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Pacheco Creek Restoration Project
Year 2 (2025) Annual Monitoring Report

Project No. 4291-04

Prepared for:

Santa Clara Valley Habitat Agency
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In Collaboration with
cbec ecoengineering, a Verdantas Company

December 10, 2025

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Section 1. Introduction

1.1 Project Overview

The Santa Clara Valley Habitat Agency (Habitat Agency) constructed the Pacheco Creek Restoration Project (project) in 2023 - 2024 as part of the implementation of the Conservation Strategy of the Santa Clara Valley Habitat Plan (Habitat Plan) (ICF International 2012). The project was designed to mitigate for unavoidable impacts to, and to conserve and protect, waters of the U.S. and habitat types within Pacheco Creek Reserve that are covered by the Habitat Plan (ICF International 2012). The project's Mitigation and Monitoring Plan (MMP) describes the specific habitat objectives and sets forth performance and final success criteria to evaluate the success of the project during a 10-year post-construction monitoring period (H. T. Harvey & Associates 2025a). Implementation of the MMP is required by the project's state and federal agency permits:

- U.S. Army Corps of Engineers (USACE) Section 404 Regional General Permit SPN-2012-00302S (File No. SPN-2020-00399)
- Central Coast Regional Water Quality Control Board (RWQCB) Section 401 Water Quality Certification No. 34322WQ06
- California Department of Fish and Wildlife (CDFW) Lake and Streambed Alteration Agreement (LSAA) No. EPIMS-SCL-35691-R3

The project is located east of State Route 152 (SR-152) in the Diablo Range in southeastern Santa Clara Valley (Figures 1 and 2). The total project area is 162.4 acres and includes Pacheco Creek Reserve (owned by the Habitat Agency), a trail easement held by County Parks, and a Bureau of Reclamation (BOR) easement containing the Pacheco Conduit. The Santa Clara Valley Water District (Valley Water) also issued a site access permit for project implementation (No. 23506). Pacheco Creek is an intermittent stream with a dynamic channel and floodplain that is primarily influenced by the upstream Pacheco Reservoir and its associated North Fork Dam.

1.1.1 Jurisdictional Habitat Enhancement, Restoration, and Creation

Construction was completed in spring 2024 by Triangle Land Restoration (Triangle); earthwork was completed by October 2023 and revegetation was completed by March 2024. A summary of enhanced, restored, and created habitats in the project area is presented in Table 1. Waters of the U.S. present within the project include wetlands and other waters (stream, pond, coastal and valley freshwater marsh [CVFM], and seasonal wetland) (Figure 2). Waters of the State present within the project include waters of the U.S. and riparian habitats within top of bank (willow riparian forest and scrub, mixed riparian forest and woodland, and central California sycamore alluvial woodland [SAW]). Habitats within CDFW jurisdiction include all waters of the State as well as all riparian habitats outside top of bank. Upland buffers include any habitats that are not aquatic, wetlands, or riparian (i.e., California annual grassland, oak woodland, and forest) and are therefore not considered jurisdictional by USACE, RWQCB, or CDFW.

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Figure 1. Vicinity Map
Pacheco Creek Restoration Project
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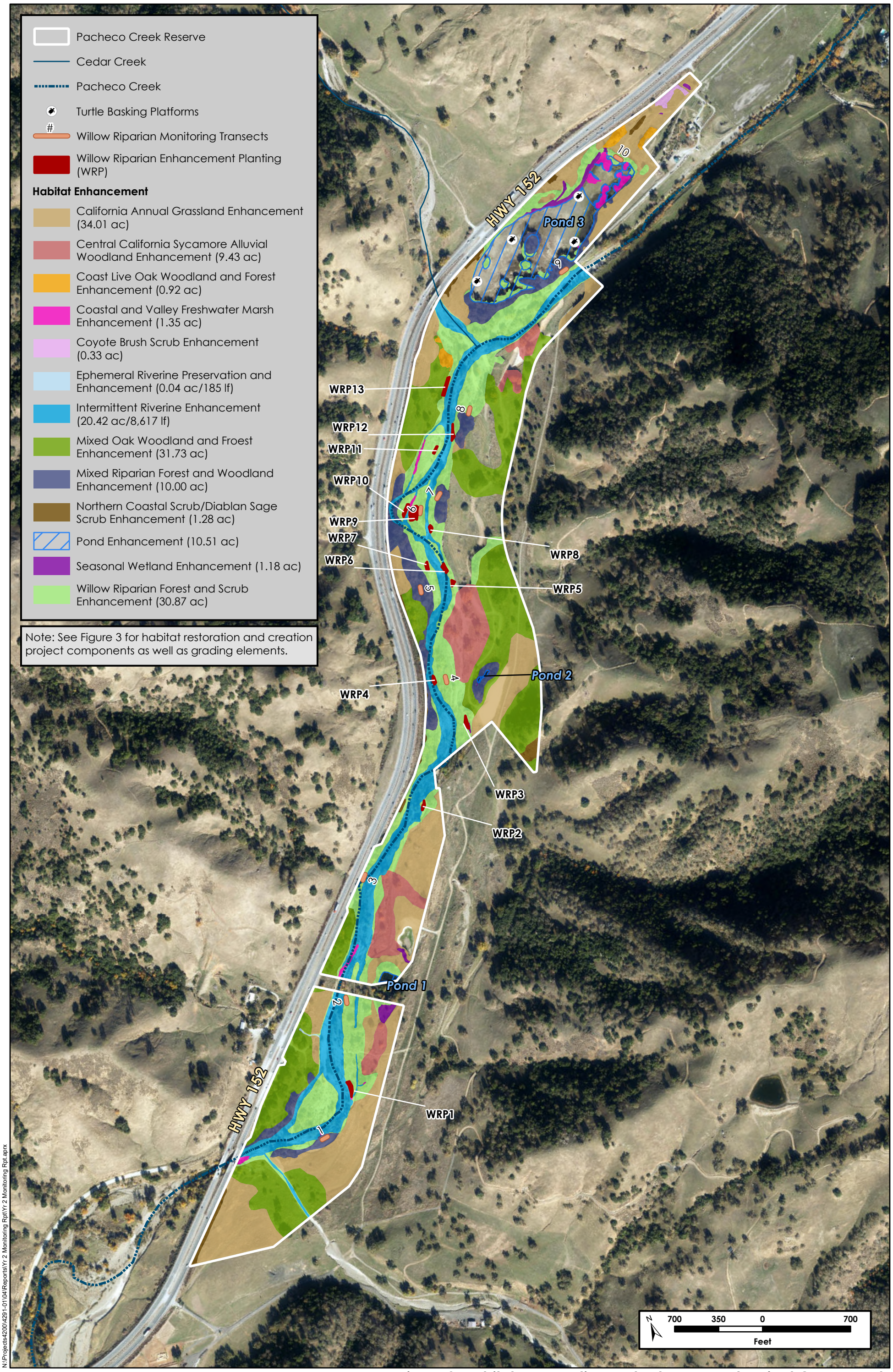

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Figure 2. Habitat Preservation and Enhancement Project Components
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Table 1. Jurisdictional Habitat Enhancement, Restoration, and Creation Summary

Land Cover Type	Preservation/ Enhancement	Restoration	Creation
Willow Riparian Forest and Scrub	30.87 acres		
Mixed Riparian Forest and Woodland	10.00 acres		
Central California Sycamore Alluvial Woodland	9.43 acres	9.62 acres	
Seasonal Wetland	1.18 acres		0.38 acre
Coastal and Valley Freshwater Marsh	1.35 acres	1.00 acre	
Pond (Open Water)	10.51 acre		
Riverine (Intermittent Stream)	20.42 acres/8,617 linear feet		
Riverine (Ephemeral Stream)	0.83 acre/2,405 linear feet	2.21 acres/6,386 linear feet	0.77 acre/ 2,223 linear feet

Preservation, enhancement, and restoration of these habitats was designed to improve and provide suitable habitat for specific special-status wildlife species, including the federally threatened and CDFW Species of Special Concern (SSC) California red-legged frog (*Rana draytonii*), CDFW SSC and federally proposed threatened northwestern pond turtle (*Actinemys marmorata*), the state threatened tricolored blackbird (*Agelaius tricolor*), and the state and federally endangered least Bell's vireo (*Vireo bellii pusillus*). The project also aims to provide and improve in-stream aquatic habitat and floodplain habitat for the federally threatened South Central California Coast (SCCC) steelhead (*Oncorhynchus mykiss*) Distinct Population Segment (DPS). Further detail on the as-built habitats and impacts at the site are documented in the project's Biological As-built Report (H. T. Harvey & Associates 2024).

1.2 Monitoring and Reporting Requirements

The regulatory agency permits and the MMP require 10 years of post-construction monitoring conducted by qualified restoration ecologists and fluvial geomorphologists to assess the temporal trajectory of habitat establishment relative to the long-term objectives. The monitoring schedule for the 10-year period is shown in Table 2. Monitoring requirements for Year 2 include assessment of the target hydrologic regime, geomorphic conditions, repeat topographic surveys, pig and cattle exclusion, invasive species cover, and Year 2 vegetation data collection in the SAW habitat restoration areas, willow and mixed riparian areas, seasonal wetlands, and CVFM areas, including photo documentation. Although there are no performance standards or success criteria associated with wildlife use of the site, monitoring of Habitat Plan-covered species is also scheduled to occur at the Habitat Agency's discretion and was conducted in Year 2.

Annual monitoring reports will be submitted to the RWQCB, CDFW, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service, and USACE. This report documents Year 2 annual monitoring conducted by H. T. Harvey & Associates (H. T. Harvey) restoration ecologists and ecohydrologists from cbec ecoengineering, a Verdantas Company (cbec).

Table 2. Monitoring Schedule for Ecological Performance Standards and Final Success Criteria

Performance Standard	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10 (Final)
Target Hydrologic Regime	X	X	X	X	X		X			X
Visual Geomorphic[1] Assessment	X	X	X	X	X	X	X	X	X	X
Repeat Topographic Survey[2]		X			X					X
Pig and Cattle Exclusion[3]	X	X	X	X	X	X	X	X	X	X
Invasive Plant Cover – Habitat Preservation, Enhancement, Restoration, and Creation	X	X	X	X	X		X			X
Survival of planted California sycamores (Sycamore Alluvial Woodland [SAW] restoration)	X	X	X	X	X					
Survival of all other Planted Trees and Shrubs (SAW restoration)	X	X	X	X	X					
Average health and vigor of planted trees and shrubs (SAW restoration)	X	X	X	X	X					
Average height of planted California sycamores	X	X	X	X	X					
Average percent cover of woody plant species (SAW restoration)					X		X			X
Survival of Installed Willow Stakes	X	X	X							
Woody understory cover in willow riparian forest and scrub and mixed riparian forest and woodland	X	X	X	X	X		X			X
Percent cover of wetland species in created seasonal wetland habitat	X	X	X	X	X					
Percent cover of native wetland vegetation in restored coastal and valley freshwater marsh	X	X	X	X	X					
Shannon-Wiener diversity in the restored coastal and valley freshwater marsh					X					
Shannon-Wiener diversity in the created seasonal wetland					X					
Seasonal wetland creation delineation					X					
Coastal valley freshwater marsh restoration and enhancement delineation					X					

Performance Standard	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10 (Final)
Percent cover of vegetation in soil placement areas, secondary channel grading areas, created seasonal wetland fringe, and any other temporarily disturbed grading areas	X									
Photo documentation[1]	X	X	X	X	X	X	X	X	X	X
Ecological trend characteristics	X	X	X	X	X		X			X
Monitoring of Habitat Plan-Covered Wildlife Species	X	X	X	X	X		X			X

[1] Visual geomorphic assessment are scheduled to occur annually; however, they may be determined to be unnecessary in years with little to no flow, based on the judgment of the monitoring geomorphologist. A summary of geomorphic assessment results will only be submitted in monitoring reports in Years 1–5, 7, and 10.

[2] Repeat topographic surveys at monitoring cross-sections and longitudinal profiles are tentatively scheduled for Years 2, 5 and 10 but the timing is subject to adjustment on the basis of observed peak flow events that activate the secondary channel network and drive geomorphic change.

[3] Monitoring of cattle exclusion and photo documentation will be collected annually in Years 1–10 but will only be submitted in monitoring reports in Years 1–5, 7, and 10.

Section 2. Monitoring Methods

Monitoring and data analysis required for Year 2 (2025) was conducted by H. T. Harvey restoration ecologists and cbec's geomorphologists in accordance with the project's MMP. Monitoring results were compared to the performance standards and used to develop maintenance recommendations. Detailed methods are provided below.

2.1 Target Hydrologic Regime

The hydrologic regime of the project area was assessed through comparison of scaled U. S. Geological Survey (USGS) discharge records for Pacheco Creek (downscaled to the portion of the watershed above the project area) to the inundation discharge thresholds that were previously calculated for the secondary channels based upon hydraulic modeling of the as-built topographic condition (cbec 2024).

2.2 Geomorphic Condition and Topographic Survey

A visual assessment of the geomorphic condition of the project's fluvial features was conducted by cbec geomorphologists (Chris Hammersmark and Evan Pesut) during a site visit on September 10th, 2025. The main channel, secondary channels (particularly the constructed inlets), adjacent floodplain areas, and the post-assisted log structures (PALSs) were the focus of the visual assessments.

Concurrently with the visual assessment, cbec performed repeat cross-section and longitudinal profile topographic surveys of the constructed secondary channels and Pacheco Creek main channel within the vicinity of the secondary channel inlets. The repeat cross-section and longitudinal profile topographic surveys were performed with Trimble Real Time Kinematic (RTK) Global Positioning System (GPS) survey equipment and tied into the survey monuments established as a part of the as-built survey (H. T. Harvey 2024).

2.3 Pig and Cattle Exclusion

The pig exclusion fencing alignments were visually assessed by restoration ecologists from H. T. Harvey (i.e., Dana DeLew, Jenna Shikuzawa, and Carly Sussman) during the monitoring of different habitats from May 22 through September 19, 2025, to determine if they were intact and functioning as designed. In addition, the effectiveness of cattle exclusion was monitored via regular site visits and communication with neighbors.

2.4 Invasive Plant Cover

Restoration ecologists conducted a visual survey for invasive plant species in Year 2 during each monitoring event within each target habitat area from May 22 through September 19, 2025. Per the MMP, invasive species are defined as those categorized as highly invasive by the California Invasive Plant Council (Cal-IPC) (Cal-IPC

2025). During the survey, all observed invasive plants that were covering an area more than 200 square feet with more than 30% cover were mapped by species. The average percent cover of invasive species was visually estimated by habitat type and by preservation/enhancement, restoration, and creation areas within each habitat type, as appropriate.

2.5 California SAW Restoration Area

2.5.1 Survival of Planted Trees and Shrubs

Monitoring of planted tree and shrub survival within the SAW habitat restoration areas was conducted by the restoration ecologists (Dana DeLew and Carly Sussman) on September 17–19, 2025. Field counts of all surviving plants were made and compared to the number of plants initially installed, as documented in the Biological As-built Report (H. T. Harvey 2024). Percent survival was calculated by California sycamore (*Platanus racemosa*); all other trees; shrubs; and by individual species using the following equation:

> Percent Survival = (Number of Individuals Alive at Monitoring / Total Number Individuals Installed During Initial Installation) * 100%.

For the purpose of this assessment, "initial installation" of California sycamore included both trees installed during construction and between monitoring Years 1 and 2, because insufficient sycamores were available for installation during initial planting, and the remainder were installed at this time.

2.5.2 Health and Vigor of Planted Trees and Shrubs

The health and vigor of all installed trees and shrubs was documented concurrently with plant survival monitoring on September 17–19, 2025. Health and vigor was assessed by considering factors such as plant color, bud development, new growth, herbivory, drought stress, fungal/insect infestation, and physical damage. Health and vigor were rated on a scale of 1–3 using the rating system shown in Table 3.

Table 3. Tree and Shrub Health and Vigor Qualitative Ratings

Qualitative Rating	Numerical Values	Observations
High health and vigor	3	67–100% healthy foliage, stem, and root crown
Medium health and vigor	2	34–66% healthy foliage, stem, and root crown
Low health and vigor	1	0–33% healthy foliage, stem, and root crown

2.5.3 Height of Planted California Sycamores

The average height of installed California sycamores was monitored on September 17–19, 2025. Each planted California sycamore tree was measured using a stadia rod. Average tree height of California sycamores was calculated using the following formula:

> Average Tree Height = Sum of Tree Heights Measured / Total Number of Trees Measured.

2.5.4 Woody Vegetation Cover

Monitoring of woody plant species percent cover in the SAW habitat restoration areas is not required in Year 2 and was therefore not performed. Woody vegetation cover monitoring will begin in Year 5, per the MMP.

2.6 Willow Riparian and Mixed Riparian Enhancement Area

2.6.1 Survival of Installed Willow Stakes

Willow stake survival was monitored by restoration ecologists Dana DeLew and Carly Sussman within the willow riparian planting areas (WRPs) on September 16, 2025. The survivorship of willow stakes was determined by field counts of all surviving stakes compared to the number of stakes initially installed, as documented in the Biological As-built Report (H. T. Harvey 2024). Percent survival was calculated using the following equation:

> Percent Survival of Willow Stakes = (Total Number of Individual Willow Stakes Alive at Monitoring / Total Number of Individual Willow Stakes Installed During Initial Installation) * 100%.

2.6.2 Woody Understory Vegetation Cover

Understory woody canopy cover was monitored by restoration ecologists Dana DeLew and Carly Sussman in willow riparian forest and scrub and mixed riparian forest and woodland areas on September 16, 2025. Understory woody cover is defined as any vegetative cover present between 0 and 10 feet above ground level. Understory woody cover was quantified using the line-intercept method (Bonham 1989) and a stadia rod. Cover above 10 feet was not included in understory woody riparian cover monitoring. Permanent 50-foot transect markers were installed during Year 1 monitoring and their locations are shown in Figure 2. Transect endpoints were recorded using GPS mapping and marked in the field with a metal u-post and aluminum tag. The number of transects used was calculated based on the amount of variation observed during collection such that the collection of additional transects is not likely to substantially alter the average (Kershaw 1973). If additional transects are determined to be necessary during later years of monitoring, additional permanent transects will be added and monitored. The average percent cover provided by native woody species in total, and by individual species, was calculated for each transect using the following formula:

> Percent Cover of Native Woody Vegetation = (Sum of Intercept Lengths of Native Woody Vegetation /Length of Transect) * 100%.
>
> Percent Cover of Native Woody Species A = (Sum of Intercept Lengths of Native Woody Species A /Length of Transect) * 100%.

2.7 Ecological Trend Characteristics

2.7.1 Willow Riparian and Mixed Riparian Woody Plant Recruitment

During understory cover monitoring, the restoration ecologists made qualitative observations of the abundance and distribution of woody recruits within the willow riparian forest and scrub, mixed riparian forest and woodland, and SAW restoration areas.

2.7.2 California Sycamore Recruitment

A site visit to assess the presence of naturally recruited California sycamore seedlings was conducted by restoration ecologists Dana DeLew and Carly Sussman on April 24, 2025. Any observed seedling was to be documented and mapped using GPS mapping software to allow for future monitoring of the recruited seedlings.

