Arroyo Grande Creek Channel Waterway Management Program

National Marine Fisheries Service Biological Opinion Annual Report

prepared for

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1 Introduction

This Annual Status Report (report) has been prepared by Rincon Consultants, Inc. (Rincon) on behalf of the County of San Luis Obispo Flood Control and Water Conservation District (District) for the Arroyo Grande Creek Channel Waterway Management Program (WMP or Project).

The WMP provides for flood control and habitat improvement within the lower reaches of the Los Berros Creek Diversion Channel and Arroyo Grande Creek (Project reach or Project area). Construction within the Project area was completed in 2021, including construction of 22 sediment management zones (SMZ), levee modifications, creation of habitat improvement structures (42 log structures), and revegetation of the Project reach (see Appendix A, Project Overview).

This report serves as the fifth annual report, as required by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) Biological Opinion (Project BO) issued in November 2017 (NMFS 2017) for the South-Central California Coast steelhead (*Oncorhynchus mykiss*, steelhead).

Per Reasonable and Prudent Measure (RPM) 4 of the Project BO, the District shall provide a written yearly report to NMFS by January 15. This annual report provides a summary of WMP activities completed during the 2025 calendar year including:

- **Section 2 – Construction and Maintenance Activities**
  - Vegetation maintenance and monitoring
  - Levee repairs at the 2023 Breach Site Levee Repair Project
  - Annual sediment management activities
- **Section 3 – Monitoring of Fish Habitat Improvement Structures and Water Quality**
  - Status of log structures and alcoves
  - Water quality monitoring
- **Section 4 – Mitigation Monitoring and Revegetation Activities**
  - Revegetation activities including remedial actions for mitigation success (planting/reseeding)
  - Qualitative and quantitative assessment of mitigation areas

Section 5 reports steelhead observations and/or relocations, and Section 6 provides a status update on RPA Sub-Element 3. References are provided in Section 7. Appendix A provides Project Figures; 2025 Site Photographs are included in Appendix B. Appendix C includes Worker Environmental Awareness Training Program (WEAP) documentation and Appendix D includes the Log Structure and Alcove Monitoring Report (Wallace Group). Lastly, Appendix E provides 2025 Mitigation Monitoring Photographs.

Project activities completed in 2025 complied with all reasonable and prudent measures and associated terms and conditions of the Project BO, and applicable RPAs are referenced throughout the document.

2 Construction and Maintenance Activities

The WMP provides for vegetation management, levee raise and repair activities, and sediment management in established SMZs. Initial construction activities, periodic sediment management, and revegetation activities, prior to 2025, have been detailed in past annual reports (SWCA 2025). Construction and maintenance activities completed in 2025 are provided below.

2.1 Vegetation Management

Table 1 provides a summary of routine vegetation maintenance work completed in 2025. Vegetation management included control of non-native species with hand held equipment, grazing animals and herbicide application. Routine vegetation management also included woody vegetation removal with equipment. Representative photos are provided in Appendix B (2025 Site Photographs).

Table 1 Summary of Annual Maintenance Activities and Monitoring Support

Dates	Activity
4/21/2025	Vegetation management: levee top mowing
4/22/2025	Vegetation management: levee top mowing
4/23/2025	Vegetation management: levee top mowing
5/8/2025	Non-native vegetation removal: weed whipping and hand tools
6/26/2025	Non-native vegetation management: weed whipping and hand tools
7/10/2025	Non-native vegetation management: weed whipping and hand tools
7/17/2025	Non-native vegetation management: weed whipping, hand tools, mower
8/18/2025	Vegetation management for goat grazing corral fence: weed whipping and hand tools
8/19/2025-8/27/2025	Vegetation management for goat grazing corral fence: weed whipping/ goat grazing
8/28/2025-8/29/2025	Vegetation management: levee mowing
9/2/2025-9/26/2025[1]	Vegetation management: chainsaw and weed whipping
9/8/2025-9/15/2025	Vegetation management for goat grazing corral fence: weed whipping/ goat grazing
10/10/2025	Woody vegetation management: chainsaw
10/13/2025	Woody vegetation management: chainsaw
11/25/2025	Non-native vegetation removal: herbicide application
12/11/2025	Non-native vegetation removal: herbicide application
12/30/2025	Emergency Flood Control: downed tree and debris removal

[1]Dates excluding weekends

Vegetation management completed in 2025 included control of non-native vegetation within SMZs and levee banks, mowing of levee roads, and woody vegetation removal within the active and secondary channels. In all cases, pre-activity clearance surveys preceded the work, and biological monitors were on site, as needed to monitor and provide guidance.

Control of non-native vegetation was primarily completed with hand tools and weed whips. Goat grazing was implemented along levee banks–this process involved pre-activity clearance surveys for sensitive resources, setting up electric fencing, and allowing goats to browse existing vegetation. These vegetation control activities focused on areas with high non-native plant cover.

Woody vegetation removal was completed with a small crew using chainsaws and hand tools. Woody vegetation removal followed WMP guidelines, including removal of fallen and dead trees, trimming of woody vegetation within the channel to maintain 6 feet of vertical clearance from the streambed, and removal of woody vegetation (live or dead) within 20 feet upstream and downstream of the existing bridges. Cut woody vegetation was removed from the channel manually and chipped or placed into a truck on the levee for offsite disposal.

Herbicide applications of *Roundup Custom Aquatic* targeted newly emergent non-native species along the inner levee slopes of SMZ 7, 8 and 10. With the exception of emergency work on December 30 (downed tree and debris removal for flood control), all in-channel vegetation management activities were completed by October 15, 2025.

2.2 Construction and Sediment Management

Sediment management in 2025 occurred at SMZ 7 and the Union Pacific Railroad (UPRR) Bridge (directly adjacent to SMZ 7). Also included in this discussion are levee repairs completed on the south levee directly adjacent to the UPRR Bridge and SMZ 7 sediment management locations (2023 Breach Site Levee Repair Project). Representative photos are provided in Appendix B (2025 Site Photographs). Additional details are provided in the following sections.

Work was completed from October 1 through October 31, 2025. Workdays including pre-activity surveys, monitoring, aquatic species relocation and general construction monitoring are summarized in Table 2, below.

Table 2 Summary of Pre-Activity Surveys and Monitoring for Construction and Sediment Management Activities

Dates	Activity[1]
10/1/2025	Pre-activity survey
10/6/2025	Aquatic Species Relocation; construction monitoring (special status species, water quality)
10/7/2025	Construction monitoring (special status species, water quality)
10/8/2025	Construction monitoring (special status species, water quality)
10/13/2025	Construction monitoring (special status species, water quality)
10/15/2025	Aquatic Species Relocation; construction monitoring (special status species, water quality)
10/16/2025	Aquatic Species Relocation; construction monitoring (special status species, water quality)
10/17/2025	Aquatic Species Relocation; construction monitoring (special status species, water quality)
10/20/2025	Construction monitoring (special status species, water quality)
10/21/2025	Aquatic Species Relocation; construction monitoring (special status species, water quality)
10/22/2025	Aquatic Species Relocation; construction monitoring (special status species, water quality)
10/23/2025	Construction monitoring (special status species, water quality)
10/24/2025	Construction monitoring (special status species, water quality)
10/27/2025	Construction monitoring (special status species, water quality)
10/28/2025	Construction monitoring (special status species, water quality)
10/29/2025	Construction monitoring (special status species, water quality)
10/30/2025	Construction monitoring (special status species, water quality)
10/31/2025	Construction monitoring (special status species, water quality)

[1] US. Fish and Wildlife Service (USFWS) approved biological monitors completed pre-activity clearance surveys and/or monitoring for all activities.

2023 Breach Site Levee Repair

The 2023 Breach Site Levee Repair Project (Breach Site) involved the permanent repair of the location of a 2023 levee breach. The levee damage and resulting breach were caused by severe flooding during a January 2023 atmospheric river precipitation event. An emergency repair of the breach site was completed in 2023, however, deficiencies in the 2023 emergency repair were noted, due to the work occurring during high flows, including the bank's inability to support riparian vegetation–an ecological function and a primary objective of the WMP.

The District submitted the Arroyo Grande Creek WMP 2025 Secondary Sediment Management Plan (2025 Secondary SMP) on August 1, 2025, detailing the planned repair including stream diversion, addition of rock slope protection (RSP), and backfill with soil and riparian plantings. The 2025 Secondary SMP included construction drawings, a *Diversion Dewatering Plan* and *Fish Removal and Rescue Plan for Steelhead Trout and Tidewater Goby*.

Routine Sediment Management

Annual sediment management activities took place in late October, concurrent with the Breach Site repairs. Routine sediment management included sediment removal at SMZ 7 and sediment/vegetation removal 20 feet upstream and downstream of the UPRR Bridge. Sediment removal at SMZ 7 included excavation of approximately 300 cubic yards of sediment within approximately 190 linear feet of the secondary channel, contiguous with the UPRR Bridge.

2.3 Protective Measures

The following protective measures were implemented during all phases of construction and maintenance work.

Reasonable and Prudent Measures/Terms and Conditions

The Project BO includes four nondiscretionary reasonable and prudent measures (RPMs) including associated terms and conditions. Following are the four RPMs listed in the Project BO (NMFS 2017):

1. Undertake measures to ensure that adverse effects to S-CCC steelhead resulting from dewatering activities, water diversion construction and fish relocation is minimized;
2. Undertake measures to maintain water quality at pre-construction and pre-maintenance levels to avoid or minimize harm to steelhead;
3. Undertake measures to minimize effects to S-CCC steelhead resulting from habitat creation (i.e., placement of log structures and creation of alcoves);
4. Prepare and provide NMFS with plans(s) and report(s) describing how listed species in the action area would be protected and/or monitored and to document the effects of the action on listed species in the action area including yearly status reports on the progress toward completing RPA sub-element 3.

Qualified Biologists (RPM 1)

Compliance support activities such as WEAP training, pre-activity surveys, monitoring and handling of aquatic species were completed by qualified biologists, approved by US. Fish and Wildlife Service (USFWS). Pre-Activity surveys and monitoring for sensitive wildlife in April and May 2025 were completed by USFWS-approved SWCA biologists Sara Snyder, Katie Saenger, Galen Pelzmann and Kyle Suchy.

Rincon biologists were approved by the USFWS via email/letter dated May 6, 2025, from Joseph Brandt. The following Rincon biologists were approved to handle California red-legged frog (CRLF; *Rana draytonii*) independently: Thea Benson, Frances McKechnie, Charleene Rode, Adam Sachs, Michael Tom and Ryan Wardle. Additionally, biologists Jaran Passmore and Cynthia Martenson were approved to handle CRLF under the direction of an approved biologist. The same Rincon biologists have demonstrated experience handling and relocating steelhead, however, a formal approval process is not required by NMFS. Individual biologist credentials and/or documentation of approval can be provided upon request.

Pre-Construction Surveys and WEAP Training (RPM 1)

SWCA and Rincon qualified biologists completed WEAP training prior to all routine maintenance and emergency work. A list of Best Management Practices and terms and conditions of the Project BO was provided to District employees, contractors and other site personnel. Table 3 includes a summary of WEAP training completed in 2025. WEAP training documentation including training materials, and worker sign-in sheets are provided in Appendix C.

Table 3 Summary of 2025 WEAP Training

Date	Compliance Activity	Approved Biologist
4/16/2025	WEAP training KD Janni	SWCA[1]
6/26/2025	WEAP training California Men's Colony	Ryan Wardle
7/17/2025	WEAP training Ventura Brush Goats	Ryan Wardle
8/18/2025	WEAP training District crews, Ventura Brush Goats	Ryan Wardle
8/28/2025	WEAP training KD Janni	Adam Sachs
9/2/2025	WEAP training KD Janni	Ryan Wardle
9/4/2025	WEAP training KD Janni	Ryan Wardle
9/10/2025	WEAP training KD Janni	Ryan Wardle
9/16/2025	WEAP training KD Janni	Ryan Wardle
10/7/2025	District crews, Papich Construction	Adam Sachs
10/13/2025	District crews, Papich Construction	Frances McKechnie
10/16/2025	WEAP training Papich Construction	Frances McKechnie
10/19/2025	WEAP training County crews	Frances McKechnie
10/21/2025	WEAP training Papich Construction	Adam Sachs
10/27/2025	WEAP training Papich Construction	Adam Sachs
12/30/2025	WEAP training Bunyon Bros	Ryan Wardle

[1] WEAP training completed by USFWS approved SWCA biologists Sara Snyder, Katie Saenger, Galen Pelzmann and/or Kyle Suchy.

Diversion, Dewatering and Aquatic Species Relocation (RPM 1)

The 2025 Secondary SMP (submitted August 1, 2025) included construction drawings (including a dewatering exhibit), a *Diversion Dewatering Plan* and *Fish Removal and Rescue Plan for Steelhead Trout and Tidewater Goby*. Isolation of the work area, capture, relocation and dewatering proceeded as described in the 2025 Secondary SMP diversion and fish rescue plans. Diversion and dewatering activities at the Breach Site commenced on October 6 and were completed by October 27, 2025.

Seven fish species were captured and relocated at the Breach Site for a total of 307 individuals; no mortalities were recorded. Species common names and number captured and relocated are provided in Table 4. Steelhead capture and relocation is further summarized in Section 5 (Table 13).

Table 4 Summary of Aquatic Species Relocations

Date	Steelhead	California Roach	Three Spine Stickleback	Prickly Sculpin	Sacramento Sucker	Mosquito Fish	Starry Flounder	Total
10/6/2025	1	0	0	0	0	0	0	1
10/15/2025	7	28	104	39	17	1	0	196
10/16/2025	3	7	15	9	6	0	0	40
10/17/2025	0	5	5	11	4	0	0	25
10/21/2025	0	0	16	12	0	1	1	30
10/22/2025	0	0	0	11	4	0		15
Total	**11**	**40**	**140**	**82**	**31**	**2**	**1**	**307**

Water Quality Monitoring During Construction (RPM 2)

RPM 2(A) specifies visually monitoring of turbidity levels downstream of the work area boundaries during instream construction and maintenance activities. Background turbidity levels were determined to be approximately 13 NTU based on the average turbidity reading recorded at the three bridge locations during seasonal monitoring. Water quality measurements recorded at the three bridge crossings are presented in Section 3.2 (Table 7). Table 5 provides the water quality monitoring data for the duration of instream work at the Breach Site, including date, sample period, sample time, visual observations and turbidity (nephelometric turbidity units [NTU]) and notes recorded during instream work at the Breach Site.

No visual observations of oil, grease or any other deleterious substances were recorded. Increases in turbidity above background levels were recorded periodically throughout instream work. During these periods, Project biologists and District staff would work with the contractor to evaluate and adjust erosion and sediment control mechanisms, as needed. No adverse effects to steelhead or critical habitat were observed. Steelhead observation data is provided in Section 5 (Table 13).

Table 5 Water Quality Monitoring Results during Breach Site Construction

Date	Sample Period	Sample Time (24-hour)	Visual Observations	Turbidity (NTU)	Notes
10/6/2025	AM	1059	No grease or oil observed	31.75	Work area established and instream vegetation removed; aquatic species capture/relocation
	Midday	–	No grease or oil observed	–	
	End of day	1433	No grease or oil observed	73.75	
10/15/2025	AM	0745	No grease or oil observed	47.85	Block nets installed, aquatic species capture/relocation using seins and dip nets; contractor begins constructing cofferdam
	Midday	–	No grease or oil observed	–	
	End of day	1425	No grease or oil observed	47.17	
10/16/2025	AM	–	No grease or oil observed	14.48	Aquatic species capture/relocation; contractor continues construction of cofferdams and begins installation of diversion pipe
	Midday	–	No grease or oil observed	–	
	End of day	1530	No grease or oil observed	8.21	
10/17/2025	AM	0742	No grease or oil observed	16.93	Aquatic species capture/relocation; contractor continues construction of cofferdams and installation of diversion pipe; block nets removed
	Midday	NS	No grease or oil observed	--	
	End of day	1723	No grease or oil observed	21.9	
10/20/2025	AM	0752	No grease or oil observed	21.2	Aquatic species capture/relocation; dewatering initiated; cofferdams fortified
	Midday	1250	No grease or oil observed	11.05	
	End of day	1518	No grease or oil observed	8.56	
10/21/2025	AM	0747	No grease or oil observed	12.07	Aquatic species capture/relocation; dewatering initiated; cofferdams fortified
	Midday	1107	No grease or oil observed	9.85	
	End of day	1655	No grease or oil observed	17.53	
10/22/2025	AM	0728	No grease or oil observed	8.28	Aquatic species capture/relocation; dewatering continued; keyway excavated and RSP placement initiated
	Midday	1158	No grease or oil observed	10.88	
	End of day	1502	No grease or oil observed	5.1	
10/23/2025	AM	0749	No grease or oil observed	15.86	Monitoring for aquatic species; placement of RSP and soil backfill
	Midday	1148	No grease or oil observed	7.14	
	End of day	1428	No grease or oil observed	6.31	
10/24/2025	AM	0736	No grease or oil observed	21.2	Monitoring for aquatic species; removal of dewatering equipment; fortify cofferdams
	Midday	1121	No grease or oil observed	8.75	
	End of day	1521	No grease or oil observed	6.13	
10/27/2025	AM	0759	No grease or oil observed	21.66	Monitoring for aquatic species; re-install block nets; deconstruction of cofferdams and diversion pipe; block nets removed
	Midday	1207	No grease or oil observed	12.89	
	End of day	1537	No grease or oil observed	15.1	
10/28/2025	AM	n/a	n/a	n/a	Monitoring for aquatic species; instream work completed
	Midday	n/a	n/a	n/a	
	End of day	n/a	n/a	n/a	

3 Aquatic Habitat

The following section addresses elements of the WMP related to aquatic habitat, including monitoring and maintenance of instream log structures, and discussion of the instream habitat benefits provided by the structures. Seasonal water quality measurements at three bridge locations along the Project reach are presented in Section 3.2.

2025 monitoring was conducted by Waterways Consulting, Inc. (Waterways), SWCA, Wallace Group and Rincon. Monitoring results are summarized in the *Log Structure and Alcove Monitoring Report* (Wallace Group 2025). A brief description of the methods and results are provided below; the full report is included in Appendix D.

3.1 Log Structure and Alcove Monitoring

The WMP included construction, maintenance and monitoring of 42 instream woody structures (two per SMZ) during the initial construction of the Project in 2019 and 2020. The goal of the log structures was to reinforce the Arroyo Grande Creek main channel as the primary flow path while adding habitat complexity and grade control within the constructed secondary channels (Waterways 2024).

"Type A" structures were constructed at the upstream end of each secondary channel. Their primary purpose is to protect the head of the bar between the main and secondary channels, downstream of the secondary channel inlets. These structures also enhance habitat complexity and provide cover for steelhead and California red-legged frog. "Type B" structures were installed near the downstream end of the secondary channels. These structures function as grade control features and habitat elements, encouraging scour and pool formation while preventing headcutting into the secondary channels (Wallace Group 2025).

The following monitoring framework was developed involving periodic inspections to verify that the structures were functioning as intended. The monitoring program contained the following elements:

- **Photo Documentation:** Taking photos of each log structure and associated pool and alcove features from established photo points.
- **Visual Assessment:** Evaluating the stability and condition of each log structure, associated pool or alcove, and adjacent channel.
- **Habitat Data Collection:** Recording habitat data focused on flow velocity (when flow is present), pool development, and shelter rating at the log structures.

Monitoring Methods

Qualitative monitoring events were completed by SWCA on January 29 and April 15-16, and by Rincon and Wallace Group on August 25 and November 21, 2025. Qualitative surveys included walking the entire Project reach and observing habitat conditions at each structure.

Quantitative monitoring of the forty-two log structures was conducted on February 28, June 25, and December 11, 2025. The February 28, 2025 monitoring was conducted by Waterways, with the remaining visits completed by Wallace Group. During each visit, field representatives walked the Project reach and collected photos, notes, and field measurements as applicable.

The following information was recorded during each quantitative monitoring visit:

- **Structure and Alcove Condition.** Including a visual evaluation of each log structure and alcove to document site specific conditions and identify any need for adaptive management or maintenance.
- **Habitat Data.** All field measurements were taken and recorded on monitoring forms including pool dimensions; flow velocity; shelter rating.
- **Photo Logs**

Monitoring Results

Overall, conditions remained relatively unchanged since the fall 2024 surveys. Log structures have remained intact following numerous high flow events, including two above average water years in 2023 and 2024. Table 6 summarizes which secondary channels were activated within the Project area since 2019-2020.

Table 6 Secondary Channels Activated by Flood Flows

Water Year	Secondary Channel Activated
2019-2020*	3, 9, 10
2020-2021	1, 3, 9, 10, 11, 12/13, 14, 15, 16, 17, 19
2021-2022	1, 3, 5, 6, 9, 10, 11, 12/13, 14, 15, 16, 17, 19
2022-2023	All Activated
2023-2024	All Activated
2024-2025	14, 15, 16, 17, 18, 19

* Only Phase I log structures had been completed: 1 – 11

Source: Wallace Group 2025

Management and Maintenance Recommendations

Pursuant to RPM 4 the yearly annual report shall document how the new habitat structures meet or exceed the expected benefits to steelhead rearing and migration habitat, including observations of steelhead or other fish species use of the structures and repair or revegetation needed to the structural integrity and habitat quality around the structures.

Appendix D (Table 2, Log Structure Condition and Habitat Rating Table) provides a summary of the log structure and habitat conditions to help prioritize future maintenance activities. A more detailed description of each log structure, including information related to the presence of water and pool formation at each structure, and the shelter rating are included on the monitoring forms.

In general, all log structures and alcoves were structurally intact and stable. However, the overall functionality of each structure and the resulting (aquatic) habitat conditions varied widely. In many cases, structures were either perched above or significantly below the ordinary high-water line; dense riparian vegetation, sediment and/or debris racks were commonly obscuring log structures. The most common instream habitat type observed was a shallow, slow velocity run. Other instream habitats observed included main channel scour pool, low gradient riffle, short cascade, and isolated scour pool. No steelhead were observed during the log structure monitoring activities.

Recommendations based on the 2025 monitoring events were provided to the agencies as part of the *Arroyo Grande Creek WMP 2025 Secondary Sediment Management Plan* on August 1, 2025.

3.2 Water Quality Monitoring within the Project Reach (RPM 2)

RPA 2, Terms/Conditions B requires the measurement of water temperature upstream and downstream of each of the three bridge crossings for a minimum of 8 times per year (two readings each season) to evaluate whether these areas are providing cooler water temperatures levels over time.

Water quality sampling was completed twice per season (winter, spring, fall), for a total of six sampling events in 2025. Water quality sampling was completed by SWCA for the first two winter sampling events. Samples were taken at each of the three bridge crossings within the Project area: Highway 1, 22nd Street, and UPRR Bridges. Water temperature and turbidity were recorded using a hand-held meter (HACH® 2100Q Portable Turbidimeter).

Table 7 provides a summary of temperature (degrees Fahrenheit [°F]) and turbidity (NTU) recorded across the four seasons in 2025. Spring and fall sampling events were completed by Rincon. Summer sampling events were not completed. Sampling locations were established approximately 30 feet upstream of each of the three bridge structures within the WMP Project reach, including Highway 1, 22nd Street, and UPRR. Water temperature (degrees Celsius) and turbidity (NTU) were recorded in-situ using a YSI Multiparameter Sonde in June and November. December data was collected with a handheld glass thermometer and Hanna portable turbidimeter.

Table 7 2025 Water Quality Sampling Results

	Union Pacific Railroad Bridge		22nd Street		Highway 1	
Date	Temperature (°F)	Turbidity (NTU)	Temperature (°F)	Turbidity (NTU)	Temperature (°F)	Turbidity (NTU)
Winter						
1/29/2025[1]	53	1.05	53	0.92	53	2.36
2/21/2025[1]	60	2.39	60	2.53	58	3.42
Spring						
4/28/2025[1]	57	3.91	57	5.43	56	7.1
6/11/2025	61	11.33	61	11.40	61	16.5
Summer						
NS	--	--	--	--	--	--
NS	--	--	--	--	--	--
Fall						
11/21/2025	57	24.75	57	24.40	57	22.50
12/22/2025	57	11.0	56	13.0	57	65.0
Average	**58**	**9**	**57**	**10**	**57**	**19**

[1] Water quality sampling events conducted by SWCA

4 Mitigation Monitoring and Revegetation Activities

The following section provides a summary of post-construction revegetation activities completed through 2024, including initial revegetation activities and remedial revegetation activities, and revegetation activities completed in 2025. Revegetation details, including seed and container plant pallets utilized from 2020-2024 are provided in previous Annual Reports (SWCA 2025).

4.1 Background

Following the completion of WMP construction activities in 2021, initial revegetation was completed in accordance with permit requirements and the Habitat Mitigation and Monitoring Plan (HMMP; SWCA 2019). Specific goals per the HMMP include:

- A continuous riparian corridor within the Arroyo Grande Creek and Los Berros Creek diversion channels;
- An increase in plant species diversity within portions of both channels by planting a diverse palette of tree species;
- The establishment of riparian and scrub vegetation in areas that are currently devoid of vegetation;
- A decrease in the overall percent cover of exotic invasive vegetation;
- Increased water quality with the removal of trash from riparian areas;
- A reduction in fine sediment erosion by vegetating buffer strips along the levee; and
- Enhanced in-stream habitat through the introduction of log structures and alcoves.

Revegetation strategies include hydroseeding and live cuttings/container plantings with natives, and eradication of exotic species through hand-pulling, herbicide application, grazing, and weed whipping. Annual monitoring tracks revegetation success, and remedial revegetation efforts are implemented in areas where performance criteria are not being met.

4.2 Initial Revegetation Implementation (2019-2021)

Initial revegetation activities were implemented following the completion of construction in 2019 (Phase I), 2020 and 2021 (Phase II). Revegetation efforts focused on the rehabilitation of sediment management areas (transition zones), the establishment of riparian scrub within bare areas outside of SMZs, and with establishment of riparian trees within the buffer zone areas. Transition zones (secondary channel bottom) and riparian scrub zones (inner levee slope bordering each secondary channel) were revegetated using site-specific seed mixes. Riparian trees were established using container stock and cuttings. The following areas were revegetated:

- Transition Zone Hydroseeding: 26,102 (square meters)
- Riparian Scrub Hydroseeding: 51,800 (square meters)
- Riparian Tree Planting: 14,164 (square meters)

Hydroseeding

Hydroseeding with site specific seed mixes was implemented for transition zone and riparian scrub areas. Phase I hydroseeding occurred in October 2019 and Phase II hydroseeding occurred in different areas between October 2020 and February 2021. Following completion of Phase II construction, all of Phase II and portions of Phase I SMZs were hydroseeded within the riparian scrub zone. A modified Phase II hydroseed mix was developed with increased seeding rates in response to the limited success of the Phase I hydroseed mix.

Planting

Phase I mitigation plantings were installed at SMZ 1-11 in March 2020 and Phase II plantings were installed at SMZ 12-22 in February and March 2021. Phase 1 and Phase II plantings included 352 and 343 individual plantings, respectively, for a total of 695 plantings across the Project reach. Additional replacement plantings in 2020-2021 included 76 trees planted in SMZ 1-11 (February-March 2021) and 14 replacement trees planted in SMZ 17, 18, 20 and 21 (January 2022).

