

**COUNTY OF MENDOCINO  
DEPT. OF PLANNING & BUILDING SERVICES**

**120 WEST FIR STREET  
FORT BRAGG, CA 95437  
Telephone: (707)-964-5379**

Case No(s) \_\_\_\_\_  
Date Filed \_\_\_\_\_  
Fee \$ \_\_\_\_\_  
Receipt No. \_\_\_\_\_  
Received by \_\_\_\_\_

**Office Use Only**

**LCP CONSISTENCY REVIEW APPLICATION FORM**

Name of Applicant  
The Nature Conservancy  
(Contact: Peter van de Burgt)

Name of Owner(s)  
Margaret Perry  
Susan Lampman

Name of Agent  
Prunuske Chatham, Inc.  
(Contact: Carrie Lukacic)

Mailing Address  
90 West Redwood Avenue  
Fort Bragg, CA 95437

Mailing Address  
28761 N. Highway 1  
Fort Bragg, CA 95437

Mailing Address  
103 Morris Street, Suite A-5  
Sebastopol, CA 95472

Telephone Number  
(850) 264-1882

Telephone Number  
(707) 964-3761

Telephone Number  
(707) 827-8916

**Project Description:**

The project will improve rearing habitat for juvenile salmonids (particularly endangered coho salmon) to increase survival and populations in the lower South Fork Ten Mile River. The project includes construction of in-channel and off-channel habitat elements at 4 sites (SF6, SF7, SF8, and SF9) along approximately xx feet of river channel. The upstream portion of the project includes construction of simple large wood structures (SF9) installed along a straightened and incised river reach. A small alcove will be constructed in a tree-covered gravel bench to provide complex, low velocity, off-channel winter habitat (SF8). A 1.6 acre wetland complex will be constructed at SF7 in a dry, rarely flooded 1965 gravel deposit, and a large alcove and seasonal pond complex will be constructed at SF6 to connect an existing seasonal pond and valley wall wetland complex.

The total project area is 7.1 acres including staging and access, of which 2.3 acres will be graded during construction. Dust and sediment control best management practices will be integrated into construction activities. Approximately 14,500 cubic yards of soil spoils from grading will be trucked to the Geo-Aggregate quarry off site for disposal. Gravel-based spoils will be off-hauled to Geo-Aggregate processing facility in Fort Bragg. The area will be seeded and mulched following construction in restoration areas and staging and access areas. Construction is planned for summer 2024.

**Driving Directions**

The site is located on the E (N/S/E/W) side of \_Camp 2 Ten Mile Road\_(name road) approximately 1 mile  
(feet/miles) S (N/S/E/W) of its intersection with Highway 1 (provide nearest major intersection). \_\_\_\_\_

**Assessor's Parcel Number(s)**

069-02-014, 069-07-011, 069-02-006, 069-02-012, 068-07-007, 069-07-002

Parcel Size (ac)  
069-02-014 (51);  
069-07-011 (36); 069-02-006  
(5.08); 069-02-012 (227);  
068-07-007 (36); 069-07-002  
(3.7)

☐ Square Feet  
☒ Acres

Note: Total project area = 7.3 acres

Street Address of Project  
28761 N. Highway 1  
Fort Bragg, CA 95437

**Please note:** Before submittal, please verify correct street address with the Planning Division in Ukiah.



November 3, 2023

**Julia Krog, Director**  
**Mendocino County Department of Planning & Building Services**  
**120 West Fir Street**  
**Fort Bragg, CA 95437**

Dear Ms. Krog,

I authorize The Nature Conservancy and Prunuske Chatham, Inc. to apply for and secure permits for the Ten Mile Habitat Enhancement Project Phase 2: South Fork, in accordance with and pursuant to the Conservation Easement. The project will occur on APNs 069-020-12, 069-020-41, 069-070-07, and 069-070-11.