2.8 Created Seasonal Wetland and Restored CVFM Areas

2.8.1 Seasonal Wetland Vegetation Cover

Wetland vegetation percent cover monitoring within the created seasonal wetland was conducted by restoration ecologists Jenna Shikuzawa and Carly Sussman on May 22, 2025. Percent cover of planted and naturally recruited wetland vegetation was determined by species using the quadrat sampling method (Bonham 1989). Quadrat locations were placed in a random-stratified fashion within the created seasonal wetland. The number of quadrats employed was determined based on the point where additional samples did not substantially change the average cover value obtained (Kershaw 1973). Wetland vegetation was defined as species with a facultative, facultative wetland, or obligate wetland indicator rating in the *Arid West 2022 Regional Wetland Plant List* (USACE 2022). Percent cover of all non-invasive wetland species within each quadrat was estimated to the nearest whole percent. For comparison, a reference seasonal wetland was also monitored in Year 2. The reference seasonal wetland is onsite and shown in Figure 3. The same sampling methods were employed for the reference seasonal wetland. Total average cover of all species and all non-invasive wetland species were then calculated among all quadrats and compared between the created seasonal wetland and the seasonal wetland reference site.

2.8.2 CVFM Vegetation Cover

Wetland vegetation percent cover monitoring within the restored CVFM was conducted by restoration ecologist Dana DeLew using high-resolution aerial imagery. The aerial imagery was collected by Triangle habitat resource manager Barry Baba on August 18, 2025. This imagery was geo-rectified into State Plane NAD83 Zone 3 (ft) projection using ground control points. An H. T. Harvey restoration ecologist and geographic information system (GIS) analyst then used the August 2025 imagery and GIS software (ArcGIS Pro) to assess percent cover of wetland vegetation in the restored CVFM area (Figure 3). Specifically, the restoration ecologist drew a polygon around each observable plant or contiguous group of plants in the CVFM. Polygons were identified by species based on observations made in the field during annual monitoring on September 16, 2025.

Some species that overlapped were not differentiable in the aerial imagery, so groups of these species were digitized together. Total percent cover in the CVFM was then calculated by dividing the total aerial vegetation cover (summed across polygons) by the total area of CVFM restoration. Percent cover of individual species in the CVFM was also calculated by dividing the sum of each species' aerial cover by the total area of CVFM.

2.8.3 Shannon-Weiner Diversity

Year 2 monitoring does not include this metric per the MMP. This metric will be calculated for the restored CVFM, created seasonal wetland, and seasonal wetland reference site in Year 5.

2.8.4 Wetland Surface Area

Year 2 monitoring does not include this metric per the MMP. This metric will be evaluated in Year 5.

2.9 Temporarily Disturbed Areas

The final success criterion of at least 70% vegetation cover was achieved in Year 1 within two of the three temporarily disturbed areas on site: the spoils placement areas and the created wetland fringe (H. T. Harvey 2025a). Therefore, additional monitoring was not required in these areas, per the MMP. However, because this final success criterion was not achieved in Year 1 along the secondary channel grading area side slopes, vegetation cover monitoring within this area continued in Year 2. Vegetation cover monitoring along the secondary channel grading area side slopes was conducted by restoration ecologists Jenna Shikuzawa and Carly Sussman on May 22, 2025. Percent cover of planted and naturally recruited vegetation was determined by species using the quadrat sampling method (Bonham 1989). Quadrat locations were placed in a random stratified fashion. The number of quadrats sampled was at the point where additional samples did not substantially change the average cover value obtained (Kershaw 1973).

2.10 Wildlife Monitoring

2.10.1 California Red-Legged Frog, California Tiger Salamander, and Northwestern Pond Turtle

H. T. Harvey's wildlife ecologists Emily Malkauskas, Dani Christensen, Lauren Salazar, and Jazmine Jensen conducted surveys for special-status wildlife species at the ponds in the project area to evaluate the presence or absence of California red-legged frog, California tiger salamander, and northwestern pond turtle. Surveys were conducted in accordance with the methods described in the MMP. The methods described in the MMP follow the most recent wildlife agency protocols (USFWS 2005, USFWS and California Department of Fish and Game 2003). The survey type, survey date, observer, and level of effort (where applicable) are presented in the Results and Discussion Section below.

2.10.2 American Bullfrog Presence/Absence

The abundance of invasive American bullfrogs (*Lithobates catesbeianus*) as well as other known aquatic predators encountered during each of the special-status wildlife surveys was recorded during surveys for special-status amphibians. Non-native animals were not dispatched during these surveys.

2.10.3 Tricolored Blackbird

H. T. Harvey wildlife ecologists also conducted a survey at the mitigation ponds to evaluate the presence or absence of tricolored blackbird. The survey was conducted on April 30, 2025, in accordance with the methods described in the MMP.

2.11 Maintenance

H. T. Harvey conducted a maintenance monitoring site visit to qualitatively assess site conditions and provide maintenance recommendations on April 24, 2025. Additional site visits were conducted by the Habitat Agency. Site maintenance was performed by Triangle.

2.12 Photo Documentation

Photo documentation was conducted during Year 2 monitoring from the photo points established in the Biological As-Built Report (H. T. Harvey 2024). Locations of photo points are shown in Figure 4.

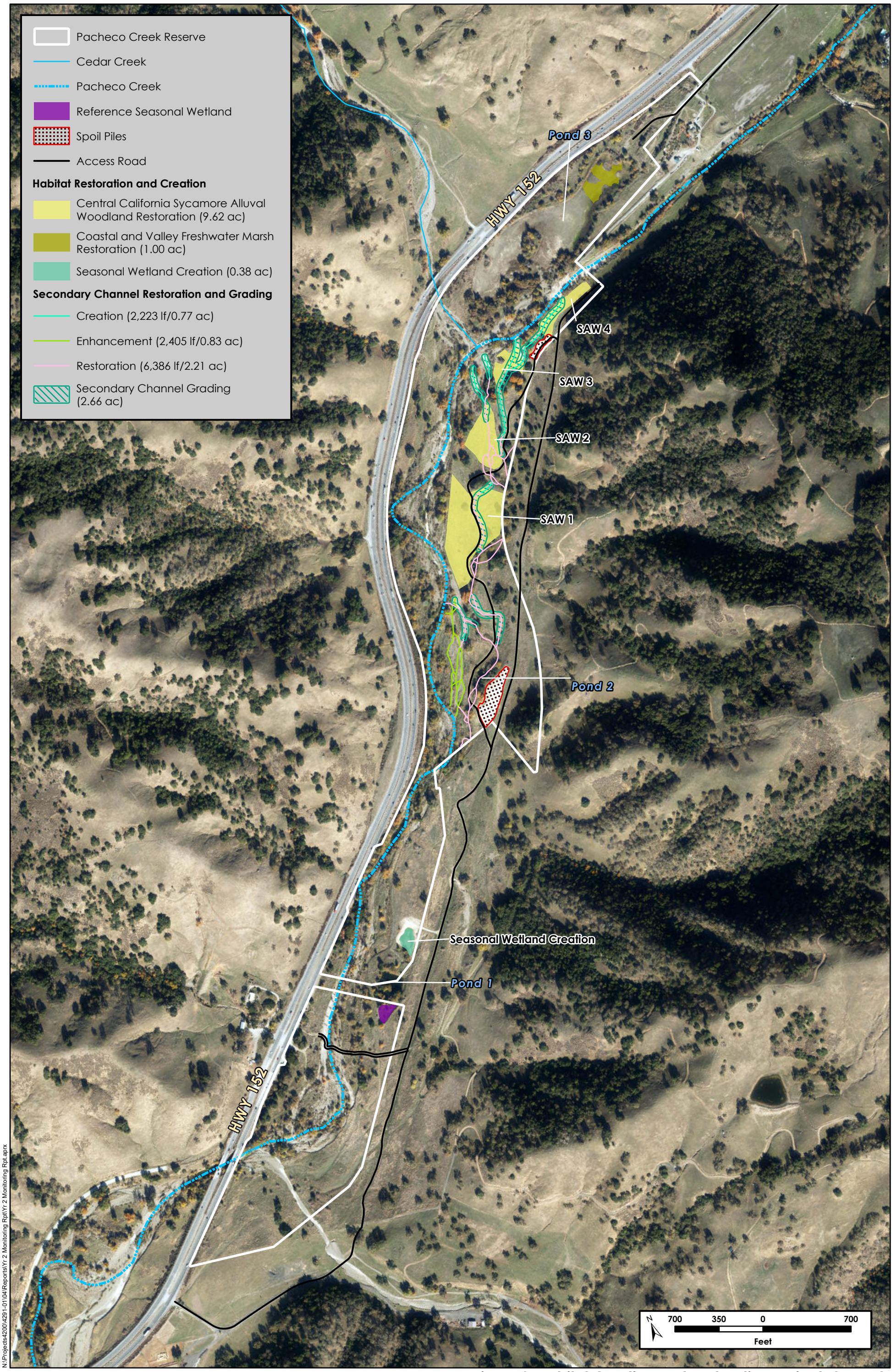

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Figure 3. Habitat Creation and Restoration Project Elements
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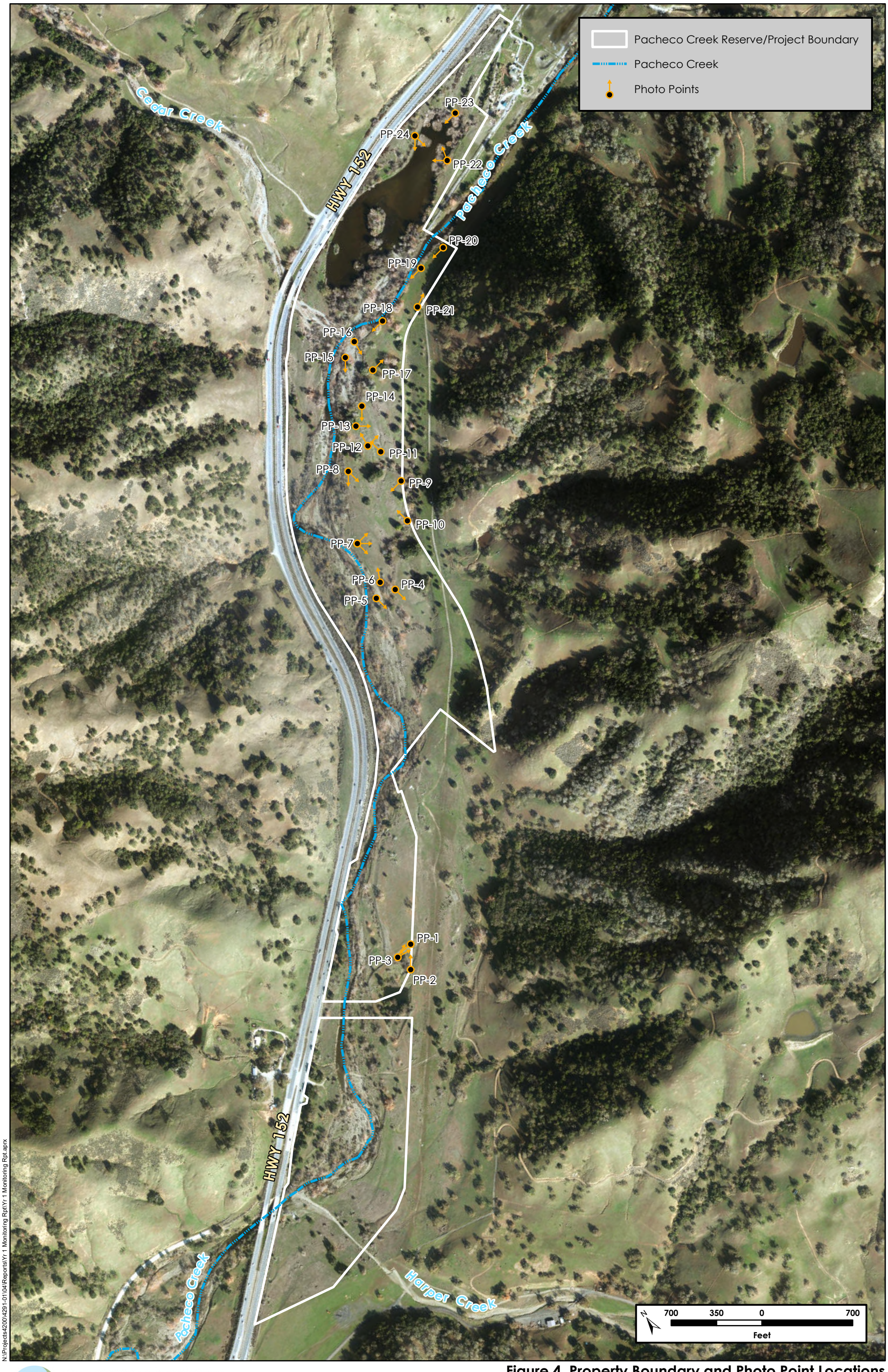

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Figure 4. Property Boundary and Photo Point Locations
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Section 3. Results and Discussion

The habitat mitigation performance criteria for Year 2 are described in the MMP (H. T. Harvey 2025a). Year 2 performance criteria and results are summarized below in Table 4.

Table 4. Year 2 Ecological Performance Standards

Performance Standard[1]	Year 2 Criterion	Year 2 Result	Met in Year 2?
Target Hydrologic Regime[2]	Secondary channel network largely activated during ≥3-year flow events	One 3-year flow event occurred, and the secondary channel network activated for less than one day of estimated inundation	Yes
Geomorphic Conditions[2]	Healthy physical processes and geomorphic dynamism supporting attainment of target hydrologic regime in secondary channels	Fluvial processes are occurring as expected	Yes
Pig and Cattle Exclusion	Cattle are excluded from mitigation area; pigs are excluded from fenced areas	Pigs and cattle excluded	Yes
Invasive Plant Cover	<10%	4.5%	Yes
Survival of planted trees and shrubs (Sycamore Alluvial Woodland [SAW] restoration)			
- Survival of planted California sycamores	N/A (Replace all dead plants)	84%	N/A
- Survival of all other planted trees and shrubs	N/A (Replace all dead plants)	76%	N/A
Average health and vigor of planted trees and shrubs (SAW restoration)	>2	2.4	Yes
Average height of planted California sycamores	Increasing temporal trend in average height	2.4 ft in Year 2 compared to 3.0 ft in Year 1	No
Survival of Installed Willow Stakes	70%	16%	No
Woody understory cover (willow riparian forest and scrub and mixed riparian forest and woodland)	Increasing temporal trend in percent cover of woody species between 0 and 10 feet in height, relative to Year 1	33.6% in Year 2 compared to 33.4% in Year 1	Yes
Percent cover of non-invasive wetland vegetation (created seasonal wetland)	Increase relative to Year 1	71.9% in Year 2 compared to 68.1% in Year 1 (128% of	Yes

Performance Standard[1]	Year 2 Criterion	Year 2 Result	Met in Year 2?
		reference wetland cover [56.2% cover])	
Percent cover of native wetland vegetation (restored coastal and valley freshwater marsh)[2]	Increase relative to Year 1	1% compared to 10% in Year 1	No
Percent cover of vegetation in all temporarily disturbed areas (e.g., spoils placement areas, secondary channel slopes, created seasonal wetland transition zone slope)	70%	74.3% in spoils placement area in Year 1 71.7% in wetland fringe in Year 1 68.3% in secondary channel slopes.	Met in spoils placement and wetland fringe in Year 1. Not met on secondary channel slopes in Year 2.

[1] There are no performance criteria for woody plant recruitment in riparian enhancement and SAW restoration areas or SAW recruitment. These metrics are only used to assess project trends and to inform maintenance decisions.

[2] See Appendix A for detailed results of hydrologic and geomorphic monitoring.

3.1 Target Hydrologic Regime

The secondary channel network was designed to be inundated during a 3-year recurrence interval event (2,201 cubic feet per second [cfs] at the site). To account for potential deposition within inlets as the channels geomorphologically adjust, some of the secondary channel inlets were designed to convey water out of the main channel at flows as low as 500 cfs. Hydraulic modeling of the as-built topographic condition verified that the constructed secondary channels became inundated as anticipated with the northernmost inlet (Secondary Channel 1, Figure 5) activating at flows slightly lower than the design (cbec 2024).

In Year 2, a comparison of the calculated inundation thresholds at the USGS Dunneville gage scaled to the project site indicates that half of the secondary channels experienced less than one day of inundation from one individual flood event, which was slightly larger than a 3-year event (Table 5) (Appendix A, Figure 3).

More detailed information on cbec's assessment of the target hydrologic regime is available in Appendix A.

3.2 Geomorphic Condition

Cross-section and longitudinal profiles were conducted by cbec at the locations previously surveyed during the as-built survey effort. The results of the surveys are presented in Appendix A. Overall, cbec concludes that the secondary channel network continues to function as intended. cbec observed minor geomorphic adjustments within the range anticipated by the channel restoration design, including minor erosion in secondary channels 1, 6, and 7. In addition, although many of the installed PALSs failed, they appear to have driven the desired geomorphic channel adjustment, and the PALSs are not required for the project to function as intended. No corrective actions are recommended by cbec at this time.

Table 5. Inundation Statistics Summary for the Secondary Channel Inlets

Secondary Channel Inlet	Estimated Activation Flow[1] (cfs)	Year 1 (2023-2024)[1]		Year 2 (2024-2025)	
		# of Individual Inundation Periods	Total Days of Inundation	# of Individual Inundation Periods	Total Days of Inundation
1	500	5	6.2	1	0.9
2	1,083	5	1.6	1	0.4
3	663	4	4.5	1	0.7
4	1,045	5	1.8	1	0.4
5	1,177	3	1.1	1	0.4
6	500	5	6.2	1	0.9
7	500	5	6.2	1	0.9
8	500	5	6.2	1	0.9

[1] As reported in H. T. Harvey & Associates 2025b; cfs = cubic feet per second

3.3 Pig and Cattle Exclusion

No pig trespass or damage was observed in fenced exclusion areas. Cattle were successfully excluded from the restoration site year-round, with the exception of one stray individual that was removed promptly.

3.4 Invasive Plant Cover

The average percent cover of invasive species across the site was 4.5%, and therefore the Year 2 performance criterion was met. Invasive plant species cover was approximately 5% in the willow and mixed riparian enhancement areas, 2% in the SAW restoration areas, <1% in the created seasonal wetland, 3% along the secondary channel grading area side slopes, and up to 8.5% in the CVFM (Figure 6). Four invasive species were observed: yellow star thistle (*Centaurea solstitialis*), red brome (*Bromus rubens*), perennial pepperweed (*Lepidium latifolium*), and floating water primrose (*Ludwigia peploides*). All four species are categorized as highly invasive by Cal-IPC (Cal-IPC 2025). Yellow star thistle was observed scattered across the site and was more concentrated in upland areas, in patches in the riparian understory, and sparsely throughout all SAW areas. Red brome was observed sparsely throughout the secondary channel grading area. Perennial pepperweed was observed growing in SAW Area 4, the created seasonal wetland, the secondary channels, and along channel banks in the willow and mixed riparian areas. Floating water primrose was observed growing in the CVFM areas in Pond 3, where it was intermingled with non-native, non-invasive water speedwell (*Veronica anagallis-aquatica*) and a species of knotweed (*Persicaria* spp.) that was not identified to species but was determined to be non-invasive. Therefore, the percent cover of floating water primrose is likely overestimated in the results (see also Section 3.8.2). Additionally, five problematic non-native species were observed growing in the willow and mixed riparian enhancement areas, SAW areas, the secondary channels, and the seasonal wetland: stinkwort (*Dittrichia graveolens*), fennel (*Foeniculum vulgare*), poison hemlock (*Conium maculatum*), black mustard (*Brassica nigra*), and Italian thistle (*Carduus pycnocephalus*). All five species are rated as being moderately invasive by Cal-IPC and are therefore not considered invasive per the MMP, however they have the capacity to outcompete native species and should continue to be monitored and controlled to reduce competition with native species.

