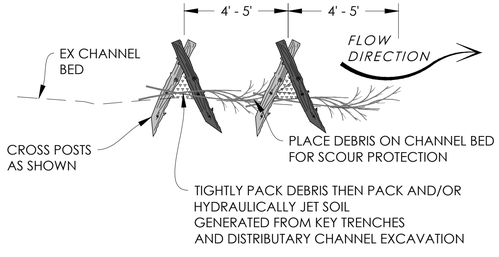
(1.xx) CONSTRUCT DEBRIS JAM TYPE 1 NO. xx

(3) EXPOSE 6' OF (EXISTING) BURIED LOG AT CENTER OF DISTRIBUTARY CHANNEL

(4) REMOVE SEDIMENT FROM DISTRIBUTARY CHANNELS THAT HAS DEPOSITED SINCE 2018 CONSTRUCTION APPROX QUANTITIES / DIMENSIONS FOR ALL THREE AREAS: 150 LF, 6' WIDE, 700 SQ FT, 4" DEEP, 4:1 SIDE SLOPES, 13 CY USE ALL EXCAVATED MATERIAL TO CONSTRUCT DEBRIS JAMS

(5) EXCAVATE DISTRIBUTARY SWALE. 110 LF, 6' BOTTOM WIDTH, 1% SLOPE, 10:1 SIDE SLOPES, AVERAGE DEPTH = 9" AT CENTERLINE, APPROX 60 CY

(6) PLACE AND COMPACT MATERIAL GENERATED FROM DISTRIBUTARY CHANNEL EXCAVATION. APPROX 20 CY. PLACE AND COMPACT REMAINING MATERIAL ON HILLSIDE NORTH EAST OF CORRAL OR AS PART OF DEBRIS DAMS, WITH APPROVAL OF ENGINEER'S REPRESENTATIVE. RESEED WITH MATERIALS AND METHODS APPROVED BY RESTORATION ECOLOGIST.



DEBRIS JAM TYPE 1
PROFILE VIEW
NTS B 1

(7) PRIOR TO GRADING ACTIVITIES, CONSTRUCT TEMPORARY TREE PROTECTION ZONE (TPZ) FENCING AT THE DRIPLINE OF TWO EXISTING NATIVE TREES IN IMMEDIATE VICINITY OF EXCAVATED DISTRIBUTARY SWALE, DEBRIS JAMS, AND SPOILS LOCATION. PROJECT RESTORATION ECOLOGIST OR QUALIFIED ARBORIST SHALL APPROVE TPZ FENCE ALIGNMENT PRIOR TO INSTALLATION. CONTACT THE PROJECT RESTORATION ECOLOGIST OR ARBORIST IF ANY BRANCHES OR ROOTS THAT HAVE A DIAMETER 2" OR GREATER ARE DISTURBED DURING THE WORK SO THAT ANY NEEDED MONITORING OR ADJUSTMENTS TO METHODS CAN BE AGREED. ROOTS SHOULD BE RETAINED AND REDIRECTED IF FEASIBLE. ALL PRUNING SHALL BE DONE WITH A CLEAN, SHARP HAND SAW. WRAP EXPOSED OR CUT ROOTS GREATER THAN 2" IN DIAMETER WITH BURLAP OR SOIL AND IRRIGATE WITHIN 1 HOUR OF EXPOSURE.

JAM TYPE 1 QUANTITIES

JAM NO.	NUMBER OF POSTS	NOTES
1	28	
2	32	
3	34	
4	38	
5	26	
6	28	
7	26	
8	40	PARTIAL SPAN
9	36	
10	32	
11	26	INSTALL THE TWO COURSES OF POSTS ON THE UPSTREAM AND DOWNSTREAM SIDES OF EXISTING FALLEN LOG
12	20	
13	10	
14	24	
TOTAL	400	

CONCEPTUAL DESIGN - NOT FOR CONSTRUCTION

SANTA CLARA COUNTY PARKS
SANTA CLARA VALLEY HABITAT AGENCY

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(510) 704-1000 • (510) 704-1001
www.BalanceHydro.com

SUBMITALS / REVISIONS	DATE	BY
ISSUED FOR REVIEW	04-19-24	EG

DESIGNED BY	DRAWN BY	CHECKED BY	IN CHARGE	DATE
ED, EG	DJ	DS	DS	04-19-2024

BOYDS CREEK

SAN FELIPE CREEK RESTORATION ADAPTIVE MANAGEMENT 2024

SANTA CLARA COUNTY, CALIFORNIA
SANTA CLARA COUNTY VALLEY HABITAT AGENCY

PROJECT NUMBER
222108

SCALE (AT 22" X 34")
AS NOTED

SHEET
1

PLAN

0' 10' 20' 40'
SCALE: 1" = 20'