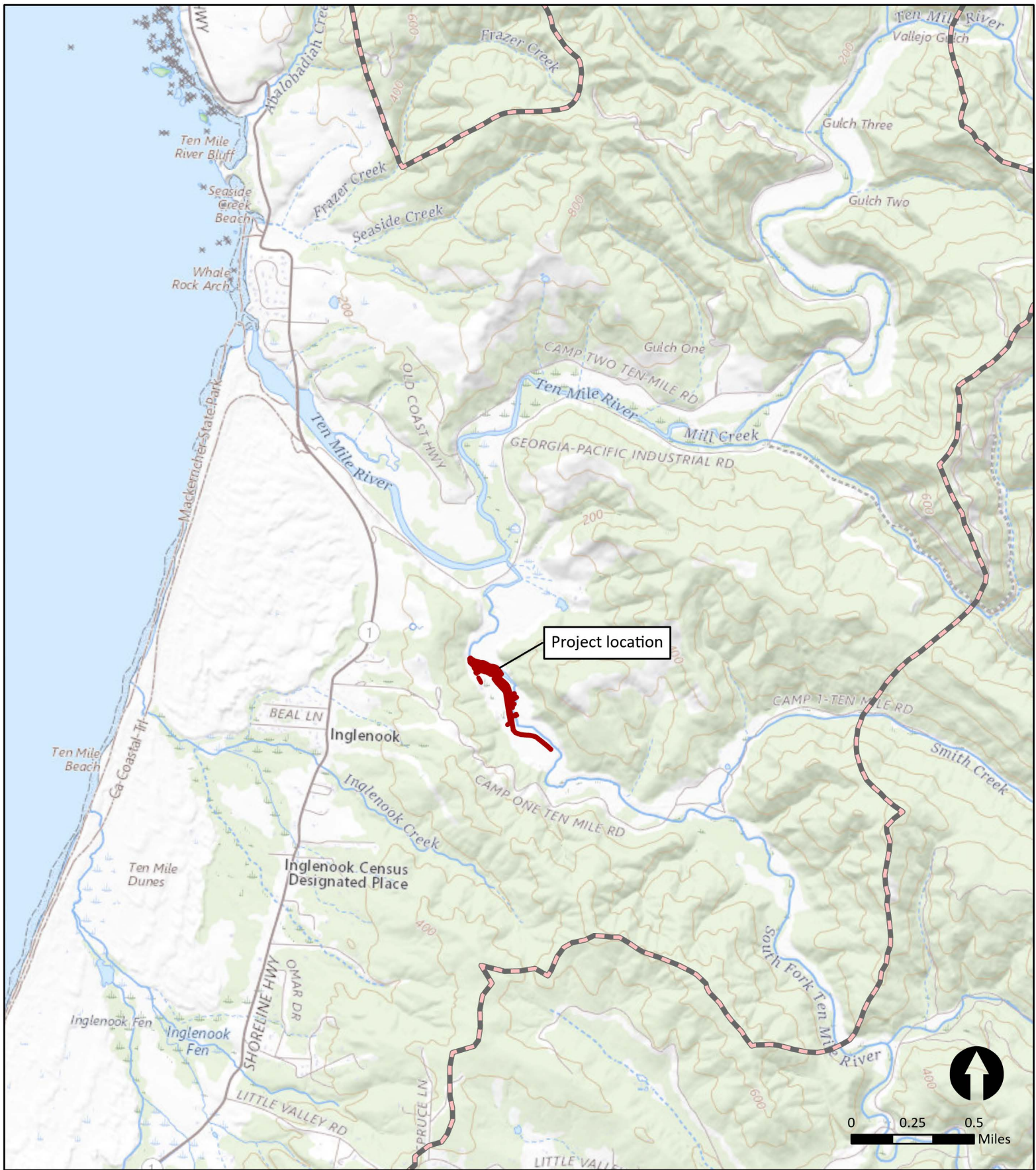
Sincerely,

MARGARET PERRY  
Print Name



Margaret Perry  
Signature

Susan Smith Lampman  
Print Name

Susan Smith Lampman  
Signature



**Figure 1**  
**Coastal Zone Boundary**

 Coastal Zone Boundary  
 Project Area



Ten Mile River Habitat Enhancement Project  
 Phase 2 – South Fork Design and Planning  
 Mendocino County, CA

11/17/2023 CP  
 Sources:  
 Basemap - USGS  
 Coastal Zone Boundary -  
 California Coastal Zone





## **South Fork Ten Mile River Project Description Ten Mile River Habitat Enhancement Project – Phase 2**

**Prepared for:**

The Nature Conservancy  
Field Office  
90 W. Redwood Avenue  
Fort Bragg, CA 95437