Plantings included riparian tree species as 1-gallon containers and cuttings. All cuttings were harvested from mature mule fat and willows located in Arroyo Grande Creek. Harvesting, temporary storage, and planting of cuttings followed standard practices, as described in the HMMP. At the conclusion of the initial revegetation effort, a total of 14,164 square meters (1.4 hectares, 3.5 acres) had been planted with riparian trees to create a continuous riparian buffer strip between the SMZ (secondary channel) and the low flow channel (main channel).

4.3 Remedial Revegetation

2022 Revegetation Activities

Agricultural operations adjacent to SMZs 17 and 19 resulted in herbicide overspray, and in January 2022 these areas were observed to be negatively affected, and devoid of vegetation. Remedial actions included hand broadcast of a modified Upper Levee Slope Seed Mix—a seed mix composed of deep-rooted, self-sowing species, adapted to the drier conditions of the upper levee slope.

Remedial actions taken in 2022 (December) to increase native plant cover in areas not meeting performance standards included application of a modified Inner Levee Slope Seed Mix in SMZ 8, 10, 12/13, 14, 15, 17, 18, 20, and 21. This seed mix deviated from the original seed mixes identified in the HMMP with species selection aimed to incorporate more locally-occurring species better adapted to the drier levee slopes. A high flow event occurred immediately following the seeding effort, and most of the seed was believed to have been washed downstream. However, when the flows receded later in 2023, some seed mix germination was observed.

2023 Revegetation Activities

Following the emergency sediment removal work in 2023, all areas disturbed by Project work were hydroseeded using the site-specific seed mixes previously approved for use on the slopes and channel bottoms of the secondary channels.

No container plantings were completed in winter of 2022-2023 due to high water levels through March 2023. Additionally, emergency sediment removal work was completed in fall of 2023, so planting efforts were delayed until the following spring (2024).

2024 Revegetation Implementation

2024 remedial revegetation activities included installation of perennial herb and grass container stock in SMZ 9 and 11. A total of 373 plantings were installed in March 2024 and an additional 152 plants were installed in December 2024; a total of 525 plantings. Non-woody, perennial species were selected in order to maintain channel flood capacity, out-compete non-native annuals, and to provide a late summer-fall food source for overwintering monarch butterflies (*Danaus plexippus*).

2025 Revegetation Implementation

Following completion of the levee stabilization at the Breach Site and sediment removal at SMZ 7, all disturbed areas were hydroseeded for native species revegetation and erosion control. Disturbed areas within the secondary channel bottom were hydroseeded with the Transition Zone Seed Mix as specified in the HMMP, and disturbed areas within the inner levee slopes were hydroseeded with a modified Riparian Scrub Seed Mix. The Riparian Scrub Seed Mix was modified from the previous seed mix identified in the HMMP to incorporate locally occurring species and species that would be more successful on the drier upper levee slopes.

During construction of the Breach Site, black cottonwood (*Populus trichocarpa* [=*P. balsamifera* ssp. *trichocarpa*]) stakes were embedded within the soil filled RSP voids as described in the 2025 Secondary SMP. After completion of the repair, additional native tree species in the form of container stock were planted along the repaired slope to increase native species diversity. Species included California sycamore (*Platanus racemosa*), white alder (*Alnus rhombifolia*), and box elder (*Acer negundo*).

In late November, broadcast spraying was conducted at SMZ 7 and SMZ 8 (north slope inner levee), and in early December at SMZ 10. This treatment was completed to prepare the area for the planting of native vegetation. In early December 2025, approximately 800 container-grown perennial herb and grass species were planted on the inner slope of the north levee at SMZ 7 and 8. In mid-December 2025 approximately 550 container plants were installed at SMZ 10. Following herbicide application, and installation of container stock, the identified management areas were broadcast seeded.

Table 8 provides a tabulation of species and seeding rates (pounds per acre [lbs./acre]) for the Transition Zone and Riparian Scrub Seed Mixes. Table 9 includes a summary of species, container size and number of individual plants installed at SMZ 7, 8 and 10.

Table 8 2025 Revegetation Seed Mixes

Scientific Name	Common Name	Seeding Location/Seeding Rate	
		Transition Zone (Lbs./acre)	Riparian Scrub (Lbs./acre)
Achillea millefolium	Yarrow	–	2
Acmispon americanus (=Lotus purshianus)	Spanish lotus	–	2
Acmispon glaber (=Lotus scoparius)	Deerweed	–	2
Ambrosia psilostachya	Western ragweed	–	1
Artemisia douglasiana	Mugwort	1	2
Bromus carinatus	California brome	–	6
Camissoniopsis cheiranthifolia	Beach evening primrose	–	0.5
Diplacus aurantiacus (=Mimulus aurantiacus)	Bush monkeyflower	–	1.5
Distichlis spicata	Salt grass	2	–
Elymus glaucus	Bule wildrye	–	2
Elymus triticoides	Creeping rye	–	2
Epilobium ciliatum	Willow herb	0.5	–
Erythranthe guttata (=*Mimulus guttatus*)	Seep monkeyflower	0.5	–
Eschscholzia californica	California poppy	–	3
Festuca microstachys	Small fescue	6	4
Hordeum brachyantherum	Meadow barley	3	3
Hordeum depressum	Alkali barley	2	–
Juncus mexicanus	Mexican rush	0.5	–
Lupinus nanus	Sky lupine	2	–
Lupinus succulentus	Arroyo lupine	–	1
Melica californica	California melic	–	3
Muhlenbergia rigens	Deer grass	1	0.5
Oenothera elata	Evening primrose	–	0.5
Stipa pulchra	Purple needlegrass	–	2
Trifolium willdenovii	Tomcat clover	2	–
Verbena lasiostachys	Western vervain	–	0.5
Total lbs./acre		**20.5**	**38.5**

Table 9 2025 Revegetation Container Plant List

Scientific Name	Common Name	Container Size	Quantity		
			SMZ 7	SMZ 8	SMZ 10
Acmispon glaber (=Lotus scoparius)	Deerweed	1-gallon	40	–	–
Artemisia douglasiana	Mugwort	1-gallon	47	78	120
Baccharis glutinosa	Marsh baccharis	1-gallon	54	71	64
Diplacus aurantiacus (=Mimulus aurantiacus)	Bush monkeyflower	1-gallon	28	40	17
Euthamia occidentalis	Western goldenrod	1-gallon	--	--	59
Muhlenbergia rigens	Deer grass	1-gallon	58	48	36
Oenothera elata	Evening primrose	1-gallon	43	123	142
Symphyotrichum chilense	Pacific aster	1-gallon	75	93	109
Verbena lasiostachys	Western vervain	1-gallon	8	–	–
Total Container Plants			**353**	**453**	**547**

4.4 Qualitative and Quantitative Monitoring

Performance and Success Criteria

The success of revegetation efforts is tracked by annual monitoring of and comparison with established performance standards. Table 10 summarizes the original performance standards outlined in the HMMP.

Table 10 2019 HMMP Performance Standards

Performance Standards[1]	Year 1	Year 2	Year 3	Year 4	Year 5
Total Percent of Native Cover for Understory	30%	40%	50%	60%	70%
Total Percent of Native Cover for Overstory	50%	60%	70%	80%	90%
Percent of Non-Native Cover for Understory[2]	<60%	<60%	<45%	<35%	<35%
Percent of Non-Native Cover for Overstory	20%	15%	10%	5%	0%
Plant Survival for Understory	90%	85%	80%	80%	80%
Plant Survival for Overstory	90%	85%	80%	80%	90%

[1] The mitigation site must be self-sustaining (i.e., no maintenance or artificial irrigation) for a minimum of two years to be considered successful. Plant survivorship may include original plantings, remedial plantings, or volunteers. Remedial plantings will be monitored until District environmental staff determines that they are self-sustaining.

[2] Percent non-native cover calculations exclude non-native annual grasses; however, includes non-native perennial grasses. The final goal for percent non-native cover is less than 35% (excluding annual grasses).

Modified Performance Standards

Following monitoring efforts in 2020 and 2021 it was determined that tracking individual plant survival was not feasible, and modified performance standards were developed to better address the goals of the HMMP. The following modified performance standards were adopted (SWCA 2025):

- Mitigation plantings will still be established and maintained to meet the goals of the HMMP (i.e., plantings will be established in areas that currently have little or no cover).
- Survival/mortality of individual plantings will not be tracked, but plantings will be monitored collectively for maintenance needs and assessed for successful establishment with an emphasis on filling in gaps in the riparian tree canopy.
- Native species diversity will be tracked by completing an inventory of dominant, co-dominant, and prominent understory as well as overstory species in each SMZ.
- Percent cover of native and non-native overstory and understory vegetation will still be documented using the established quadrat sampling method, along with the new diversity metrics

Minimum diversity thresholds (performance standards) were recommended, and the following diversity standards were adopted (Table 11).

Table 11 Modified Performance Standards

Performance Standards[1]	Year 1	Year 2	Year 3	Year 4	Year 5
Number of Overstory Species in Buffer Zones adjacent to each SMZ[2] (Downstream of 22nd St)	1	2	2	2	2
Number of Overstory Species Present in Buffer Zones adjacent to each SMZ (Upstream of 22nd St)	2	3	3	3	4
Number of Overstory Species Present in the Project Area	3	4	4	5	5
Minimum Number of Native Overstory Species Co-Dominant in the Project Area	2	3	3	4	4

[1] Overstory vegetation is parsed between areas upstream and downstream of 22nd Street due to restrictions on the tree species that can be established downstream. Understory species will include perennial herbs, vines, and shrubs. Any notable population of native annual species will be documented as part of the qualitative assessment of overall mitigation success and health/diversity of the habitat but not included in species diversity counts.

[2] Trees established in the buffer zone adjacent to each SMZ are tracked in association with that SMZ, but woody vegetation is not being established directly within SMZs (secondary channel) in order to maintain flood capacity.

Survey Methodology

Quantitative monitoring surveys of the Project reach were completed by Rincon on June 11, 12, 13, and 16 of 2025. Survey methodology followed descriptions in previous annual reports (SWCA 2025). One square meter quadrats were used to collect quantitative data across three micro-habitats:

1. the riparian buffer strip on either side of the main (active) channel (Buffer Strip [BS])
2. the riparian scrub zone associated with the active SMZ (Riparian Scrub [RS])
3. transitional zone between the two (Transition Zone [TZ])

Quadrats were established along one, two or three transects, spaced at roughly even intervals along each SMZ, with the number of transects varying according to SMZ length. A single transect was established in SMZs less than 500-feet in length, two transects were established in SMZs 500 to 1,000 feet, and three transects in SMZs over 1,000 feet long. Quadrats were established in pairs, and placed on either side of the transect, with the exception of the Buffer Strip which straddled the active channel. Quadrats were placed in representative areas along each transect in within each microhabitat. Six quadrats were established along each transect, two in each microhabitat (BS, TZ and RS). The following data was collected at each quadrat location.

- Overstory native and non-native (absolute percent cover)
- Understory native and non-native (absolute percent cover)
- Number of native overstory species
- Number of dominant and co-dominant native understory species

The California Native Plant Society percent cover diagrams were utilized to calibrate percent cover estimates and maintain consistent results (CNPS 2025). In order to collect percent cover of overstory vegetation, a phone camera in self-portrait mode was aimed towards the sky in the center of each quadrat. Dominant and co-dominant understory native species were tallied within each quadrat. Dominant species composed at least 20 percent cover, while co-dominant species occupied up to 10 percent cover.

Photo sampling points were also re-established at each SMZ. Existing photo point monitoring locations established within the SMZs were found to be inaccessible or less informative due to dense vegetation growth, so new photo point monitoring locations were established along the levee

structure to generate an informative overview of all the vegetation present within the SMZ. Two photo points were taken at each SMZ, one on each end of the zone, looking inwards. An additional two photo points were taken in the center of SMZ 13, facing outwards, due to its large size.

The number of native overstory species within each SMZ as evaluated on November 21, 2025 (see Table 11, Modified Performance Standards). Overstory species observed within the buffer strip of each SMZ was recorded during a qualitative survey of the entire Project reach.

Monitoring Results

Monitoring data collected for all 22 SMZs in 2025 are summarized in Table 12. SMZs that met Year-5 performance criteria are highlighted grey. Overstory and understory exotic cover met the 5-year performance criteria at most SMZs. Understory native plant cover improved significantly since 2024, however, Year-5 (70 percent) cover was not achieved at any SMZ. Overstory native cover was also less than the Year-5 goal of 90 percent, however, this is likely due to the quadrat sampling method, which averages the overstory cover of all quadrats, including the TZ and RS zones, which are managed without overstory species. Modified performance criteria was established for the number of native overstory species in buffer strips (BS), and 2025 observations indicate a good diversity of native tree speciesYear-5 criteria was achieved at most SMZs, especially in the downstream portion of the Project.

Year-5 performance criteria for the number of native dominant and co-dominant native understory species was only achieved at one location (SMZ 12/13). These results are also most likely biased toward under reporting native plant cover, due to the very limited sample size provided by quadrat sampling. In the future, it is recommended that an SMZ-wide assessment of dominant/sub-dominant/prominent native plant cover be used to evaluate native plant performance.

Number of overstory species reported from quadrat surveys by micro habitat resulted in a poor sample of the total overstory diversity across the Project reach. Quadrat data generally captured one or two overstory species, when in fact, the average number of overstory species present in each SMZ ranged from three to six species, with the exception of Los Berros Creek (SMZ 20-22) which lacks overstory species diversity. A total of eight overstory species were observed in the Project area including:

- Boxelder (*Acer negundo;* ACNE)
- Northern California black walnut (*Juglans californica* var. *hindsii*; JUCA)
- Black cottonwood (*Populus trichocarpa;* POBA)
- Fremont cottonwood (*P. fremontii;* POFR*)*
- California sycamore (*Platanus racemosa;* PLRA)
- Red willow (*Salix laevigata;* SALLAE)
- Arroyo willow (*S. lasiolepis;* SALLAS)
- Pacific willow *(S. lucida* ssp*. lasiandra;* SALUL)

Of these eight species, arroyo willow is by far the most dominant, with black cottonwood and red willow as common co-dominants. California sycamore was less frequently observed but well documented as a co-dominant in the Project reach. Boxelder and pacific willow were relatively infrequent. Fremont cottonwood and Northern California black walnut were only observed one and two times respectively.

Photographs recorded during monitoring are provided in Appendix E.

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Table 12 2025 Quantitative and Visual Observation Data

SMZ	Understory Native % Cover[1]	Understory Exotic % Cover[1]	Overstory Native % Cover[1]	Overstory Exotic % Cover[1]	Number of Native Overstory Species[1]		Number of Dominant/ Co-dominant Native Understory Species[1,3]	Number of Native Overstory Species in Buffer Zones[2, 4]		Number of Native Overstory Species in Project Area[2]	
					Downstream of 22nd Street	Upstream of 22nd Street		Downstream of 22nd Street	Upstream of 22nd Street	Total Number of Species	Minimum Number of Co-Dominant Species
Year 5 Performance Criteria	**70**	**<35**	**90**	**0**	**2**	**4**	**5**	**2**	**4**	**5**	**4**
SMZ 1	5.8	61.7	66.7	**0**	1	–	1	**6 (ACNE, POBA, POFR, PLRA, SALLAE, SALLAS, SALUL)**	–	**8 Overstory Species Total**	
SMZ 2	28.0	**34.2**	59.2	0.8	1	–	1	**3 (SASLAE, SALLAS, PLRA)**	–	**Dominant Overstory Species**	
SMZ 3[5]	–	–	–	–	–	–	–	**5 (ACNE, POBA, PLRA, SALLAE, SALLAS)**	–	SALLAS - Arroyo willow (*Salix lasiolepis*)	
SMZ 4	41.7	**31.2**	51.1	**0**	1	–	3	**4 (POBA, PLRA, SALLAE, SALLAS)**	–	SALLAE - Red willow (*S. laevigata*)	
SMZ 5	21.0	**17.5**	65.0	**0**	2	–	2	**3 (PLRA, SALLAE, SALLAS)**	–	POBA - black cottonwood (*Populus trichocarpa*)	
SMZ 6	33.3	**19.2**	74.2	**0**	1	–	2	**4 (SALLAE, SALLAS, SALUL, PLRA)**	–	PLRA - CA sycamore (*Platanus racemosa*)	
SMZ 7	39.2	**31.7**	53.3	**0**	1	–	2	**4 (POBA, PLRA, SALLAE, SALLAS)**	–	**Co-Dominant Overstory Species**	
SMZ 8	12.8	74.2	75.0	13.3	–	2	2	–	**4 (SALLAE, SALLAS, POBA, PLRA)**	ACNE - boxelder (*Acer negundo*)	
SMZ 9	42.5	**17.5**	62.5	**0**	–	1	2	–	3 (POBA, SASLAE, SALLAS)	SALUL - Pacific willow (*S. lucida* ssp. *lasiandra*)	
SMZ 11	49.1	**17.2**	50.6	**0**	–	2	3	–	**4 (POBA, PLRA, SALLAE, SALLAS)**	**Other Species Observed**	
SMZ 11	67.5	**24.2**	30.0	**0**	–	1	2	–	3 (POBA, SALLAE, SALLAS)	JUCA - CA black walnut (*Juglans californica* var. *hindsii*)	
SMZ 12/13	65.0	**20.9**	68.3	**0**	–	1	**4**	–	**5 (ACNE, JUCA, POBA, PLRA, SALLAE, SALLAS)**	POFR - Fremont cottonwood (*P. fremontii*)	
SMZ 14	15.6	57.8	51.7	**0**	–	2	2	–	**5 (ACNE, POBA, PLRA, SALLAE, SALLAS)**		
SMZ 15	17.5	**35.0**	72.5	**0**	–	1	2	–	**4 (ACNE, JUCA, SALLAE, SALLAS)**		
SMZ 16	24.2	70.0	47.5	**0**	–	1	1	–	3 (POBA, PLRA, SALLAS)		
SMZ 17	28.8	**19.7**	88.3	**0**	–	1	2	–	3 (PLRA, SALLAE, SALLAS)		
SMZ 18	20.5	**28.3**	65.0	**0**	–	1	2	–	3 (PLRA, SALLAE, SALLAS)		
SMZ 19	13.3	**26.2**	75.0	**0**	–	2	3	–	**4 (POBA, SALLAE, SALLAS, SALUL)**		
SMZ 20	42.5	70.8	65.8	**0**	–	1	3	–	1 (SALAS)		
SMZ 21	19.2	75.0	49.2	0.8	–	1	2	–	2 (SALAS, ACNE)		
SMZ 22	1.7	78.3	41.7	**0**	–	1	1	–	1 (SALAS)		

[1] Original performance criteria: data collected using the documented quadrat method

[2] Modified performance criteria (new diversity metric): data collected using visual assessment of specified sampling unit

[3] Year 4 performance criteria for number of dominant/co-dominant native understory species taken from 2024 Annual Report; Year 1, 2, 3 and 5 performance criteria developed in 2025 based on industry standards and trends provided in other criteria

[4] Modified performance criteria (new diversity metric): number of overstory species in Buffer Strip adjacent to each SMZ; species are listed alphabetically

[5] Quadrat sampling data was not collected at SMZ 3 due to limited access and safety issues; tall and dense hoary nettle (*Urtica dioica*), California blackberry (*Rubus ursinus*) and poison oak (*Toxicodendron diversilobum*) within the SMZ made for conditions in which data collection was not feasible

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5 Steelhead Relocation and Observations

Special status species observations and relocations included 11 steelhead recovered during dewatering activities at the Breach Site. Table 13 provides a summary of steelhead captured and relocated including date, fork length in millimeters and approved biologists. Appendix A, Special Status Species Observation Map depicts the capture and relocation sites.

Table 13 Summary of South-Central California Coast Steelhead Relocations

Occurrence Number	Date	Size (millimeters [mm])	Approved Biologists
1	10/6/2025	188	Rincon (Adam Sachs / Frances McKechnie / Ryan Wardle)
2	10/15/2025	65	Rincon (Adam Sachs / Ryan Wardle / Charleen Rhode)
3	10/15/2025	89	
4	10/15/2025	97	
5	10/15/2025	150	
6	10/15/2025	97	
7	10/15/2025	126	
8	10/15/2025	103	
9	10/16/2025	135	Rincon (Ryan Wardle / Charleen Rhode / Jaran Passmore / Cynthia Martinson)
10	10/16/2025	125	
11	10/16/2025	104	

6 Status Update on RPA Sub-Element 3

The following outlines all the actions that have been taken by the District to implement the RPA sub-element 3 to date:

- **March 2021** – District awarded contract to Stillwater Sciences (Stillwater) for hydraulic modeling, alternatives analysis, and conceptual design plans.
- **March – August 2021** – District and Stillwater coordinated on review and compilation of available studies, reports, and data.
- **August 2021** – Stillwater completed Tech Memo #1 Available Studies and Data.
- **September 2021** – District conducted meeting with Science Panel to discuss Tech Memo #1 Available Studies and Data.
- **September 2021** – District conducted outreach for four new Science Panel Members: U.S. Army Corps of Engineers, Coastal San Luis Resource Conservation District, South County Sanitation District, and Creek Lands Conservation.
- **October 2021** – District conducted Science Panel meeting to introduce new members.
- **November 2021** – Stillwater completed Draft Tech Memo #2 Existing Conditions.
- **December 202**1 – District provided comments on Draft Tech Memo #2 Existing Conditions.
- **January 2022** – Stillwater provided the District with a final Existing Conditions Report.
- **March 2022** – District convened a Science Panel meeting to discuss the Existing Conditions Report and brainstorm alternatives.
- **April 2022** – District convened a Science Panel meeting to discuss alternatives; a decision was made to conduct preliminary modeling of the levee setback alternative to determine if there would be upstream flooding impacts.
- **April 2022** – South San Luis Obispo County Sanitation District provided a letter stating concerns with levee setback alternative.
- **May 2022** – Stillwater provided draft modeling results for levee setback alternative.
- **June 2022** – Stillwater provided final modeling results for levee setback alternative addressing District comments.
- **June 2022** – Modeling results provided to Science Panel.
- **August 2022** – NMFS provided the District with questions on modeling results.
- **September 2022** – District provided NMFS with responses to their questions on modeling results.
- **September 2022** – South San Luis Obispo County Sanitation District provided email stating objection to restoration activities occurring on its property.
- **October 2022** – District convened a Science Panel meeting to discuss the levee setback alternative modeling results and Sanitation District concerns.
- **November 2022** – District provided a Preliminary Alternatives Report to USACE for review.
- **November 2022** – USACE provided the District with comments on the Preliminary Alternative Report.
- **December 2022** – District and USACE discussion of USACE comments on the Preliminary Alternatives Report.

- **January 2023** – District completed a revised Preliminary Alternatives Report for USACE and NMFS review. Upon review, USACE and NMFS agreed that the District's approach of continuing with detailed analysis of the remaining three alternatives was appropriate and suitable.
- **January to April 2023** – District and Stillwater finalized the modeling rationale/approach and decided not to model Alternative 5, but to focus available modeling funds on Alternatives 3 and 4. Stillwater commenced the modeling for Alternatives 3 and 4.
- **April 2023** – District began a monthly water quality monitoring program in Oceano Lagoon, Meadow Creek Lagoon, and Arroyo Grande Lagoon with the purpose of informing habitat considerations for restoration alternatives.
- **July 2023** – Stillwater provided preliminary modeling results for District review and discussion.
- **August 2023** – District and Stillwater met to discuss modeling results in more detail.
- **October 2023** – Stillwater provided a draft Alternatives Report that included more detailed information on the modeling approach and assumptions to assist the District in review of the modeling results. District is completing its review of the Alternatives Report and anticipates following up with Stillwater in the December 2023 to January 2024 timeframe.
- **July to August 2024** – Final Draft Alternatives Report to Science Panel.
- **September 2024** – District convened a Science Panel meeting to discuss preferred alternatives from the Final Draft Alternatives Report.
- **November 2024** – Written responses provided to the Science Panel's questions on the Final Draft Alternative Report. Preferred alternative to be selected based on input from Science Pannel, public, and agency input.
- **December 2024** – District convened a Science Panel meeting to discuss Alternative 4 as the proposed preferred alternative with restoration elements of Alternative 4 included as adaptive management should success not considered achieved after implementation of Alternative 3.
- **March 2025** – District convened a Science Panel meeting to discuss the proposed project and gain feedback. Science Panel members concurred that the proposed project goals met the intent of the RPA, and the District proposed moving towards 30% design and a CEQA document.
- **December 2025** – Consulting design firm provided a Final Alternatives Report incorporating 30 percent design of the preferred alternative with proposed success criteria and adaptive management measures. District continues to review the report and intends to schedule the next Science Panel meeting in early 2026 to discuss the report.

7 References

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Appendix A

Project Figures

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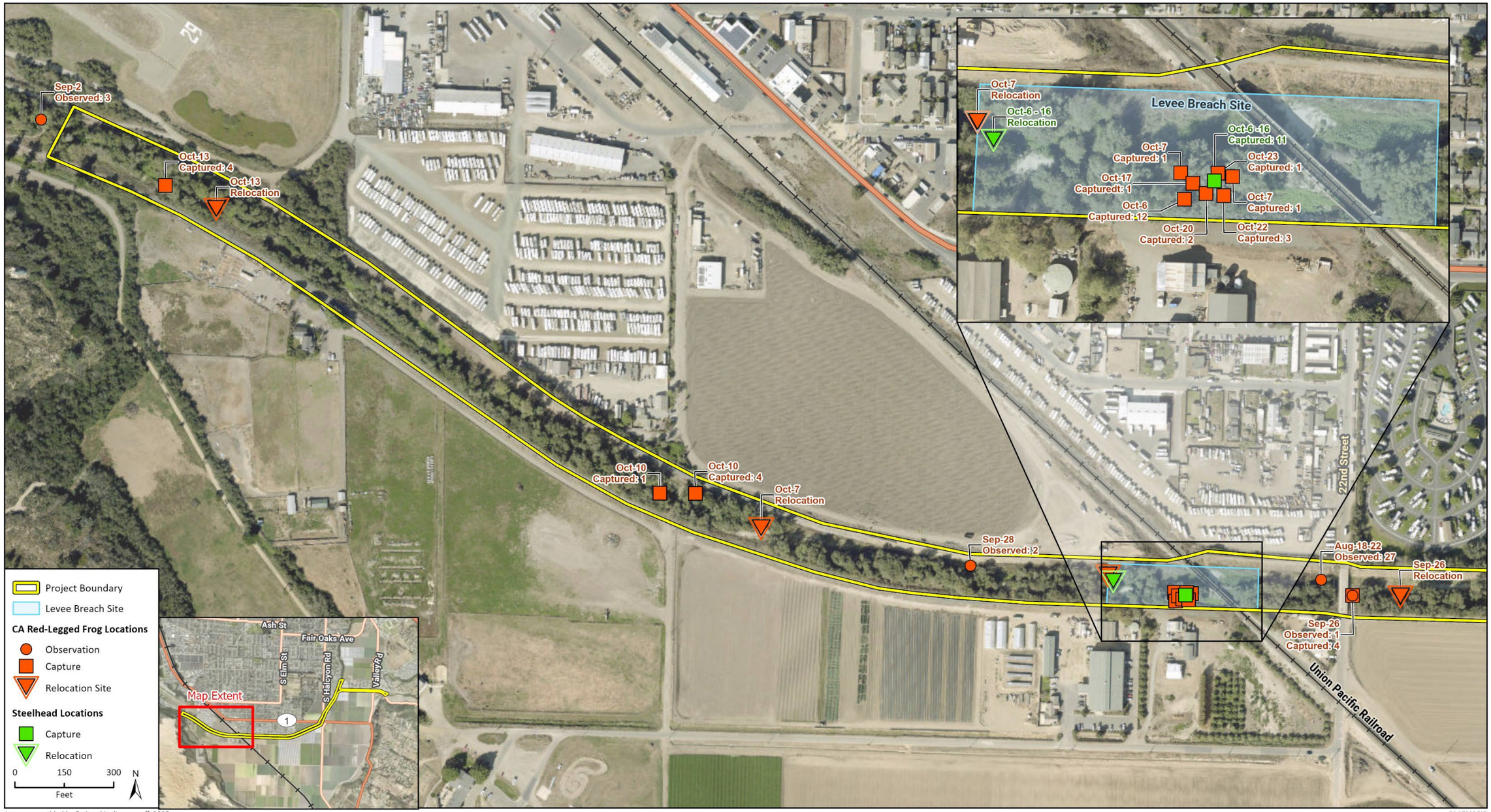
24-17044 BIO
Fig A-1 Project Overview



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24-17044 BIO
Fig A-2 Special Status Species Observation and Relocation Map

Appendix B

2025 Site Photographs (Vegetation Maintenance, Sediment Management and Revegetation Activities)

Photograph 1. Vegetation removal at SMZ 12/13, facing east. July 10, 2025.