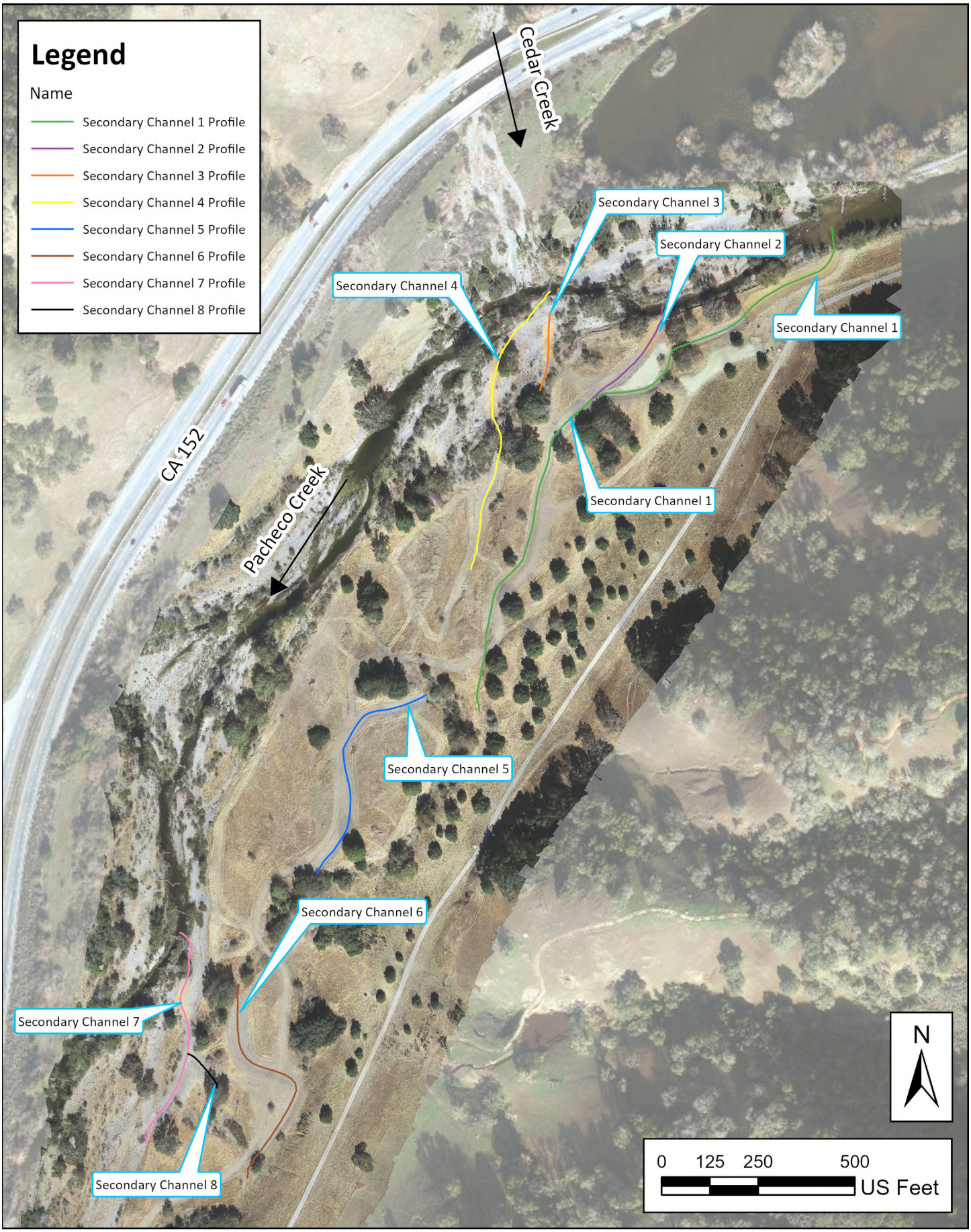

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Figure 5. Secondary Channel Restoration and Creation

Pacheco Creek Restoration Project
Year 2 (2025) Annual Monitoring Report (4291-04)
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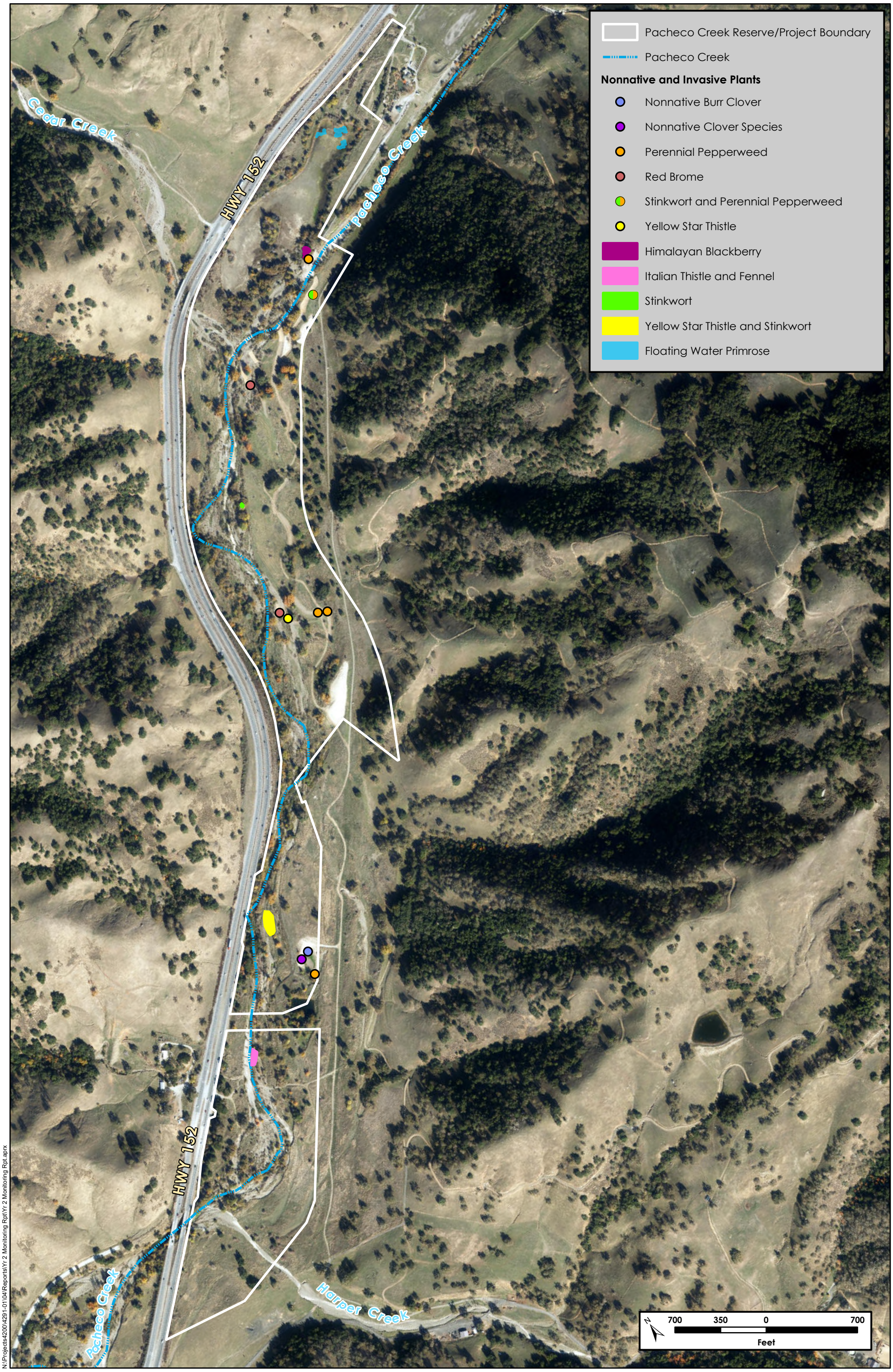

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Figure 6. Nonnative and Invasive Plant Locations
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We observed the following non-native, non-invasive plant species establishing within the created seasonal wetland: bur clover (*Medicago polymorpha*, facultative upland [FACU]), field clover (*Trifolium campestre*, upland [UPL]), clustered clover (*Trifolium glomeratum*, UPL), and rose clover (*Trifolium hirtum*, UPL). While not considered invasive per the MMP, these species are not considered to be wetland species due to their wetland indicator statuses of facultative upland and upland. Because these species conflict with a key performance standard that the created seasonal wetland be dominated by wetland vegetation, we recommend their removal to reduce competition with wetland species.

3.5 California SAW Restoration

3.5.1 Survival of Planted Trees and Shrubs

The percent survival of California sycamore across the SAW habitat restoration areas was high at 84%, with 560 surviving trees out of 668 installed (315 trees initially installed in 2024 and 353 trees installed in 2025 to correct for reduced planting in 2024). Percent survival of California sycamore is reported separately from other planted trees per the MMP, as it was anticipated that California sycamore would have substantially lower survival rates than other species due to the particular set of abiotic factors required for establishment of this species. Higher survival rates were likely due to the substantial replanting in 2025, installation of protective tree tubes and root cages that reduced rodent herbivory on all 2025 plantings, and high health and vigor of the 2025 nursery seedlings. There is no performance criterion for planted tree and shrub survival in Year 2; however, the MMP requires that all dead plants be replaced (Table 4).

Survival of all planted tree and shrub species, excluding California sycamore, across all SAW habitat restoration areas was 76%. Percent survival by species is provided in Table 6. All planted species had moderate to high survival rates. The percent survival of one species, Valley oak (*Quercus lobata*), is greater than 100% due to replanting. Natural recruitment of California rose (*Rosa californica*) and Coast live oak (*Quercus agrifolia*) was observed within and near planting basins in all SAW habitat restoration areas.

Table 6. Percent Survival of Planted Trees and Shrubs Excluding California Sycamores

Scientific Name	Common Name	# of Living Plants	# of Plants Initially Installed	# Replanted in 2025	% Survival
Trees					
Aesculus californica	California buckeye	34	50	10	68%
*Populus fremontii**	Fremont cottonwood	1	0	0	-
Quercus agrifolia	Coast live oak	10	15	0	67%
Quercus lobata	Valley oak	16	7	13	243%
Sambucus nigra	Blue elderberry	41	66	14	62%
Tree Total		**103**	**138**	37	75%
Shrubs					
Artemisia californica	California sagebrush	18	22	5	82%

Scientific Name	Common Name	# of Living Plants	# of Plants Initially Installed	# Replanted in 2025	% Survival
Baccharis salicifolia	Mulefat	57	88	18	65%
*Diplacus aurantiacus**	Orange Bush Monkeyflower	1	0	1	-
Rosa californica	California rose	79	88	18	90%
Shrub Total		**154**	**198**	**42**	**78%**
Overall Total		**257**	**336**	**79**	**76%**

* These species were not included on the initial planting list, therefore they were excluded from survival calculations.

3.5.2 Health and Vigor of Planted Trees and Shrubs

The average health and vigor of all planted species across all SAW habitat restoration areas was rated as "medium" with an average score of 2.4. The Year 2 performance criterion is an average score greater than 2, which was met (Table 4). However, per the MMP, dead plants are included in this average and are given a score of 1. When the health and vigor of only living plants is evaluated, the average rating for all planted species is "high" with an average score of 2.6. There is no final success criterion for health and vigor, as the ratings are used only to assess trends and inform maintenance decisions. Plants with medium health and vigor showed signs of rodent herbivory (bark stripping, broken branches, grazing on buds) and/or mild drought stress (leaf wilting, browning, or necrosis). Plants with high health and vigor had full canopies of healthy foliage and new growth. Average health and vigor ratings by species are presented in Table 7 and range from medium to high.

Table 7. Average Health and Vigor of Planted Trees and Shrubs

Scientific Name	Common Name	# Plants Observed	3	2	1 (living)	1 (dead)	Avg* Score	Avg* Rating
Trees								
Aesculus californica	California buckeye	36	13	12	9	2	2.0	Medium
Platanus racemosa	California sycamore	640	404	132	24	80	2.3	Medium
Populus fremontii	Fremont cottonwood	1	1	0	0	0	3.0	High
Quercus agrifolia	Coast live oak	10	7	3	0	0	2.7	High
Quercus lobata	Valley oak	17	8	8	1	0	2.4	Medium
Sambucus nigra	Blue elderberry	42	15	15	11	1	2.0	Medium
Tree Total		**746**	**448**	**170**	**45**	**83**	**2.3**	**Medium**
Shrubs								
Artemisia californica	California sagebrush	18	5	12	1	0	2.2	Medium
Baccharis salicifolia	Mulefat	65	44	13	0	8	2.4	Medium
Diplacus aurantiacus	Orange Bush Monkeyflower	1	1	0	0	0	3.0	High

Scientific Name	Common Name	# Plants Observed	3	2	1 (living)	1 (dead)	Avg* Score	Avg* Rating
Rosa californica	California rose	80	62	15	2	1	2.7	High
Shrub Total		**164**	**112**	**40**	**3**	**9**	**2.6**	**High**
Overall Total		**910**	**560**	**210**	**48**	**92**	**2.4**	**Medium**

* Avg = Average

3.5.3 Height of Planted California Sycamores

The average height of planted California sycamores was 2.4 feet across all four SAW habitat restoration areas (Table 8). The Year 2 performance criterion is an increase in average height relative to Year 1 (Table 4). Average height decreased from 3.0 feet in Year 1; therefore, this performance criterion was not met. However, the decrease in average height is likely due to substantial replanting, resulting in smaller statured individuals compared to those planted in Year 1. Additionally, 33% (185 out of 560) of California sycamores had heights greater than 3 feet tall. Average heights were higher in SAW habitat restoration areas 3 and 4 compared to average heights in SAW habitat restoration areas 1 and 2.

Table 8. Average Height of Planted California Sycamores by SAW Habitat Restoration Area

SAW Habitat Restoration Area	Year 1 Average Height (ft)	Year 2 Average Height (ft)
1	3.3	2.5
2	2.0	1.9
3	3.1	2.8
4	2.9	2.8
Total	**3.0**	**2.4**

Definitions: SAW = sycamore alluvial woodland

3.6 Willow Riparian and Mixed Riparian Enhancement Area

3.6.1 Survival of Installed Willow Stakes

The total survival of willow stakes across the site was very low (17%), with 20 surviving stakes out of the 116 initially installed (Table 9), despite replanting between Years 1 and 2. The Year 2 performance criterion is at least 70% survival of all installed willow stakes, which was not met (Table 4). Survival was highest in WRPs 4 and 1 (138% and 56%, respectively). Percent survival exceeds 100% in WRP 4 because of replanting. A total of 97 stakes were replanted in January 2025 across the 13 WRPs. Eight out of 13 WRPs had 0% survival, likely due to difficulty installing stakes to sufficient depth to access groundwater because of the high proportions of gravel and rock in the soil. However, willow stake survival is often low, especially in harsh climatic conditions like those present at the project site. All willow stakes were either red willow (*Salix laevigata*) or arroyo willow (*Salix lasiolepis*) and were installed in willow riparian forest and scrub enhancement areas (Figure 2).

Table 9. Survival of Installed Willow Stakes

Willow Riparian Planting (WRP) Area	# Living Stakes in 2024	# Living Stakes in 2025	# Stakes Initially Installed	% Survival
WRP 1	1	5	9	56%
WRP 2	5	1	9	11%
WRP 3	0	0	10	0%
WRP 4	1	11	8	138%
WRP 5	0	0	5	0%
WRP 6	0	0	6	0%
WRP 7	0	0	9	0%
WRP 8	0	0	8	0%
WRP 9	0	0	20	0%
WRP 10	2	0	8	0%
WRP 11	0	0	4	0%
WRP 12	4	1	10	10%
WRP 13	6	2	10	20%
Total	**19**	**20**	**116**	**17%**

3.6.2 Woody Understory Vegetation Cover

The average percent cover of native woody understory vegetation within the willow riparian forest and scrub and mixed riparian forest and woodland areas was 33.6% (Table 10). The Year 2 performance criterion is an increase in average percent cover relative to Year 1 (33.4%); thus, the performance criterion was met (Table 4). Mulefat (*Baccharis salicifolia*) had the highest percent cover of all understory species at 24.9%. Percent cover of mulefat was slightly lower than in Year 1; however, this is likely attributed to the upward growth of branches over 10 feet which was not included in cover monitoring, rather than a true loss of vegetation cover. The majority of the increase in understory cover came from growth of blue elderberry (*Sambucus nigra*).

Table 10. Percent Cover of Native Woody Vegetation

Scientific Name	Common Name	Year 1 (2024) Percent Cover	Year 2 (2025) Percent Cover
Baccharis salicifolia	Mulefat	27.1%	24.9%
Grindelia camporum	Common gumplant	-	0.4%
Rosa californica	California rose	3.2%	3.2%
Salix laevigata	Red willow	1.3%	1.4%
Sambucus nigra	Blue elderberry	1.7%	3.0%
Umbellularia californica	California bay	0.1%	0.6%
Total Cover of Native Woody Vegetation		**33.4%**	**33.6%**

3.7 Ecological Trend Characteristics

3.7.1 California Sycamore and Willow Riparian and Mixed Riparian Woody Plant Recruitment

Moderate natural recruitment of woody understory species was observed during Year 2 monitoring. Recruitment was primarily observed in four species: common gumplant (*Grindelia camporum*), red willow, mulefat, and coast live oak. Substantial recruitment of common gumplant was observed in the SAW planting areas and throughout the willow and mixed riparian forest understory. Moderate recruitment of red willow and mulefat was observed along the channel banks. Moderate recruitment of coast live oak was observed primarily in the secondary channels and throughout the willow and mixed riparian forest understory, although it was not observed along monitoring transects. Recruitment was more commonly observed in the northern portions of the site. No California sycamore recruitment was observed during the targeted survey or other monitoring efforts.

3.8 Created Seasonal Wetland and Restored CVFM Areas

3.8.1 Seasonal Wetland Vegetation Cover

In Year 2, the average percent cover of non-invasive wetland vegetation in the created seasonal wetland was 71.9%, relative to 68.1% cover measured in Year 1 (Table 11). Therefore, the Year 2 performance standard of an increase in non-invasive wetland vegetation cover relative to Year 1 was met (Table 4). The average percent cover of non-invasive wetland vegetation in the reference wetland was 56.2%. Thus, cover in the created seasonal wetland was 128% of that in the reference wetland which exceeds the Year 5 final success criterion of having at least 75% of cover in the reference seasonal wetland.