**Prepared by:**

Prunuske Chatham, Inc.  
103 Morris Street, Suite A-5  
Sebastopol, CA 95472



**PCI ECOLOGICAL**

**November 2023**

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# 1 Introduction

The Ten Mile River and its three subwatersheds was ranked by the Mendocino Coast SHaRP members as having the highest potential for habitat and salmonid population recovery in the HUC12 based on existing habitat integrity, potential for restoration success, and its biological importance to the diversity strata (Mendocino SHaRP presentation Feb 2021). Within the lower, alluvial valley reaches of the South Fork, the priority restoration methods recommended by the SHaRP members are off-channel/floodplain enhancements and engineered large wood structures. Maximizing rearing and foraging habitat in the alluvial valley reaches of the Ten Mile River is a key component of coho population recovery. This is because out-migrating smolts visit nutrient-rich, seasonally flooded wetlands to bulk up before heading out to sea, and young-of-the-year juveniles need accessible floodplains and low-velocity environments to survive winter high flows. Large wood structures help create and maintain deep, complex pools that provide winter base flow and summer low flow rearing habitats. With climate change bringing more frequent winter droughts and higher summer temperatures, the lower reaches of this coastal watershed has become a critical refugia zone where riparian vegetation and coastal fog maintain cool water temperatures and perennial springs sustain streamflow.

The Nature Conservancy (TNC) proposes to implement the South Fork Ten Mile River Enhancement Project Phase 2 in summer 2024. Phase 2 is the third phase of implementation of TNC's larger reach-wide habitat enhancement program in the lower 1.7 miles of the South Fork Ten Mile River with a goal of increasing survival and populations of coho salmon. This project extends downstream from phases 1A and 1B implemented in 2018 and 2020 respectively. These projects are located along a stretch of the lower South Fork Ten Mile River in Mendocino County, California.

The first phase (Phase 1A) of restoration on the South Fork Ten Mile was implemented in the summer of 2018 and included construction of habitat elements across a 0.5-mile reach. Two large wood structures were constructed at sites SF-13 and SF-14; an off-channel, seasonally flooded wetland was constructed at SF-16; and a split-flow side channel and large wood structures were constructed at SF-17. The next phase (Phase 1B) built upon the practical experience and knowledge gained from implementation and monitoring of the first phase. Phase 1B installed five wood structures at SF-10 and an off-channel seasonally flooded wetland and alcove (SF-11). Three accelerated recruitment wood structures were constructed at SF-12 to provide connectivity between the previously constructed SF-13 feature. A new side channel was also constructed in Phase 1B. These enhancements were designed to reestablish channel meandering and floodplain connection by supporting natural geomorphic processes and to provide a range of complex habitat elements that are beneficial to coho across a range of flow conditions through a 0.9-mile of stream channel.

The current project (Phase 2) will utilize the practical experience and knowledge gained from implementation and monitoring of the earlier phases to build upon its success. The project includes enhancements at four sites immediately downstream of the Phase 1 improvements:

- SF-6: Large Alcove and Seasonal Pond Complex. A long, deep alcove and shallow pond will be constructed to connect to the existing seasonal pond and valley wall wetland complex along the left valley edge.

- SF 7 – Wetland complex. The dry, rarely flooded 1965 gravel deposit on the left bank will be excavated out to create a 1.6-acre, tidal-bore flooded wetland. The wetland surface get flooded daily during high tides and during nearly every storm event.
- SF 8 – Alcove. A small alcove set into a wide, tree-covered gravel bench will be constructed to provide complex, low-velocity, off-channel winter habitat in the upper project reach.
- SF 9 – Simple Large Wood Structures. Four accelerated recruitment-type large wood structures will be constructed to increase channel bedform and habitat complexity in the long glide reach. A mix of downed alder, willow slash, and whole redwood trees will be used to form the structures.

The current project also includes implementation of adaptive management measures at two locations in the Phase 1 project area. These activities will include:

- SF 16 – Alcove Inlet. The inlet at SF 16 will be excavated to the alcove to inundate at baseflow conditions to make the constructed side channel accessible to salmonids through a full range of future winter conditions. The inlet will be deepened about 3 feet. The excavated floodplain material will be trucked to the quarry located along the mainstem Ten Mile River. Monitoring indicates the habitat feature is limited to accessibility during high flows only. The inlet adjustment will provide additional accessible habitat for salmonids.
- SF 10 – Alcove Pilot Channels. Monitoring indicates pilot channels are needed in the constructed alcove at SF 10 to create a network of channels through alcove to make the upper alcove more assessible to salmonids.

## 2 Location

The project site is located 7 miles north of Fort Bragg and 1 mile east of the Pacific Ocean near the small community of Inglenook, Mendocino County. It is accessed from Highway 1 then Camp One Ten Mile Road. It is mapped on the Dutchmans Knoll USGS 7.5' quadrangle (39.533056°N, -123.74667°W) at 20 to 30' in elevation. The project site comprises several assessor parcels (APNs 069-02-014, 069-07-011, 069-02-012, 069-07-006, and 069-07-007). TNC holds a conservation easement over the project area.