Photograph 2. Goats utilized for vegetation removal downstream on 22nd Street bridge, facing north. August 20, 2025.

Photograph 3. Goats utilized for vegetation removal downstream on 22nd Street bridge, facing east. August 20, 2025.

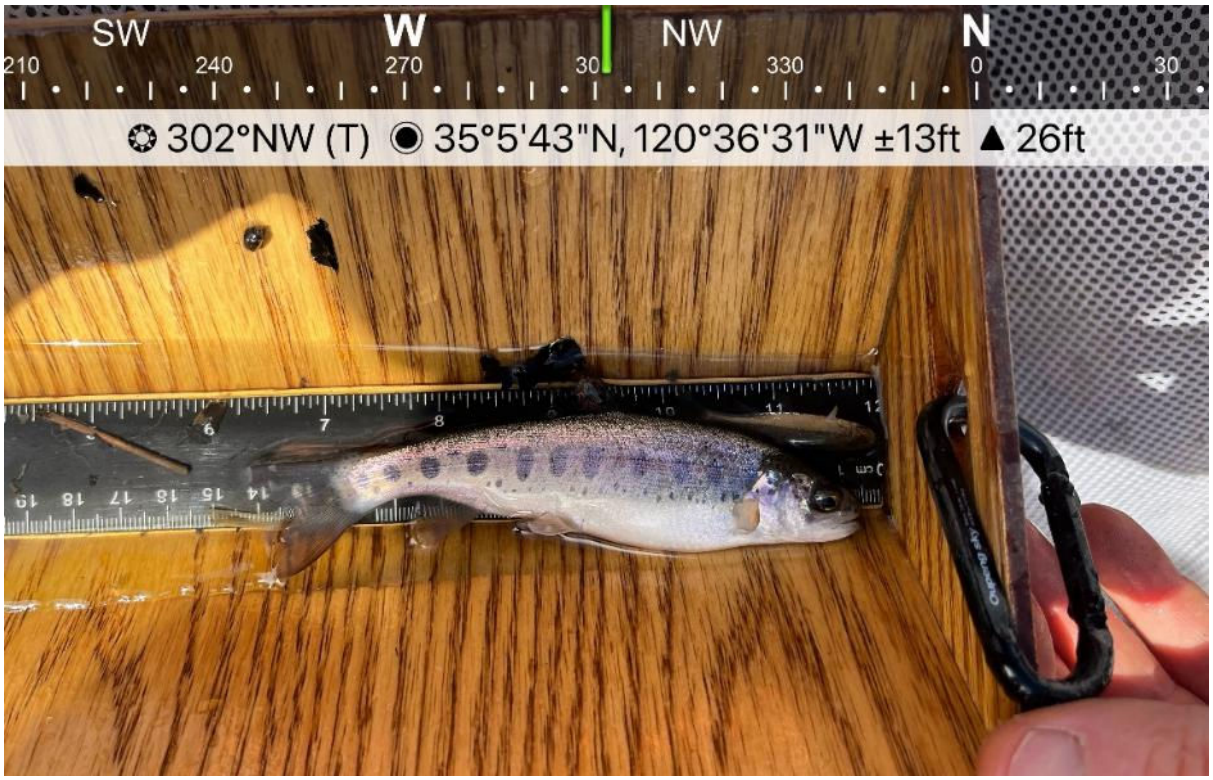
Photograph 4. Vegetation management crew trimming woody vegetation within the secondary channel north of Arroyo Grande Creek, facing south. September 16, 2025.

Photograph 5. Crew trimming woody vegetation along levee road south of Los Berros Creek, facing east. September 19, 2025.

Photograph 6. Levee road north of Arroyo Grande Creek following woody vegetation trimming, facing east. September 16, 2025.

Photograph 7. Looking east at the upstream block at the Breach Site. October 16, 2025.

Photograph 8. Fish recovery and relocation during diversion of Arroyo Grande Creek at the Breach Site. October 16, 2025.



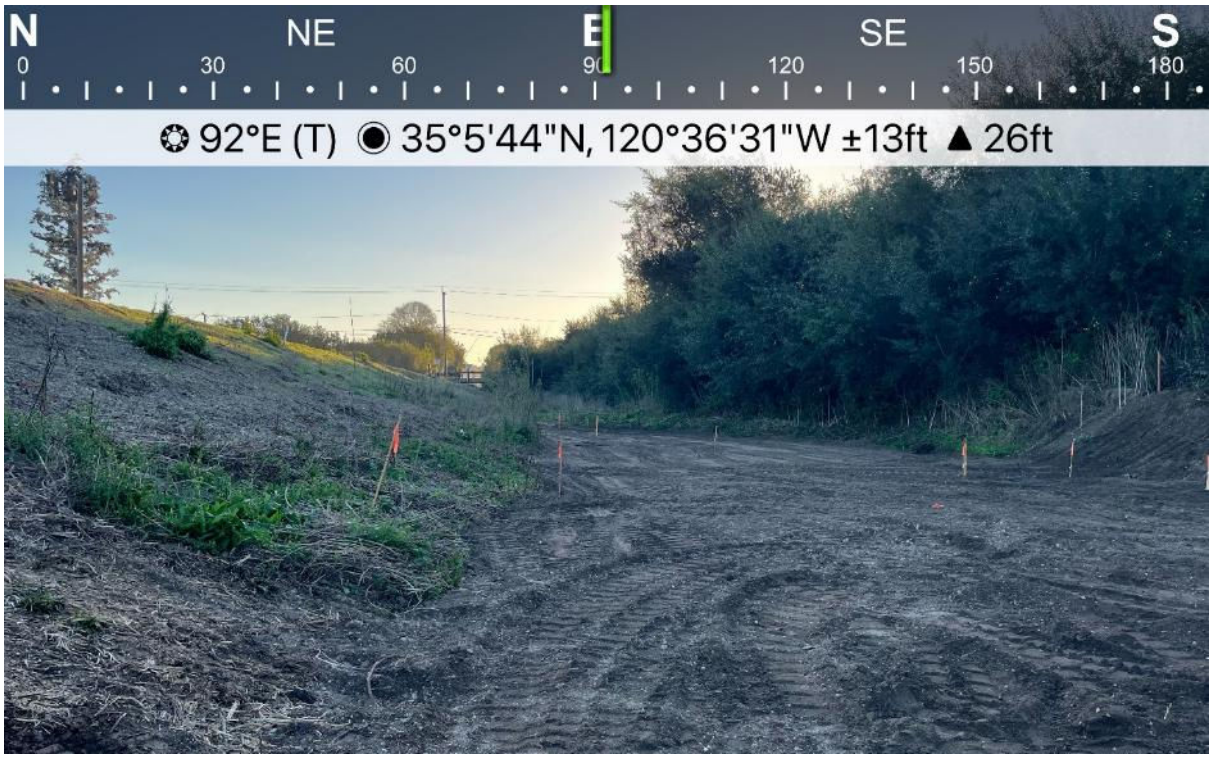
Photograph 9. SCCC steelhead recovered and relocated from the Breach Site. October 15, 2025.

Photograph 10. Sediment removal at SMZ 7. October 16, 2025.

Photograph 11. Looking east at the upstream diversion dam and diversion pipe running under the UPRR Bridge. October 21, 2025.

Photograph 12. Looking downstream (southwest) at the Breach Site with diversion pipe and dewatering wells in the foreground. October 21, 2025.

Photograph 13. Adult CRLF captured and relocated. October 22, 2025.



Photograph 14. Looking upstream (east) within the secondary channel sediment removal area of SMZ 7. October 23, 2025.

Photograph 15. Looking downstream (southwest) at the UPRR Bridge crossing the SMZ 7 secondary channel; Breach Site work area in background, photo left. October 27, 2025.

Photograph 16. Looking downstream (west) of Breach Site; levee bank has been stabilized, diversion removed, and streamflow returned to the primary channel. October 28, 2025.

Photograph 17. Planting container plants at SMZ 7. December 2, 2025.

Photograph 18. Planting container plants at SMZ 8. December 8, 2025.

Photograph 19. Newly planted native perennials with mulch topdressing; SMZ 8. December 8, 2025.

Photograph 20. Site preparation for new container plantings at SMZ 10. December 8, 2025.

Appendix C

Worker Environmental Awareness Training Program (WEAP) Documentation

WORKER ENVIRONMENTAL AWARENESS PROGRAM
Arroyo Grande Creek UPRR Area Additive TRM and Breach Site Stabilization Project
Species Profiles

The following special status species could occur onsite. If any special status species are encountered during construction, construction activities shall cease in that area and a Rincon biologist shall be notified immediately. Please DO NOT HANDLE!

California Red-legged Frog (*Rana draytonii*)

Status: Federally Threatened, State Species of Special Concern

Description:

- 1.75 to 5.25 inches
- Reddish-brown to brown, gray or olive with dark banding on legs
- Two ridges (dorsolateral folds) down back
- Underside of hind legs is red to salmon colored

Habitat:

Typically occupies dense riparian vegetation such as willows; however, can be found in moist places away from water and in upland burrows. Breeds in slow moving water with deep pools.

Steelhead (*Oncorhynchus mykiss irideus pop. 9*)

Status: Federally Threatened

Description:

- Can be up to 45 inches
- Blunt head and short jaw
- Distinct dark spots on dorsal fin.
- Often has reddish stripe along sides, gill cover reddish

Habitat:

Aquatic runs in coastal basins from the Pajaro River south to, but not including the Santa Maria River.

Southwestern Pond Turtle (*Actinemys pallida*)

Status: Federally Proposed Threatened, State Species of Special Concern

Description:

- 7 to 9 inches
- A medium sized turtle with a yellowish belly and dark blotches and black spots or lines found on top of their heads.
- Large eyes, middorsal stripe, and an enlarged rostral (scale over the tip of the snout).

Habitat:

Common in permanent and intermittent waters of rivers, creeks, small lakes and ponds, marshes, irrigation ditches and reservoirs. Basks on land or near water on logs, branches, or boulders.

Tidewater goby (*Eucyclogobius newberryi)*
Status: Federally Threatened, State Species of Special Concern
Description:

- Up to 2 inches
- A small fish that appears almost translucent with grey-brown mottled bodies.
- Fused pelvic fins that form a disc below the chest and belly and large pectoral fins.

Habitat:
Inhabits lagoons, estuaries, and coastal streams. Requires cool, brackish water with emergent vegetation. Prefer shallow relatively shallow and still, but not stagnant, water.

Least Bell's vireo (*Vireo bellii pusillas)*
Status: Federally Endangered, State Endangered
Description:

- 4.5 - 5 inches
- Small bird, mostly gray above and pale below.
- Short, rounded wings and short, straight bill.
- Faint white spectacle-like eye-ring, and thin white wingbars.

Habitat:
Nests primarily in willows. Forages in riparian and adjacent upland habitat. Breeding season is March 31 through August 31.

Tricolored blackbird (*Agelaius tricolor)*
Status: State Threatened
Description:

- 7 – 9.5 inches
- Medium-sized bird, males larger with are black with bright red and white bands on wing,
- Females are smaller, brown to black with smaller reddish band on wing

Habitat:
Primarily found in cattail or tule marshes, wetlands, also forages in fields and farms. Nests in large colonies in patches of thick vegetation form Feb. 15 – Sep. 15.

Coast horned lizard (*Phrynsoma blainvillii)*
Status: State Species of Special Concern
Description:

- 2.5 – 4.5 inches
- A small lizard with a flat, oval-shaped body that is colored reddish, brown, yellow, or gray, with dark blotches on the sides of its neck.
- Large crown of horns displayed on its head, with the two center horns being the longest.

Habitat:
Found in grasslands, woodlands, and chaparral. Primarily inhabits sandy and loose soils for burrowing and reproduction. Feeds on insects, especially ants.

California legless lizard (*Anniella pulchra)*
Status: State Species of Special Concern
Description:

- 4-7 inches
- A medium sized lizard with a complete lack of limbs, a blunt tail, elongated bodies, and one well-defined line along the top of the backside.
- Juveniles start out as silvery and yellow; adults vary between brown, dark brown, to completely black.

Habitat:
Found in loose, sandy soils or areas with leaf litter. Moisture is essential for their skin shedding process. Common in several habitats but especially in coastal dune, valley-foothill, chaparral, and coastal scrub.

Coast Range newt (*Taricha torosa torosa)*
Status: State Species of Special Concern
Description:

- 4.9 – 7.8 inches
- A stocky, medium-sized salamander, yellowish-brown to dark brown with light underside.
- Rough, grainy skin in the terrestrial phase with eyes that appear to extend to or beyond the outline of the head.

Habitat:
Found in wet forests, oak forests, chaparral, and rolling grasslands along the coast and coast range mountains. Breeds in water but found in upland areas nearby when not breeding.

Avoidance and Minimization Measures

General Measures:

- No pets will be allowed on the construction site
- All trash, debris, and construction material shall be removed from the project site following construction.
- Prior to activity within the channel, the Contractor and District shall work together to identify the limits of the required access routes and encroachment. These "work area" limits shall be identified with brightly-colored flagging or fencing. Work shall be limited to this defined area only. Flagging shall be maintained in good repair for the duration of the project. All areas within the channel beyond the identified work area limits shall be considered Environmentally Sensitive Areas (ESA) and shall not be disturbed.
- Project disturbance shall be limited to the extent practicable, including storage, parking, and laydown areas. Staging and parking shall occur in previously disturbed areas to the extent practicable.
- Staging and storage areas for equipment, materials, fuels, lubricants, and solvents shall be located in the designated staging area only. Stationary equipment such as motors, pumps, generators, compressors and welders, located adjacent to the stream or where fluids or other material may enter the stream, shall be positioned over drip-pans. Equipment shall be moved away from the stream prior to refueling and lubrication.
- Install and maintain appropriate erosion control measures on exposed slopes and if soils or materials will be stockpiled. Maintain erosion control mechanisms on a daily basis.
- To minimize the risk of ensnaring and strangling wildlife, coir rolls, erosion control mats or blankets, straw or fiber wattles, or similar erosion control products shall be composed entirely of natural-fiber, biodegradable materials and not contain "photodegradable" plastic.
- If wildlife is encountered during work, work in that area will be halted and it shall be allowed to escape the work area. If it is unable to leave the work area, contact the Environmental Programs Division immediately to determine next steps.

Vegetation Removal Measures:

- Trees and shrubs should be avoided to the extent practicable. Prune and trim trees where possible, rather than removing. Removal of trees greater than 4-inch-diameter at breast height is prohibited without prior approval from the Environmental Programs Division. All trees and shrubs to be cut or otherwise removed shall be identified and clearly marked to avoid accidentally removing trees that should not otherwise be affected.
- No trees will be removed within the buffer area which is generally defined as the area 15 ft on either side of the low flow channel on Arroyo Grande creek, and 7.5 ft on either side of the low flow channel on Upper Los Berros creek (the District will define the extent of the buffer area on a site specific basis). Exceptions include trees that have fallen over and are a risk to the integrity of the levee (e.g. – lodged against levee or bridge) or have the potential to increase the risk of flooding (fallen across channel, obstructing flow), or as necessary to complete this emergency work. All root balls in the buffer zone will be left intact to the maximum extent possible to enable resprouting and to help stabilize soils.
- The disturbance or removal of vegetation shall not exceed the minimum necessary to address the emergency and shall only occur within the defined work area. Precautions shall be taken to avoid other damage to vegetation by people or equipment

- Vegetation removed from the project site shall be disposed of at an appropriate and legal off-site location where the material cannot enter the stream channel. No such material shall be stockpiled in the streambed, banks, or channel. If under direction by the District, native vegetation removed from the channel may be salvaged for habitat restoration.
- All invasive plant species that are disturbed by the project shall be removed from the project work area. Any periwinkle, Cape or German ivy, castor bean, giant reed, or other non-native invasive plant species shall be appropriately disposed of. Non-native species shall not be used in mulching, composting, or otherwise placed in or around the project site or within the stream.

Diversion and Dewatering Measures:

- At least 10 working days prior to beginning any in-stream work, the contractor shall present their means and methods to conduct a stream diversion which will be subject to review and approval by the Environmental Programs Division. Any materials intended for use in the diversion such as pumps, screens, hoses, gravel bags, filter fabric, straw bales, and netting must be inspected and approved by the Environmental Programs Division prior to implementing the diversion.
- No work in standing or flowing water is allowed. Stream diversion activities shall be conducted in accordance with the 2025 Diversion/Dewatering Plan prepared for this project. Diversion methods may include, but are not limited to, installation of cofferdams up and downstream of the work site to divert flow out of the work area. Temporary structures used to dewater the stream channel shall consist of clean washed gravel, sandbags, or other non-erodible material and shall be completely removed from the work area at project completion. Upon completion of construction activities, any diversions or barriers to flow will be removed in a manner that allows flow to resume with the least disturbance to the substrate. Alteration of the streambed will be minimized to the maximum extent possible; any imported material will be removed from the streambed upon completion of the project. Installation and removal of stream diversion measures will be monitored by a qualified biologist.
- During construction, and only with prior approval of the Environmental Programs Division and on-site biologist, if there are ponded areas in the channel that need to be temporarily dewatered by pumping, intakes will be completely screened with wire mesh not larger than 0.2 inch (5 mm) to prevent aquatic organisms such as fish and amphibians from entering the pump system or being impinged on intake screening. Pumps will release the diverted water into a sediment containment zone, so that suspended sediment will not re-enter the stream. The form and function of pumps used during the dewatering activities will be checked daily to ensure a dry work environment and minimization of adverse effects to aquatic species and habitats. Dewatering activities will be monitored by a qualified biologist

California Red-legged Frog Measures:

- A biologist(s) familiar with the California red-legged frog should be present during activities to ensure that any individuals of this species present are avoided, or are allowed to move out of harm's way of their own volition. If suspending the activities is not possible until a California red-legged frog leaves, the biologist(s) should move the individual animals to suitable habitat nearby to avoid direct injury or mortality.

- The activities should be monitored daily to ensure that no other California red-legged frogs are in the work area and could be killed or injured. Clearance surveys prior to the onset of activities each day would be prudent to make sure any California red-legged frogs that have moved into the area overnight are captured.
- Suitable markers should be installed around the work area to minimize the footprint of disturbance needed to complete the project.
- All refueling and equipment maintenance should be conducted away from waterbodies to avoid accidental contamination.
- Any open pits or holes should be covered at the end of each work day to avoid entrapment of California red-legged frogs that may be dispersing through the area.
- Any graded areas in California red-legged frog habitat should be restored to pre-project conditions, as feasible.
- Special attention should be given to the voids proposed for filling as California red-legged frog are likely seeking cover/refuge in those places.

Tidewater Goby Mesaures:

- The District will employ qualified biologists, to ensure compliance with protective measures pertaining to tidewater goby and other biological resources. Monitoring will occur throughout the length of initial vegetation and sediment removal and during supplemental vegetation and sediment removal.
- If in-stream work is necessary and pumps are incorporated to assist in temporarily dewatering the site, the contractor will screen the pump intakes with no larger than 0.2 inch wire mesh to prevent tidewater gobies and other sensitive aquatic species from entering the pump system. Pumps will release the additional water to a settling basin allowing the suspended sediment to settle out prior to re-entering the stream outside of the isolated area. The form and function of all pumps used during dewatering activities will be checked daily, at a minimum, by the biologist(s) to ensure a dry work environment and minimize adverse effects to aquatic species and habitats.
- The biological monitor(s) will monitor erosion and sediment controls to identify and correct any conditions that could adversely affect sensitive aquatic species or habitats. The biological monitor(s) will be granted the authority to halt work activities as necessary and to recommend measures to avoid and/or minimize adverse effects to tidewater goby and its habitat.

Steelhead Measures:

- When feasible, all work activity occurring within the active low flow channel shall be conducted when the channel is dry or at its lowest flow condition (late summer).
- The applicant shall minimize mobilization of bank sediment into the creek from access roads and construction (installation of log structures) activities. Specifically, any sandbags to be used during the construction of the coffer dam for a water diversion shall only be filled with clean/washed sands or gravels. All fill material for cofferdams or access ramps shall be completely removed from the channel upon project completion.
- The District shall visually monitor turbidity levels beyond the work area boundaries and downstream when instream construction and maintenance activities occur within the protected buffer. Turbidity monitoring equipment shall be available on site, and turbidity shall

be measured any time visual monitoring indicates any increase of turbidity outside of the work area. NMFS shall be notified immediately by the contractor if at any time the turbidity monitoring indicates exposure of steelhead to levels of turbidity outside of the described work area of more than a 20 percent increase above background levels. The applicant-retained biologist shall monitor in-channel activities and performance of sediment control or detention devices for the purpose of identifying and reconciling any condition that could result in take of steelhead. When turbidity levels below the work area rise above 20 percent greater than background turbidity levels, the biologists shall halt work activity to recommend measures for avoiding adverse effects to steelhead and critical habitat and ensure sediment control mechanisms are properly working. Turbidity measurements shall be documented, compiled into a report, and submitted to NMFS' Southern California Office (501 W. Ocean Blvd., Suite 4200, Attn: Brittany Struck, Long Beach, California 90802).

Water Quality Measures:

- At all times, appropriate types and sufficient quantities of materials shall be maintained on site to contain and clean up any spill or inadvertent release of materials that may cause a condition of pollution or nuisance if the materials reach waters of the state. Construction personnel must know how to use appropriate containment and clean up materials.
- Fueling, lubrication, maintenance, storage, and staging of vehicles and equipment must not result in a discharge to any waters of the state, and shall be located outside of waters of the state in areas where accidental spills will not enter or affect such waters.
- If construction-related materials reach surface waters, appropriate spill response procedures must be initiated as soon as the incident is discovered. In addition, the State Water Board staff contact identified in this Order must be notified via email and telephone within twenty-four (24) hours of occurrence.
- Construction materials and debris from all construction work areas shall be removed from the site and disposed of properly following completion of individual projects enrolled under this Order.
- Water diversion activities must not result in the degradation of beneficial uses or exceedances of water quality objectives of any of the receiving waters. Any temporary dam or other constructed obstruction must only be built from materials which will cause little or no siltation (e.g., clean gravel). Normal flows must be restored to the affected water immediately upon completion of work at that location.
- Effective best management practices (BMPs) must be implemented to control erosion and runoff from areas associated with the emergency project, this includes access roads. All areas of temporary impacts and all other areas of temporary disturbance which could result in a discharge or a threatened discharge to waters of the U.S. and/or state must be restored. Restoration must include grading of disturbed areas to pre-project contours and revegetation with native species.

ENVIRONMENTAL AWARENESS TRAINING
SIGN-IN SHEET

A. G. Levee

	NAME	SUPERVISOR	DEPT. or COMPANY	PHONE	EMPLOYEE ID	SIGNATURE
15	J. Flores					Flores OFFICE
16	Flores					Flores OFFICE
17	Victor					
18	Celestino					Prendergast
19	AG Maul					
20	A Prendergast					
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Worker Environmental Awareness Program (WEAP) Training

Sign-in Sheet

	Name	Title	Signature	Date
1	Adam Sachs	Biologist (Rincon)	[redacted]	8/28/25
2	KAI JANNI	MANAGER (KD JANNI)		8/28/25
3	Juan C Toledo	↓		8/28/25
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Worker Environmental Awareness Program (WEAP) Training

Sign-in Sheet

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Worker Environmental Awareness Program (WEAP) Training

Sign-in Sheet

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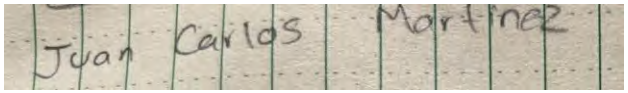
1	Juan Carlos Martinez	Labor		9/4/2025
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Worker Environmental Awareness Program (WEAP) Training

Sign-in Sheet

	Name	Title	Signature	Date
1	Peter Consultor	KD Janny	[signature]	09/02/25
2	Juan C. Toledo	↕	[signature]	9/2/25
3	Juan Romero G.	KD Jerry	[signature]	9/10/25
4	DIEGO ARMANDO GÓMEZ LÓPEZ	KD Janny	DIEGO GÓMEZ	9/10/25
5	Alejandro Aparicio	KD Janni	[signature]	9-10-25
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Worker Environmental Awareness Program (WEAP) Training

Sign-in Sheet

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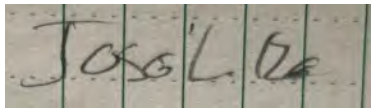
1	Jose Rondon	Labor		9/16/2025
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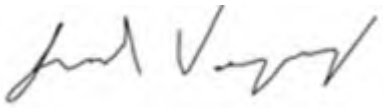
Worker Environmental Awareness Program (WEAP) Training

Sign-in Sheet

	Name	Title	Signature	Date
1	Jesse Pizano	Papich Construction		10/7/2025
2	Robert Herrera	Papich Construction		10/7/2025
3	Craig Caballero	Papich Construction		10/7/2025
4	Josh Vasquez	Papich Construction		10/7/2025
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Worker Environmental Awareness Program (WEAP) Training

Sign-in Sheet

	Name	Title	Signature	Date
1	Josh Vasquez	County Inspector		10/13/2025
2	Craig Caballero	Project Manager		10/13/2025
3	Robert Dyk	Papich Super		10/13/25
4	ROBERT HERRERA	FOREMAN		10/13/25
5	IRAN NIEVES	LABOR		10/13/25
6	Justin Benson	Assistant Project Manager		10/13/25
7	ALBERTO BARAJAS	LABOR		10/13/25
8	JESSE PIZANO	LABOR		10/13/2025
9	MIKE LEMONS	SAFETY		10-13-25
10	Abdon Arellano	QE		10-13-25
11	MICHAEL BOYCE	RE, COSLO		Dec 13, 2025
12	IRAN NIEVES	PAPICH		Oct. 13, 2025
13	SEAN PATTEN	NRSS		Oct - 13, 2025
14	DOUG SPANG	SLOPW		10-13-25
15	Loren Nunnery	Papich		10-16-25
16	Alejandra Celio	SLOPW		10-19-25
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Worker Environmental Awareness Program (WEAP) Training

Sign-in Sheet

	Name	Title	Signature	Date
21	Christian Rochester	operator		10-21-25
22	Derrek Johnson	flagger		10-27-25
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Appendix D

Wallace Group Log Structure and Alcove Monitoring Report

ARROYO GRANDE CREEK

WATERWAY MANAGEMENT PROGRAM

Annual Log Structure and Alcove Monitoring

For

County of San Luis Obispo

JANUARY 2026

Prepared by:

WALLACE GROUP

Wallace Group
612 Clarion Court
San Luis Obispo, CA 93401
805 544-4011
Job Number: 0019-0118

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PURPOSE

The purpose of this report is to document and summarize the quantitative log structure and alcove monitoring conducted in 2025 as part of the Arroyo Grande Creek Waterway Management Program. This annual monitoring effort documents how these structures meet their objectives of maintaining flood conveyance capacity within the leveed channel and enhancing aquatic and riparian habitat for sensitive species. This report provides data to guide adaptive management strategies, prioritize maintenance needs, and inform future sediment and vegetation management actions by assessing structural integrity, hydraulic function, and habitat conditions.