Dominant wetland species in the created seasonal wetland included native tall flatsedge (*Cyperus eragrostis*), and non-native, non-invasive rabbitsfoot grass (*Polypogon monspeliensis*) and bur clover (both Cal-IPC limited) (Cal-IPC 2025). Of the planted/seeded species, tall flatsedge had the highest vegetation cover in Year 2. This species has increased by approximately 10% since Year 1. Other planted/seeded species were observed to be spreading within the created seasonal wetland, including Baltic rush (*Juncus balticus*) and meadow barley (*Hordeum brachyantherum*). Dominant wetland species within the reference seasonal wetland differed from the created seasonal wetland and included non-native, non-invasive species English plantain (*Plantago lanceolata*) and Bermuda grass (*Cynodon dactylon*).

Table 11. Average Vegetation Cover of Created and Reference Seasonal Wetland

Scientific Name	Common Name	Status (Cal-IPC Rating)[1]	Wetland Indicator Status[2]	Average Vegetation Cover (%)			
				Created Seasonal Wetland		Reference Seasonal Wetland	
				Year 1 (2024)	Year 2 (2025)	Year 1 (2024)	Year 2 (2025)
Ammannia coccinea	Purple ammannia	Native	OBL	0.3	-	-	-
Anthemis cotula	Mayweed	Non-Native	FACU	0.1	0.1	-	-
Asclepias fascicularis	Narrow leaf milkweed	Native	FAC	-	-	0.1	-
Artemisia douglasiana[5]	California mugwort	Native	FAC	0.1	-	-	-
Avena fatua	Wild oat	Non-Native (Moderate)	UPL	-	0.1	-	-
Bromus hordeaceus	Soft brome	Non-Native (Limited)	FACU	0.1	-	-	-
Carduus pycnocephalus	Italian thistle	Non-Native (Moderate)	UPL	-	-	-	0.2
Cynodon dactylon	Bermuda grass	Non-Native (Moderate)	FACU	-	-	15.7	15.5
Cyperus eragrostis[4,5]	Tall flatsedge	Native	FACW	27.4	37.8	2.6	-
Dipsacus sativus	Fuller's teasel	Non-Native (Moderate)	UPL	-	-	0.3	-
Dittrichia graveolens	Stinkwort	Non-Native (Moderate)	UPL	0.1	-	-	-
Eleocharis macrostachya[4]	Common spikerush	Native	OBL	6.3	4.5	37.9	3.2
Elymus triticoides[4,5]	Creeping wild rye	Native	FAC	0.4	1.6	-	-
Epilobium brachycarpum	Tall annual willowherb	Native	FAC	1.7	1.9	1.1	0.2
Epilobium ciliatum	Fringed willowherb	Native	FACW	-	0.9	-	-
Euthamia occidentalis[5]	Western goldenrod	Native	FACW	-	0.3	-	-
Festuca perennis	Italian rye grass	Non-Native (Moderate)	FAC	-	0.4	-	0.7
Geranium dissectum	Cutleaf geranium	Non-Native (Limited)	UPL	-	0.5	-	3.0
Grindelia camporum[5]	Common gumplant	Native	FACW	0.1	-	0.3	0.3
Helenium puberulum	Sneezeweed	Native	FACW	-	0.4	0.6	1.5
Helminthotheca echioides	Bristly ox-tongue	Non-Native (Limited)	FAC	-	0.1	-	-

Scientific Name	Common Name	Status (Cal-IPC Rating)[1]	Wetland Indicator Status[2]	Average Vegetation Cover (%)			
				Created Seasonal Wetland		Reference Seasonal Wetland	
				Year 1 (2024)	Year 2 (2025)	Year 1 (2024)	Year 2 (2025)
Hordeum brachyantherum[5]	Meadow barley	Native	FACW	0.1	2.8	-	-
Hordeum marinum	Seaside barley	Non-Native (Moderate)	FAC	0.1	-	-	-
Juncus balticus[4]	Baltic rush	Native	FACW	1.0	8.5	1.6	3.2
Juncus bufonius	Toad rush	Native	FACW	10.0	0.6	-	-
Juncus xiphioides	Iris leaved rush	Native	OBL	0.1	0.4	-	-
Lactuca serriola	Prickly lettuce	Non-Native	FACU	-	0.1	-	-
Lotus corniculatus	Bird's foot trefoil	Non-Native	FAC	-	-	0.1	2.0
Lysimachia arvensis	Scarlet pimpernel	Non-Native	FAC	0.2	0.4	-	0.3
Lythrum hyssopifolia	Hyssop loosestrife	Non-Native (Moderate)	OBL	15.9	0.8	-	0.7
Medicago polymorpha	Bur clover	Non-Native (Limited)	FACU	-	8.6	-	2.7
Mentha pulegium	Pennyroyal	Non-Native (Moderate)	OBL	-	-	-	3.7
Plantago lanceolata	English plantain	Non-Native (Limited)	FAC	-	-	8.6	33.5
Plantago major	Common plantain	Non-Native	FAC	-	-	0.1	1.2
Polypogon monspeliensis	Rabbitsfoot grass	Non-Native (Limited)	FACW	3.1	9.8	12.6	3.3
Pseudognaphalium luteoalbum	Jersey cudweed	Non-Native	FAC	-	0.1	-	2.2
Rumex crispus	Curly dock	Non-Native (Limited)	FAC	0.1	-	-	-
Rumex pulcher	Fiddle dock	Non-Native	FAC	-	-	0.3	-
Salix laevigata[4]	Red willow	Native	FACW	1.1	0.5	-	-
Setaria parviflora	Marsh bristlegrass	Native	FAC	-	-	9.0	-
Sonchus asper	Spiny sowthistle	Non-Native	FAC	-	0.4	-	0.3
Sisyrinchium bellum[5]	Western blue eyed grass	Native	FACW	-	0.1	-	-

Scientific Name	Common Name	Status (Cal-IPC Rating)[1]	Wetland Indicator Status[2]	Average Vegetation Cover (%)			
				Created Seasonal Wetland		Reference Seasonal Wetland	
				Year 1 (2024)	Year 2 (2025)	Year 1 (2024)	Year 2 (2025)
Torilis arvensis	Field hedge parsley	Non-Native (Moderate)	UPL	-	-	-	0.3
Trifolium campestre	Field clover	Non-Native	UPL	-	0.8	-	-
Trifolium glomeratum	Clustered clover	Non-Native	UPL	-	7.5	-	-
Trifolium hirtum	Rose clover	Non-Native (Limited)	UPL	-	2.0	-	-
Typha latifolia	Broadleaf cattail	Native	OBL	0.1	-	-	-
Vicia sativa	Spring vetch	Non-Native	FACU	-	-	-	0.3
Total				**68.4**	**91.6**	**90.9**	**78.2**
Total Non-Invasive Wetland Cover[3]				**68.1**	**71.9**	**74.9**	**56.2**

[1] Cal-IPC = California Invasive Plant Council. Per the Mitigation and Monitoring Plan (MMP), invasive plant species are defined as those categorized as highly invasive by the Cal-IPC (Cal-IPC 2025).

[2] Wetland indicator status is based on the Arid West 2022 Regional Wetland Plant List (U.S. Army Corps of Engineers 2022). Status is abbreviated as follows: upland (UPL), facultative upland (FACU), facultative (FAC), facultative wetland (FACW), or obligate wetland (OBL).

[3] Per the MMP, wetland vegetation is defined as species with a facultative, facultative wetland, or obligate wetland indicator status.

[4] Planted species, per the Pacheco Creek Restoration Project As-Built Report Notification Report (H. T. Harvey & Associates 2024).

[5] Seeded species, per the Pacheco Creek Restoration Project As-Built Report Notification Report (H. T. Harvey & Associates 2024).

3.8.2 CVFM Vegetation Cover

The Year 2 percent cover of tall emergent vegetation in the CVFM was 1%, while total cover was 32% (Table 12; Figure 7). The percent cover of tall emergent vegetation decreased since Year 1 (3.4%); therefore, the performance standard of an increasing trend relative to Year 1 was not met (Table 4). The dominant species in the restored CVFM area were not tall emergent species but rather the non-native perennial species water speedwell (*Veronica anagallis-aquatica*). Water speedwell is non-native but is not rated as being invasive by the Cal-IPC (Cal-IPC 2025). Other observed species include floating water primrose and an unknown knotweed species (*Persicaria* sp.).

Floating water primrose is rated as being highly invasive (Cal-IPC 2025). However, because floating water primrose, water speedwell, and knotweed were not visually separable in the aerial imagery, the percent cover of each species independently is not known. Based on visual observations, tall emergent vegetation cover within the restoration area appears to be the same as in Year 1, and the existing cover outside of the planting area appears to be recovering from damage caused by high flows in winter 2023/2024. The existing CVFM on the eastern edge of the pond appears to be recovering more quickly than the western edge (Figure 7). The loss of tall emergent vegetation cover relative to Year 1 is likely an artifact of post-processing of aerial imagery and does not reflect a true loss of cover. In Year 3, imagery should be collected using RTK positioning to improve positional accurate and ensure consistency in future cover analyses.

Table 12. Percent Cover of Coastal and Valley Freshwater Marsh Vegetation

Scientific Name	Common Name	Percent Cover
Ludwigia peploides and *Persicaria* sp.	Floating water primrose and knotweed species	6.7%
Ludwigia peploides, Persicaria sp., and Veronica anagallis-aquatica	Floating water primrose, knotweed species, and water speedwell	1.7%
Schoenoplectus californicus, Schoenoplectus acutus, and *Sparganium eurycarpum*	California bulrush, hardstem bulrush, and giant bur-reed	0.2%
Typha sp.	Cattail species	0.8%
Veronica anagallis-aquatica	Water speedwell	22.5%
Total		**32.0%**

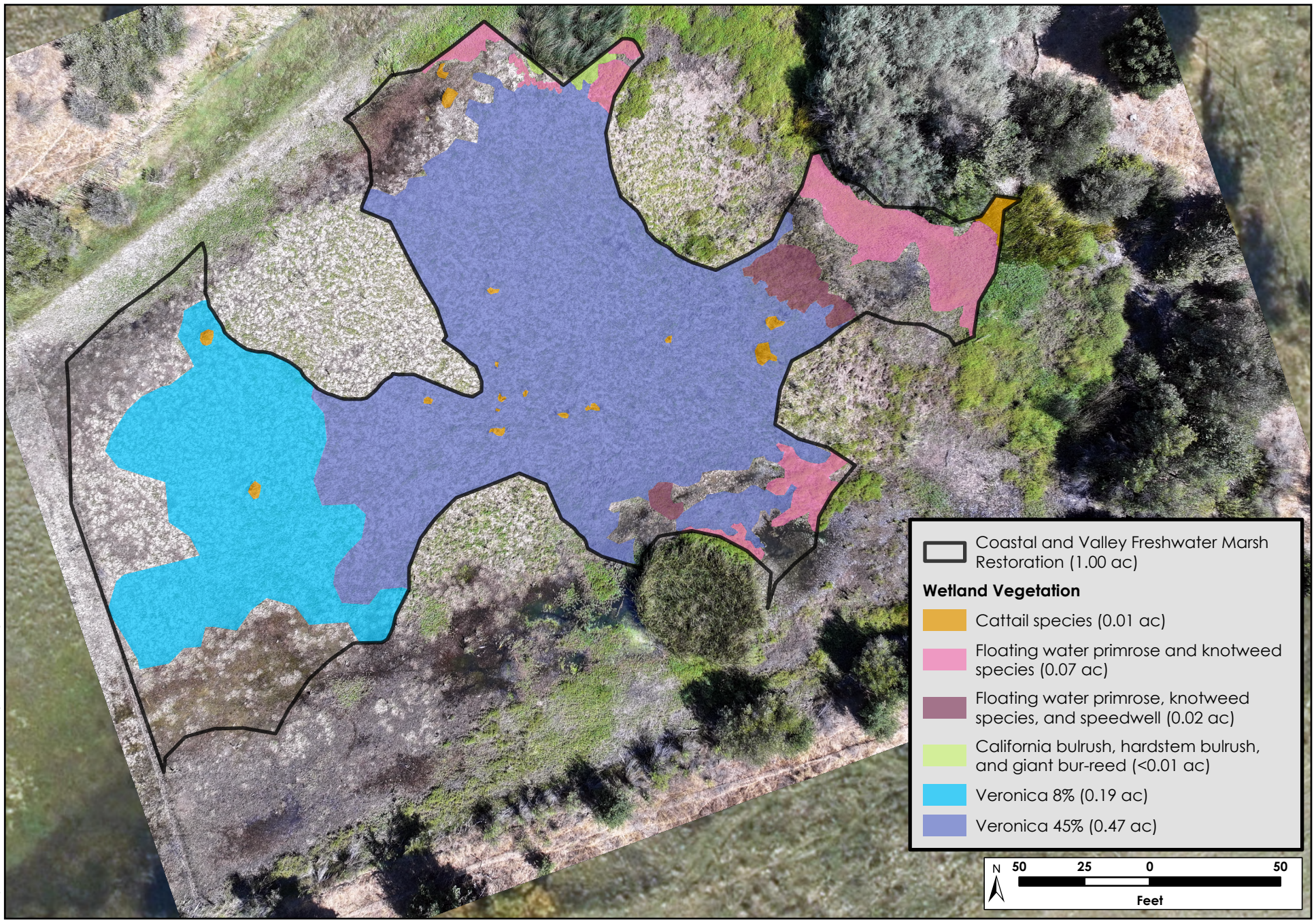

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Figure 7. Coastal and Valley Freshwater Marsh Restoration Vegetation Cover
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3.9 Temporarily Disturbed Areas

In Year 2, the average percent cover of vegetation along the secondary channel grading area side slopes was 68.3%, with a 95% confidence interval [50.4, 86.2] (Table 13). Therefore, the Year 1 performance standard of 70.0% was not met in Year 2 (Table 4). However, the percent cover was close to the performance standard, and the upper limit of the 95% confidence interval exceeds the performance standard. In addition, no problematic erosion was observed in the secondary channels, and some variability in cover is to be expected due to flows removing seed from channel sides. The ability to move dynamically is desirable for the function of the secondary channels, and regular erosion monitoring is planned annually for the entire monitoring period. Therefore, no additional monitoring of temporarily disturbed areas is recommended.

Dominant vegetation in the temporarily disturbed areas primarily included non-native species that typically occur in California annual grasslands, such as clustered clover, Italian thistle, rose clover, and wild oat (*Avena fatua*). Small fescue (*Festuca microstachys*), a native species that was seeded in all temporarily disturbed areas, has also established at moderate densities within the secondary channel grading area side slopes (Table 13).

Table 13. Average Vegetation Cover of Secondary Channel Grading Area Side Slopes

			Average Vegetation Cover (%)	
Scientific Name	**Common Name**	**Status (Cal-IPC Rating)[1]**	**Year 1**	**Year 2**
Avena fatua	Wild oat	Non-Native (Moderate)	16.4	7.5
*Bromus carinatus**	California brome	Native	1.0	0.2
Bromus diandrus	Ripgut brome	Non-Native (Moderate)	0.8	1.9
Bromus hordeaceus	Soft brome	Non-Native (Limited)	5.3	4.1
Bromus madritensis ssp. rubens	Red brome	Invasive (High)	0.1	1.0
Carduus pycnocephalus	Italian thistle	Non-Native (Moderate)	1.0	7.9
Centaurea melitensis	Tocalote	Non-Native (Moderate)	0.3	0.5
Centaurea solstitialis	Yellow star thistle	Invasive (High)	0.4	-
Croton setiger	Turkey-mullein	Native	1.0	0.1
Dittrichia graveolens	Stinkwort	Non-Native (Moderate)	0.3	-
*Elymus glaucus**	Blue wildrye	Native	0.3	0.3
Epilobium brachycarpum	Tall annual willowherb	Native	-	0.1
Erigeron canadensis	Canada horseweed	Native	0.5	0.6
Erodium cicutarium	Redstem stork's bill	Non-Native (Limited)	-	1.9
*Eschscholzia californica**	California poppy	Native	0.8	1.6
*Festuca microstachys**	Small fescue	Native	11.3	7.9

			Average Vegetation Cover (%)	
Scientific Name	**Common Name**	**Status (Cal-IPC Rating)[1]**	**Year 1**	**Year 2**
Festuca myuros	Rattail sixweeks grass	Non-Native (Moderate)	0.2	1.1
Festuca perennis	Italian rye grass	Non-Native (Moderate)	1.8	1.1
Geranium dissectum	Cutleaf geranium	Non-Native (Limited)	-	0.3
Grindelia camporum	Common gumplant	Native	0.1	-
Heterotheca oregona	Oregon golden aster	Native	1.8	-
Hirschfeldia incana	Short podded mustard	Non-Native (Moderate)	2.0	2.6
Hordeum marinum	Seaside barley	Non-Native (Moderate)	2.5	0.3
Hordeum murinum	Foxtail barley	Non-Native (Moderate)	0.5	0.2
Juncus bufonius	Toad rush	Native	0.6	-
Logfia gallica	Narrowleaf cottonrose	Non-Native	0.3	-
*Lupinus succulentus**	Arroyo lupine	Native	2.2	0.8
Medicago polymorpha	Bur clover	Non-Native (Limited)	-	1.1
Melilotus indicus	Annual yellow sweetclover	Non-Native	0.6	1.5
Polypogon monspeliensis	Rabbitsfoot grass	Non-Native (Limited)	0.8	-
Pseudognaphalium luteoalbum	Jersey cudweed	Non-Native	-	0.1
Sonchus asper	Spiny sowthistle	Non-Native	-	0.1
*Stipa pulchra**	Purple needle grass	Native	0.1	-
Trifolium angustifolium	Narrow leaved clover	Non-Native	0.5	-
Trifolium campestre	Field clover	Non-Native	0.6	0.6
Trifolium glomeratum	Clustered clover	Non-Native	8.7	15.2
Trifolium hirtum	Rose clover	Non-Native (Limited)	-	7.7
Total			**62.8**	**68.3**
Total Invasive Cover[2]			**0.5**	**1.0**

[1] Cal-IPC = California Invasive Plant Council (Cal-IPC 2025)

[2] Per the Mitigation and Monitoring Plan, invasive plant species are defined as those categorized as highly invasive by the Cal-IPC.

* Seeded species from the Pacheco Creek Restoration Project As-Built Report Notification Report (H. T. Harvey & Associates 2024)

3.10 Wildlife Monitoring

3.10.1 California Red-Legged Frog

Two adult California red-legged frogs were observed in Pond 3 during Year 2 monitoring on March 27, 2025 (Table 14). Additionally, one unconfirmed California red-legged frog was observed on March 27 in a small pond between Pacheco Creek and Pond 3 (located at 37.0317248, -121.3200266). Habitat Agency biologists Matthew Fogarty and Ben Teton also observed two adult red-legged frogs in Pond 1 on September 22, 2025, and one adult red-legged frog in Pond 1 on October 12, 2025. No red-legged frog egg masses were observed in the ponds during Year 2 monitoring.