The salmonid habitat improvements will occur on South Fork Ten Mile River, a tributary to Ten Mile River which flows to the Pacific Ocean. The South Fork Ten Mile River has a watershed area of approximately 25,000 acres. It ranges from 5' in elevation to 1,200' in the upper watershed. The confluence with Ten Mile River is approximately 1 mile downstream of the project site. Land uses surrounding the site include open space, timberland, rural residential properties, and grazing lands.



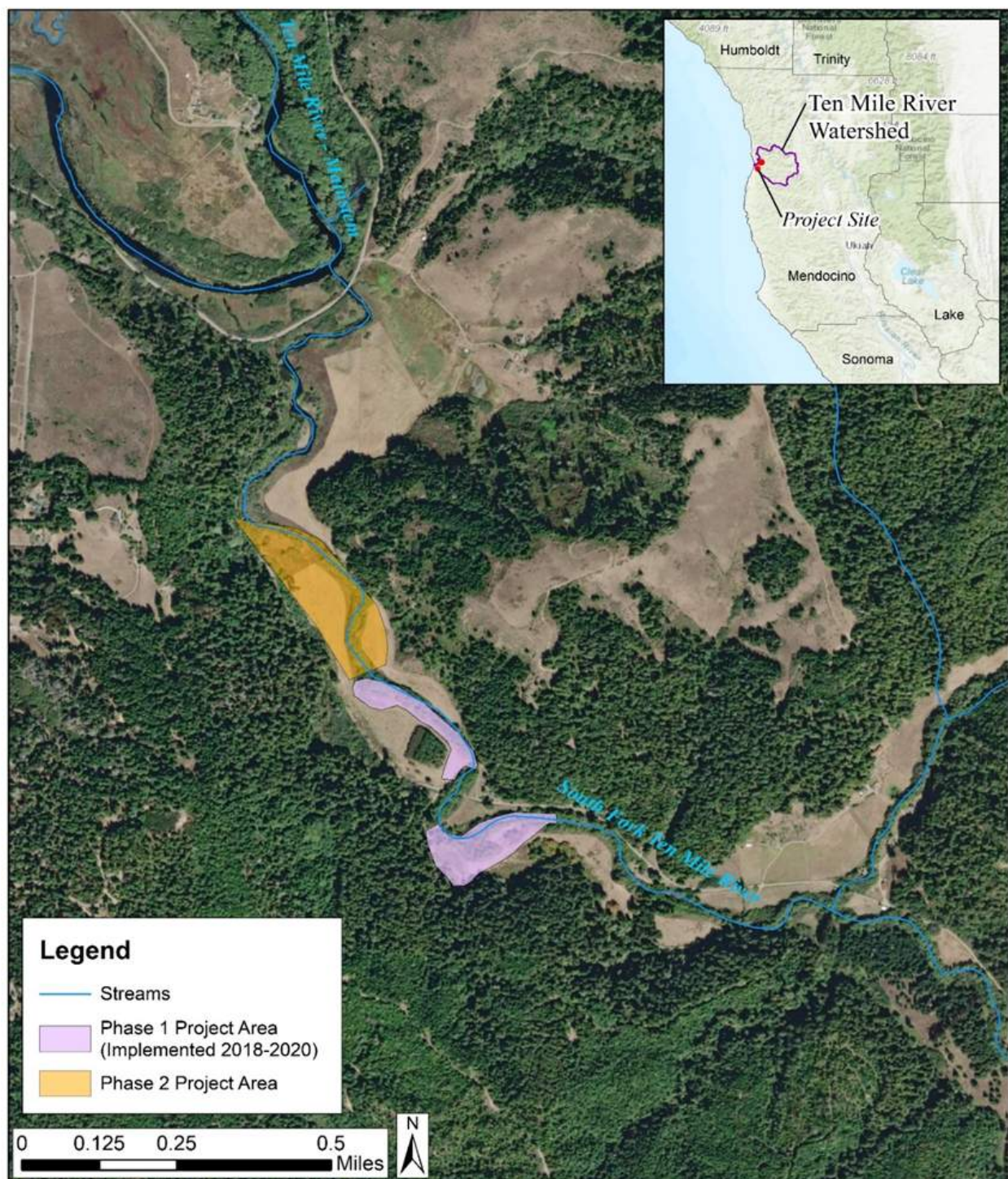


Figure 1. Site map and project location.