Qualitative monitoring is documented in the NMFS Annual Status Report prepared by Rincon Consultants.

Recommendations resulting from this monitoring are included in the Annual Work Plan and/or the Secondary Sediment Management Plan.

INTRODUCTION

This report summarizes the monitoring of log structures installed along approximately 15,000 linear feet of Arroyo Grande and Los Berros Creeks in San Luis Obispo County, California. The monitoring is part of the Arroyo Grande Creek Waterway Management Program Project (Project), which aims to increase flood capacity within the project reach while enhancing water quality and providing habitat for sensitive species, including salmonids, in the leveed channel. To maintain the improved flood capacity, sediment and vegetation within the reach are managed as needed. The Phase 1 Design Drawings (August 13, 2019) and the Phase 2 Design Drawings (March 6, 2020) prepared by Cannon (Drawings) provide further details regarding the Project designs and can be provided upon request.

Construction of the Project was completed in two phases. In 2019, the first phase included installation of twenty-two (22) log structures and construction of eleven (11) secondary channels. The second phase, completed in 2020, added twenty (20) log structures and ten (10) secondary channels. Each secondary channel, located within a leveed portion of Arroyo Grande Creek (Figure 1), contains two log structures and corresponds to a designated Sediment Management Zone (SMZ). This report provides an assessment of all forty-two (42) log structures installed during both phases.

LOG STRUCTURE AND ALCOVE MONITORING

Log Structure Overview and Design Intent

Log structures were incorporated into the Project to reinforce the primary flow path of the Arroyo Grande Creek main channel while adding habitat complexity and grade control within the constructed secondary channels. Two types of structures were installed.

“Type A” structures were constructed at the upstream end of each secondary channel. Their primary purpose is to protect the head of the bar between the main and secondary channels, downstream of the secondary channel inlets. These structures also enhance habitat complexity and provide cover for steelhead and California red-legged frog. During high-flow events, Type A structures are intended to create turbulence that forms and maintains pools. Additionally, they introduce roughness, promoting variability in flow conditions and channel substrate.

"Type B" structures were installed near the downstream end of the secondary channels. These structures function as grade control features and habitat elements, encouraging scour and pool formation while preventing headcutting into the secondary channels. Depending on their position relative to the main channel, Type B structures can create backwater alcoves and mimic undercut banks, offering refuge for migrating steelhead during high flows. Alcoves also provide habitat for red-legged frogs when flow velocities are low and when areas remain moist or ponded as flows recede and secondary channels dry.

Monitoring Program

Specific monitoring procedures for the log structures were not included in the project permits. Therefore, a monitoring program was developed to inspect the log structures, verify that they are functioning as intended, and implement adaptive management measures if needed. The monitoring program includes the following elements:

- Photo Documentation: Taking photos of each log structure and associated pool and alcove features from established photo points.
- Visual Assessment: Evaluating the stability and condition of each log structure, associated pool or alcove, and adjacent channel.
- Habitat Data Collection: Recording habitat data focused on flow velocity (when flow is present), pool development, and shelter rating at the log structures.

Monitoring Methods

Quantitative monitoring of the forty-two log structures was conducted on February 28, June 25, and December 11, 2025. During each visit, Wallace Group representatives walked the project reach and collected photos, notes, and field measurements as applicable. The February 28, 2025 monitoring was conducted by Waterways Consulting. Photos were taken to document the condition of each structure and surrounding area. Type A structures were photographed generally looking downstream, while Type B structures were photographed generally looking upstream. An exhibit of the log structures, secondary channels, and general photo point locations is included in Appendix A. Representative photos of the log structures are included in Appendix B.

Field measurements and observations were recorded on monitoring forms. Where water was present in pools adjacent to log structures, pool dimensions were measured; where water was absent, dimensions were estimated where visible scour had occurred. Velocity was measured using the orange peel method when surface flow was present. This method involves placing an orange peel in the water and timing its travel over a defined distance using a stopwatch. Velocity is calculated by dividing the distance traveled by the recorded time, yielding feet per second.

A shelter rating was also determined for each log structure using the method outlined in the California Salmonid Stream Habitat Restoration Manual, Part III: Habitat Inventory Methods (CDFW 2004), included as Appendix C. Shelter ratings were assigned assuming the presence of flow and appropriate depths to provide steelhead habitat, even if a structure was dry at the time of monitoring. Additional observations included visual estimates of pool cover percentage, notes on log structure and adjacent channel condition, and identification of recommended adaptive management or maintenance needs.

Monitoring Results

Conditions remained relatively unchanged since the fall 2024 inspection, which followed sediment and debris removal activities completed throughout most of the project reach. Refer to the 2024 report for locations where maintenance occurred. Storm flows during 2025 were similar to those in 2024, if not lower. The creek did not experience any high-flow events exceeding full storm flow stage at the 22nd Street Bridge gage (County of San Luis Obispo Public Works Department, 2025). Figure 1 includes a graph showing flow stage at 22nd Street Bridge during 2025.

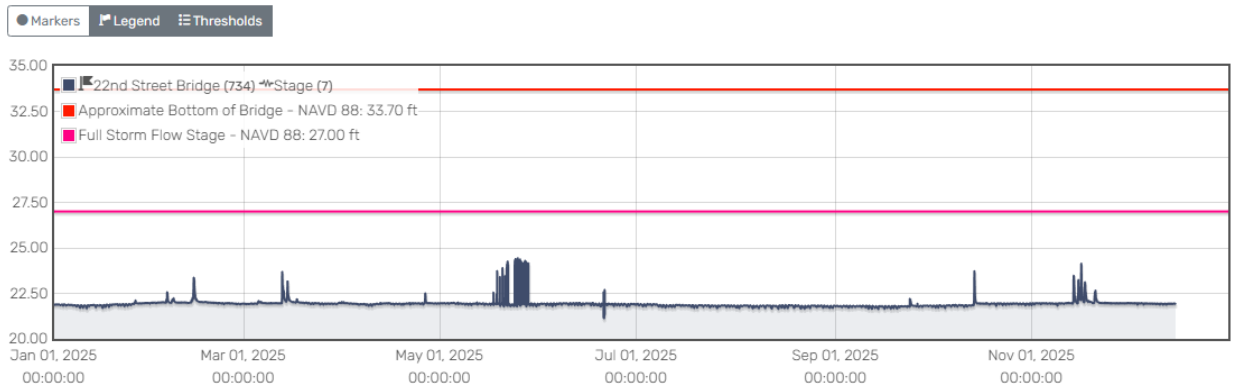

Figure 1. 22nd Street Bridge Gage Stage Data 2025

Few secondary channels appeared to have been activated during 2025, and of those activated, all but Secondary Channel 15 have swapped from their primary channels to the secondary permanently. Table 1 summarizes the secondary channels activated during each winter since monitoring began in Water Year 2020.

Table 1. Secondary Channels Activated by Flood Flows

Water Year	Secondary Channel /Sediment and Vegetation Management Site # Activated
2019-2020	3, 9, 10
2020-2021	1, 3, 9, 10, 11, 12/13, 14, 15, 16, 17, 19
2021-2022	1, 3, 5, 6, 9, 10, 11, 12/13, 14, 15, 16, 17, 19
2022-2023	All Secondary Channels
2023-2024	All Secondary Channels
2024-2025	14, 15, 16, 17, 18, 19

The log structures have remained intact after experiencing high flows during several events since project construction. Some areas of scour have persisted around certain structures, while other locations have undergone cycles of scour and deposition.

For some Type A structures, scouring adjacent to the secondary channel inlet has exposed the log spanning the inlet. In some cases, this has resulted in flow impingement along the levee or bank toe because the log is sloped away from the main channel.

For Type B structures, some footer logs have been undermined but continue to force flow over the top of the logs during medium to high flows. These scour areas provide cover and habitat complexity when inundated and are not considered problematic unless they lead to headcut formation extending upstream or erosion along the levee or bank toe.

Monitoring forms with field notes are provided in Appendix D, organized by inspection date. Table 2 summarizes log structure and secondary channel conditions to help prioritize future maintenance activities. A detailed description of each log structure—including water presence, pool formation, and shelter rating—is included on the monitoring forms. Representative photos of each log structure are included in Appendix B. Comprehensive digital photos from each inspection can be provided upon request.

Table 2 summarizes the log structure and habitat conditions to help prioritize future maintenance activities. A more detailed description of each log structure, including information related to the presence of water and pool formation at each structure, and the shelter rating are included on the monitoring forms. Recommendations based on the 2025 monitoring events can be found in the 2025 Secondary Sediment Management Plan.

Table 2. Log Structure Condition and Habitat Rating Table

Site #	Log Structure Condition	Alcove/Pool Condition	Notes
1A	OK	None	Structure is perched on riparian buffer. Heavy sediment build up within log structure.
1B	Good	Poor	Log structure holding grade near outlet of secondary channel.
2A	Good	None	1 to 2 ft of deposition at inlet to the secondary channel.
2B	Good	Poor	Sediment covers top of footer log on upstream side, and a small pool downstream.
3A	Good	Good	Heavy vegetation in and around structure. Significant debris racking.
3B	Poor	OK	Continuous groundwater on both sides of footer log. Log structure undercut and significant scour on upstream side. River left root wad near to fully exposed, river right footer log is buried.
4A	Good	OK	Heavy vegetation in and around structure and only a small pool.
4B	OK	Poor	Root wad logs are perched above the channel. Footer log is buried.
5A	Good	Good	Sediment in the secondary channel. Heavy debris racking on top of structure.
5B	OK	Poor	River right root wad is perched on riparian buffer. Minimal to no vegetative cover.
6A	Good	Good	Appears stable and performing as intended.
6B	Good	OK	Root wad on river right is perched on riparian buffer. Footer log is buried. Sediment deposition in secondary channel downstream from the structure.
7A	OK	Good	Pool is perched above main flow channel, approx. 3 to 4 feet. Debris racking between structure and main channel.
7B	Good	OK	Footer log exposed on downstream side, small pool on river right.
8A	OK	Good	Heavy sediment build up, dense vegetation.
8B	Good	OK	Rootwad on river right and footer log completely covered. Narrow channel on upstream side of footer log on river left.
9A	Good	Good	Significant debris racking, dense vegetation.
9B	OK	Poor	Footer log on river right is fully undermined. Higher flows conveyed over the logs. Sediment deposition downstream of structure, before main channel.
10A	Good	Good	Significant debris racking. There was a beaver dam in the area that is now gone after the November storms.
10B	OK	Poor	Fully filled in with sediment. Minor depression near rootwad on river left. Root wad on river right buried.
11A	Good	Poor	Sediment build up under structure. Minor flow path under structure. Standing water in secondary channel.
11B	OK	OK	River left root wad fully exposed, river right root wad fully buried.

Site #	Log Structure Condition	Alcove/Pool Condition	Notes
12/13A	OK	Good	Structure is perched approx. 3 feet above the main channel. Small scour pool immediately underneath the structure.
12/13B	Good	Good	Log structure operates optimally. Root wads exposed on both sides, shallow pool immediately downstream from structure.
14A	Good	None	Flow in secondary channel only. Unlikely that primary flow will shift back to main channel, bend in thalweg pointing away from log structure.
14B	Poor	OK	Footer logs completely submerged. Root wad logs are both exposed on the side/top, with root wad fully exposed.
15A	OK	Good	Significant bank cutting over river right log (approx. 8ft).
15B	OK	Good	Footer logs were fully submerged in June from apparent backwater. Root wad on river right is exposed. River left root wad log is partially buried. Erosion cut on river right adjacent to root wad, approx. 5 to 6 feet deep.
16A	Poor	Good	Structure is perched above the primary channel. Vertical erosion cut into the secondary channel bank at river left, approx. 6-foot overhanging wall. Flow in both channels.
16B	Poor	Good	Trash present, flow solely in secondary channel, completely undercut. Root wads and footer logs are fully exposed.
17A	OK	Good	Sediment deposition underneath is limiting factor for pool. The structure is perched above the channels on the riparian buffer.
17B	OK	None	Completely submerged, flowing in both primary and secondary channels.
18A	OK	None	Significant sediment, log structure well outside main channel.
18B	OK	Poor	Trash present, debris present. Footer logs are completely undercut. Root wad logs are fully exposed.
19A	Good	OK	Structure impacted by buildup of sediment to within the top of the interior logs. Structure is perched above the channels on the riparian buffer. Some debris racking.
19B	Poor	Poor	All flow in secondary channel creating increased potential for impacting fish passage. Footer log is completely undercut and no longer holding grade. River left root wad log is fully buried.
20A	Good	OK	The log structure is perched above the channel and is only inundated during high flow.
20B	Good	None	The log structure is perched above the channel and is only inundated during high flow. River left root wad log perched, river right root wad wholly buried.
21A	Good	OK	The log structure is perched above the channel and is only inundated during high flow. Scour under structure and pool sloped towards main channel.
21B	Good	None	The log structure is perched above the channel and is only inundated during high flow. Structure 80% buried.
22A	Good	Good	The log structure is perched above the channel and is only inundated during high flow.
22B	Good	None	The log structure is perched above the channel and is only inundated during high flow. River right root wad exposed, all else buried.

REFERENCES

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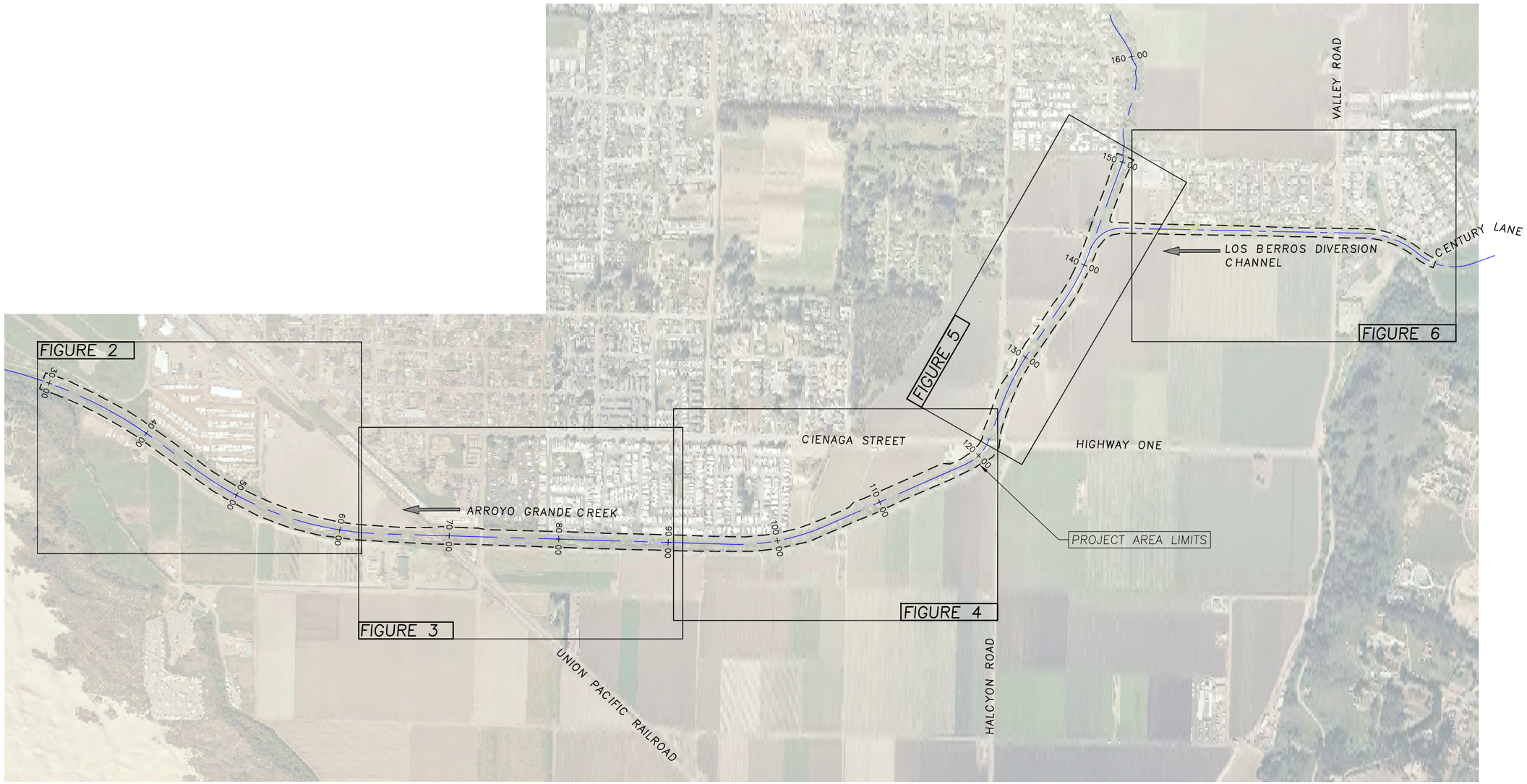
APPENDIX A

Log Structures, Secondary Channels, and General Photo Point Locations



PROJECT AREA OVERVIEW
SCALE: 1"=500'

LEGEND

ARROYO GRANDE CREEK

WATERWAYS CONSULTING INC.
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PROJECT AREA OVERVIEW

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
1

LEGEND

- (E) CONTOURS
- BANKFULL CHANNEL
- (E) DIRT ROAD
- MAIN CHANNEL CENTERLINE AND STATIONING
- PROPOSED SECONDARY CHANNEL GRADING SITE LIMITS
- TYPE "A" LOG HABITAT STRUCTURE
- TYPE "B" LOG HABITAT STRUCTURE
- 13 — GRADING SITE IDENTIFICATION NUMBER
- 9B — PHOTO MONITORING POINT AND LOG STRUCTURE IDENTIFICATION NUMBER

SITE PLAN

SCALE: 1"=100'

WATERWAYS CONSULTING INC.
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LOG STRUCTURE AND ALCOVE MONITORING
PHOTO MONITORING PLAN (1 OF 5)

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE
2

LEGEND

- (E) CONTOURS
- BANKFULL CHANNEL
- (E) DIRT ROAD
- MAIN CHANNEL CENTERLINE AND STATIONING
- PROPOSED SECONDARY CHANNEL GRADING SITE LIMITS
- TYPE "A" LOG HABITAT STRUCTURE
- TYPE "B" LOG HABITAT STRUCTURE
- GRADING SITE IDENTIFICATION NUMBER
- PHOTO MONITORING POINT AND LOG STRUCTURE IDENTIFICATION NUMBER

SITE PLAN

SCALE: 1"=100'

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LOG STRUCTURE AND ALCOVE MONITORING PHOTO MONITORING PLAN (2 OF 5)

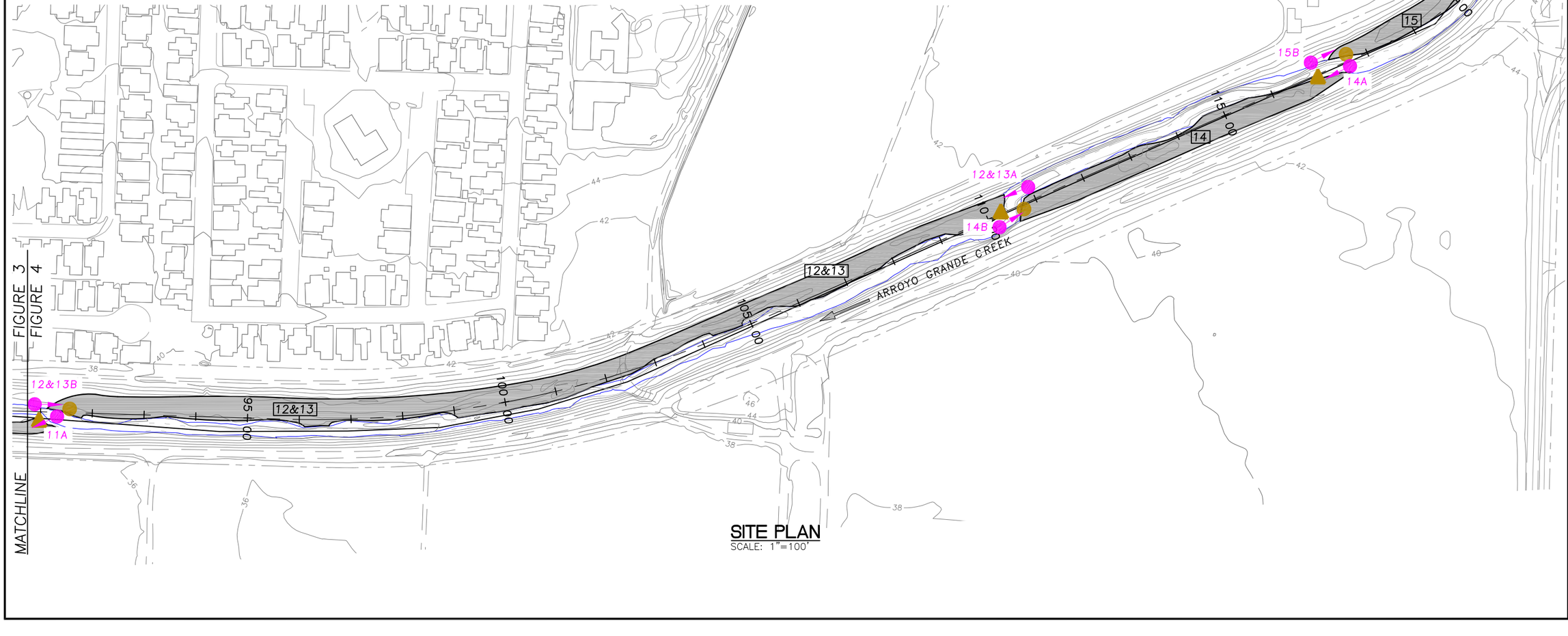
BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE 3

LEGEND

- (E) CONTOURS
- BANKFULL CHANNEL
- (E) DIRT ROAD
- MAIN CHANNEL CENTERLINE AND STATIONING
- PROPOSED SECONDARY CHANNEL GRADING SITE LIMITS
- TYPE "A" LOG HABITAT STRUCTURE
- TYPE "B" LOG HABITAT STRUCTURE
- 13 — GRADING SITE IDENTIFICATION NUMBER
- 9B — PHOTO MONITORING POINT AND LOG STRUCTURE IDENTIFICATION NUMBER



SITE PLAN
SCALE: 1"=100'

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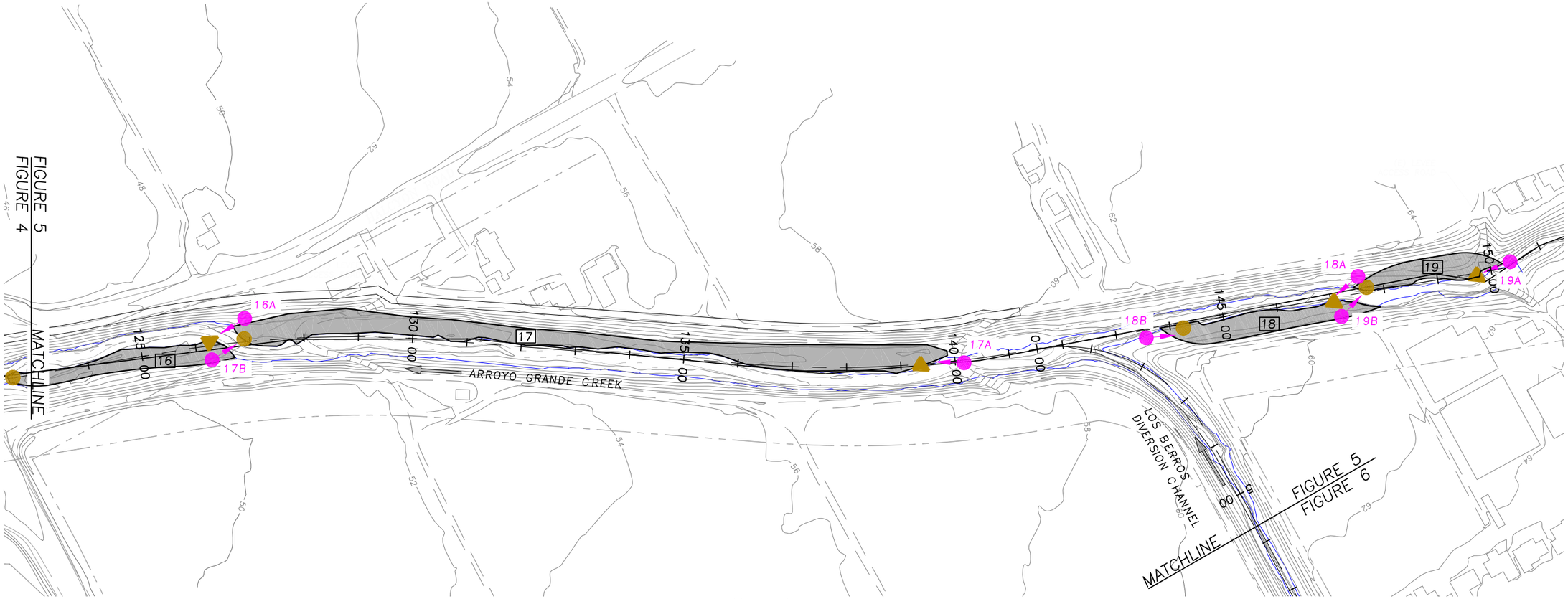
LOG STRUCTURE AND ALCOVE MONITORING
PHOTO MONITORING LOCATION PLAN (3 OF 5)