Table 14. Wildlife and Aquatic Predator Surveys – Level of Effort and Results

Date	Survey Type	Observer	Pond Mitigation Site Results
March 25, 2025	Diurnal northwestern pond turtle and aquatic predator visual survey	Emily Malkauskas, Dani Christensen	Two adult northwestern pond turtles observed at Pond 1 and one adult northwestern pond turtle observed at Pond 3; American bullfrogs observed at Pond 2
March 27, 2025	Nocturnal California red-legged frog and aquatic predator visual survey	Emily Malkauskas, Jazmine Jensen	Two adult California red-legged frogs observed at Pond 3; American bullfrogs observed at Ponds 1, 2 and 3
April 30, 2025	Diurnal California red-legged frog and California tiger salamander dipnet survey; northwestern pond turtle, tricolored blackbird and aquatic predator visual survey	Emily Malkauskas, Lauren Salazar	Two adult northwestern pond turtles observed at Pond 1; colony of approx. 200 tricolored blackbirds observed near Pond 1, American bullfrogs observed at Ponds 1, 2 and 3
May 22, 2025	Diurnal California red-legged frog and California tiger salamander dipnet survey; northwestern pond turtle, tricolored blackbird and aquatic predator visual survey	Emily Malkauskas	Three adult northwestern pond turtles observed basking at edge of Pond 1; American bullfrogs observed at Ponds 1 and 3

3.10.2 California Tiger Salamander

No California tiger salamanders or egg masses were observed in the ponds during Year 2 monitoring (Table 14). California tiger salamanders have not been observed on or close to the project site. The nearest records of California tiger salamander are approximately 3 mi northwest of the site on the north side of SR-152, with an additional record approximately 2.7 mi southeast of the site, on the south side of SR-152 (H. T. Harvey 2015, California Natural Diversity Database 2025).

3.10.3 Northwestern Pond Turtle

The site provides suitable northwestern pond turtle habitat. Northwestern pond turtles were observed at Ponds 1 and 3 during Year 2 monitoring (Table 14).

3.10.4 Tricolored Blackbird

Tricolored blackbird nesting habitat is present at Pond 3 in the form of aquatic emergent vegetation. However, the area of CVFM was significantly reduced in size in the winter of 2023-2024 due to a combination of high flows and severe pig browse prior to the installation of exclusion fencing, thereby reducing the amount and quality of tricolored blackbird nesting habitat to the extent that is currently marginal habitat at best. A colony of approximately 200 tricolored blackbirds and at least one nest was observed nearby, but outside of the restoration site, within and surrounding a thick mustard patch (located at 37.01576, -121.33183) on April 30, 2025. Female tricolored blackbirds were observed repeatedly carrying food to the mustard patch, indicating that multiple nests and/or recently fledged dependent young were present. A subsequent site visit the weekend of May 3-4 observed that the colony was no longer active, and may have failed.

Wildlife results are further detailed in Table 14.

3.10.5 Comparison to Performance Standards

There are no performance standards or success criteria associated with wildlife use of the site. Surveys for Habitat Plan-covered species, including California red-legged frog, California tiger salamander, northwestern pond turtle, and tricolored blackbird, as well as American bullfrogs, will be used to inform site management.

3.11 Maintenance

The maintenance contractor, Triangle, performed regular site maintenance. Maintenance activities included invasive species removal, including removal of stinkwort, yellow star thistle, and perennial pepperweed. Triangle also irrigated all plantings in the SAW habitat restoration areas approximately once per week in March through September and reduced to once every other week in October. No irrigation was provided in November though February.

3.12 Photo Documentation

Photo documentation is presented in Appendix B.

Section 4. Maintenance Recommendations

Based on the results of Year 2 monitoring, the following actions are recommended for maintaining the site in Year 3 (2026):

- **Install Replacement Plants in the SAW Habitat Restoration Areas—**The project's MMP requires replacement of all dead plants in Year 2. Replanting to 100% of initial planting numbers in SAW habitat restoration areas will help facilitate rapid establishment of the target habitats and increase the likelihood that the site will achieve the performance and final success criteria by Year 10 (2033). Replacement plants should coincide with the locations of dead/failed conspecific tree and shrubs to the extent feasible. During replanting, install root protection cages and incorporate compost into planting basins. Root protection cages should be made of hexagonal woven wire mesh (3/4-inch mesh size) with approximately a 5-year design life in the soil. The basket dimension should be at least double the size of the seedling root ball. Compost should be added at a 1:4 (compost to native soil) ratio to increase water retention in soil.

Table 15. Recommended Replacement Planting by SAW Habitat Restoration Area

SAW Area	# Dead Sycamores To Replace	# Other Trees and Shrubs To Replace
SAW 1	35	53
SAW 2	17	17
SAW 3	2	4
SAW 4	24	0
Total	**78**	**74**

Definitions: SAW = sycamore alluvial woodland

- **Replenish Coarse Wood Chip Mulch in All Irrigation Basins in the SAW Planting Areas**—Replenish coarse wood chip much to a thickness of 3 inches in all irrigation basins to aid in soil moisture conservation. Continue to maintain wood chip mulch throughout the dry season.

- **Install Replacement Willow Stakes in the WRPs—**The performance criterion for survival of installed willow stakes was not met in Year 2. The project's MMP requires replacement of all dead willow stakes to 100% of the initial installation numbers. Therefore, 96 replacement willow stakes should be installed in willow riparian and mixed riparian forest and woodland areas (Table 9). We recommend that replacement plantings not be installed in former planting areas with 0% survival. Instead, additional stakes should be installed in or near areas with some stake survival, and new suitable locations should be identified by a restoration ecologist. Installation locations and quantities should be documented to aid in future monitoring efforts. We further recommend that 50% of the willow stakes be replaced with mulefat, which may have higher survival rates.

- **Irrigate All Installed Plants in the SAW Habitat Restoration Areas—**All installed plants should be irrigated during Year 3 (2026). Irrigation should consist of watering two times per month with approximately 10 gallons per event during the dry season (approximately April through October), or as recommended by the monitoring ecologist.

- **Prevent Grazing Animals (e.g., cattle) from Damaging Young California Sycamores—**If flash grazing is to be implemented for vegetation removal, a detailed survey should be conducted to locate and protect any naturally recruited California sycamore seedlings/saplings just prior to the flash grazing event. Seedling and sapling protection should be provided by temporary electric fencing or welded wire browse protection cages held in place by metal T-posts or 2-inch-wide lodge pole stakes during grazing events. The cages should be as large as required to protect them from browse during the grazing event and expanded or removed to prevent the trees from growing and becoming entangled in the cages.

- **Continue to Control Invasive Plant Species throughout the Site and Competing Herbaceous Vegetation in Each Irrigation Basin—**Spread of invasive plant species could compromise attainment of the site's final success criteria. All invasive plant species should continue to be removed by hand, removing as much of the root and stem material as possible. If invasive plants are observed to be in flower or seed, the flower and/or seed heads should be cut, bagged, and removed off site. The irrigation basins in the SAW habitat restoration areas should be kept weed free by maintaining a coarse wood mulch layer and manually removing invasive plants and weeds that become established. Invasive species removal should occur regularly in riparian enhancement areas as well as active revegetation areas.

    - Yellow star thistle and perennial pepperweed should be priority species for control. Control should occur during multiple visits from spring through fall, following germination and growth, and prior to flowering and/or seed set, in the areas with the densest populations of invasive plant species. Both species should be assessed and controlled in the late spring, summer, and fall.

    - Because red brome is also an invasive species, it is also a target for control. Red brome should be searched for and controlled in the spring. Red brome seed may also be collected and disposed of during other control events to avoid further spread.

    - Although floating water primrose is also invasive, this species is easily spread by root fragments and likely to be outcompeted by tall emergent vegetation over time. Therefore, this species is not a key target for control.

    - Non-invasive, non-native species such as fennel, stinkwort, poison hemlock, black mustard, and Italian thistle, should also be controlled in areas where they may compete with establishment of the target habitats or areas where they grow particularly densely. These species should be targeted for survey and removal in the spring, with the exception of stinkwort, which appears in summer and should be removed prior to going to seed in late summer/early fall.

- Non-native species such as rabbitsfoot grass and bur clover should be controlled in the seasonal wetland, to provide a greater competitive edge to native wetland species. These species should be targeted for survey and removal in the spring.

Section 5. References

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Appendix A. Hydrologic and Geomorphic Monitoring Report

TECHNICAL MEMORANDUM

Date:	October 24, 2025
To:	Nathan Hale (SCVHA) and Kate Drake (HT Harvey & Associates)
From:	Chris Hammersmark and Evan Pesut
Project:	19-1011-4 Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring
Subject:	Year 2 (2025) Monitoring & Performance Assessment Technical Memorandum

1 INTRODUCTION

cbec was tasked with documenting the geomorphic adjustment of the constructed secondary channels and Pacheco Creek main channel within the vicinity of the secondary channel inlets after the project experienced two wet seasons. After the 2024-25 winter flow season, Chris Hammersmark and Evan Pesut conducted a visual geomorphic assessment and performed cross-section and longitudinal profile topographic surveys at the project site. This technical memorandum also summarizes the overall performance of the post-assisted log structure (PALS) installations as well as any noteworthy physical processes they influenced.

2 METHODS

2.1 HYDROLOGIC REGIME

The hydrologic regime of the project area was assessed through comparison of scaled U.S. Geological Survey (USGS) discharge records for Pacheco Creek (downscaled to the portion of the watershed above the project area) to the inundation discharge thresholds that were previously calculated for the secondary channels based upon hydraulic modeling of the as-built topographic condition (cbec 2024).

2.2 GEOMORPHIC CONDITON AND TOPOGRAPHIC SURVEY

A visual assessment of the geomorphic condition of the project's fluvial features was conducted by cbec geomorphologists (Chris Hammersmark and Evan Pesut) during a site visit on September 10th, 2025. The main channel, secondary channels (particularly the constructed inlets), adjacent floodplain areas, and the PALSs were the focus of the visual assessments. Concurrently with the visual assessment of the geomorphic conditions, repeat cross-section and longitudinal profile topographic surveys of the

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constructed secondary channels and Pacheco Creek main channel within the vicinity of the secondary channel inlets were performed. The repeat cross-section and longitudinal profile topographic surveys were performed with Trimble Real Time Kinematic (RTK) Global Positioning System (GPS) survey equipment and tied into the survey monuments established as a part of the as-built survey (HTH 2024).

3 RESULTS & DISCUSSION

3.1 HYDROLOGIC REGIME

The secondary channel network was designed to be inundated and well connected to the main channel during a 3-year recurrence interval event (estimated to be 2,201 cfs at the site). To account for potential deposition within the inlets as the channels geomorphologically adjust, some of the secondary channel inlets were designed to convey water out of the main channel at flows as low as 500 cfs. Hydraulic modeling of the as-built topographic condition verified that the constructed secondary channels became inundated as anticipated with the northernmost inlet (Secondary Channel 1, Figure 1) activating at flows slightly lower than the design (cbec 2024).

Figures 2 and 3 show the discharge data observed during the Year 1 (2023-24) and Year 2 (2024-25) winter flow seasons at the USGS Dunneville gage scaled to the project site. Comparing the calculated inundation thresholds to the scaled hydrograph indicates that each of the secondary channels experienced less than one day of inundation from only one individual runoff event (Table 1).

Table 1: Inundation Statistics Summary for the Secondary Channel Inlets

Secondary Channel Inlet	Estimated Activation Flow[1] (cfs)	Year 1 – 2023-4[1]		Year 2 – 2024-5	
		# of Separate Inundation Periods	Total Days of Inundation	# of Separate Inundation Periods	Total Days of Inundation
1	500	5	6.2	1	0.9
2	1,083	5	1.6	1	0.4
3	663	4	4.5	1	0.7
4	1,045	5	1.8	1	0.4
5	1,177	3	1.1	1	0.4
6	500	5	6.2	1	0.9
7	500	5	6.2	1	0.9
8	500	5	6.2	1	0.9

1) As reported in HTH 2025.

3.2 TOPOGRAPHIC SURVEY AND GEOMORPHIC CONDITION

Cross-section and longitudinal profile surveys were performed at the locations shown in Figure 1. During the as-built survey effort, cross-sections were established along every constructed secondary channel

except for secondary channels 5 and 8. Longitudinal surveys (aka Profiles) were conducted along an 1,800 ft long upstream reach of Pacheco Creek main channel, a 1,100 ft long downstream reach of Pacheco Creek main channel, and along every constructed secondary channel except for secondary channel 5. These surveys were repeated as a part of the Year 2 monitoring survey. The Pacheco Creek main channel and secondary channel survey profiles are provided in Figures 4 through 7. The four cross-sections of Pacheco Creek are shown in Figure 8 and the seven cross-sections of the secondary channels are shown in Figures 9 through 12.

Along the upstream reach of the main channel of Pacheco Creek (Figure 4), the hydraulic control point approximately 100 ft downstream of secondary channel inlet 1 increased in elevation by approximately 0.4 ft between stations 3+00 and 3+25. The Pacheco Creek main channel bed adjacent to the inlet of secondary channel 2 (station 7+30) showed little to no change. The most notable fluvial dynamism along the upstream reach of the main channel of Pacheco Creek is present between stations 11+25 and 14+50. The high point in the main channel of Pacheco Creek in the vicinity of the inlets of secondary channels 3 and 4 shifted upstream approximately 50 ft and decreased in elevation by approximately 0.3 ft. Despite the structural failure of every PALS within this reach, the Pacheco Creek main channel thalweg expressed more topographic heterogeneity and shifted towards secondary channels 3 and 4. Pacheco Creek cross-sections 1, 2, and 3 (Figure 8) are approximately located at stations 3+25, 9+90, and 14+75 on Figure 4, respectively.

The controlling thalweg elevation of secondary channel 1 increased in elevation by approximately 0.2 ft, while most of the surveyed profile remained mostly unchanged compared to the as-built condition except for an area of localized scour, located between station 12+40 and 13+60 (Figure 5). The change in the controlling thalweg elevations of secondary channels 2 and 3 between the as-built and year 2 conditions was negligible (Figure 6); however, secondary channel 3 shows signs of fine sediment deposition beginning at the downstream extent of the erosion control fabric (station 2+00) and extending down to the end of the surveyed profile. The secondary channel 4 inlet, adjacent to the previously mentioned fluvially dynamic reach of Pacheco Creek main channel, experienced an approximate 0.2 ft increase in the controlling thalweg elevation while the rest of year 2 surveyed profile varied minimally compared to the as-built condition (Figure 6). The cross-sections corresponding with secondary channels 1, 2, 3, and 4 are provided in Figures 9 through 11.

The downstream reach of the main channel of Pacheco Creek (Figure 7) exhibited several notable instances of fluvial dynamism in the vicinity of stations 1+00, 2+15, 3+15, 4+40, 4+90, and 6+00, all of which are collocated with PALS installations that structurally failed. Despite the fluvial dynamism that occurred since the as-built condition throughout this reach, the hydraulic controlling thalweg elevations adjacent and downstream of the secondary channel 7 inlet at station 5+50 and 6+75 remained mostly unchanged. Downstream of the PALS installations, topographic change has occurred immediately upstream and downstream of a natural log jam bolstered with a fallen mature tree spanning between station 9+50 and 9+75. Pacheco Creek cross-section 4 is located at approximately station 4+30.

The inlets of secondary channels 6 and 7 maintained steady invert elevations compared to the as-built condition and experienced pockets of erosion further downstream (Figure 7). The erosion present along

secondary channel 6 spanned stations 3+35 and 4+50 along the toe of the left bank. The erosion present along secondary channel 7 occurs immediately downstream of the installed erosion control fabric and spans between stations 2+45 and 3+25 with a small mound of existing material at station 2+60. Secondary channel 8 has experienced little to no change compared to the as-built condition. The cross-sections associated with secondary channels 6 and 7 are provided in Figures 11 and 12, respectively.

A total of 34 PALS were installed. 27 were installed within the vicinity of the constructed secondary channel network. As of September 10th, 2025, 8 PALS remained structurally intact and functional while the other 19 PALS have structurally failed (Figure 13). Despite the 70% failure rate of PALS within the vicinity of the constructed secondary channel network, failed PALS were responsible for notable topographic change and lateral migration towards secondary channel inlets 4 and 7. The uppermost three PALS located upstream of Secondary Channel 1 continue to deflect flow away from the right bank, towards the Secondary Channel 1 inlet. Just downstream, the two PALS that impede a primary flow path to the pond continue to function as expected. Two of the remaining 8 PALS, located about 100 ft downstream from the inlet to Secondary Channel 2, have driven fluvial dynamism in the Pacheco Creek main channel and created a preferential flow path across part of the left-bank floodplain toward the inlets of Secondary Channels 3 and 4. The remaining PAL, located near the Secondary Channel 4 inlet has led to sediment deposition upstream of the structure driving flow to the south, towards the secondary channel network. 7 PALS were installed approximately 1,000 ft downstream of the constructed secondary channel network and none of these installations remain functional (Figure 14). Based on visual reconnaissance alone, little to no topographic change was observed in the reach of PALS installed downstream of the constructed secondary channel network.

Although minor geomorphic adjustments have occurred within the project area, the project's secondary channel network continues to function as intended. While a large number of the installed PALSs failed, they appear to have driven the desired geomorphic channel adjustments, and the PALSs are not required for the project to function as intended.

4 RECOMMENDATIONS

Based upon the observations of this monitoring effort, the following recommendations are provided:

- The cross section and profile monitoring conducted as a part of this technical memorandum should be continued in order to document changes in the side channel connectivity, particularly if changes result in lesser degrees of hydraulic connectivity.
- Continue to monitor the minor erosional zones identified within secondary channels 1, 6, and 7. No action beyond future monitoring is suggested at this time.
- Despite the success of the geomorphic dynamism driven by the PALS, reconstruction of the PALS that failed is not recommended due to the installation cost and the lack of appropriate materials on site.