### 3 Site Conditions

The lower South Fork Ten Mile River in the project reach flows through a wide alluvial valley with broad floodplains and a narrow riparian corridor that are disconnected from the river (Figure 2). The channel is entrenched and trapezoidal in shape along much of its length. Small, alternating vegetated bars and inset floodplain benches have formed within the active channel banks, and a narrow band of young riparian trees lines the streambanks. The broad floodplain pastures are flooded only during infrequent large flood events. It appears the current channel form is heavily influenced by historic logging and ranching practices. Logging practices in the late 1800s/early 1900s denuded the hillslopes of trees and understory vegetation, which led to destabilized drainages and high rates of topsoil erosion and sediment deposition in the valleys. As a result, the floodplains have become elevated five to eight feet above the channel bed and are composed of homogenous silty loam soils. What appears to be a historic valley floor surface is found 6 inches to a 1-foot above the channel's riffle crest elevations, and is composed of fine gravels and sand similar to the current bed composition. Redwood logs and remains of root crowns are also found buried in this buried gravel layer.



*Figure 2. Image of the project reach in 2022 (looking downstream towards the Ten Mile River estuary). The upper riverine section of the project area is in the foreground, with the tidally influenced lower section in the mid-ground left bank, beyond the fence line.*

Wetlands and seasonal ponds fed by winter rains and ephemeral drainages line the left edge of the valley; however, these wetlands are disconnected from the creek except during infrequent, short duration flood events. The largest and most persistent of these seasonal ponds is located within the Phase 2 project reach, and increasing its accessibility for fish is part of the project objectives.

The Phase 2 project reach is characterized by two distinct sections: the lower tidal and lagoon influenced area and the upper riverine area. The lower third of the project reach is tidally influenced. Water depths fluctuate by several feet daily with the tides, and the site is within the lagoon backwater when the sandbar at the mouth closes off. The large, 1965-flood deposited gravel bar makes up most of the left bank in this lower section. A seasonal pond is located adjacent to the ranch road, between the 1965 gravel bar and the valley wall. This pond typically fills in early winter after significant rains and stays wet through late spring. During winter storm periods water flows down valley through the valley-wall wetlands to the pond. During infrequent, high floods, water flows across the floodplains and drains from the left bank floodplain through this lower area across the gravel bar and a drainage swale along the road. Because the gravel bar is so dry, it is not used for grazing and the landowners have given permission for broad, valley-wide restoration in this lower area.

In the upper riverine section, the channel is constrained within a 125- to 150-foot wide riparian zone between the high floodplain pastures. Within the riparian zone, the channel gently meanders between narrow vegetated alternating bars that act as inset floodplains. Bed forms range from plane bed (i.e. flat long glides with no distinguishable pools, riffles, or gravel bars) to a pool-riffle morphology with small gravel bars. In the middle of the project reach is a meander cutoff channel that formed during a flood event in the mid-2000s. This feature is now serving as high flow refugia, as it has revegetated with a dense understory. A small high flow alcove has persisted at the downstream end of the cutoff channel. The point bars, overflow channels, and alcoves in the reach provide some high flow refugia, however velocities quickly become elevated on these features during larger storm events.