JAM TYPE 1 HEIGHT	
JAM NO.	HEIGHT ABOVE EXISTING INVERT
12	1.0'
13	2.5'
14	2.5'

NOTES:

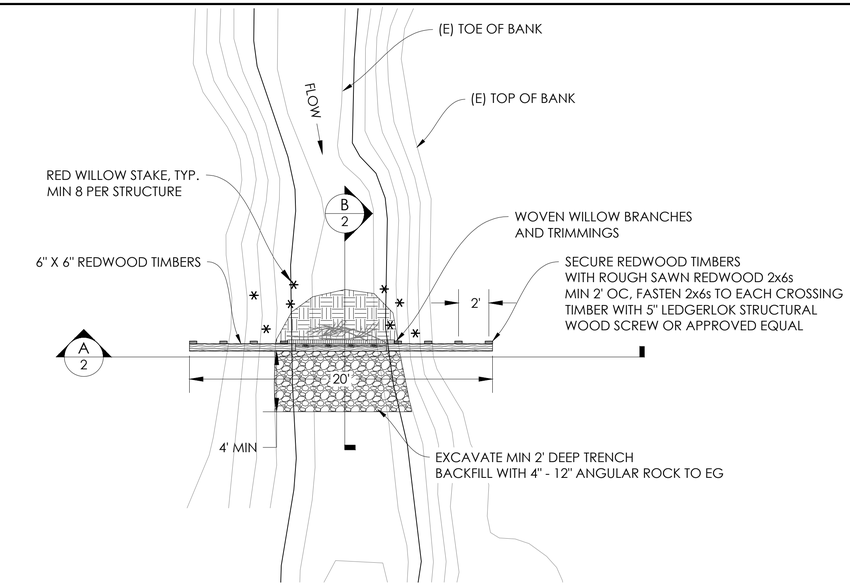
(1.xx) CONSTRUCT DEBRIS JAM TYPE 1 NO. xx (SEE DETAIL, SHEET 1 AND TABLE THIS SHEET)

(2) CONSTRUCT DEBRIS JAM TYPE 2 (SEE DETAIL, THIS SHEET)

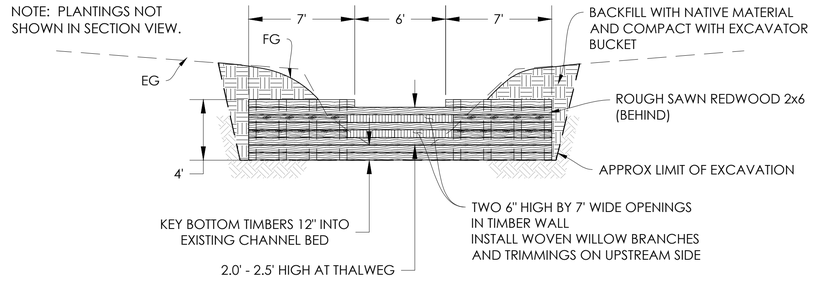
(7) SEE NOTE 7 ON SHEET 1

(8) HAND WORK AT MINOR EROSION AROUND (EXISTING) TERMINAL JAM PLACE SLASH DEBRIS ALONG BANKS. PLACE ADDITIONAL ROCK IMMEDIATELY DOWNSTREAM AND ADJACENT TO TERMINAL STRUCTURE, PER DIRECTION OF ENGINEER'S REPRESENTATIVE. ESTIMATED QUANTITY: 4 TONS OF CLASS II ROCK.

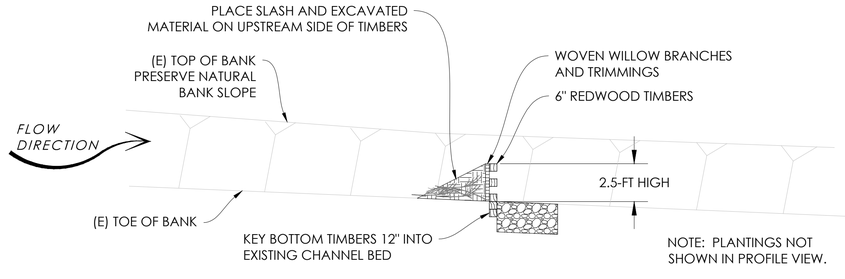
CONCEPTUAL DESIGN - NOT FOR CONSTRUCTION



(2) DEBRIS JAM TYPE 2 - REDWOOD TIMBERS
SCALE: 1" = 5'



DEBRIS JAM TYPE 2
ELEVATION VIEW
1" = 5'
A
2



DEBRIS JAM TYPE 2
PROFILE VIEW
1" = 5'
B
2

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SUBMITTALS / REVISIONS	BY	DATE
ISSUED FOR REVIEW	EG	04-19-24

DESIGNED BY	DRAWN BY	CHECKED BY	IN CHARGE	DATE
ED, EG	DJ	DS	DS	04-19-2024

INCISED EASTERN TRIBUTARY (ID02-01)