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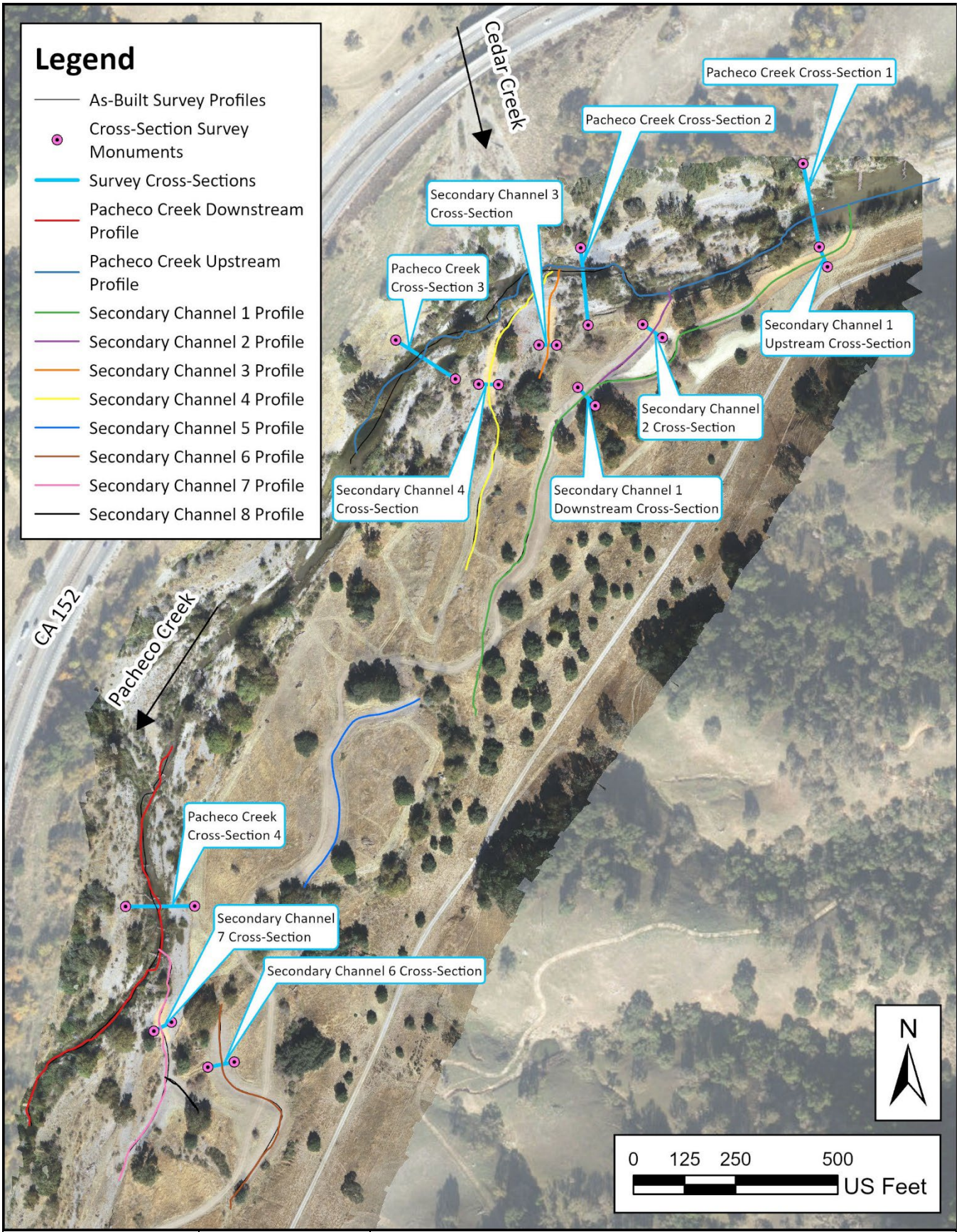
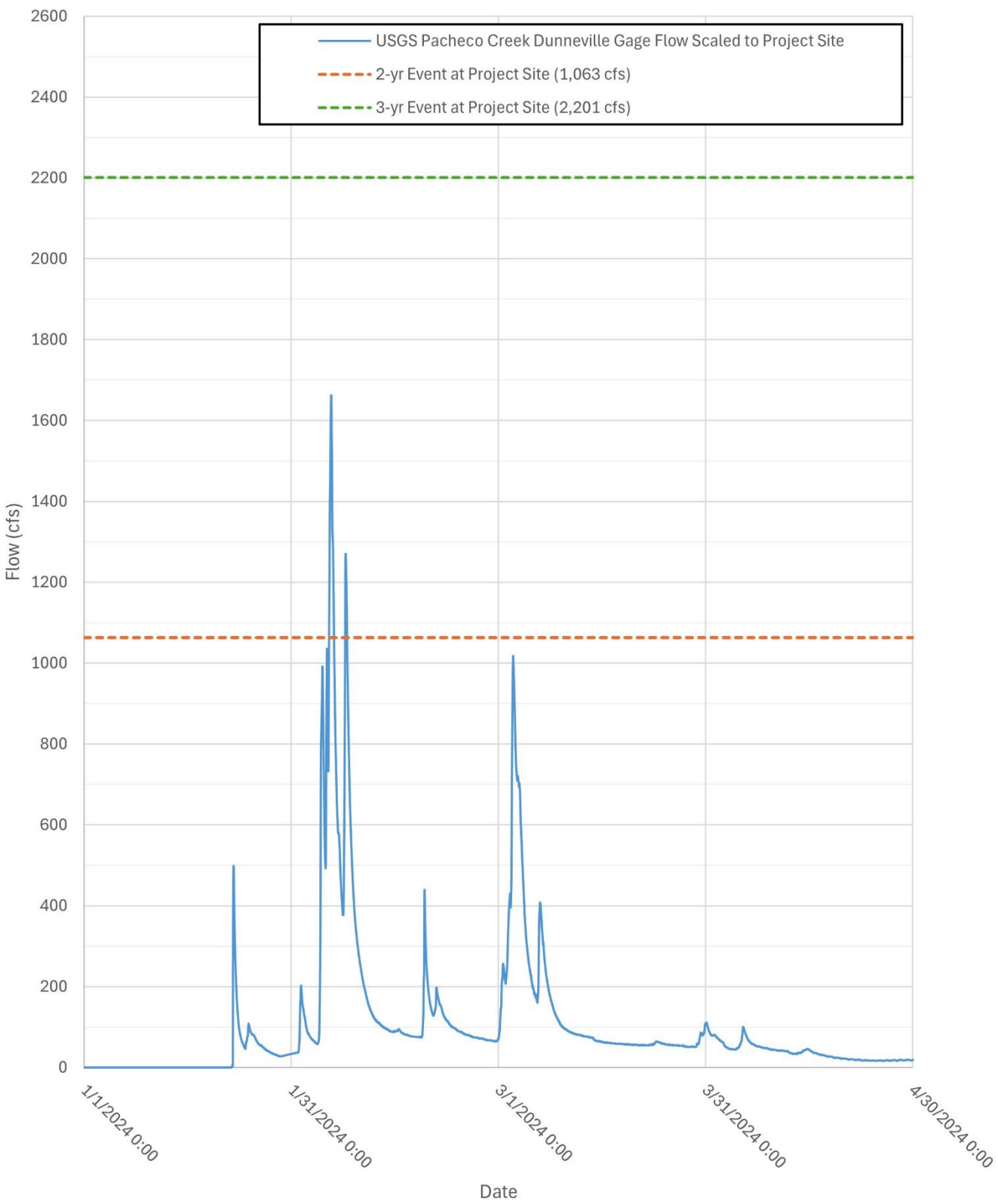
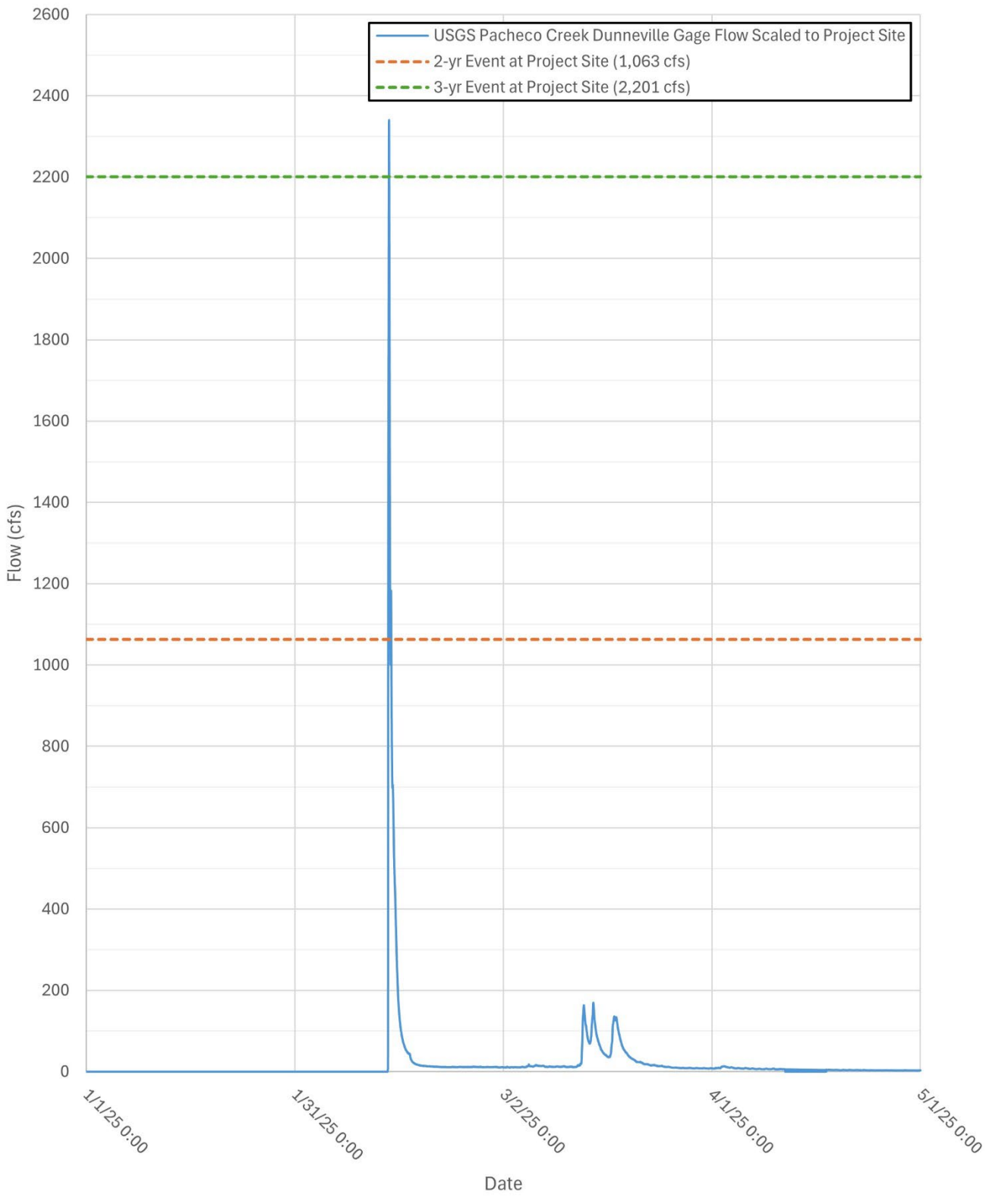


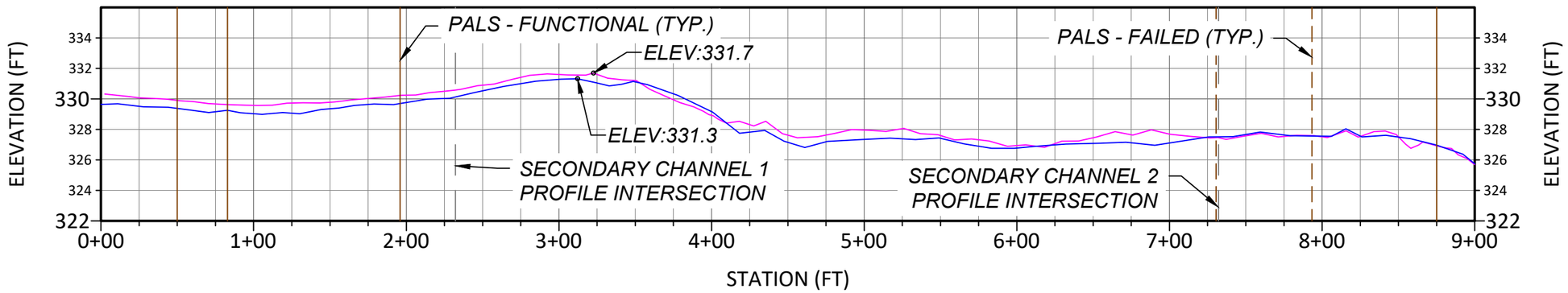
Notes: Secondary channel 5 was not surveyed for the as-built or year 2 monitoring effort.	cbec eco engineering A Verdantas Company	*Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring* **Year 2 Monitoring – Cross-Section & Profile Survey Plan View**		
		Project No. 19-1011-4	Created By: EMP	**Figure 1**



Notes:	cbec eco engineering A Verdantas Company	*Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring* **Year 1 (2023-24 Winter Flow Season) Hydrograph**		
		Project No. 19-1011-4	Created By: EMP	**Figure 2**

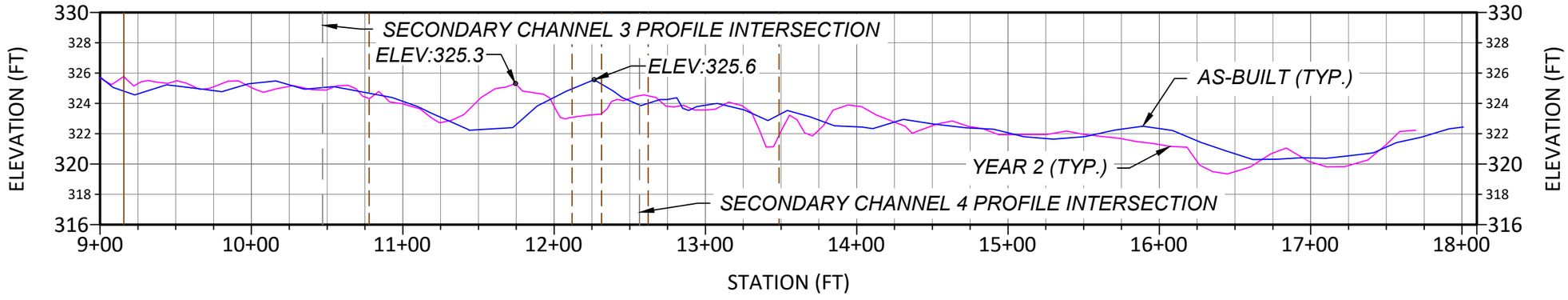


Notes:	cbec eco engineering A Verdantas Company	*Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring* **Year 2 (2024-25 Winter Flow Season) Hydrograph**		
		Project No. 19-1011-4	Created By: EMP	**Figure 3**



PACHECO CREEK UPSTREAM PROFILE (STA 0+00 to 9+00)

SCALE: H1" = 80', V1" = 8'



PACHECO CREEK UPSTREAM PROFILE (STA 9+00 to 18+10)

SCALE: H1" = 80', V1" = 8'

0 80 160 240 FT

Horizontal Scale 1" = 80'

0 8 16 24 FT

Vertical Scale 1" = 8'

Notes: The vertical datum for the elevations shown in the above profile plots is NAVD88. The as-built (blue) and year 2 (pink) monitoring survey efforts took place on 11/14/2023 and 9/10/2025, respectively.

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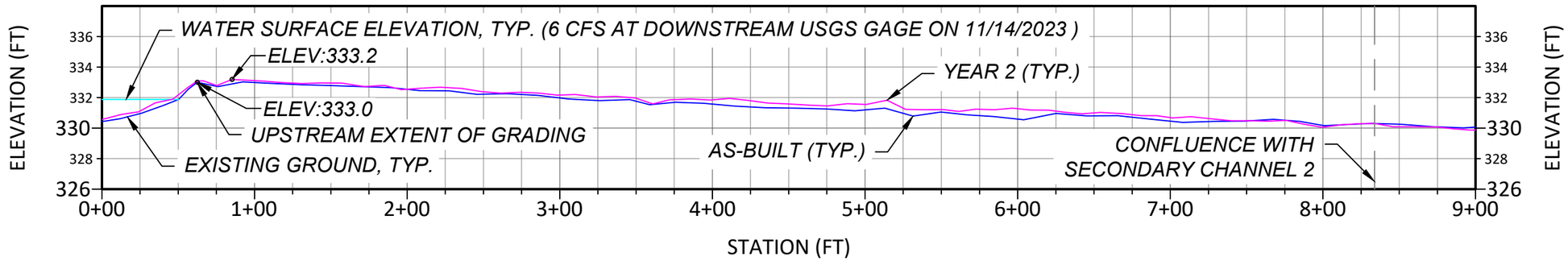
Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring

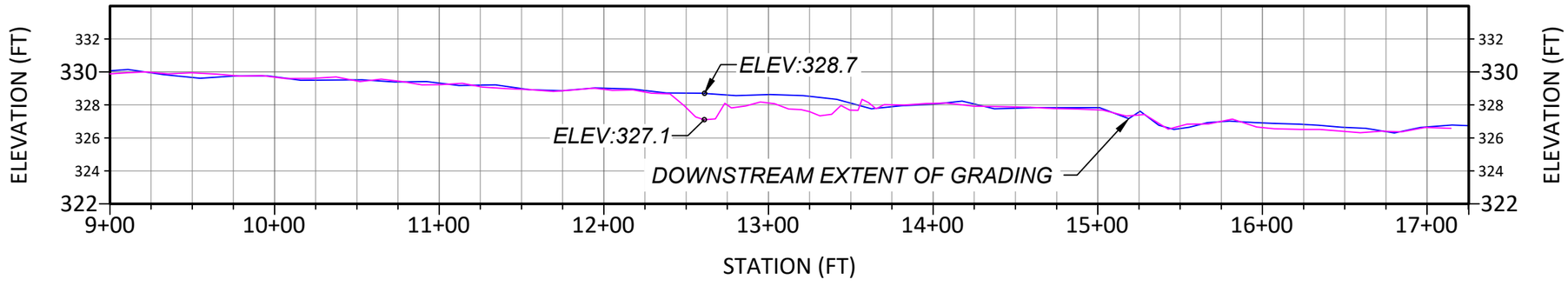
As-Built and Year 2 Profile View 1

Project No. 19-1011-4 | Created By: EMP | **Figure 4**



SECONDARY CHANNEL 1 PROFILE (STA 0+00 to 9+00)

SCALE: H1" = 80', V1" = 8'



SECONDARY CHANNEL 1 PROFILE (STA 9+00 to 17+25)

SCALE: H1" = 80', V1" = 8'

Horizontal Scale 1" = 80'

Vertical Scale 1" = 8'

Notes: The vertical datum for the elevations shown in the above profile plots is NAVD88. The as-built (blue) and year 2 (pink) monitoring survey efforts took place on 11/14/2023 on 9/10/2025, respectively.