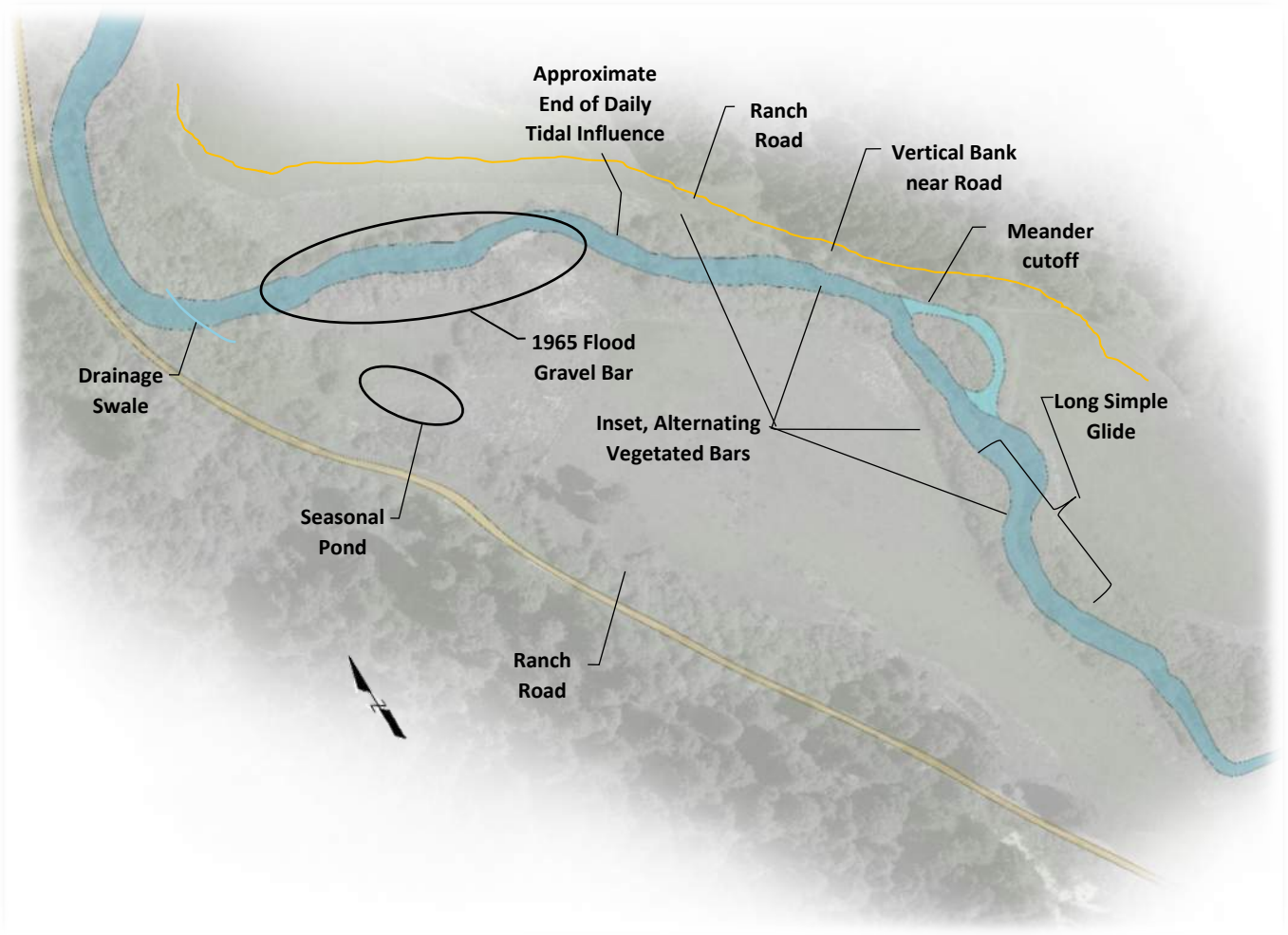


Figure 3. Existing conditions along project reach. River flow direction is from right to left.





*Figure 4. Site Images. Clockwise from upper left: a) & b) Long glides with plane-bed channel form in upper project reach, c) tidal lagoon backwater influence in November 2022 (Normal water depth is several feet lower than shown when tidal lagoon backwater is not in effect.), d) vegetated inset gravel bar in photo center with elevated 1965 floodplain above on left bank (looking downstream), and e) existing seasonal wetland in winter (water supply to pond is via local drainage and groundwater as wetland is disconnected from river).*

## 4 Habitat Enhancement Description

The overall project goal is to increase juvenile salmonid survival and coho salmon population numbers. The lower reach is utilized by juvenile salmonids for both winter and summer rearing, and ideally it provides abundant velocity and predator refugia and foraging habitats. Areas like this, where the river transitions to the estuary, should promote salmonid growth and survival. The habitat enhancement objectives for Phase 2 are based on guidance provided by the current and previous Technical Working Groups, as well as observations of design performance and fish utilization of the Phase 1 projects. The following are project objectives and specific design guidance:

- Create complex in- and off-channel features for salmonid winter rearing, foraging, and velocity refugia.
- Increase connectivity to and enhance existing floodplain features.
- Provide stage resilient rearing habitat (i.e. high quality, low-velocity edge habitat at a wide range of river flows).
- Include deep alcoves with lots of woody cover.
- Break up long, featureless glides with simple wood structures that will initiate deeper pool scour, gravel sorting, and bar development at higher flows. The structures should also provide complex cover at low flows, and backwater inset floodplain benches at higher flows, where appropriate.
- Natural looking wood accumulation designs are preferred over engineered log jams.
- Avoid destabilizing right bank ranch road.

The Phase 2 sites and treatments were selected to 1) take advantage of existing off-channel features and unused valley land, or 2) enhance low-value, in-channel habitat areas. The intention is to provide significant uplift to the coho salmon rearing capacity of the 0.4-mile reach. The site elements will function together to provide high-value in- and off-channel habitats that can be utilized by salmonids across a wide spectrum of winter and spring flow conditions as they travel into the Ten Mile River estuary.