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
4

LEGEND

- (E) CONTOURS
- BANKFULL CHANNEL
- (E) DIRT ROAD
- MAIN CHANNEL CENTERLINE AND STATIONING
- PROPOSED SECONDARY CHANNEL GRADING SITE LIMITS
- TYPE "A" LOG HABITAT STRUCTURE
- TYPE "B" LOG HABITAT STRUCTURE
- 13 — GRADING SITE IDENTIFICATION NUMBER
- 9B — PHOTO MONITORING POINT AND LOG STRUCTURE IDENTIFICATION NUMBER



SITE PLAN
SCALE: 1"=100'

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LOG STRUCTURE AND ALCOVE MONITORING PHOTO MONITORING PLAN (4 OF 5)

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
5

LEGEND

- (E) CONTOURS
- BANKFULL CHANNEL
- (E) DIRT ROAD
- MAIN CHANNEL CENTERLINE AND STATIONING
- PROPOSED SECONDARY CHANNEL GRADING SITE LIMITS
- TYPE "A" LOG HABITAT STRUCTURE
- TYPE "B" LOG HABITAT STRUCTURE
- 13 — GRADING SITE IDENTIFICATION NUMBER
- 9B — PHOTO MONITORING POINT AND LOG STRUCTURE IDENTIFICATION NUMBER

SITE PLAN
SCALE: 1"=100'

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LOG STRUCTURE AND ALCOVE MONITORING
PHOTO MONITORING PLAN (5 OF 5)

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
6

APPENDIX B

Representative Log Structure Monitoring Photos

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PHOTO A: SITE 1 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 1 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

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PHOTO A: SITE 2 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 2 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

P

WATERWAYS CONSULTING, INC.
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PHOTO A: SITE 3 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 3 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

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PHOTO A: SITE 4 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 4 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

WATERWAYS CONSULTING, INC.
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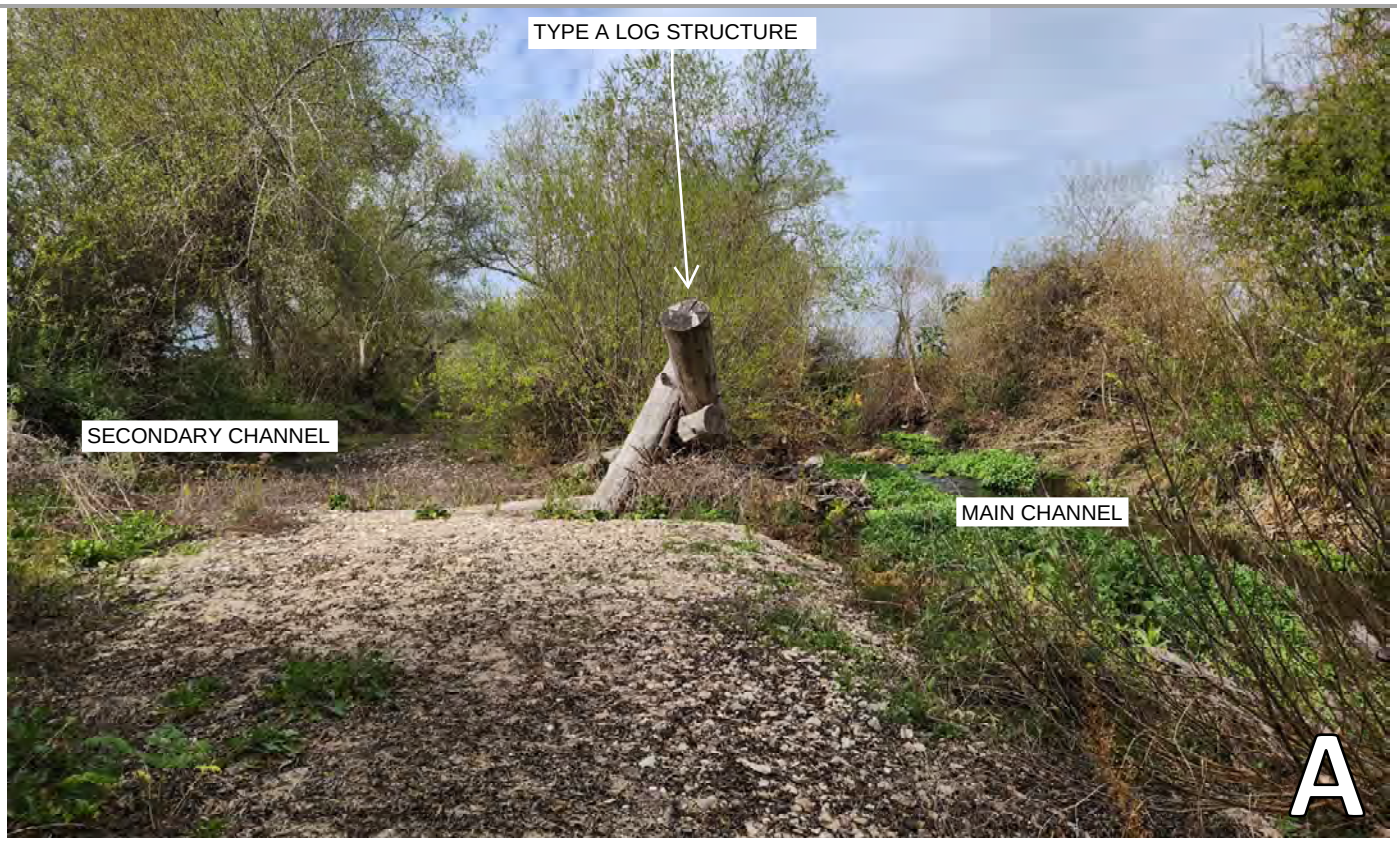
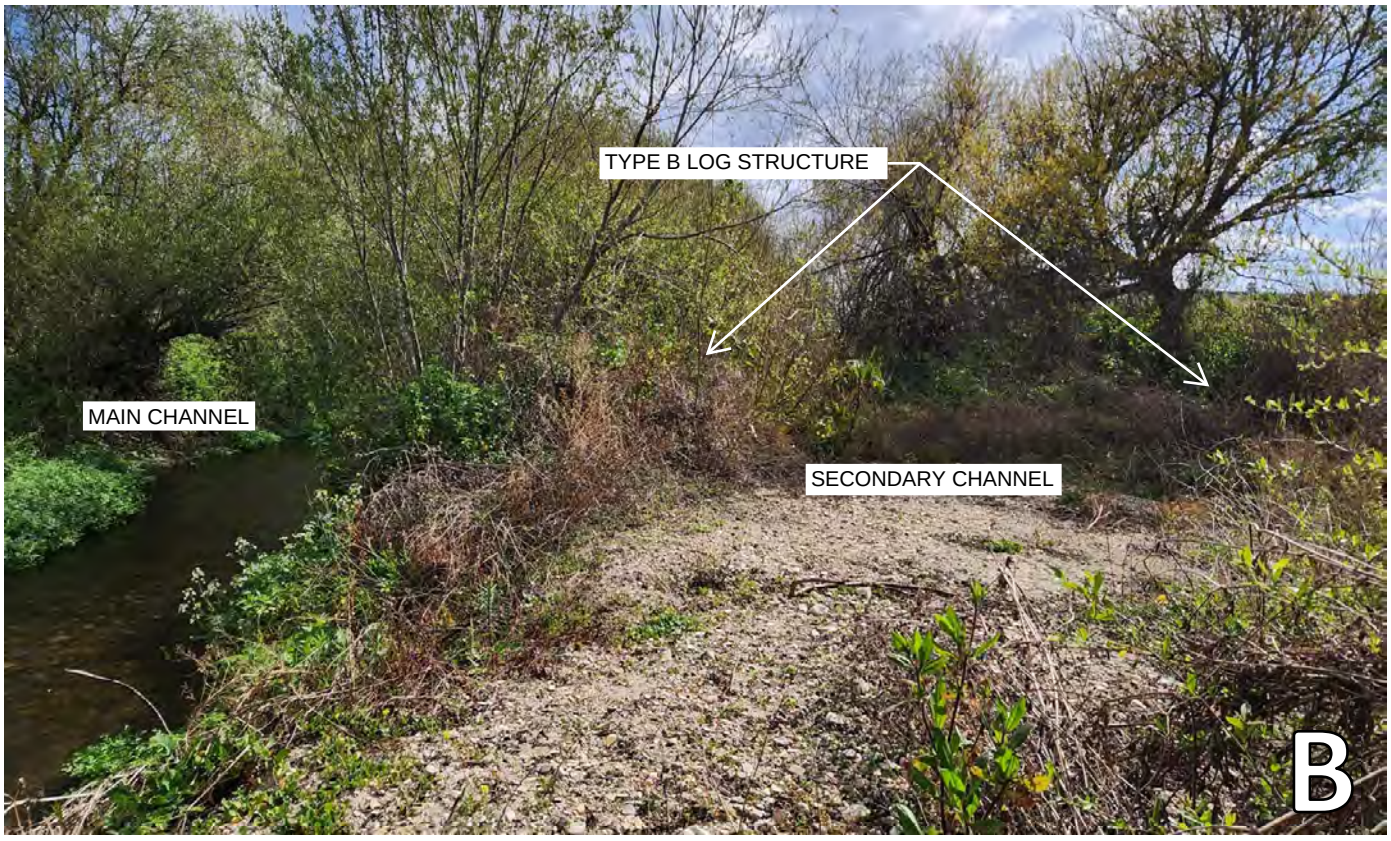
PHOTO A: SITE 5 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 5 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)





WATERWAYS CONSULTING, INC.
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PHOTO A: SITE 6 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 6 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

WATERWAYS CONSULTING, INC.
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PHOTO A: SITE 7 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 7 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

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PHOTO A: SITE 8 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 8 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

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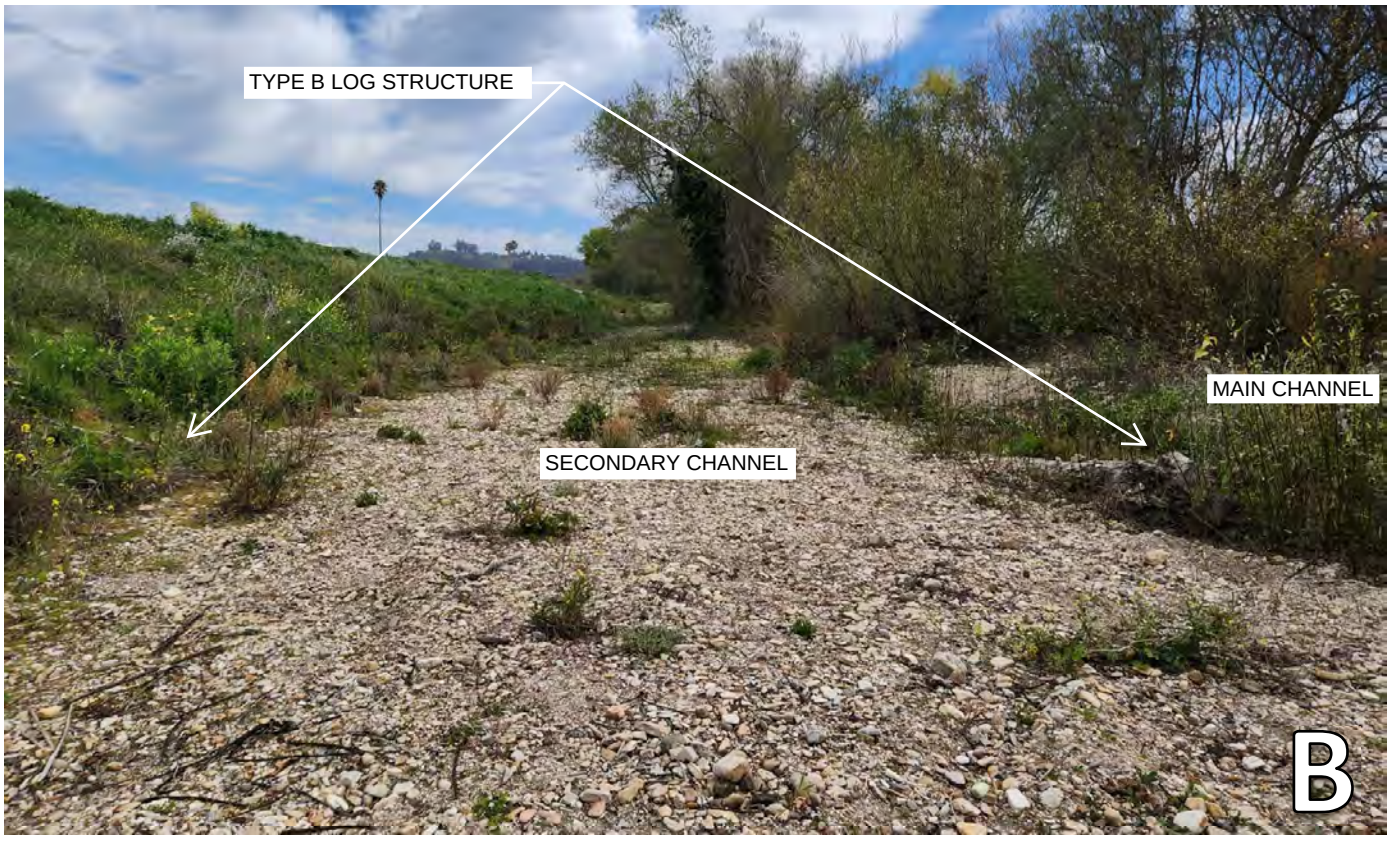
PHOTO A: SITE 9 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 9 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)



WATERWAYS CONSULTING, INC.
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PHOTO A: SITE 10 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 10 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

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PHOTO A: SITE 11 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 11 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

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PHOTO A: SITE 12&13 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 12&13 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

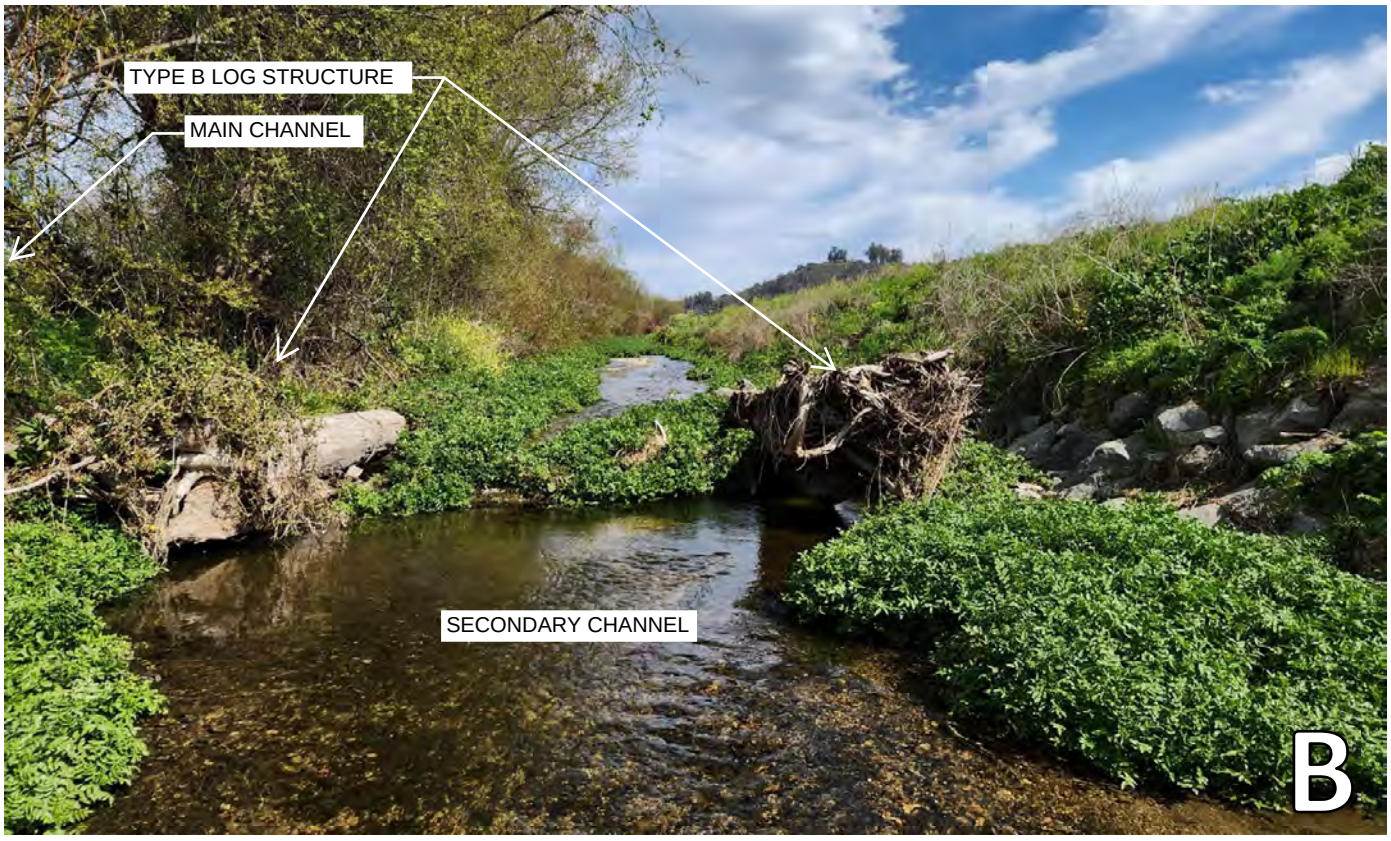

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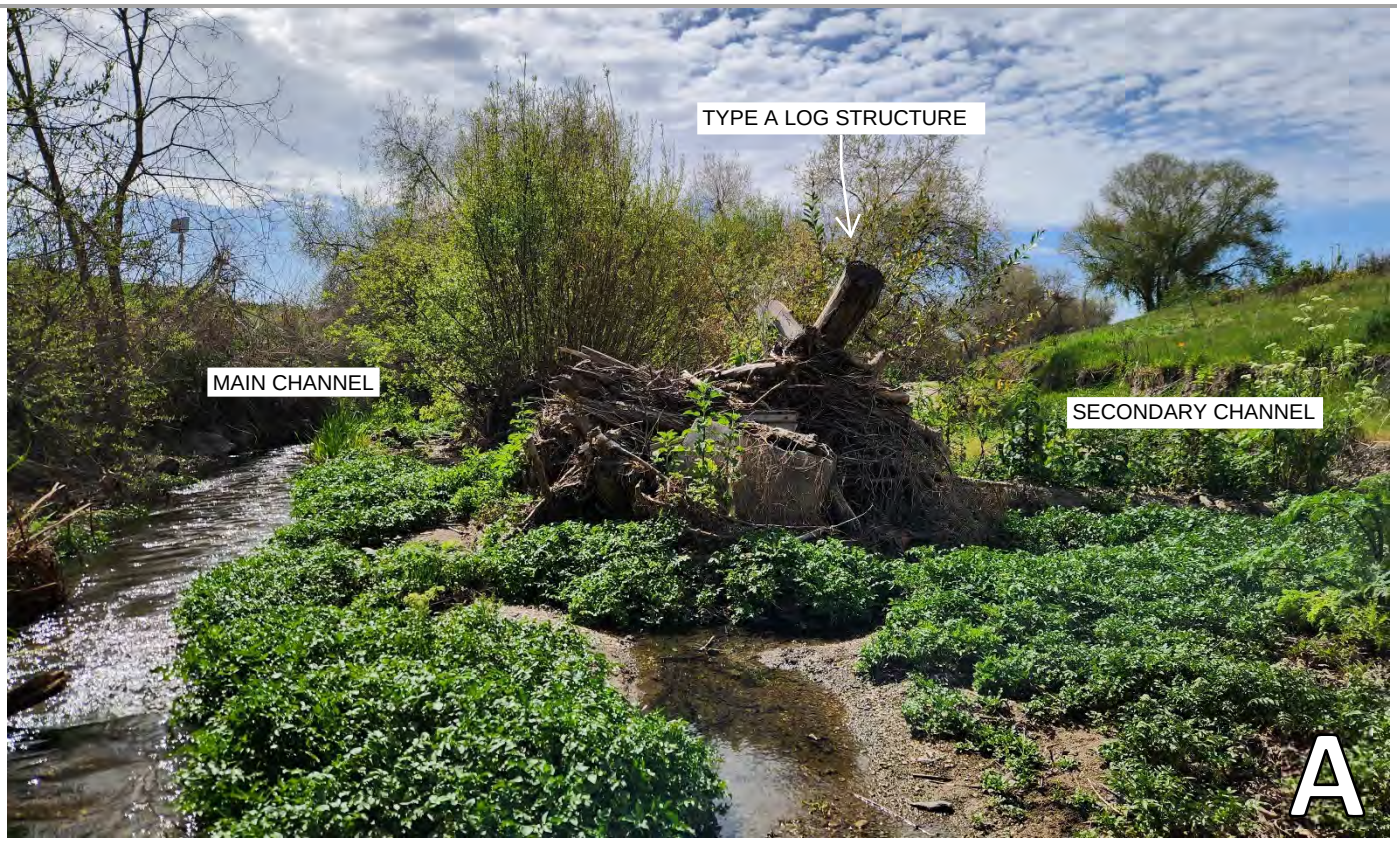
PHOTO A: SITE 14 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 14 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)



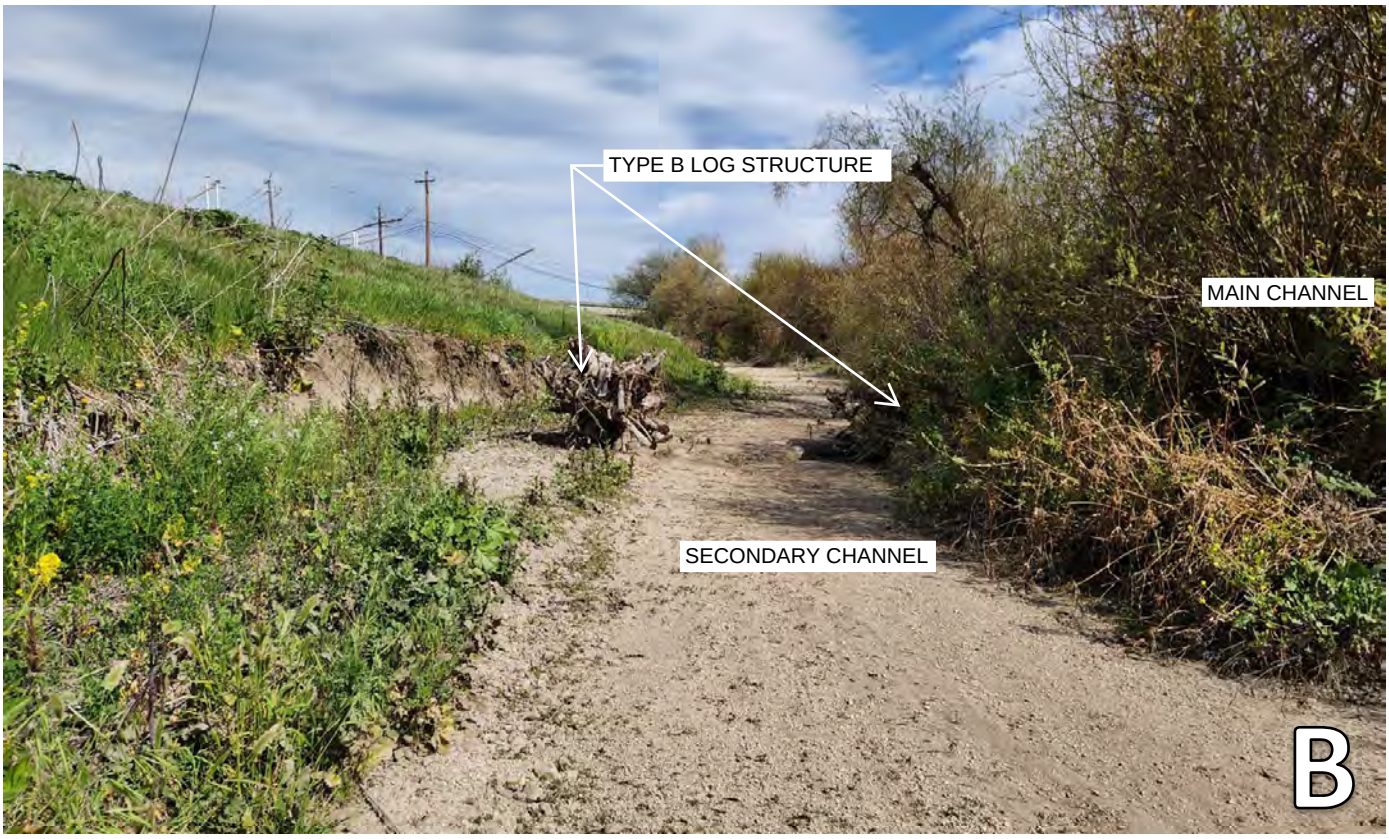


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PHOTO A: SITE 15 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 15 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

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PHOTO A: SITE 16 TYPE A STRUCTURE (FEB. 2025)

PHOTO B: SITE 16 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

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PHOTO A: SITE 17 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 17 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

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PHOTO A: SITE 18 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 18 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

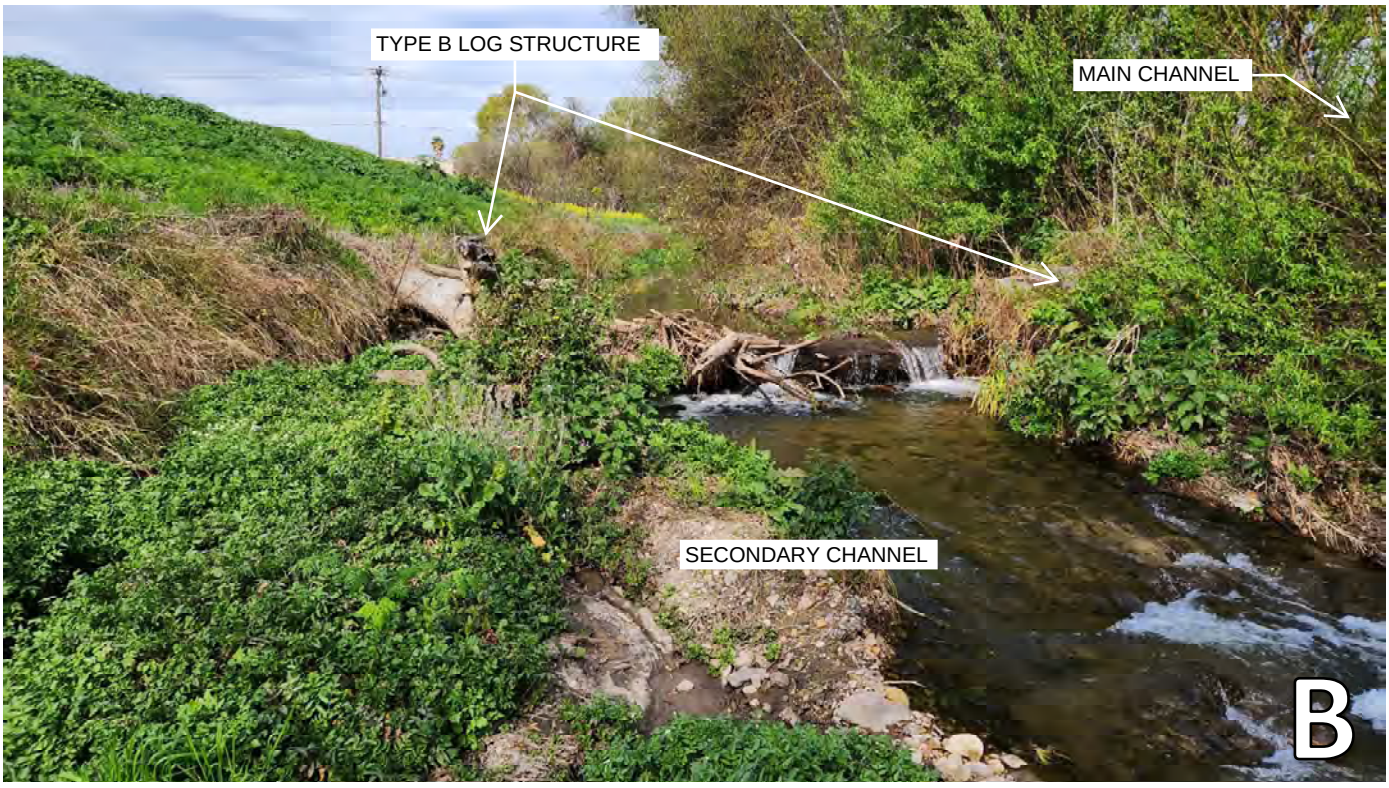

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PHOTO A: SITE 19 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 19 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