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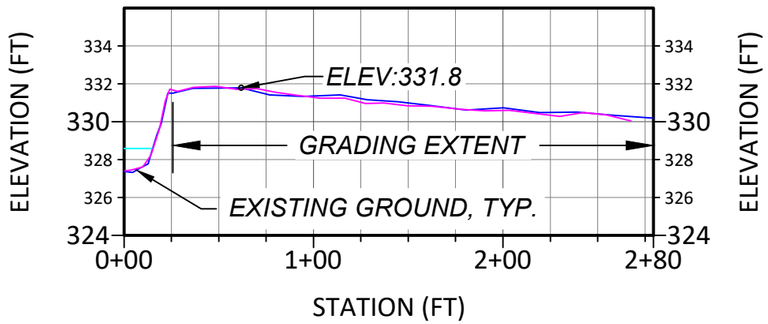
Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring

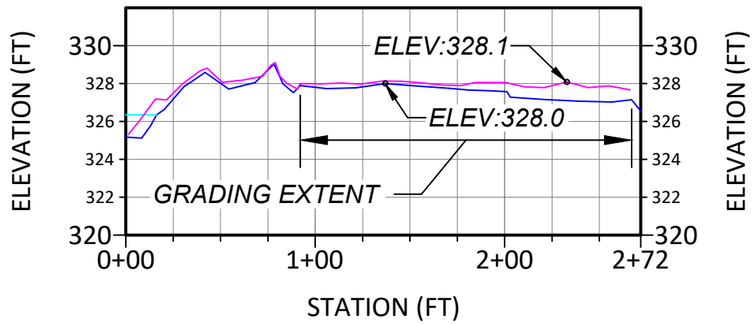
As-Built and Year 2 Profile View 2

Project No. 19-1011-4 | Created By: EMP | **Figure 5**



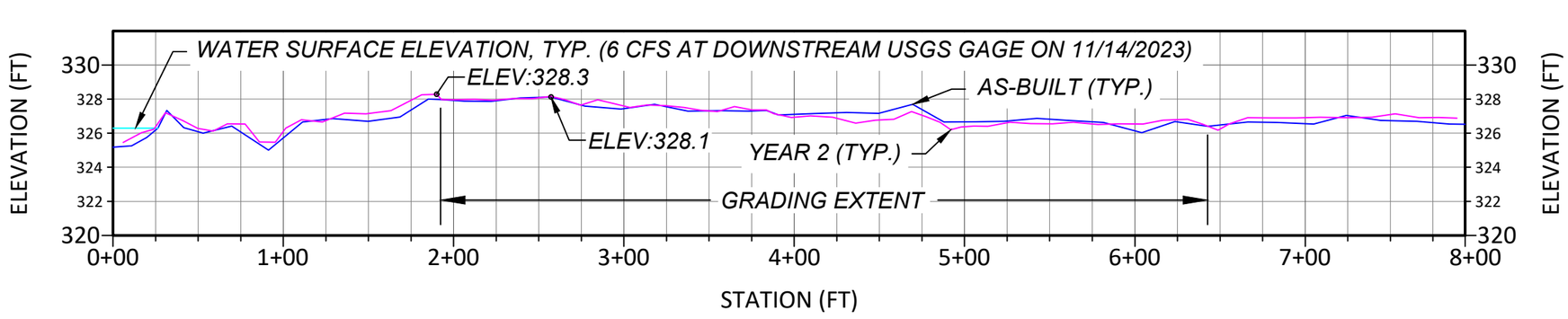
SECONDARY CHANNEL 2 PROFILE

SCALE: H1" = 80', V1" = 8'



SECONDARY CHANNEL 3 PROFILE

SCALE: H1" = 80', V1" = 8'



SECONDARY CHANNEL 4 PROFILE

SCALE: H1" = 80', V1" = 8'

0 80 160 240 FT

Horizontal Scale 1" = 80'

0 8 16 24 FT

Vertical Scale 1" = 8'

Notes: The vertical datum for the elevations shown in the above profile plots is NAVD88. The as-built (blue) and year 2 (pink) monitoring survey efforts took place on 11/14/2023 and 9/10/2025, respectively.

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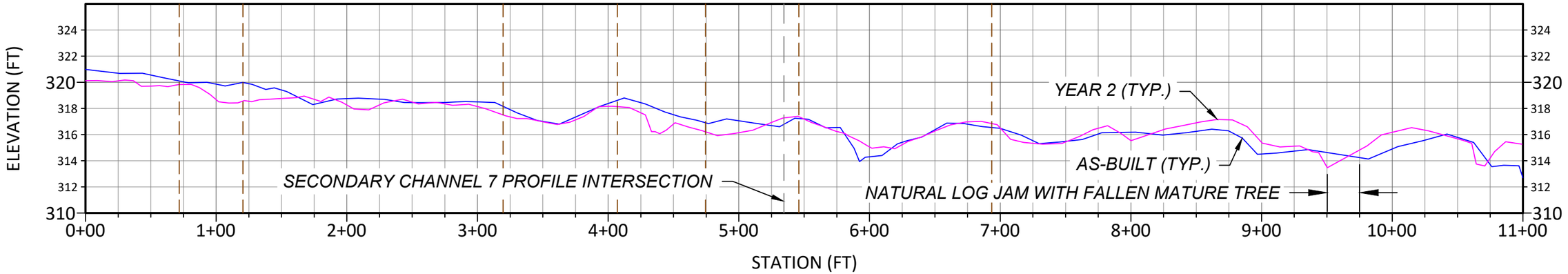
Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring

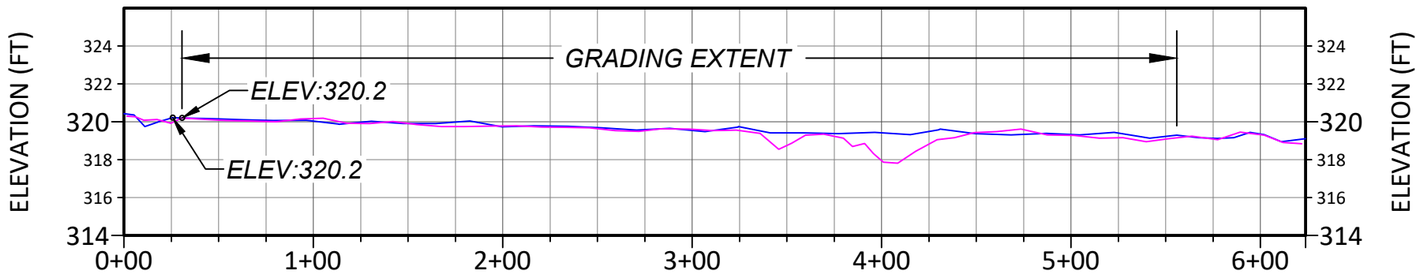
As-Built and Year 2 Profile View 3

Project No. 19-1011-4 | Created By: EMP | **Figure 6**



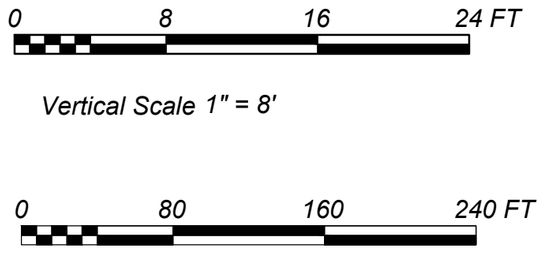
PACHECO CREEK DOWNSTREAM PROFILE

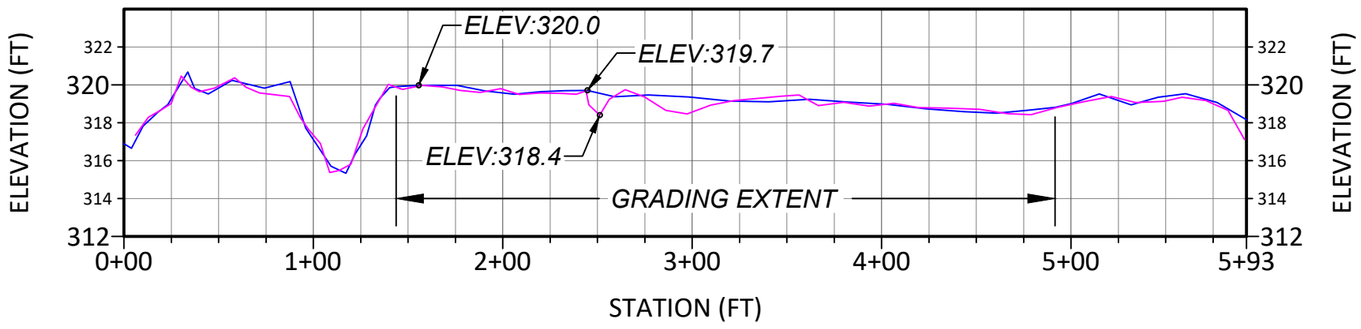
SCALE: H1" = 80', V1" = 8'



SECONDARY CHANNEL 6 PROFILE

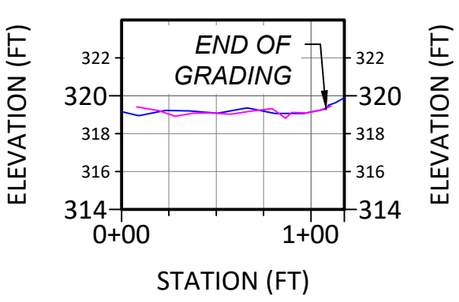
SCALE: H1" = 80', V1" = 8'





SECONDARY CHANNEL 7 PROFILE

SCALE: H1" = 80', V1" = 8'



SECONDARY CHANNEL 8 PROFILE

SCALE: H1" = 80', V1" = 8'

Notes: The vertical datum for the elevations shown in the above profile plots is NAVD88. The as-built (blue) and year 2 (pink) monitoring survey efforts took place on 11/14/2023 and 9/10/2025, respectively.

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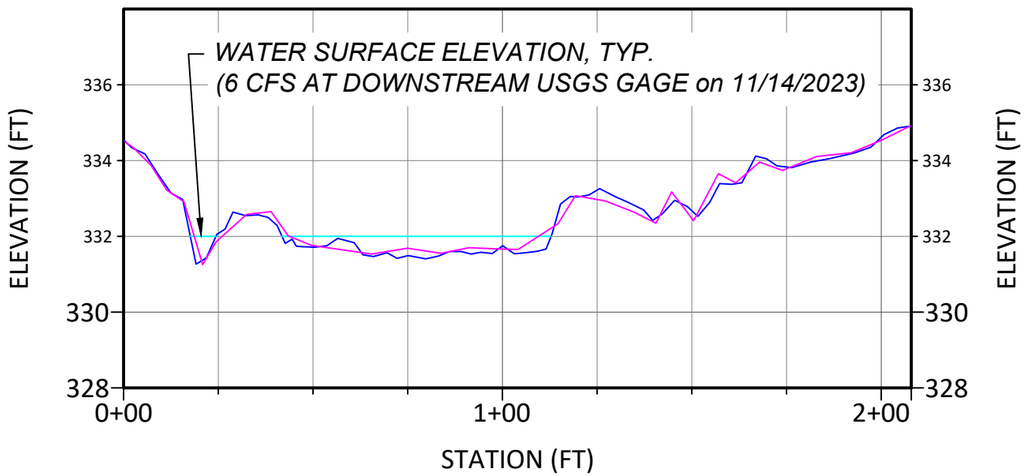
Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring

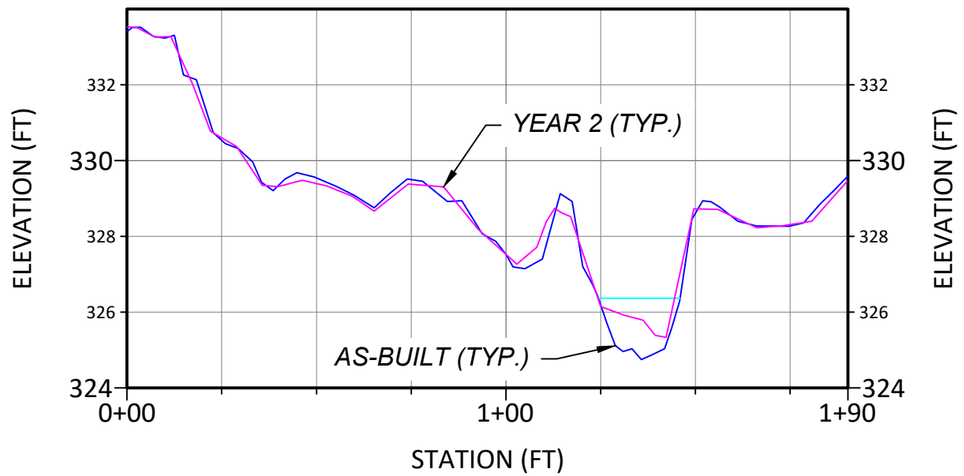
As-Built and Year 2 Profile View 4

Project No. 19-1011-4 | Created By: EMP | **Figure 7**



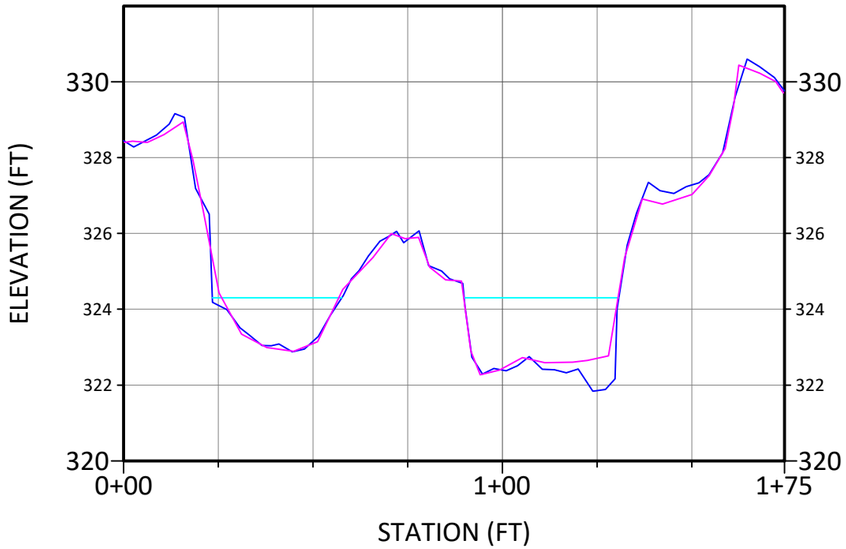
PACHECO CREEK CROSS-SECTION 1

SCALE: H1" = 40', V1" = 4'



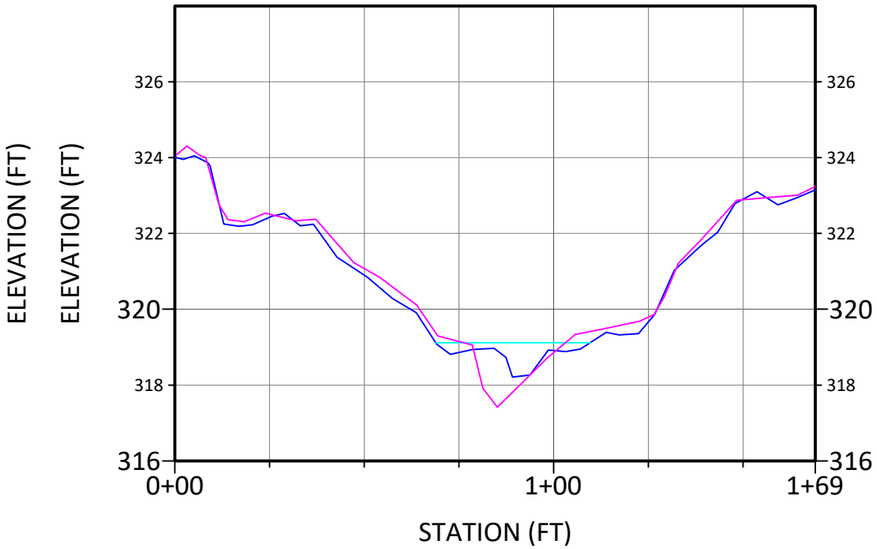
PACHECO CREEK CROSS-SECTION 2

SCALE: H1" = 40', V1" = 4'



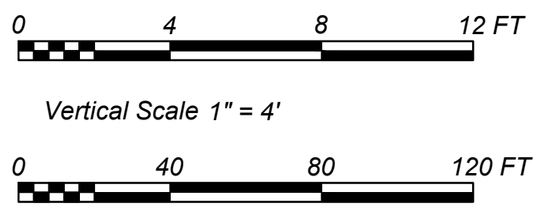
PACHECO CREEK CROSS-SECTION 3

SCALE: H1" = 40', V1" = 4'



PACHECO CREEK CROSS-SECTION 4

SCALE: H1" = 40', V1" = 4'



Notes: The vertical datum for the elevations shown in the above cross-section plots is NAVD88. Survey monuments are located at the starting and ending stations at each cross-section plot. The as-built (blue) and year 2 (pink) monitoring survey efforts took place on 11/14/2023 and 9/10/2025, respectively.

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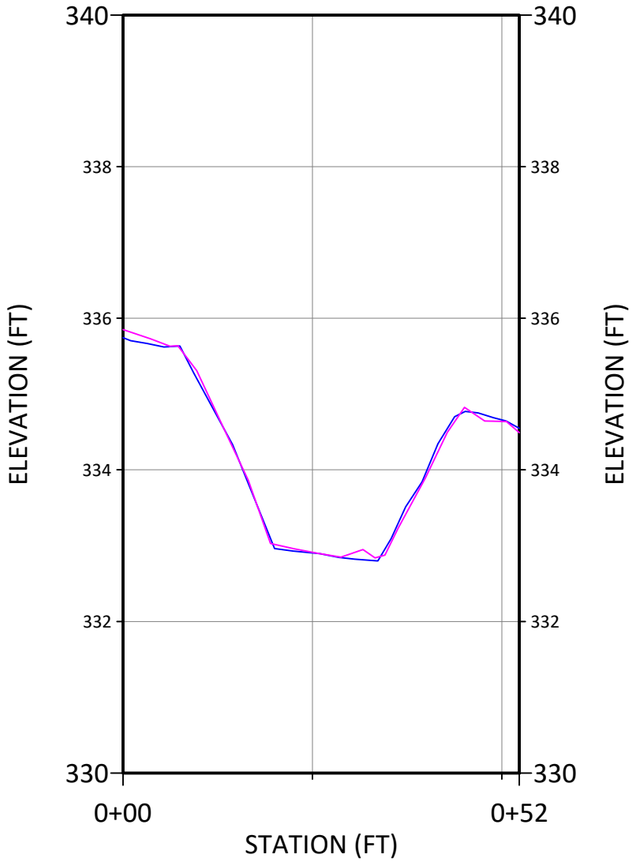
Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring

As-Built and Year 2 Cross-Section View 1

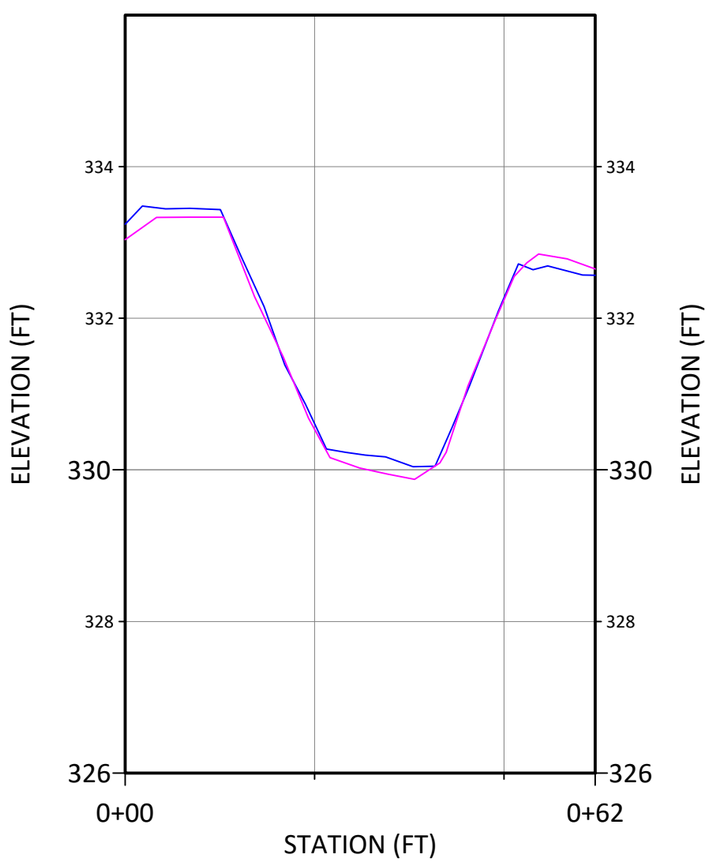
Project No. 19-1011-4	Created By: EMP	**Figure 8**

10/24/2025



SECONDARY CHANNEL 1 UPSTREAM CROSS-SECTION

SCALE: H1" = 20', V1" = 2'



SECONDARY CHANNEL 1 DOWNSTREAM CROSS-SECTION

SCALE: H1" = 20', V1" = 2'

Horizontal Scale 1" = 20'

Vertical Scale 1" = 2'

Notes: The vertical datum for the elevations shown in the above cross-section plots is NAVD88. Survey monuments are located at the starting and ending stations at each cross-section plot. The as-built (blue) and year 2 (pink) monitoring survey efforts took place on 11/14/2023 and 9/10/2025, respectively.