SAN FELIPE CREEK RESTORATION ADAPTIVE MANAGEMENT 2024

SANTA CLARA COUNTY, CALIFORNIA
SANTA CLARA COUNTY VALLEY HABITAT AGENCY

PROJECT NUMBER
222108

SCALE (AT 22" X 34")
AS NOTED

SHEET
2

APPENDIX D PHOTO POINT MONITORING PHOTOS

Photos were taken at each of the 48 permanent photo point locations on May 8, 2024. An informative subset from the photo-documentation views is presented. For this subset of photos, Year 1 and current year (Year 6) photos are shown for contrast. Intervening years' photos and photo points 1, 7, 11, 13, 19, 22*, 23, 28, 33, 35, 35*, 37, 39, and 40 can be furnished upon request. These photo points were removed for file size reduction and due to the limited information and/or redundant nature of the photos.

Additional photos of planting areas are included at the end of this appendix, since the photo monitoring photos do not capture these planting areas sufficiently.

Photo Point 2

Photo 2. Year 1 (2019), facing west toward SW03. Photo taken 9/30/2019

Photo 2. Year 6 (2024), facing west toward SW03. Photo taken 5/8/2024

Photo Point 3

Photo 3. Year 1 (2019), facing southwest toward ED03 and ID03-1A. Photo taken 6/19/2019

Photo 3. Year 6 (2024), facing southwest toward ED03 and ID03-1A. Photo taken 5/8/2024

Photo Point 4

Photo 4. Year 1 (2019), facing northeast toward SW03. Photo taken 6/18/2019

Photo 4. Year 6 (2024), facing northeast toward SW03. Photo taken 5/8/2024

Photo Point 5

Photo 5. Year 1 (2019), facing south toward ID03-1A. Photo taken 9/30/2019

Photo 5. Year 6 (2024), facing south toward ID03-1A. Photo taken 5/8/2024

Photo Point 6

Photo 6. Year 1 (2019), facing north toward ID03-1A. Photo taken 9/30/2019

Photo 6. Year 6 (2024), facing north toward ID03-1A. Photo taken 5/8/2024

Photo Point 8

Photo 8. Year 1 (2019), facing south toward ID03-1B. Photo taken 6/19/2019

Photo 8. Year 6 (2024), facing south toward ID03-1B. Photo taken 5/8/2024

Photo Point 9

Photo 9. Year 1 (2019), facing west toward ID03-1B. Photo taken 6/19/2019

Photo 9. Year 6 (2024), facing west toward ID03-1B. Photo taken 5/8/2024

Photo Point 10

Photo 10. Year 1 (2019), facing southwest toward ID03-1B. Photo taken 6/19/2019

Photo 10. Year 6 (2024), facing southwest toward ID03-1B. Photo taken 5/8/2024

Photo Point 12

Photo 12. Year 1 (2019), facing south toward ID03-03. Photo taken 9/30/2019

Photo 12. Year 6 (2024), facing south toward ID03-03. Photo taken 5/8/2024

Photo Point 14

Photo 14. Year 1 (2019), facing west toward ID03. Photo taken 6/19/019

Photo 14. Year 6 (2024), facing west toward ID03. Photo taken 5/8/2024

Photo Point 15

Photo 15. Year 1 (2019), facing west toward ID03. Photo taken 6/19/2019

Photo 15. Year 6 (2024), facing west toward ID03. Photo taken 5/8/2024

Photo Point 16

Photo 16. Year 1 (2019), facing east toward ED03-01 and SW04. Photo taken 6/19/2019

Photo 16. Year 6 (2024), facing east toward ED03-01 and SW04. Photo taken 5/8/2024

Photo Point 16*

Photo 16*. Year 3 (2021), facing northwest toward ED03-01. Photo taken 6/21/2021

Photo 16*. Year 6 (2024), facing northwest toward ED03-01. Photo taken 5/8/2024

Photo Point 17

Photo 17. Year 1 (2019), facing east toward ED03-01 and SW02. Photo taken 9/30/2019

Photo 17. Year 6 (2024), facing east toward ED03-01 and SW02. Photo taken 5/8/2024

Photo Point 17*

Photo 17*. Year 3 (2021), facing west toward ED03-02. Photo taken 6/21/2021

Photo 17*. Year 6 (2024), facing west toward ED03-02. Photo taken 5/8/2024

Photo Point 18

Photo 18. Year 1 (2019), facing east toward ED03-02 and SW02. Photo taken 9/30/2019

Photo 18. Year 6 (2024), facing east toward ED03-02 and SW02. Photo taken 5/8/2024