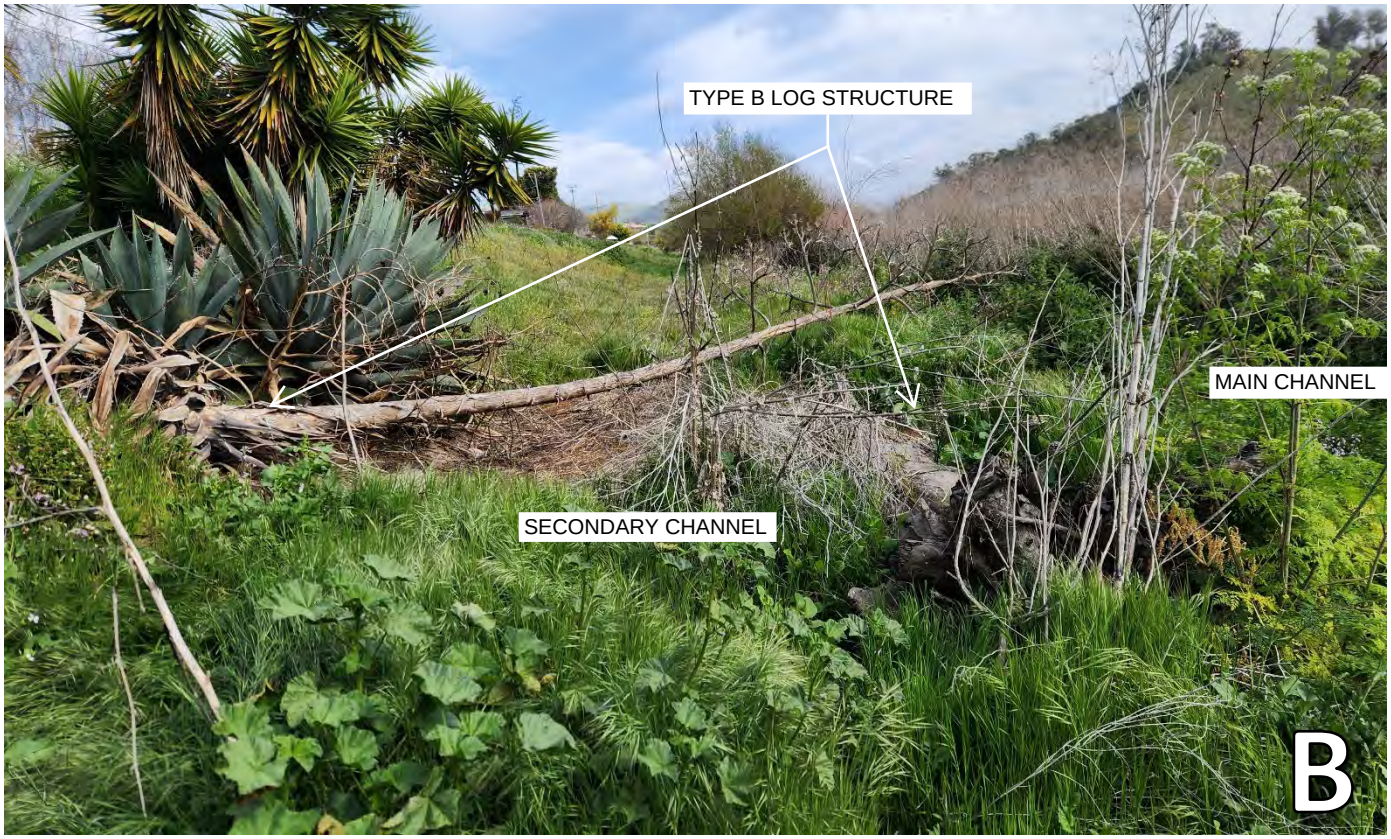

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PHOTO A: SITE 20 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 20 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

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PHOTO A: SITE 21 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 21 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

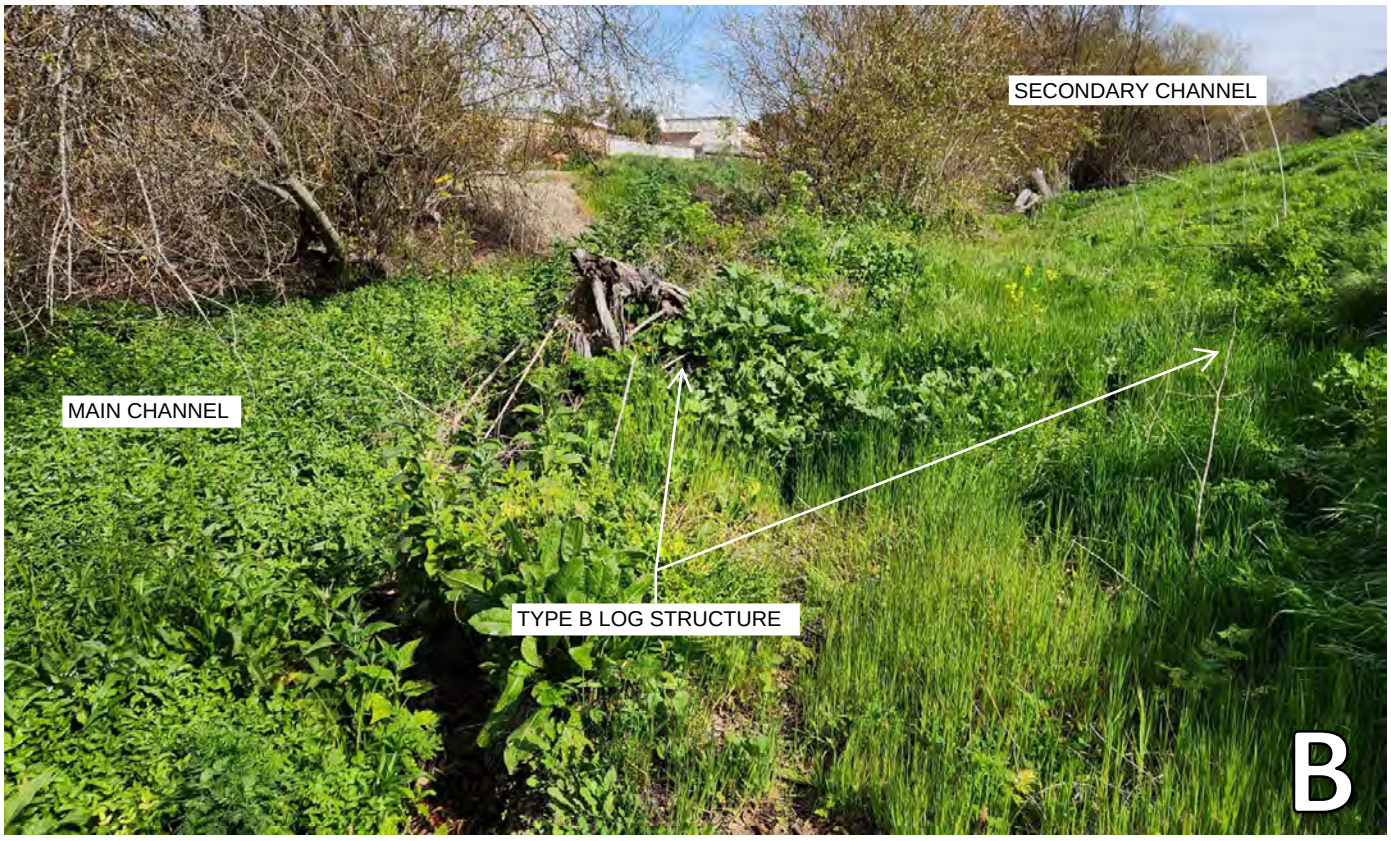

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PHOTO A: SITE 22 TYPE A STRUCTURE LOOKING DOWNSTREAM (FEB. 2025)

PHOTO B: SITE 22 TYPE B STRUCTURE LOOKING UPSTREAM (FEB. 2025)

APPENDIX C

California Department of Fish and Wildlife – Shelter Rating

(California Salmonid Stream Habitat Restoration Manual, Fourth Edition)

Instream Shelter

Instream shelter within each habitat unit can be rated according to a standard system. This rating system is a field procedure for habitat inventories which utilizes objective field measurements. It is intended to rate, for each habitat unit, complexity of shelter that serves as instream habitat or that creates areas of diverse velocities which are focal points for salmonids. In this rating system, instream shelter is composed of those elements within a stream channel that provide protection from predation for salmonids, areas of reduced water velocities in which fish can rest and conserve energy, and separation between territorial units to reduce density related competition. This rating does not consider factors related to changes in discharge, such as water depth.

Instream Shelter Complexity. A value rating can be assigned to instream shelter complexity. This rating is a relative measure of the quantity and composition of the instream shelter.

Value	Instream Shelter Complexity Value Examples:
0	● No shelter.
1	● One to five boulders. ● Bare undercut bank or bedrock ledge. ● Single piece of large wood (>12" diameter and 6' long) defined as large woody debris (LWD).
2	● One or two pieces of LWD associated with any amount of small wood (<12" diameter) defined as small woody debris (SWD). ● Six or more boulders per 50 feet. ● Stable undercut bank with root mass, and less than 12" undercut. ● A single root wad lacking complexity. ● Branches in or near the water. ● Limited submersed vegetative fish cover. ● Bubble curtain.
3	Combinations of (must have at least two cover types): ● LWD/boulders/root wads. ● Three or more pieces of LWD combined with SWD. ● Three or more boulders combined with LWD/SWD. ● Bubble curtain combined with LWD or boulders. ● Stable undercut bank with greater than 12" undercut, associated with root mass or LWD. ● Extensive submersed vegetative fish cover.

Instream Shelter Percent Covered. Instream shelter percent covered is a measure of the area of a habitat unit occupied by instream shelter. The area is estimated from an overhead view.

APPENDIX D
Monitoring Forms

February 28, 2025

Date of Monitoring Event: 2/28/2025 Monitoring Performed By: Peter Lansdale

Site # 1	**Site # 1**
Log Structure type: A	**Log Structure type: B**
Water Present: No	**Water Present:** No
Pool Depth: N/A	**Alcove Depth:** 0.5 ft
Pool Width: N/A	**Alcove Width:** 20 ft
Pool Length: N/A	**Alcove Length:** 30 ft
Pool Area: N/A	**Alcove Area:** 600 sq. ft.
Flow Velocity: N/A	**Flow Velocity:** N/A
Velocity Differential Present: N/A	**Velocity Differential Present:** N/A
Is cover Present at Pool area? Yes. Grasses and forbs. Young willows.	**Is cover Present at Alcove?** Yes – Boulder and rootwad. Grasses and forbs. Young willows.
Percent of Pool area w/ cover: N/A	**Percent of Alcove area w/ cover**: 90%
Shelter Rating: 3	**Shelter Rating:** 2
Notes: Sandy deposition occurred just upstream of log structure. The secondary channel inlet is perched 2 ft. above the main channel. Herbaceous vegetation has established throughout the secondary channel.	**Notes:** The log structure is holding grade. There is an approximately 1.5 ft. drop across the footer logs to the channel downstream.

Site # 2	**Site # 2**
Log Structure type: A	**Log Structure type: B**
Water Present: No	**Water Present:** No
Pool Depth: 1.5 ft	**Alcove Depth**: 0.5 ft.
Pool Width: 6 ft	**Alcove Width:** 20 ft.
Pool Length: 6 ft	**Alcove Length**: 80 ft.
Pool Area: 36 sq. ft.	**Alcove Area**: 1,600 sq. ft.
Flow Velocity: N/A	**Flow Velocity**: N/A
Velocity Differential Present: N/A	**Velocity Differential Present**: N/A
Is cover Present at Pool area? Yes. Logs, vines, grasses and forbs.	**Is cover Present at Alcove**? Yes. Grasses and forbs, overhanging willow, rootwads
Percent of Pool area w/ cover: 30%	**Percent of Alcove area w/ cover**: 75%
Shelter Rating: 3	**Shelter Rating:** 2
Notes: There is a scour hole just upstream of the log structure and sandy deposition at the inlet to the secondary channel. The secondary channel is perched 2 ft. above the main channel. Herbaceous vegetation has established throughout the secondary channel.	**Notes:** The footer logs are 60% exposed with a 10 in. deep scour hole at the center of channel downstream of the footer logs. Areas of piping visible below footer logs.

Note: Pool and alcove dimensions have been estimated where water is not present.

Date of Monitoring Event: 2/28/2025 Monitoring Performed By: Peter Lansdale

Site # 3	**Site # 3**
Log Structure type: A	**Log Structure type: B**
Water Present: Yes	**Water Present:** Yes
Scour Depth: 1.5 ft.	**Alcove Depth:** 1 ft.
Pool Width: 15	**Alcove Width:** 20 ft.
Pool Length: 12	**Alcove Length:** 30 ft.
Pool Area: 180 sq. ft.	**Alcove Area**: 600 sq. ft.
Flow Velocity: 0 ft/sec	**Flow Velocity:** 0 ft/sec
Velocity Differential Present: 1.5 ft/sec	**Velocity Differential Present:** 1.5 ft/sec
Is cover Present at Pool area? Yes. Logs, woody debris, willow	**Is cover Present at Alcove?** Yes. Logs, overhanging willows, grasses and forbs.
Percent of Pool area w/ cover: 100%	**% of Pool area w/ cover:** 20%
Shelter Rating: 3	**Shelter Rating**: 3
Notes: Gravel deposition occurred upstream, adjacent to, and downstream of the log structure. Scour beneath the log structure has exposed ballast boulders and 90% of the log with rootwad extending across the secondary channel. A backwatered pool is present beneath the log structure. All flow is in the main channel. Large woody debris are racked on the log structure. Herbaceous vegetation has established in the majority of the secondary channel bed area.	**Notes:** There is a pool under and around the log structure fed by a subsurface connection to the main channel. The footer logs are undermined and no longer holding grade. The river left log is fully exposed. A 2-3 ft. tall vertical bank cut formed at river left by the rootwad.

Site # 4	**Site # 4**
Log Structure type: A	**Log Structure type: B**
Water Present: No	**Water Present:** No
Pool Depth: 1 ft.	**Alcove Depth:** 0.5 ft.
Pool Width: 12 ft.	**Alcove Width:** 30 ft.
Pool Length: 8 ft.	**Alcove Length:** 70 ft.
Pool Area: 96 sq. ft.	**Alcove Area:** 2,100 sq. ft.
Flow Velocity: N/A	**Flow Velocity**: 0 ft/sec
Velocity Differential Present: N/A	**Velocity Differential Present**: N/A
Is cover Present at Pool area? Yes –overhanging willows, logs, grasses and forbs	**Is cover Present at Alcove?** Yes – rootwads, grasses and forbs, overhead willows and cottonwood trees
Percent of Pool area w/ cover: 100%	**Percent of Alcove area w/ cover:** 75%
Shelter Rating: 3	**Shelter Rating:** 2
Notes: The inlet to the secondary channel is perched 3-5 ft above the main channel invert. A willow growing along main channel is resting on the structure. Sandy deposition is visible at the inlet to the secondary channel, and in the first 40 ft. of the secondary channel downstream of the log structure. Herbaceous vegetation has established throughout the secondary channel.	**Notes:** Large alcove area downstream of logs when flow is present, separated from main channel by a low berm. The footer logs are completely buried, the rootwad logs are 60% exposed. A 8 in. deep x 4 ft. x 3 ft. scour hole has developed by the river left rootwad.

Note: Pool and alcove dimensions have been estimated where water is not present.

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Site # 5	**Site # 5**
Log Structure type: A	**Log Structure type: B**
Water Present: Yes, stagnant	**Water Present:** No
Pool Depth: 2 ft.	**Alcove Depth:** 0.5 ft.
Pool Width: 25 ft.	**Alcove Width:** 10 ft.
Pool Length: 15 ft.	**Alcove Length**: 20 ft.
Pool Area: 375 sq. ft.	**Alcove Area:** 200 sq. ft.
Flow Velocity: 0 ft/sec	**Flow Velocity**: 0 ft/sec
Velocity Differential Present: 0.5 ft/sec	**Velocity Differential Present:** N/A
Is cover Present at Pool area? Yes – Rootwads, logs, debris, willows.	**Is cover Present at Alcove?** Yes – weeds, overhanging willows, rootwads.
Percent of Pool area w/ cover: 100%	**Percent of Alcove area w/ cover:** 80%
Shelter Rating: 3	**Shelter Rating:** 2
Notes: Debris racking on the log structure. Deposition of gravel downstream of the log structure. Nice pool has developed under the log structure exposing more of the logs and a ballast boulder. Inlet to the secondary channel is perched 3+ ft. above the main channel invert.	**Notes:** Top half of the footer logs are visible. There is an approximately 3 ft. drop to the main channel invert from the log structure. Deposition of gravel is visible in portions of the alcove. Herbaceous vegetation has established throughout the alcove.

Site # 6	**Site # 6**
Log Structure type: A	**Log Structure type: B**
Water Present: Yes	**Water Present:** No
Pool Depth: 2 ft.	**Alcove Depth:** 0.5 ft.
Pool Width: 15 ft.	**Alcove Width:** 20 ft.
Pool Length: 10 ft.	**Alcove Length:** 30 ft.
Pool Area: 150 sq. ft.	**Alcove Area:** 600 sq.ft.
Flow Velocity: 0 ft/sec	**Flow Velocity**: 0 ft/sec
Velocity Differential Present: 1.0 ft/sec	**Velocity Differential Present**: N/A
Is cover Present at Pool area? Yes – rootwad and logs.	**Is cover Present at Alcove?** Yes – overhanging and young willows.
Percent of Pool area w/ cover: 80%	**Percent of Alcove area w/ cover:** 10%
Shelter Rating: 3	**Shelter Rating:** 2
Notes: There is a backwater pool located below the log structure. Woody debris is racked on the log structure. Sand and gravel deposition is visible upstream of the log structure.	**Notes:** The rootwad logs are 50% exposed. The top of the footer logs are barely exposed. Deposition at downstream end of alcove near the confluence with the main channel.

Note: Pool and alcove dimensions have been estimated where water is not present.

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Site # 7	**Site # 7**
Log Structure type: A	**Log Structure type: B**
Water Present: No.	**Water Present:** No.
Pool Depth: 2 ft.	**Alcove Depth:** 0.25 ft.
Pool Width: 15 ft.	**Alcove Width:** 15 ft.
Pool Length: 6 ft.	**Alcove Length:** 25 ft.
Pool Area: 90 sq.ft.	**Alcove Area:** 375 sq. ft.
Flow Velocity: 0 ft/sec	**Flow Velocity:** 0 ft/sec
Velocity Differential Present: N/A	**Velocity Differential Present**: N/A
Is cover Present at Pool area? Yes – Logs. Overhead trees, grasses, and forbs,	**Is cover Present at Alcove?** Yes – rootwads, grasses and forbs, overhanging willows.
Percent of Pool area w/ cover: 50%	**Percent of Alcove area w/ cover:** 100%
Shelter Rating: 3	**Shelter Rating:** 2
Notes: Debris racking on and adjacent to log structure. The secondary channel invert is perched approximately 3 ft. above the main channel invert.	**Notes:** There is a 4 ft x 15 ft x 1 ft deep scour hole by the rootwad of the river right log.

Site # 8	**Site # 8**
Log Structure type: A	**Log Structure type: B**
Water Present: Yes, stagnant	**Water Present:** No
Pool Depth: 3 ft	**Alcove Depth:** 0.5 ft.
Pool Width: 15 ft	**Alcove Width:** 30 ft.
Pool Length: 12 ft	**Alcove Length:** 100 ft.
Pool Area: 180 sq. ft.	**Alcove Area:** 3000 sq. ft.
Flow Velocity: 0 ft/sec	**Flow Velocity:** 0 ft/sec
Velocity Differential Present: N/A	**Velocity Differential Present:** N/A
Is cover Present at Pool area? Yes. Logs, young willow, woody debris.	**Is cover Present at Alcove?** Yes – overhanging willows, rootwads, grasses and forbs
Percent of Pool area w/ cover: 30%	**Percent of Alcove area w/ cover:** 30%
Shelter Rating: 3	**Shelter Rating:** 2
Notes: Subsurface flow from main channel is inundating the pool located directly upstream and below the log structure. Willows continue to become established downstream of log structure. Deposition in secondary channel downstream of the log structure.	**Notes:** A large alcove extends downstream of the log structure. The footer logs are buried. The river left log and rootwad is 75% exposed. Herbaceous vegetation has established throughout the secondary channel.

Note: Pool and alcove dimensions have been estimated where water is not present.

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Site # 9	**Site # 9**
Log Structure type: A	**Log Structure type: B**
Water Present: Yes	**Water Present:** No
Pool Depth: 2 ft.	**Alcove Depth**: 1 ft.
Pool Width: 15 ft.	**Alcove Width:** 15 ft.
Pool Length: 20 ft.	**Alcove Length:** 20 ft.
Pool Area: 300 sq. ft.	**Alcove Area:** 240 sq. ft.
Flow Velocity: 0 ft/sec	**Flow Velocity:** 0 ft/sec
Velocity Differential Present: 1 ft/sec	**Velocity Differential Present:** No.
Is cover Present at Pool area? Yes – Racked debris, overhanging willows, logs	**Is cover Present at Alcove?** Overhanging willows, rootwads, forbs
Percent of Pool area w/ cover: 100%	**Percent of Alcove area w/ cover:** 90%
Shelter Rating: 3	**Shelter Rating:** 3
Notes: There is a backwater pool located below the log structure. Mature willows adjacent to the log structure are helping to reinforce the bar between the channels. Young willows are establishing beside logs. Scour along levee/bank toe downstream of structure. Mature vegetation on levee/bank helping to reinforce slope at area of scour.	**Notes:** The footer logs and river right log are undermined. Large logs racked on the river left log with rootwad are providing cover and habitat complexity when flow is present in the secondary channel.

Site # 10	**Site # 10**
Log Structure type: A	**Log Structure type: B**
Water Present: Yes	**Water Present:** No
Pool Depth: 1.5 ft.	**Alcove Depth:** 0.5 ft.
Pool Width: 20 ft.	**Alcove Width:** 30 ft.
Pool Length: 10 ft.	**Alcove Length:** 40 ft.
Pool Area: 20 sq. ft.	**Alcove Area:** 1200 sq. ft.
Flow Velocity: 0 ft/sec	**Flow Velocity**: 0 ft/sec
Velocity Differential Present: 1.0 ft/sec	**Velocity Differential Present:** N/A
Is cover Present at Pool area? Yes – logs, debris, grasses and forbs, overhanging willows	**Is cover Present at Alcove?** Yes – rootwads, young willows
Percent of Pool area w/ cover: 80%	**Percent of Alcove area w/ cover:** 5%
Shelter Rating: 3	**Shelter Rating:** 2
Notes: There is a backwater pool located below the log structure. Deposition is visible at the secondary channel inlet. Mature trees downstream of the log structure are reinforcing the bar between channels. Large woody debris is racked on structure. Areas of scour along levee/bank toe has resulted in an approx. 1 ft. tall vertical bank.	**Notes:** Footer logs are buried and logs with rootwads are 90% buried. 1-2 ft. depth of gravel deposition is visible in the alcove and around the log structure. The alcove is perched approximately 1.5 ft. above the main channel invert.

Note: Pool and alcove dimensions have been estimated where water is not present.

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Site # 11	**Site # 11**
Log Structure type: A	**Log Structure type:** B
Water Present: Yes	**Water Present:** No
Pool Depth: 1.5 ft.	**Alcove Depth:** 1.0 ft
Pool Width: 8 ft.	**Alcove Width:** 6 ft
Pool Length: 20 ft.	**Alcove Length:** 40 ft
Pool Area: 160 sq.ft.	**Alcove Area**: 240 sq. ft.
Flow Velocity: 0 ft/sec	**Flow Velocity:** 0 ft/sec
Velocity Differential Present: 1 ft/sec	**Velocity Differential Present**: N/A
Is cover Present at Pool area? Yes – young willows, logs, woody debris, grasses, and forbs	**Is cover Present at Alcove?** N/A
Percent of Pool area w/ cover: 5%	**Percent of Alcove area w/ cover:** 5%
Shelter Rating: 3	**Shelter Rating:** 2
Notes: There is a backwater pool located below the log structure. Deposition of gravel upstream of the log structure. Willows are establishing upstream of the log structure at the inlet to the secondary channel.	**Notes:** Log structure is at the confluence with the main channel. Logs are buried except for the river left log. Sandy deposition is visible over the logs. Herbaceous vegetation has established throughout the secondary channel.

Site # 12 & 13	**Site # 12 & 13**
Log Structure type: A	**Log Structure type: B**
Water Present: No	**Water Present:** No
Pool Depth: 1.5 ft.	**Alcove Depth**: 0.5 ft.
Pool Width: 6 ft.	**Alcove Width:** 35 ft.
Pool Length: 8 ft.	**Alcove Length:** 65 ft.
Pool Area: 48 sq. ft.	**Alcove Area:** 2,275 sq. ft.
Flow Velocity: 0 ft/sec	**Flow Velocity**: 0 ft/sec
Velocity Differential Present: N/A	**Velocity Differential Present**: N/A
Is cover Present at Pool area? Yes – logs, debris racking, young willows.	**Is cover Present at Alcove?** Yes – overhanging willows and logs.
Percent of Pool area w/ cover: 100%	**Percent of Alcove area w/ cover:** 5%
Shelter Rating: 3	**Shelter Rating:** 3
Notes: Significant debris are racked on the log structure. Gravel deposited is visible upstream of the structure. There is an area of localized erosion where there is a 3 ft. vertical bank for 5 linear feet along levee toe directly adjacent to the log structure.	**Notes**: The footer log is holding grade. Scour is visible on the downstream side of the footer logs. Deposition approx. 1 ft. deep is visible in the alcove area.