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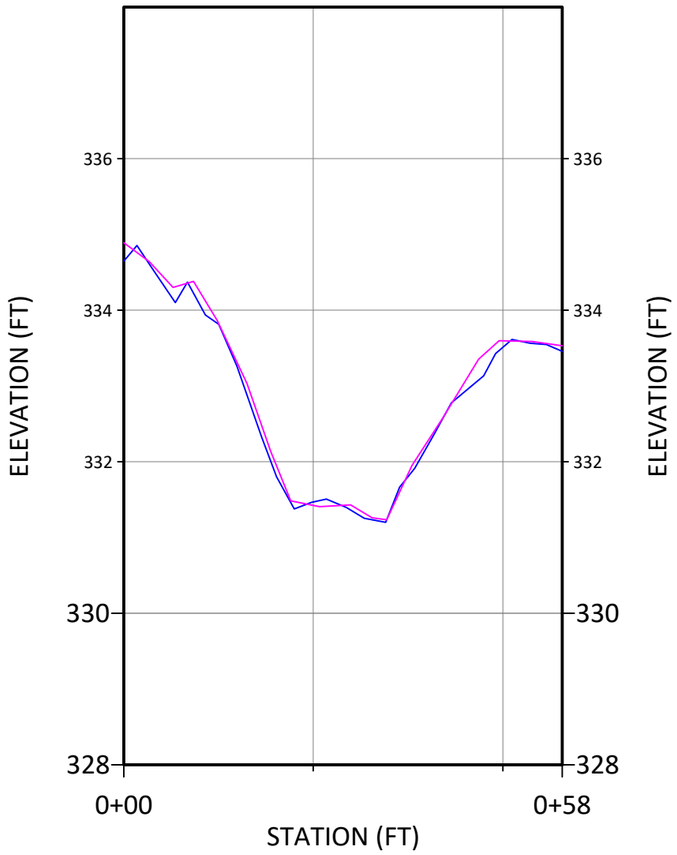
Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring

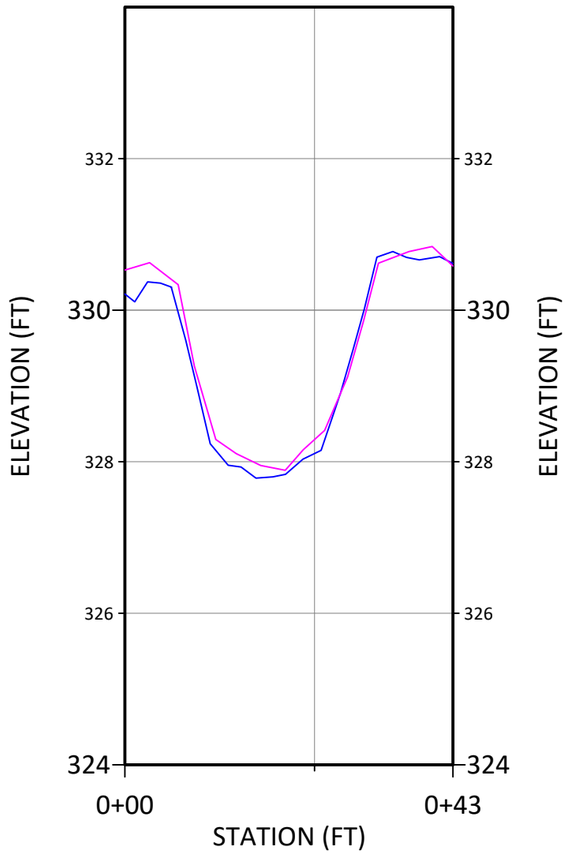
As-Built and Year 2 Cross-Section View 2

Project No. 19-1011-4 | Created By: EMP | **Figure 9**



SECONDARY CHANNEL 2 CROSS-SECTION

SCALE: H1" = 20', V1" = 2'



SECONDARY CHANNEL 3 CROSS-SECTION

SCALE: H1" = 20', V1" = 2'

Horizontal Scale 1" = 20'

Vertical Scale 1" = 2'

Notes: The vertical datum for the elevations shown in the above cross-section plots is NAVD88. Survey monuments are located at the starting and ending stations at each cross-section plot. The as-built (blue) and year 2 (pink) monitoring survey efforts took place on 11/14/2023 and 9/10/2025, respectively.

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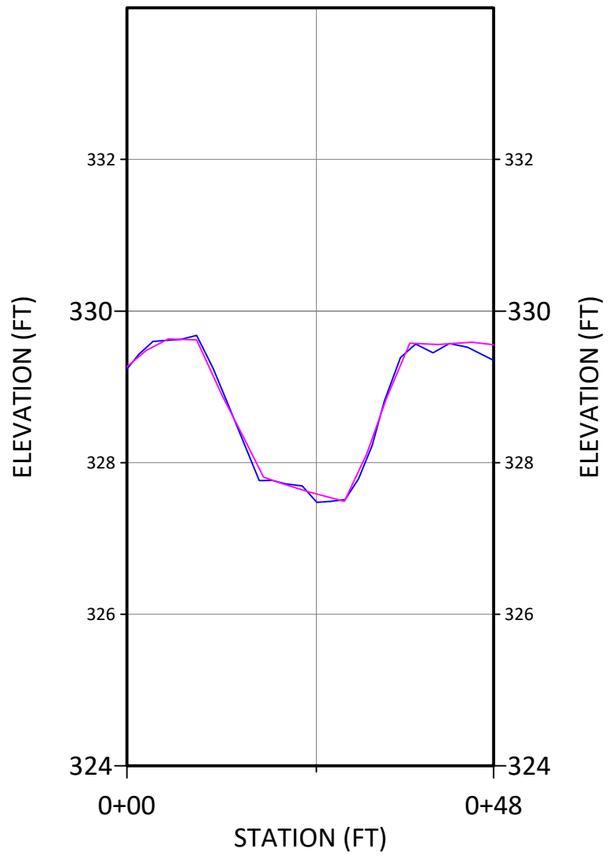
Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring

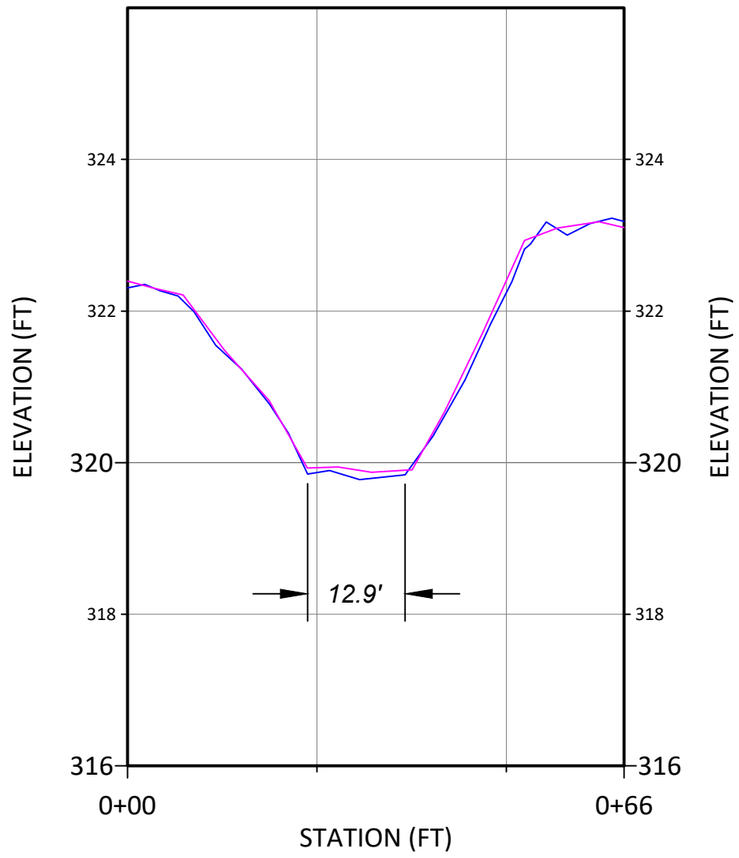
As-Built and Year 2 Cross-Section View 3

Project No. 19-1011-4 | Created By: EMP | **Figure 10**



SECONDARY CHANNEL 4 CROSS-SECTION

SCALE: H1" = 20', V1" = 2'



SECONDARY CHANNEL 6 CROSS-SECTION

SCALE: H1" = 20', V1" = 2'

Horizontal Scale 1" = 20'

Vertical Scale 1" = 2'

Notes: The vertical datum for the elevations shown in the above cross-section plots is NAVD88. Survey monuments are located at the starting and ending stations at each cross-section plot. The as-built (blue) and year 2 (pink) monitoring survey efforts took place on 11/14/2023 and 9/10/2025, respectively.

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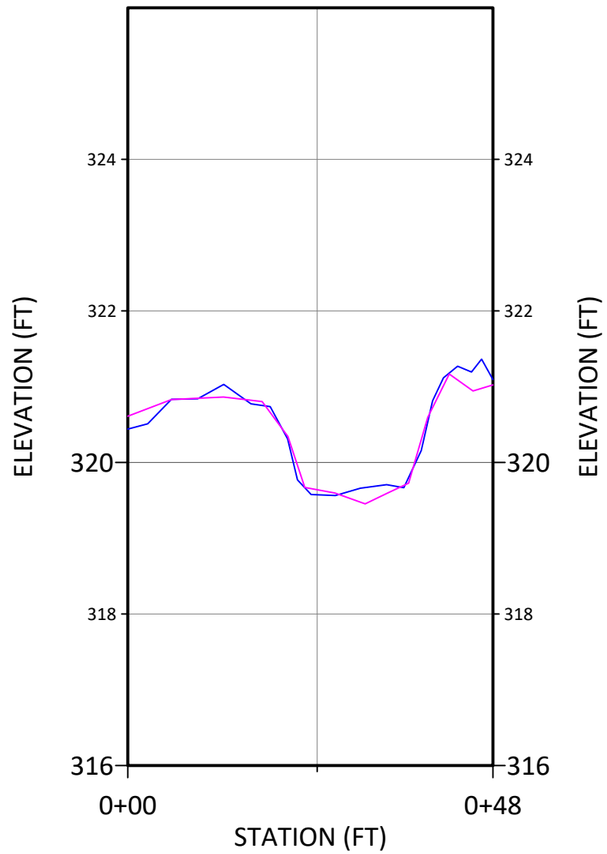
Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring

As-Built and Year 2 Cross-Section View 4

Project No. 19-1011-4 | Created By: EMP | **Figure 11**



SECONDARY CHANNEL 7 CROSS-SECTION

SCALE: H1" = 20', V1" = 2'

0 20 40 60 FT

Horizontal Scale 1" = 20'

0 2 4 6 FT

Vertical Scale 1" = 2'

Notes: The vertical datum for the elevations shown in the above cross-section plots is NAVD88. Survey monuments are located at the starting and ending stations at each cross-section plot. The as-built (blue) and year 2 (pink) monitoring survey efforts took place on 11/14/2023 and 9/10/2025, respectively.

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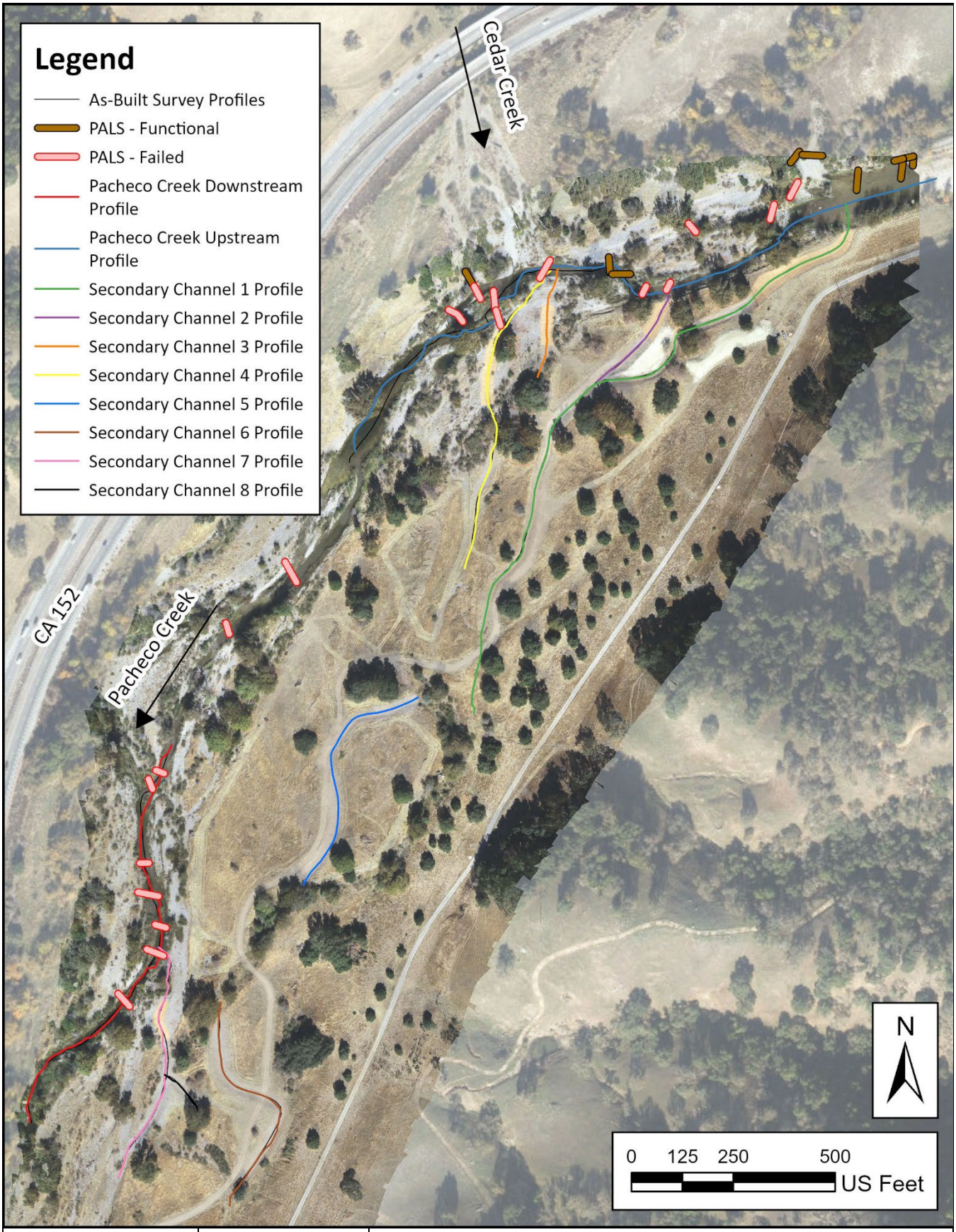
Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring

As-Built and Year 2 Cross-Section View 5

Project No. 19-1011-4 | Created By: EMP | **Figure 12**



Notes:

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Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring

Year 2 PALS Inventory in Vicinity of Secondary Channels

Project No. 19-1011-4 | Created By: EMP | **Figure 13**

Notes:	cbec eco engineering A Verdantas Company	*Pacheco Creek Restoration Project Year 1 & 2 Post-Construction MMP Monitoring* **Year 2 PALS Inventory Downstream of Secondary Channels**		
		Project No. 19-1011-4	Created By: EMP	**Figure 14**

Appendix B. Photo Documentation


Photopoint 1. Showing Seasonal Wetland Looking Southwest in Year 1 monitoring on July 17, 2024 (Left) and in Year 2 monitoring on May 22, 2025 (Right)


Photopoint 2. Showing Seasonal Wetland Looking North in Year 1 monitoring on July 17, 2024 (Left) and in Year 2 monitoring on May 22, 2025 (Right)


Photopoint 3. Showing Seasonal Wetland Looking Northeast in Year 1 monitoring on July 17, 2024 (Left) and in Year 2 monitoring on May 22, 2025 (Right)


Photopoint 4. As-Built Conditions Looking South, Showing Graded Secondary Channel 6 on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)


Photopoint 5. As-Built Conditions Looking South, Showing Graded Secondary Channel 7 on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)

Photopoint 6. As-Built Conditions Looking North, Showing SAW 1 From Southernmost Corner on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)

Photopoint 7. As-Built Conditions Looking East, Showing SAW 1 From West Fence Line on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)

Photopoint 8. As-Built Conditions Looking South, Showing SAW 1 From Northwest Corner on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)


Photopoint 9. As-Built Conditions Looking West, Showing SAW 1 From Northeast Corner on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)


Photopoint 10. As-Built Conditions Looking North, Showing SAW 1 From Southeast Corner on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)


Photopoint 11. As-Built Conditions Looking North, Showing SAW 2 From Southeast Corner on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)


Photopoint 12. As-Built Conditions Looking North, Showing SAW 2 From Southern Fenceline on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)


Photopoint 13. As-Built Conditions Looking East, Showing SAW 2 From Western Fenceline on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)


Photopoint 14. As-Built Conditions Looking South, Showing SAW 2 From Northern Corner on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)


Photopoint 15. As-Built Conditions Looking South, Showing Graded Secondary Channel 4 on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)


Photopoint 16. As-Built Conditions Looking South, Showing Graded Secondary Channel 3 on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)


Photopoint 17. As-Built Conditions Looking Northeast, Showing SAW 3 From Southern Corner on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)


Photopoint 18. As-Built Conditions Looking Southwest, Showing Graded Secondary Channel 2 through SAW 3 on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)


Photopoint 19. As-Built Conditions Looking Southwest, Showing Graded Secondary Channel 1 Adjacent to SAW 4 on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)


Photopoint 20. As-Built Conditions Looking Southwest, Showing SAW 4 From Outside Northeast Fenceline on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)

Photopoint 21. As-Built Conditions Looking Northeast, Showing SAW 4 From Southwest Corner on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)

Photopoint 22. As-Built Conditions Looking North, Showing Pond 3 From Southeast Bank Outside Fenceline on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)

Photopoint 23. As-Built Conditions Looking West, Showing Pond 3 From Bank Inside Fenceline on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)

Photopoint 23. As-Built Conditions Looking West, Showing Pond 3 From Bank Inside Fenceline, on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)

Photopoint 23. As-Built Conditions Looking Southeast, Showing Pond 3 From Peninsula Inside Fenceline on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)

Photopoint 24. As-Built Conditions Looking Southeast, Showing Pond 3 From Northwest Bank outside of Fenceline on March 20, 2024 (Left) and in Year 2 monitoring on September 19, 2025 (Right)