Photo Point 18*

Photo 18*. Year 3 (2021), facing southwest toward ED03-03. Photo taken 6/21/2021

Photo 18*. Year 6 (2024), facing southwest toward ED03-03. Photo taken 5/8/2024

Photo Point 19*

Photo 19*. Year 3 (2021), facing west toward ED03-02 and SW04. Photo taken 6/21/2021

Photo 19*. Year 6 (2024), facing west toward ED03-02 and SW04. Photo taken 5/8/2024

Photo Point 20

Photo 20. Year 1 (2019), facing northeast toward ED03-03 and SW04. Photo taken 6/19/2019

Photo 20. Year 6 (2024), facing northeast toward ED03-03 and SW04. Photo taken 5/8/2024

Photo Point 21

Photo 21. Year 1 (2019), facing east toward ED03-03 and AD01. Photo taken 9/30/2019

Photo 21. Year 6 (2024), facing east toward ED03-03 and AD01. Photo taken 5/8/2024

Photo Point 22

Photo 22. Year 1 (2019), facing north toward ED03-04 and AD01. Photo taken 6/19/2019

Photo 22. Year 6 (2024), facing north toward ED03-04 and AD01. Photo taken 5/8/2024

Photo Point 24

Photo 24. Year 1 (2019), facing north toward ED03-05 and AD01. Photo taken 9/30/2019

Photo 24. Year 6 (2024), facing north toward ED03-05 and AD01. Photo taken 5/8/2024

Photo Point 25

Photo 25. Year 1 (2019), facing south toward ID02. Photo taken 9/30/2019

Photo 25. Year 6 (2024), facing south toward ID02. Photo taken 5/8/2024

Photo Point 26

Photo 26. Year 1 (2019), facing west toward ID02. Photo taken 6/19/2019

Photo 26. Year 6 (2024), facing west toward ID02. Photo taken 5/8/2024

Photo Point 27

Photo 27. Year 1 (2019), facing east toward ED03-03 and SW02. Photo taken 9/30/2019

Photo 27. Year 6 (2024), facing east toward ED03-03 and SW02. Photo taken 5/8/2024

Photo Point 27*

Photo 27*. Year 1 (2019), facing west toward ED03-03. Photo taken 6/21/2021

Photo 27*. Year 6 (2024), facing west toward ED03-03. Photo taken 5/8/2024

Photo Point 29

Photo 29. Year 1 (2019), facing north toward ID01. Photo taken 9/30/2019

Photo 29. Year 6 (2024), facing north toward ID01. Photo taken 5/8/2024

Photo Point 29*

Photo 29*. Year 1 (2019), facing southwest toward ID01. Photo taken 9/30/2019

Photo 29*. Year 6 (2024), facing southwest toward ID01. Photo taken 5/8/2024

Photo Point 30

Photo 30. Year 1 (2019), facing south toward ID01. Photo taken 9/30/2019

Photo 30. Year 6 (2024), facing southeast toward ID01. Photo taken 5/8/2024

Photo Point 31

Photo 31. Year 1 (2019), facing east toward ID01. Photo taken 6/19/2019

Photo 31. Year 6 (2024), facing east toward ID01. Photo taken 5/8/2024

Photo Point 32

Photo 32. Year 1 (2019), facing southwest toward ID01. Photo taken 6/19/2019

Photo 32. Year 6 (2024), facing southwest toward ID01. Photo taken 5/8/2024

Photo Point 34

Photo 34. Year 3 (2021), facing east toward ID01. Photo taken 6/19/2021

Photo 34. Year 6 (2024), facing east toward ID01. Photo taken 5/8/2024

Photo Point 36

Photo 36. Year 1 (2019), facing west toward ID01. Photo taken 9/30/2019

Photo 36. Year 6 (2024), facing west toward ID01. Photo taken 5/8/2024

Photo Point 38

Photo 38. Year 1 (2019), facing north toward ED01. Photo taken 6/19/2019

Photo 38. Year 6 (2024), facing north toward ED01. Photo taken 5/8/2024

Additional Photos

Riparian buffer ID03-1A planted area, facing north. Photo taken 5/8/2024.

Riparian buffer ID03-1A planted area, facing west. Photo taken 5/8/2024.

Seasonal wetland rehabilitation and enhancement area (SW-03) planted area, facing west. Photo taken 5/8/2024.

Riparian buffer ID-03-02 planted area, facing west. Photo taken 5/8/2024.

Riparian buffer ID-03-03 planted area, facing east. Photo taken 5/8/2024.

Riparian buffer ID-03-04 planted area, facing southwest. Photo taken 5/8/2024.

Seasonal wetland rehabilitation and enhancement area (SW-02) planted area, facing northeast. Photo taken 5/8/2024.

Seasonal wetland re-establishement area (SW-04), facing south. Photo taken 5/8/2024.