Note: Pool and alcove dimensions have been estimated where water is not present.

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Site # 14	**Site # 14**
Log Structure type: A	**Log Structure type**: B
Water Present: Yes	**Water Present:** Yes
Pool Depth: N/A	**Alcove Depth:** N/A
Pool Width: N/A	**Alcove Width:** N/A
Pool Length: N/A	**Alcove Length:** N/A
Pool Area: N/A	**Alcove Area:** N/A
Flow Velocity: 2 ft/sec	**Flow Velocity:** 2 ft/sec
Velocity Differential Present: N/A	**Velocity Differential Present**: N/A
Is cover Present at Pool area? Yes – logs, young willow	**Is cover Present at Alcove?** Yes – logs
Percent of Pool area w/ cover: N/A	**Percent of Alcove area w/ cover:** 90%
Shelter Rating: 3	**Shelter Rating:** 3
Notes: Log structure is approximately 30 ft. upstream of the vegetated bar. Deposition at the structure has resulted in the structure being elevated above adjacent flow with no scour pool at structure. All flow is entirely in the secondary channel entering both upstream and downstream of the structure. Rock slope protection along levee toe continues to protect this area.	**Notes**: No alcove is present due to 100% of the flow being conveyed within the secondary channel. The footer logs are undermined and there is a 2 ft. deep scour pool below the logs.

Site # 15	**Site # 15**
Log Structure type: A	**Log Structure type: B**
Water Present: Yes	**Water Present:** No
Pool Depth: 3.5 ft.	**Alcove Depth:** 1 ft.
Pool Width: 8 ft.	**Alcove Width:** 20 ft.
Pool Length: 15 ft.	**Alcove Length:** 70 ft.
Pool Area: 120 sq. ft.	**Alcove Area:** 1400 sq. ft.
Flow Velocity: 1 ft/sec	**Flow Velocity:** 0 ft/sec
Velocity Differential Present: 1 ft/sec	**Velocity Differential Present:** 0.5 ft/sec
Is cover Present at Pool area? Yes – logs, debris	**Is cover Present at Alcove?** Yes – overhanging willows, rootwads, grasses and forbs
Percent of Pool area w/ cover: 80%	**Percent of Alcove area w/ cover:** 15%
Shelter Rating: 3	**Shelter Rating:** 3
Notes: There is a backwater pool located below the log structure. Scour at the log structure has exposed the ballast boulders and the log with rootwad extending across the secondary channel. The log is sloped away from the main channel and is directing flow into the levee/bank toe which has resulted in a 5 ft. vertical bank for approximately 50 feet. Significant debris is racked on the log structure.	**Notes:** No surface flow is present is the secondary channel. There is scour adjacent to the river right log, leaving a 4-5 ft. tall vertical bank for 30 ft. The footer logs are 80% buried. The rootwad logs are 100% exposed.

Note: Pool and alcove dimensions have been estimated where water is not present.

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Site # 16	**Site # 16**
Log Structure type: A	**Log Structure type: B**
Water Present: Yes.	**Water Present:** Yes
Pool Depth: 0.5 ft.	**Alcove Depth:** 3.5 ft.
Pool Width: 20 ft.	**Alcove Width:** 20 ft.
Pool Length: 12 ft.	**Alcove Length:** 25 ft.
Pool Area: 240 sq. ft.	**Alcove Area:** 500 sq. ft.
Flow Velocity: 0 ft/sec	**Flow Velocity:** 1.0 ft/sec
Velocity Differential Present: N/A	**Velocity Differential Present:** N/A
Is cover Present at Pool area? Yes – logs, overhead willow	**Is cover Present at Alcove?** Yes – logs, woody debris
Percent of Pool area w/ cover: 100%	**Percent of Alcove area w/ cover:** 25%
Shelter Rating: 3	**Shelter Rating:** 3
Notes: 95% of the flow is in the main channel. 5% of flow is in the secondary channel. The pile logs have rotated downstream but are still connected to each other. Erosion along the levee toe has resulted in an approx. 5-foot-tall vertical bank for approx. 20 linear feet. Erosion along the toe is being exacerbated by the log extending across the secondary channel that has become exposed. Scour at the log structure has exposed a ballast boulder. Flow enters the secondary channel approximately 30 feet upstream of the Type B structure.	**Notes:** All flow is in the secondary channel. All flow is conveyed below the footer logs. Rock and concrete rubble exposed between the logs with rootwads is helping to hold grade upstream preventing further incision. There is a 3.5 ft. deep pool downstream of the log structure.

Site # 17	**Site # 17**
Log Structure type: A	**Log Structure type: B**
Water Present: No	**Water Present:** Yes
Pool Depth: 1 ft.	**Alcove Depth:** N/A
Pool Width: 8 ft.	**Alcove Width:** N/A
Pool Length: 8 ft.	**Alcove Length:** N/A
Pool Area: 64 sq. ft.	**Alcove Area:** N/A
Flow Velocity: 0 ft/sec	**Flow Velocity:** 1.5 ft/sec
Velocity Differential Present: No	**Velocity Differential Present:** N/A
Is cover Present at Pool area? Yes – logs, debris, vegetation, overhung willows	**Is cover Present at Alcove?** Yes. Logs, grasses and forbs, young willows
Percent of Pool area w/ cover: 40%	**Percent of Alcove area w/ cover**: 10%
Shelter Rating: 3	**Shelter Rating:** 2
Notes: All the flow is in the main channel, but is then directed into the secondary channel approximately halfway between the 17A and 17B log structures. Willows downstream of the log structure are helping to maintain the bar between channels. Significant debris is racked on the log structure.	**Notes:** 2/3 of the total flow is in the secondary channel and is being conveyed over the log structure. The footer logs are not exposed. The river right log with rootwad is 60% exposed. The river left log is buried.

Note: Pool and alcove dimensions have been estimated where water is not present.

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Site # 18	**Site # 18**
Log Structure type: A	**Log Structure type: B**
Water Present: No	**Water Present:** Yes
Pool Depth: N/A	**Alcove Depth**: 1.5 ft**.**
Pool Width: N/A	**Alcove Width:** 12 ft.
Pool Length: N/A	**Alcove Length**: 30 ft**.**
Pool Area: N/A	**Alcove Area**: 360 sq. ft.
Flow Velocity: 0 ft/sec	**Flow Velocity:** 1 ft/sec
Velocity Differential Present: N/A	**Velocity Differential Present:** Yes – 1.5-2 ft/sec
Is cover Present at Pool area? Yes – willows, logs, grasses, and forbs	**Is cover Present at Alcove?** Yes – logs, root wads, bank cuts, overhung willows
Percent of Pool area w/ cover: N/A	**Percent of Alcove area w/ cover:** 20%
Shelter Rating: 3	**Shelter Rating:** 3
Notes: The log structure is located close to the river left bank and only gets inundated during high flows. Debris and sediment in the main channel are directing flow into the secondary channel 30 ft. downstream of the type A structure. Flow also enters the secondary channel directly downstream of the log structure. The secondary channel is incised downstream of where flow enters.	**Notes:** All flow is in secondary channel and being conveyed under the log structure. All logs are fully exposed. Incision has resulted in a 4-5 ft. vertical bank cut along the levee/bank toe. A 3 ft. deep pool has formed under the footer logs.

Site # 19	**Site # 19**
Log Structure type: A	**Log Structure type: B**
Water Present: Yes	**Water Present:** Yes
Pool Depth: 1 ft.	**Alcove Depth:** N/A
Pool Width: 15 ft.	**Alcove Width:** N/A
Pool Length: 15 ft.	**Alcove Length:** N/A
Pool Area: 225 sq. ft.	**Alcove Area:** N/A
Flow Velocity: 0.5 ft/sec	**Flow Velocity**: 1.5 ft/sec
Velocity Differential Present: 1.5 ft/sec	**Velocity Differential Present**: N/A
Is cover Present at Pool area? Yes – logs, young willows, woody debris.	**Is cover Present at Alcove?** Yes – logs, debris, overhanging willow, vertical banks
Percent of Pool area w/ cover: 5%	**Percent of Alcove area w/ cover**: 10%
Shelter Rating: 3	**Shelter Rating**: 3
Notes: Debris jam in the main channel directs 100% of the flow into the secondary channel upstream of the log structure. The secondary channel has incised approx. 2-3 ft.	**Notes:** All flow is within the secondary channel. Flow is passing below the footer logs and log with rootwad on river right.

Note: Pool and alcove dimensions have been estimated where water is not present.

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Site # 20	**Site # 20**
Log Structure type: A	**Log Structure type: B**
Water Present: No	**Water Present:** No
Pool Depth: 0.5 ft.	**Alcove Depth:** N/A
Pool Width: 3 ft.	**Alcove Width:** N/A
Pool Length: 3 ft.	**Alcove Length:** N/A
Pool Area: 9 sq.ft.	**Alcove Area**: N/A
Flow Velocity: N/A	**Flow Velocity:** N/A
Velocity Differential Present: N/A	**Velocity Differential Present:** N/A
Is cover Present at Pool area? Yes – logs, grasses, and forbs	**Is cover Present at Alcove?** Yes – root wad, grasses, and forbs.
Percent of Pool area w/ cover: 100%	**Percent of Alcove area w/ cover:** 5%
Shelter Rating: 3	**Shelter Rating:** 2
Notes: During high flow conditions, flow reenters the main channel from the secondary channel approximately 40 ft. downstream of the log structure at the concrete drop structure where the bar between channels was eroded. Scour along the bank has left the rootwad overhanging the main channel. Deposition is visible in the secondary channel for 50 ft. downstream of the log structure.	**Notes:** The log structure and secondary channel are perched 2+ ft. above the main channel. Minor scour is visible below the rootwad adjacent to main channel.

Site # 21	**Site # 21**
Log Structure type: A	**Log Structure type: B**
Water Present: No	**Water Present:** No
Pool Depth: 0.5 ft.	**Alcove Depth:** N/A
Pool Width: 3 ft.	**Alcove Width:** N/A
Pool Length: 6 ft.	**Alcove Length:** N/A
Pool Area: 18 sq.ft.	**Alcove Area:** N/A
Flow Velocity: N/A	**Flow Velocity:** N/A
Velocity Differential Present: N/A	**Velocity Differential Present:** N/A
Is cover Present at Pool area? Yes – logs, debris, grasses and forbs	**Is cover Present at Alcove?** N/A
Percent of Pool area w/ cover: 90%	**Percent of Alcove area w/ cover:** N/A
Shelter Rating: 3	**Shelter Rating:** 2
Notes: Dense grasses and forbs are established throughout the secondary channel. Debris is racked on the log structure. Scour/bank erosion below the log structure exposed the top of the anchor boulder, leaving logs overhanging main channel 3 ft. Logs structure is stable.	**Notes:** Dense grasses and forbs are established throughout the secondary channel. The secondary channel invert is perched approx. 1 ft. above the main channel.

Note: Pool and alcove dimensions have been estimated where water is not present.

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Site # 22	**Site # 22**
Log Structure type: A	**Log Structure type: B**
Water Present: No	**Water Present:** No
Pool Depth: 0.5 ft.	**Alcove Depth:** 0.5 ft
Pool Width: 2 ft.	**Alcove Width:** 10 ft
Pool Length: 3 ft.	**Alcove Length:** 6 ft
Pool Area: 6 sq. ft.	**Alcove Area**: 60 sq. ft.
Flow Velocity: N/A	**Flow Velocity:** N/A
Velocity Differential Present: N/A	**Velocity Differential Present:** N/A
Is cover Present at Pool area? Yes – logs, grasses and forbs	**Is cover Present at Alcove?** Yes – logs, grasses and forbs
Percent of Pool area w/ cover: 100%	**Percent of Alcove area w/ cover:** 90%
Shelter Rating: 3	**Shelter Rating:** 2
Notes: Dense grasses and forbs are established throughout the secondary channel. Scour under structure has exposed the ballast boulder and logs. Log structure is stable. The entrance to the secondary channel is perched 2+ ft. above the main channel.	**Notes:** Dense grasses and forbs are established throughout the secondary channel. Erosion along the main channel bank has exposed the end of the footer log.

Note: Pool and alcove dimensions have been estimated where water is not present.

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Site # 1	
Log Structure type: A	**Log Structure type:** B
Water Present: No, No pool	**Water Present:** No
Pool Depth (ft): N/A	**Alcove Depth (ft):** 0.5
Pool Width (ft): N/A	**Alcove Width (ft):** 2
Pool Length (ft): N/A	**Alcove Length (ft):** 6
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** 12
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: N/A	**Is Cover Present at Alcove:** Minimal, log and rock
Pool area w/ cover (%): N/A	**Alcove area w/ cove (%):** 25
Shelter Rating: N/A	**Shelter Rating:** 1
Notes: Structure is overgrown with willows and brambles. Structure is perched on riparian buffer. Heavy sediment build up within 1ft of log joining. Similar to 2A.	**Notes:** Dense vegetation. Minor pool on river left at end of root wad. Shallow pool on river right at end of root wad. Sediment over top of footer log with minor drop on downstream side.

Site # 2	
Log Structure type: A	**Log Structure type:** B
Water Present: No pool	**Water Present:** No
Pool Depth (ft): N/A	**Alcove Depth (ft):** 1.5
Pool Width (ft): N/A	**Alcove Width (ft):** 6
Pool Length (ft): N/A	**Alcove Length (ft):** 3
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** 18
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):**
Is Cover Present at Pool area: N/A	**Is Cover Present at Alcove:** Minimal, large woody debris (lwd), and brush
Pool area w/ cover (%): N/A	**Alcove area w/ cove (%):** 25
Shelter Rating: NA	**Shelter Rating:** 1
Notes: No pool, Log structure perched on riparian buffer. Heavy growth of brambles covering entire structure. Sediment deposition upstream of structure at entrance to secondary channel.	**Notes:** Sediment covers top of footer log on upstream side, small pool downstream.

Site # 3	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes	**Water Present:** Yes
Pool Depth (ft):	**Alcove Depth (ft):** 1
Pool Width (ft):	**Alcove Width (ft):** 20
Pool Length (ft):	**Alcove Length (ft):** 18
Pool Area (ft^2):	**Alcove Area (ft^2):** 360
Flow Velocity (fps):	**Flow Velocity (fps):** 0
Velocity Differential Present (fps):	**Velocity Differential Present (fps):** 0
Is Cover Present at Pool area:	**Is Cover Present at Alcove:** Minimal, lwd
Pool area w/ cover (%):	**Alcove area w/ cove (%):** 0
Shelter Rating:	**Shelter Rating:** 1
Notes: Could not access, overgrown from both sides of channel. Photo taken from secondary channel.	**Notes:** Standing water on both sides of footer log. Small flow path through secondary channel. Significant scour on upstream side. River left root wad fully exposed. Footer log near to fully exposed at river left, right right footer log is buried. Photo taken looking downstream.

Site # 4	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** No
Pool Depth (ft): 2	**Alcove Depth (ft):** 0.5
Pool Width (ft): 10	**Alcove Width (ft):** 10
Pool Length (ft): 7	**Alcove Length (ft):** 15
Pool Area (ft^2): 70	**Alcove Area (ft^2):** 150
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): 0	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, lwd, woody tree cover	**Is Cover Present at Alcove:** Minimal to none
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** 0
Shelter Rating: 2	**Shelter Rating:** 1 (potential 0)
Notes: Heavy vegetation (willows and brambles) in and around the structure. Small pool immediately under the structure.	**Notes:** Heavy growth of herbaceous vegetation, no woody cover. Minimal pool. Root wad logs are perched above the channel, footer log is buried.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 5	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes	**Water Present:** No
Pool Depth (ft): 2	**Alcove Depth (ft):** 0.5
Pool Width (ft): 10	**Alcove Width (ft):** 4
Pool Length (ft): 16	**Alcove Length (ft):** 15
Pool Area (ft^2): 160	**Alcove Area (ft^2):** 60
Flow Velocity (fps): 0	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, lwd, woody tree cover	**Is Cover Present at Alcove:** Minimal, lwd
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** 0
Shelter Rating: 3	**Shelter Rating:** 1
Notes: Lots of sediment in the secondary channel. Heavy debris racking on top of structure. Edge of pool abuts the main channel at river right.	**Notes:** River right root wad is perched on riparian buffer. Riparian buffer is densely overgrown.

Site # 6	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** No
Pool Depth (ft): 3	**Alcove Depth (ft):** 1
Pool Width (ft): 17	**Alcove Width (ft):** 3
Pool Length (ft): 4	**Alcove Length (ft):** 12
Pool Area (ft^2): 68	**Alcove Area (ft^2):** N/A
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, logs, lwd, woody tree cover	**Is Cover Present at Alcove:** Yes, woody tree, lwd
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** 50
Shelter Rating: 3	**Shelter Rating:** 2
Notes: Debris around the base of the structure. Good cover for pool. Appears stable and performing as intended.	**Notes:** Minimal pool at river left. Root wad on river right is perched on riparian buffer. Footer log is buried. Sediment deposition in secondary channel downstream from the structure.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 7	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** No
Pool Depth (ft): 1.5	**Alcove Depth (ft):** 1.5
Pool Width (ft): 18	**Alcove Width (ft):** 4
Pool Length (ft): 6	**Alcove Length (ft):** 6
Pool Area (ft^2): 108	**Alcove Area (ft^2):** 24
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, overhead trees and logs	**Is Cover Present at Alcove:** Yes, brush and log roots
Pool area w/ cover (%): 50	**Alcove area w/ cove (%):** 25
Shelter Rating: 3	**Shelter Rating:** 2
Notes: Pool is perched above main flow channel, approx 3 to 4 feet. Debris racking between structure and main channel.	**Notes:** Footer log exposed on downstream side, small pool on river right. Some cover is herbaceous vegetation, cover will likely decrease after veg management. Photo taken looking downstream.

Site # 8	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes, stagnant pool	**Water Present:** No
Pool Depth (ft):3	**Alcove Depth (ft):** 0.75
Pool Width (ft): 12	**Alcove Width (ft):** 4
Pool Length (ft):8	**Alcove Length (ft):**8
Pool Area (ft^2): 96	**Alcove Area (ft^2):** 32
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, lwd, woody tree cover	**Is Cover Present at Alcove:** Yes, small woody debris (swd), woody tree cover
Pool area w/ cover (%):75	**Alcove area w/ cove (%):**50
Shelter Rating:3	**Shelter Rating:**2
Notes: (2:34pm) Heavy sediment buildup. Dense willows established over structure.	**Notes:** (2:39pm) Rootwad on river right and footer log completely covered. Small alcove near rootwad on river left. Narrow channel on upstream side of footer log on river left.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 9	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes	**Water Present:** Yes, standing water
Pool Depth (ft): 1.5	**Alcove Depth (ft):** 1
Pool Width (ft): 30	**Alcove Width (ft):** 24
Pool Length (ft): 10	**Alcove Length (ft):** 4
Pool Area (ft^2): 300	**Alcove Area (ft^2):** 96
Flow Velocity (fps): 0	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): 2	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, lwd, swd, woody tree cover	**Is Cover Present at Alcove:** Minimal lwd
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** 25
Shelter Rating: 3	**Shelter Rating:** 1
Notes: (2:21pm) Debris racking, heavy willow growth.	**Notes:** (2:27pm) Footer log on river right is fully undermined. Sediment deposition downstream of structure, before main channel.

Site # 10	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes	**Water Present:** No
Pool Depth (ft): 24	**Alcove Depth (ft):** 0.25
Pool Width (ft): 18	**Alcove Width (ft):** 4
Pool Length (ft): 8	**Alcove Length (ft):** 2
Pool Area (ft^2): 144	**Alcove Area (ft^2):** 8
Flow Velocity (fps): 0	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Lwd, swd, woody tree cover	**Is Cover Present at Alcove:** N/A
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** 25
Shelter Rating: 3	**Shelter Rating:** 1
Notes: (2:04pm) Significant debris racking. Note that beaver dam is present just upstream from structure, fully across main channel.	**Notes:** (2:14pm) No alcove, fully filled in with sediment. Minor depression near rootwad on river left. Root wad on river right buried.

Site # 11	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes, stagnant or groundwater	**Water Present:** Yes, backwater
Pool Depth (ft): 0.75	**Alcove Depth (ft):** 1
Pool Width (ft): 8	**Alcove Width (ft):** 30
Pool Length (ft): 25	**Alcove Length (ft):** 4
Pool Area (ft^2): 200	**Alcove Area (ft^2):** 120
Flow Velocity (fps): 0	**Flow Velocity (fps):** 0
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: No	**Is Cover Present at Alcove:** No
Pool area w/ cover (%):0	**Alcove area w/ cove (%):** 0
Shelter Rating: 0	**Shelter Rating:** 0
Notes: (1:47pm) Sediment buildup under structure. Minor flow path under structure. Standing water in secondary channel.	**Notes:** (1:55pm) Standing water upstream and downstream of structure, likely backwater. River left root wad fully exposed, river right root wad fully buried.

Site # 12 & 13	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** Yes, shallow stagnant pool
Pool Depth (ft): 2	**Alcove Depth (ft):** 2
Pool Width (ft): 8	**Alcove Width (ft):** 30
Pool Length (ft): 4	**Alcove Length (ft):** 8
Pool Area (ft^2): 32	**Alcove Area (ft^2):** 240
Flow Velocity (fps): N/A	**Flow Velocity (fps):** 0
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, lwd, swd, woody tree cover	**Is Cover Present at Alcove:** Yes, lwd
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** 25
Shelter Rating: 3	**Shelter Rating:** 2
Notes: (12:27pm) Structure is perched approx. 3-feet above the main channel. Small scour pool immediately underneath the structure. Overgrown riparian area	**Notes:** (1:39pm) Log structure operating optimally. Root wads exposed on both sides, shallow pool immediately downstream from structure. The riparian area is very dense with vegetation.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 14	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes, submerged	**Water Present:** Yes, submerged
Pool Depth (ft): 0.5	**Alcove Depth (ft):** 2.5
Pool Width (ft): 4	**Alcove Width (ft):** 25
Pool Length (ft): 5	**Alcove Length (ft):** 5
Pool Area (ft^2): 20	**Alcove Area (ft^2):** 125
Flow Velocity (fps): 0	**Flow Velocity (fps):** 0.5
Velocity Differential Present (fps): 2	**Velocity Differential Present (fps):** 2
Is Cover Present at Pool area: Yes, lwd, woody tree cover	**Is Cover Present at Alcove:** Yes, lwd, woody tree cover
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** 50
Shelter Rating: 3	**Shelter Rating:** 3
Notes: (12:07pm) Willows established over the structure. Minor sediment buildup. Monitor sediment for next year.	**Notes:** Footer logs completely submerged. Root wad logs are both exposed on the side/top, with root wad fully exposed. Pools are deeper immediately under the root wads.

Site # 15	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes	**Water Present:** Yes, fully submerged From backwater
Pool Depth (ft):0.5	**Alcove Depth (ft):** 0.5
Pool Width (ft):10	**Alcove Width (ft):** 12
Pool Length (ft):4	**Alcove Length (ft):**4
Pool Area (ft^2): 40	**Alcove Area (ft^2):** 48
Flow Velocity (fps): 2.5	**Flow Velocity (fps):**0
Velocity Differential Present (fps): 2	**Velocity Differential Present (fps):**0
Is Cover Present at Pool area: Yes, lwd, some swd	**Is Cover Present at Alcove:** Yes over river left, lwd woody tree cover
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** 25
Shelter Rating:3	**Shelter Rating:** 3
Notes: (11:28am) Significant debris racking, significant bank cutting over river right log (approx 8ft).	**Notes:** (12:00pm) Footer logs are fully submerged. Root wad on river right is exposed. River left root wad log is partially buried. All water appears to be backwater. Erosion cut on river right adjacent to root wad, approx 5 to 6 feet deep.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 16	
Log Structure type: A	**Log Structure type:** B
Water Present: No, water flowing around but not under	**Water Present:** Yes
Pool Depth (ft): 0.5	**Alcove Depth (ft):** 1
Pool Width (ft): 8	**Alcove Width (ft):** 14
Pool Length (ft): 6	**Alcove Length (ft):** 10
Pool Area (ft^2): 48	**Alcove Area (ft^2):** 140
Flow Velocity (fps): 0.5	**Flow Velocity (fps):** 0
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** 3
Is Cover Present at Pool area: Lwd, swd, woody tree cover	**Is Cover Present at Alcove:** Yes, lwd, woody tree cover
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** 75
Shelter Rating: 3	**Shelter Rating:** 3
Notes: (11:00am) Both secondary and primary channels flowing. Structure is perched above the primary channel. Vertical erosion cut into the secondary channel bank at river left, approx 4-foot overhanging wall. Good cover underneath the lower logs.	**Notes:** (11:14am) Flowing in secondary channel, completely undercut. Root wads and footer logs are fully exposed.

Site # 17	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** Yes, Completely submerged and flowing
Pool Depth (ft): 0.5	**Alcove Depth (ft):** N/A
Pool Width (ft): 6	**Alcove Width (ft):** N/A
Pool Length (ft): 8	**Alcove Length (ft):** N/A
Pool Area (ft^2): 48	**Alcove Area (ft^2):** N/A
Flow Velocity (fps): N/A	**Flow Velocity (fps):** 2
Velocity Differential Present (fps):	**Velocity Differential Present (fps):** 0
Is Cover Present at Pool area: Yes, lwd, swd, woody tree cover	**Is Cover Present at Alcove:** Minimal from woody tree cover
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** N/A
Shelter Rating: 3	**Shelter Rating:** 1
Notes: (10:32am) Sediment deposition underneath is limiting factor for pool. The structure is perched above the channels on the riparian buffer. Monitor sediment for next year.	**Notes:** (10:56am) Completely submerged, flowing in both primary and secondary channels.

Site # 18	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** Yes
Pool Depth (ft): N/A	**Alcove Depth (ft):** N/A
Pool Width (ft): N/A	**Alcove Width (ft):** N/A
Pool Length (ft): N/A	**Alcove Length (ft):** N/A
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** N/A
Flow Velocity (fps): N/A	**Flow Velocity (fps):** 2.5
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):**0
Is Cover Present at Pool area: N/A	**Is Cover Present at Alcove:** River right under log Lwd and woody veg
Pool area w/ cover (%): N/A	**Alcove area w/ cove (%):** N/A
Shelter Rating: N/A	**Shelter Rating:** N/A
Notes: Significant sediment, log structure well outside main channel.	**Notes:** (10:24am) No alcove, all flowing water. Footer logs are completely undercut. Root wad logs are fully exposed.