Figure 5 shows the four sites (SF6, SF7, SF8, and SF9) that encompass Phase 2. The Phase 2 project expands upon treatment approaches and features that worked well in Phase 1, including alcoves, seasonally flooded wetlands and ponds, complex large wood structures for cover, and accelerated recruitment-type log jams that utilize downed alders and whole redwood trees.



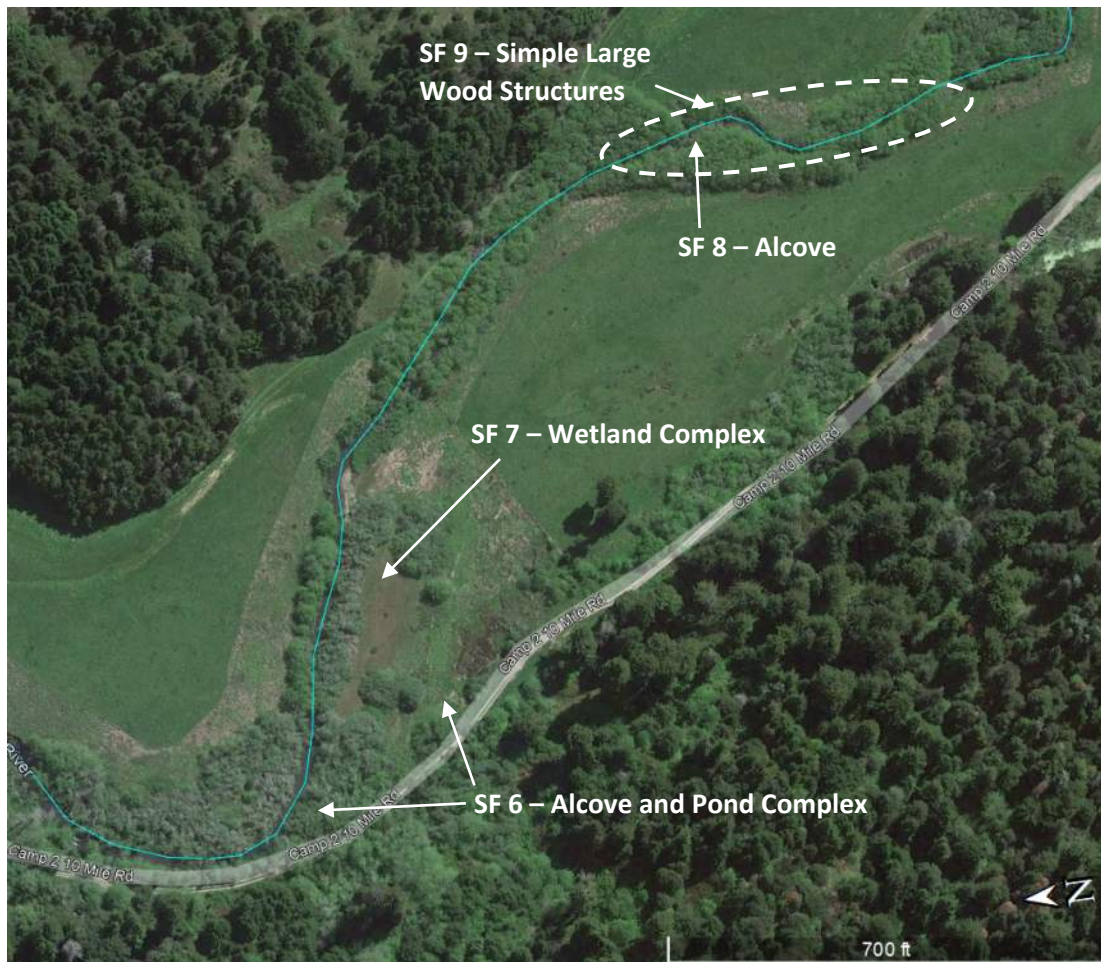


Figure 5. Site locations and description within the Phase 2 project area. South Fork Ten Mile River flow direction is from right to left.