Site # 19	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** Yes
Pool Depth (ft): N/A	**Alcove Depth (ft):** 1
Pool Width (ft): N/A	**Alcove Width (ft):** 8
Pool Length (ft): N/A	**Alcove Length (ft):** 12
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** 96
Flow Velocity (fps): N/A	**Flow Velocity (fps):** 0.5
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** 2.0
Is Cover Present at Pool area: Yes, lwd, woody tree cover	**Is Cover Present at Alcove:** Yes, swd, woody tree cover
Pool area w/ cover (%): Minimal	**Alcove area w/ cove (%):** 50
Shelter Rating: 1	**Shelter Rating:** 2
Notes: No pool, structure impacted by build up of sediment to within the top of the interior logs. Structure is perched above the channels on the riparian buffer. Some debris racking. Willows established over the structure.	**Notes:** All flow is in secondary channel. Footer log is completely undercut and no longer holding grade. River left root wad log is fully buried.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 20	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** No
Pool Depth (ft): N/A	**Alcove Depth (ft):** N/A
Pool Width (ft): N/A	**Alcove Width (ft):** N/A
Pool Length (ft): N/A	**Alcove Length (ft):** N/A
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** N/A
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Lwd	**Is Cover Present at Alcove:** N/A
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** N/A
Shelter Rating: 2	**Shelter Rating:** N/A
Notes: (3:53pm) Sediment buildup under structure. Good shelter, no pool.	**Notes:** No pool, no shelter, river left root wad log perched, river right root wad wholly buried. No photo, structure not visible through vegetation.

Site # 21	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** No
Pool Depth (ft): N/A	**Alcove Depth (ft):** N/A
Pool Width (ft): N/A	**Alcove Width (ft):** N/A
Pool Length (ft): N/A	**Alcove Length (ft):** N/A
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** N/A
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, lwd woody tree cover	**Is Cover Present at Alcove:** No
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** N/A
Shelter Rating: 2	**Shelter Rating:** N/A
Notes: (4:03pm), Photo taken looking downstream, significant sediment build up. Scour under structure and pool sloped towards maim channel.	**Notes:** (3:59pm) Photo taken looking upstream, no pool, structure 80% buried.

Site # 22	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** No
Pool Depth (ft): N/A	**Alcove Depth (ft):** 0.25
Pool Width (ft): N/A	**Alcove Width (ft):** 10
Pool Length (ft): N/A	**Alcove Length (ft):** 4
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** 40
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, lwd	**Is Cover Present at Alcove:** No
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** 0
Shelter Rating: 3	**Shelter Rating:** 0
Notes: (4:24pm) Good shelter, no pool. Rocks exposed. Alcove drains to main channel. No sediment. Photo looking upstream.	**Notes:** (4:20pm) River right root wad exposed. All else buried. Photo taken looking downstream.

Note: Pool and alcove dimensions have been estimated where water is not present

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Site # 1	
Log Structure type: A	**Log Structure type:** B
Water Present: No, No pool	**Water Present:** No
Pool Depth (ft): N/A	**Alcove Depth (ft):** 0.5
Pool Width (ft): N/A	**Alcove Width (ft):** 2
Pool Length (ft): N/A	**Alcove Length (ft):** 6
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** 12
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps):	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: N/A	**Is Cover Present at Alcove:** Minimal, log and rock
Pool area w/ cover (%): N/A	**Alcove area w/ cove (%):** 25
Shelter Rating: N/A	**Shelter Rating:** 1
Notes: 2:03pm, Structure is overgrown with willows and brambles. Structure is perched on riparian buffer. Heavy sediment build up within 1ft of log joining. Similar to 2A.	**Notes:** 2:09pm, Significant and dense overgrowth. Minor pool on river left at end of root wad. Shallow pool on river right at end of root wad. Sediment over top of footer log with minor drop on downstream side.

Site # 2	
Log Structure type: A	**Log Structure type:** B
Water Present: No, No Pool	**Water Present:** No
Pool Depth (ft): N/A	**Alcove Depth (ft):** 1.5
Pool Width (ft): N/A	**Alcove Width (ft):** 6
Pool Length (ft): N/A	**Alcove Length (ft):** 3
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** 18
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):**
Is Cover Present at Pool area: N/A	**Is Cover Present at Alcove:** Minimal, large woody debris (lwd), and brush
Pool area w/ cover (%): N/A	**Alcove area w/ cove (%):** 25
Shelter Rating: N/A	**Shelter Rating:** 1
Notes: 1:52pm, No pool, Log structure perched on riparian buffer. Heavy growth of brambles covering entire structure. Sediment deposition upstream of structure at entrance to secondary channel. No photo due to heavy vegetation.	**Notes:** 1:59pm, Significant overgrowth. Sediment covers top of footer log on upstream side, small pool downstream.

Site # 3	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes, Groundwater	**Water Present:** Yes
Pool Depth (ft): 0.5	**Alcove Depth (ft):** 1
Pool Width (ft): 14	**Alcove Width (ft):** 20
Pool Length (ft): 4	**Alcove Length (ft):** 18
Pool Area (ft^2): 15	**Alcove Area (ft^2):** 360
Flow Velocity (fps): 0	**Flow Velocity (fps):** 0
Velocity Differential Present (fps): 2	**Velocity Differential Present (fps):** 2
Is Cover Present at Pool area: Yes, small woody debris (swd) and lwd	**Is Cover Present at Alcove:** Minimal, lwd
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** 0
Shelter Rating: 3	**Shelter Rating:** 1
Notes: 1:42pm, some debris racking	**Notes:** 1:49pm, Stagnant water on both sides of footer log. Small flow path through secondary channel. Log structure undercut. Significant scour on upstream side. River left root wad fully exposed. Footer log near to fully exposed at river left, right right footer log is buried.

Site # 4	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** No
Pool Depth (ft): 2	**Alcove Depth (ft):** 0.5
Pool Width (ft): 10	**Alcove Width (ft):** 10
Pool Length (ft): 7	**Alcove Length (ft):** 15
Pool Area (ft^2): 70	**Alcove Area (ft^2):** 150
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): 0	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, lwd, woody tree cover	**Is Cover Present at Alcove:** Minimal to none
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** 0
Shelter Rating: 2	**Shelter Rating:** 1 (potential 0)
Notes: 1:30pm, Heavy vegetation (willows and brambles) in and around the structure. Small pool immediately under the structure.	**Notes:** 1:38pm, Heavy growth of herbaceous vegetation, no woody cover. Minimal pool. Root wad logs are perched above the channel, footer log is buried.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 5	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes, backwater	**Water Present:** No
Pool Depth (ft): 2	**Alcove Depth (ft):** 0.5
Pool Width (ft): 10	**Alcove Width (ft):** 4
Pool Length (ft): 16	**Alcove Length (ft):** 15
Pool Area (ft^2): 160	**Alcove Area (ft^2):** 60
Flow Velocity (fps): 0	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): 2.5	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, lwd, wood tree cover	**Is Cover Present at Alcove:** Minimal, lwd
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** 0
Shelter Rating: 3	**Shelter Rating:** 1
Notes: 1:23pm, Lots of sediment in the secondary channel. Heavy debris racking on top of structure. Edge of pool abuts the main channel at river right.	**Notes:** 1:25pm, River right root wad is perched on riparian buffer. Riparian buffer is densely overgrown.

Site # 6	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** No
Pool Depth (ft): 3	**Alcove Depth (ft):** 1
Pool Width (ft): 17	**Alcove Width (ft):** 3
Pool Length (ft): 4	**Alcove Length (ft):** 12
Pool Area (ft^2): 68	**Alcove Area (ft^2):** N/A
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, logs, lwd, woody tree cover	**Is Cover Present at Alcove:** Yes, woody tree, lwd
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** 50
Shelter Rating: 3	**Shelter Rating:** 2
Notes: 1:08pm, Debris around the base of the structure. Good cover for pool. Appears stable and performing as intended.	**Notes:** 1:14pm, Minimal pool at river left. Root wad on river right is perched on riparian buffer. Footer log is buried. Sediment deposition in secondary channel downstream from the structure.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 7	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** No
Pool Depth (ft): 1.5	**Alcove Depth (ft):** 1.5
Pool Width (ft): 18	**Alcove Width (ft):** 4
Pool Length (ft): 6	**Alcove Length (ft):** 6
Pool Area (ft^2): 108	**Alcove Area (ft^2):** 24
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/a
Is Cover Present at Pool area: Yes, overhead trees and logs	**Is Cover Present at Alcove:** Yes, brush and log roots
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** 25
Shelter Rating: 3	**Shelter Rating:** 2
Notes: 12:55pm, Pool is perched above main flow channel, approx 3 to 4 feet. Debris racking between structure and main channel.	**Notes:** 1:05pm, Footer log exposed on downstream side, small pool on river right. Veg cleared from breach site repair. Secondary channel is open under bridge.

Site # 8	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes, stagnant (groundwater?)	**Water Present:** No
Pool Depth (ft): 3	**Alcove Depth (ft):** 0.75
Pool Width (ft): 12	**Alcove Width (ft):** 4
Pool Length (ft): 8	**Alcove Length (ft):** 8
Pool Area (ft^2): 96	**Alcove Area (ft^2):** 32
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): 2	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, lwd, woody tree cover	**Is Cover Present at Alcove:** Yes, swd, woody tree cover
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** 50
Shelter Rating: 3	**Shelter Rating:** 2
Notes: Heavy sediment buildup. Dense willows established over structure. No photo.	**Notes:** 10:35am, Rootwad on river right and footer log completely covered. Small alcove near rootwad on river left. Narrow channel on upstream side of footer log on river left.

Site # 9	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes	**Water Present:** Yes, groundwater
Pool Depth (ft): 1.5	**Alcove Depth (ft):** 1
Pool Width (ft): 30	**Alcove Width (ft):** 24
Pool Length (ft): 10	**Alcove Length (ft):** 4
Pool Area (ft^2): 300	**Alcove Area (ft^2):** 96
Flow Velocity (fps): 0	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): 2	**Velocity Differential Present (fps):** 2
Is Cover Present at Pool area: Yes, lwd, swd, woody tree cover	**Is Cover Present at Alcove:** Minimal lwd
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** 25
Shelter Rating: 3	**Shelter Rating:** 1
Notes: 10:25am, Debris racking, heavy willow growth.	**Notes:** 10:27am, Footer log on river right is fully undermined. Sediment deposition downstream of structure, before main channel.

Site # 10	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes	**Water Present:** No
Pool Depth (ft): 2	**Alcove Depth (ft):** 0.25
Pool Width (ft): 18	**Alcove Width (ft):** 4
Pool Length (ft): 8	**Alcove Length (ft):** 2
Pool Area (ft^2): 144	**Alcove Area (ft^2):** 8
Flow Velocity (fps): 0	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Lwd, swd, woody tree cover	**Is Cover Present at Alcove:** N/A
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** 25
Shelter Rating: 3	**Shelter Rating:** 1
Notes: 10:16am, Significant debris racking. Note that beaver dam upstream of 10A is gone.	**Notes:** 10:22am, No alcove, fully filled in with sediment. Minor depression near rootwad on river left. Root wad on river right buried. Veg clearing in secondary channel.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 11	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes, stagnant or groundwater	**Water Present:** No
Pool Depth (ft): 0.75	**Alcove Depth (ft):** 1
Pool Width (ft): 3	**Alcove Width (ft):** 4
Pool Length (ft): 25	**Alcove Length (ft):** 30
Pool Area (ft^2): 200	**Alcove Area (ft^2):** 120
Flow Velocity (fps): 0	**Flow Velocity (fps):** 0
Velocity Differential Present (fps): 1.5	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Minimal	**Is Cover Present at Alcove:** Yes, woody veg
Pool area w/ cover (%):	**Alcove area w/ cove (%):** 15
Shelter Rating: 1	**Shelter Rating:** 1
Notes: 10:03am, Sediment buildup under structure. Minor flow path under structure. Standing water in secondary channel.	**Notes:** 10:08am, River left root wad fully exposed, river right root wad fully buried, channel not activated.

Site # 12 & 13	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** Yes, shallow stagnant pool (groundwater?)
Pool Depth (ft): 2	**Alcove Depth (ft):** 2
Pool Width (ft): 8	**Alcove Width (ft):** 30
Pool Length (ft): 4	**Alcove Length (ft):** 8
Pool Area (ft^2): 32	**Alcove Area (ft^2):** 240
Flow Velocity (fps): N/A	**Flow Velocity (fps):** 0
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Yes, lwd, swd, woody tree cover	**Is Cover Present at Alcove:** Yes, woody veg, swd
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** 25
Shelter Rating: 3	**Shelter Rating:** 2
Notes: 9:43am, Structure is perched approx. 3-feet above the main channel. Small scour pool immediately underneath the structure. Overgrown riparian area.	**Notes:** 9:59am, Log structure operating optimally. Root wads exposed on both sides, shallow pool immediately downstream from structure. The riparian area is very dense with vegetation, veg clearing in secondary channel.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 14	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** Yes, submerged
Pool Depth (ft): N/A	**Alcove Depth (ft):** 2.5
Pool Width (ft): N/A	**Alcove Width (ft):** 25
Pool Length (ft): N/A	**Alcove Length (ft):** 5
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** 125
Flow Velocity (fps): N/A	**Flow Velocity (fps):** 0.5
Velocity Differential Present (fps): 2.5	**Velocity Differential Present (fps):** 2
Is Cover Present at Pool area: N/A	**Is Cover Present at Alcove:** Yes, lwd, woody tree cover
Pool area w/ cover (%): N/A	**Alcove area w/ cove (%):** 25
Shelter Rating: N/A	**Shelter Rating:** 1
Notes: 9:30am, no pool, unlikely primary flow will ever be in main channel without modifications, bend in thalweg is pointing away from log structure. This is a potential area to swap secondary to primary channel with new plantings. Cottonwood stakes in rock to river left.	**Notes:** 9:40am, Footer logs completely submerged. Root wad logs are both exposed on the side/top, with root wad fully exposed. Pools are deeper immediately under the root wads. Veg cover has died back.

Site # 15	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes	**Water Present:** No
Pool Depth (ft): 0.5	**Alcove Depth (ft):** 0.5
Pool Width (ft): 10	**Alcove Width (ft):** 4
Pool Length (ft): 4	**Alcove Length (ft):** 6
Pool Area (ft^2): 40	**Alcove Area (ft^2):** 24
Flow Velocity (fps): 2.5	**Flow Velocity (fps):** 0
Velocity Differential Present (fps): 2	**Velocity Differential Present (fps):** 0
Is Cover Present at Pool area: Yes, lwd, some swd	**Is Cover Present at Alcove:** Yes, woody veg, swd
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** 50
Shelter Rating: 3	**Shelter Rating:** 2
Notes: 9:20am, Significant debris racking, significant bank cutting over river right log (approx 8ft). Secondary channel appears to have engaged in previous storm.	**Notes:** 9:25am, SMZ appears to have activated and recent sediment plume, now completely dry.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 16	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** Yes
Pool Depth (ft): 0.5	**Alcove Depth (ft):** 1
Pool Width (ft): 8	**Alcove Width (ft):** 20
Pool Length (ft): 6	**Alcove Length (ft):** 6
Pool Area (ft^2): 48	**Alcove Area (ft^2):** 120
Flow Velocity (fps): 0.5	**Flow Velocity (fps):** 1
Velocity Differential Present (fps): 2.5	**Velocity Differential Present (fps):** 2
Is Cover Present at Pool area: Yes, swd, lwd, woody veg	**Is Cover Present at Alcove:** Yes, swd
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** 25
Shelter Rating: 3	**Shelter Rating:** 1
Notes: 9:07am, significant bank scour to river left 6ft, flow in both channels. No change to alcove structure.	**Notes:** 9:16am, trash present, flowing in secondary channel, completely undercut. Root wads and footer logs are fully exposed.

Site # 17	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** Yes, no alcove
Pool Depth (ft): 0.5	**Alcove Depth (ft):** N/A
Pool Width (ft): 6	**Alcove Width (ft):** N/A
Pool Length (ft): 8	**Alcove Length (ft):** N/A
Pool Area (ft^2): 48	**Alcove Area (ft^2):** N/A
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** 1.5
Is Cover Present at Pool area: Yes, lwd, swd, woody tree cover	**Is Cover Present at Alcove:** N/A
Pool area w/ cover (%): 100	**Alcove area w/ cove (%):** N/A
Shelter Rating: 3	**Shelter Rating:** 0
Notes: 8:53am, Sediment deposition underneath is limiting factor for pool. The structure is perched above the channels on the riparian buffer. Monitor sediment for next year, channel appears to have engaged with minimal flow but now dry.	**Notes:** 9:02am, Completely submerged, no alcove, flowing in both primary and secondary channels.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 18	
Log Structure type: A	**Log Structure type:** B
Water Present: No, no pool	**Water Present:** Yes
Pool Depth (ft): N/A	**Alcove Depth (ft):** 4
Pool Width (ft): N/A	**Alcove Width (ft):** 25
Pool Length (ft): N/A	**Alcove Length (ft):** 4
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** 100
Flow Velocity (fps): N/A	**Flow Velocity (fps):**2
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** 1.5
Is Cover Present at Pool area: N/A	**Is Cover Present at Alcove:** Yes, swd, lwd
Pool area w/ cover (%): N/A	**Alcove area w/ cove (%):**25
Shelter Rating: N/A	**Shelter Rating:**1
Notes: 8:40am, Significant sediment, log structure well outside main channel.	**Notes:** 8:45am, trash present, debris present. Footer logs are completely undercut. Root wad logs are fully exposed.

Site # 19	
Log Structure type: A	**Log Structure type:** B
Water Present: Yes	**Water Present:** Yes
Pool Depth (ft): 0.25	**Alcove Depth (ft):** 2.5
Pool Width (ft):2	**Alcove Width (ft):** 10
Pool Length (ft):4	**Alcove Length (ft):**4
Pool Area (ft^2): 8	**Alcove Area (ft^2):** 40
Flow Velocity (fps):0	**Flow Velocity (fps):**2
Velocity Differential Present (fps):1	**Velocity Differential Present (fps):**0
Is Cover Present at Pool area: Yes, woody veg	**Is Cover Present at Alcove:** Yes, woody veg, swd
Pool area w/ cover (%):100	**Alcove area w/ cove (%):**25
Shelter Rating:2	**Shelter Rating:**1
Notes: 8:25am, structure impacted by build up of sediment to within the top of the interior logs. Structure is perched above the channels on the riparian buffer. Some debris racking. Willows established over the structure.	**Notes:** 8:35am, All flow is in secondary channel. Potential for fish passage blockage. Footer log is completely undercut and no longer holding grade. River left root wad log is fully buried.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 20	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** No
Pool Depth (ft): N/A	**Alcove Depth (ft):** N/A
Pool Width (ft): N/A	**Alcove Width (ft):** N/A
Pool Length (ft): N/A	**Alcove Length (ft):** N/A
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** N/A
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):** N/A
Is Cover Present at Pool area: Lwd	**Is Cover Present at Alcove:** N/A
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** N/A
Shelter Rating: 2	**Shelter Rating:** N/A
Notes: 11:09am, Sediment buildup under structure. Good shelter, no pool.	**Notes:** 11:12am, No pool, no shelter, river left root wad log perched, river right root wad wholly buried. Structure not visible through vegetation.

Site # 21	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** No
Pool Depth (ft): N/A	**Alcove Depth (ft):** N/A
Pool Width (ft): N/A	**Alcove Width (ft):** N/A
Pool Length (ft): N/A	**Alcove Length (ft):** N/A
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** N/A
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): N/A	**Velocity Differential Present (fps):**
Is Cover Present at Pool area: Yes, lwd woody tree cover	**Is Cover Present at Alcove:** No
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** N/A
Shelter Rating: 2	**Shelter Rating:** N/A
Notes: 11:02am, significant sediment build up. Scour under structure and pool sloped towards main channel.	**Notes:** 11:04am, no pool, structure 80% buried.

Note: Pool and alcove dimensions have been estimated where water is not present

Site # 22	
Log Structure type: A	**Log Structure type:** B
Water Present: No	**Water Present:** No
Pool Depth (ft): N/A	**Alcove Depth (ft):** 0.25
Pool Width (ft): N/A	**Alcove Width (ft):** 10
Pool Length (ft): N/A	**Alcove Length (ft):** 4
Pool Area (ft^2): N/A	**Alcove Area (ft^2):** 40
Flow Velocity (fps): N/A	**Flow Velocity (fps):** N/A
Velocity Differential Present (fps): 1	**Velocity Differential Present (fps):** 1
Is Cover Present at Pool area: Yes, lwd	**Is Cover Present at Alcove:** No
Pool area w/ cover (%): 75	**Alcove area w/ cove (%):** 0
Shelter Rating: 3	**Shelter Rating:** 0
Notes: 11:28am, Good shelter. Rocks exposed. Alcove drains to main channel. No sediment. Water in main channel	**Notes:** 11:30am, River right root wad exposed. All else buried. Water in main channel

Note: Pool and alcove dimensions have been estimated where water is not present

Appendix E

2025 Mitigation Monitoring Photographs

Photograph 1. View of SMZ 1, facing east. June 11, 2025.

Photograph 2. View of SMZ 1, facing northwest. June 11, 2025.

Photograph 3. View of SMZ 2, facing east. June 11, 2025.

Photograph 4. View of SMZ 2, facing northwest. June 11, 2025.

Photograph 5. View of SMZ 3, facing east. June 11, 2025.

Photograph 6. View of SMZ 3, facing north. June 11, 2025.

Photograph 7. View of SMZ 4, facing south. June 12, 2025.

Photograph 8. View of SMZ 4, facing west. June 12, 2025.

Photograph 9. View of SMZ 5, facing east. June 12, 2025.

Photograph 10. View of SMZ 5, facing northwest. June 12, 2025.

Photograph 11. View of SMZ 6, facing northeast. June 12, 2025.

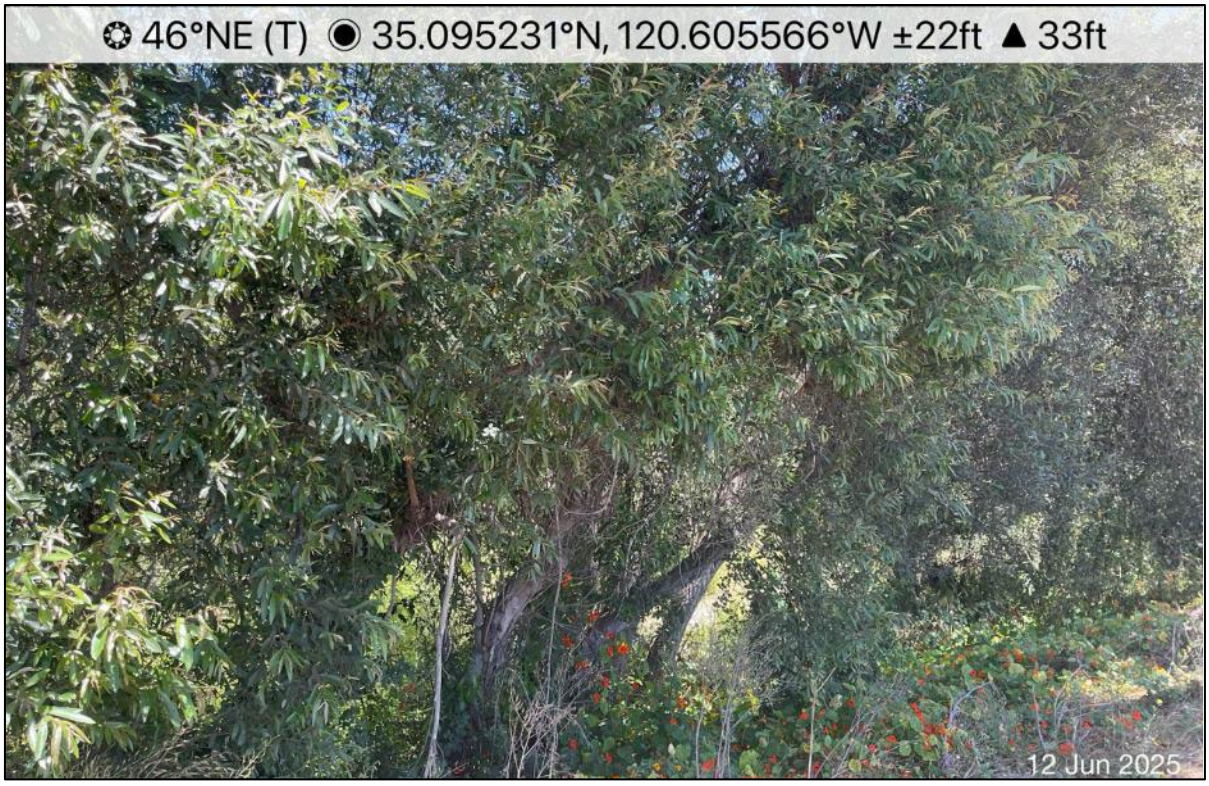
Photograph 12. View of SMZ 6, facing northwest. June 12, 2025.

Photograph 13. View of SMZ 7, facing southeast. June 12, 2025.

Photograph 14. View of SMZ 7, facing southwest. June 12, 2025.

Photograph 15. View of SMZ 8, facing southeast. June 13, 2025.

Photograph 16. View of SMZ 8, facing southwest. June 13, 2025.



Photograph 17. View of SMZ 9, facing northeast. June 12, 2025.

Photograph 18. View of SMZ 9, facing northwest. June 12, 2025.

Photograph 19. View of SMZ 10, facing southeast. June 13, 2025.

Photograph 20. View of SMZ 10, facing southwest. June 13, 2025.

Photograph 21. View of SMZ 11, facing northeast. June 12, 2025.

Photograph 22. View of SMZ 11, facing northwest. June 12, 2025.

Photograph 23. View from edge of SMZ 13, facing southeast. June 13, 2025.

Photograph 24. View from the middle of SMZ 13, facing southwest. June 13, 2025.

Photograph 25. View from the middle of SMZ 13, facing southeast. June 13, 2025.

Photograph 26. View from edge of SMZ 13, facing south. June 13, 2025.

Photograph 27. View of SMZ 14, facing north. June 12, 2025.

Photograph 28. View of SMZ 14, facing northwest. June 12, 2025.

Photograph 29. View of SMZ 15, facing east. June 12, 2025.

Photograph 30. View of SMZ 15, facing south. June 12, 2025.

Photograph 31. View of SMZ 16, facing north. June 16, 2025.

Photograph 32. View of SMZ 16, facing southwest. June 16, 2025.

Photograph 33. View of SMZ 17, facing east. June 13, 2025.

Photograph 34. View of SMZ 17, facing south. June 13, 2025.

Photograph 35. View of SMZ 18, facing north. June 16, 2025.

Photograph 36. View of SMZ 18, facing southwest. June 16, 2025.

Photograph 37. View of SMZ 19, facing northeast. June 16, 2025.

Photograph 38. View of SMZ 19, facing south. June 16, 2025.

Photograph 39. View of SMZ 20, facing northeast. June 16, 2025.

Photograph 40. View of SMZ 20, facing northwest. June 16, 2025.

Photograph 41. View of SMZ 21, facing northeast. June 16, 2025.

Photograph 42. View of SMZ 21, facing southwest. June 16, 2025.

Photograph 43. View of SMZ 22, facing east. June 16, 2025.

Photograph 44. View of SMZ 22, facing northwest. June 16, 2025.