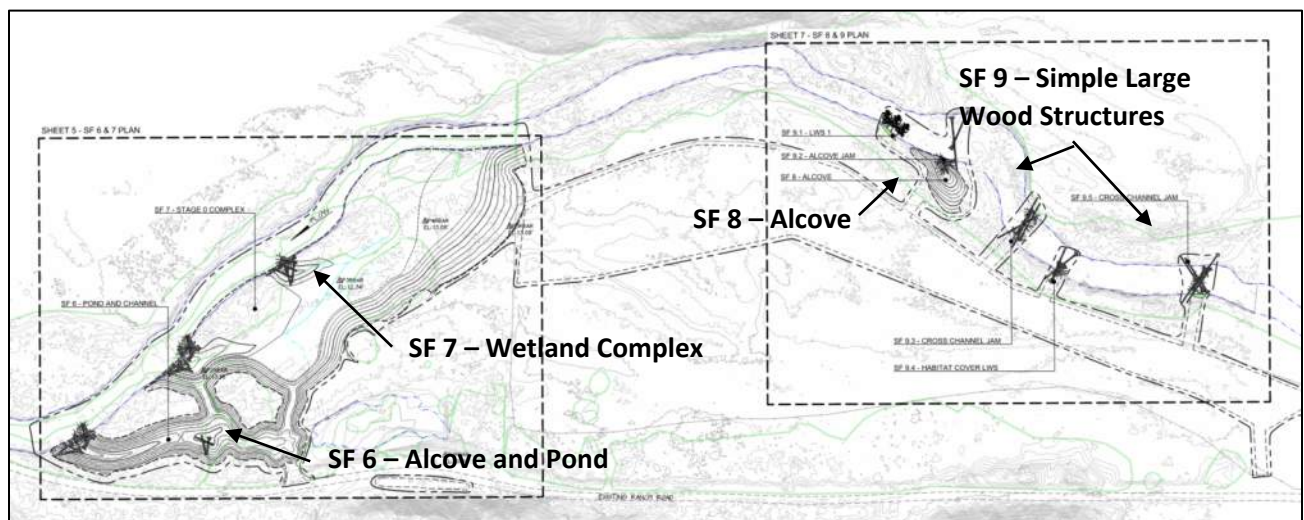


Figure 6. 65% plans overview of designs.



- **SF 6 – Large Alcove and Seasonal Pond Complex.** At this location a long, deep alcove and shallow pond will connect to the existing seasonal pond and valley wall wetland complex along the left valley edge. An objective of this design is to not drain the existing pond and wetland, as they are important feature in the landscape, providing native frog and other wildlife habitat as well as promoting groundwater recharge.

The graded alcove will transition into a wetland swale and smaller ponded area along an existing swale feature. The alcove will be 150 feet long with depths ranging from 3 to 0 feet during low tide periods (water surface at ~ 6'). During the monthly higher high tides, the water surface will increase to 7' and up to 8', which will extend the inundated area another 150 feet up the wetland channel. A 0.03-acre depression (pond) will be incorporated into the wetland swale; it will pond water one foot deep and will be connected to the alcove during every higher high tide cycle during the summer and every flow above low winter baseflow in the winter.

A large wood cover structure will be placed at the outlet of the alcove to attract fish and provide complex shelter from predators. The six redwood rootwads and two to three logs and salvaged willow and alder will also help stabilize the excavated slopes of the alcove. Large wood will also be placed in the pond to provide habitat and cover for both fish and western pond turtles.

All excavated areas will be revegetated with native seed and plants; specifically, in the wetted areas, native plants will be wetland sedges and rushes. Approximately 2,000 cubic yards of silty loam spoils will be hauled to a quarry up on the mainstem Ten Mile River, where it will be used to reclaim the quarry site.

- **SF 7 – Wetland complex.** A dry 1965 gravel deposit will be converted to a 1.6-acre multi-threaded channel/wetland complex. The wetland surface flood daily during high tides and during every storm event. It is expected that the wetland surface terrain, vegetation composition, and channel pathway(s) will evolve over time with coarse sediment deposition.

The entire surface of the gravel bar will be graded and excavated to lower the surface to just above low tide/winter baseflow elevation (6.5' at the upstream end transitioning to 5.5' at downstream end). Small, shallow pilot channels will be excavated into the new ground surface to initiate channel formation and provide pathways for fish to navigate through the wetland. Two three-foot-deep alcoves will be excavated into the wetland where the pilot channels reconnect to the main channel. Large wood habitat structures will be installed in the alcove to provide deep cover habitat. These structures will be made of redwood rootwads and logs, with additional salvage material added to increase habitat complexity. Approximately 14,000 cubic yards of sandy gravel will be hauled to a yard in Fort Bragg and reused for aggregate needs. Once complete, the lowered ground surface will be planted with native wetland sedges and rushes to create high-quality cover and foraging habitat for juvenile coho salmon.

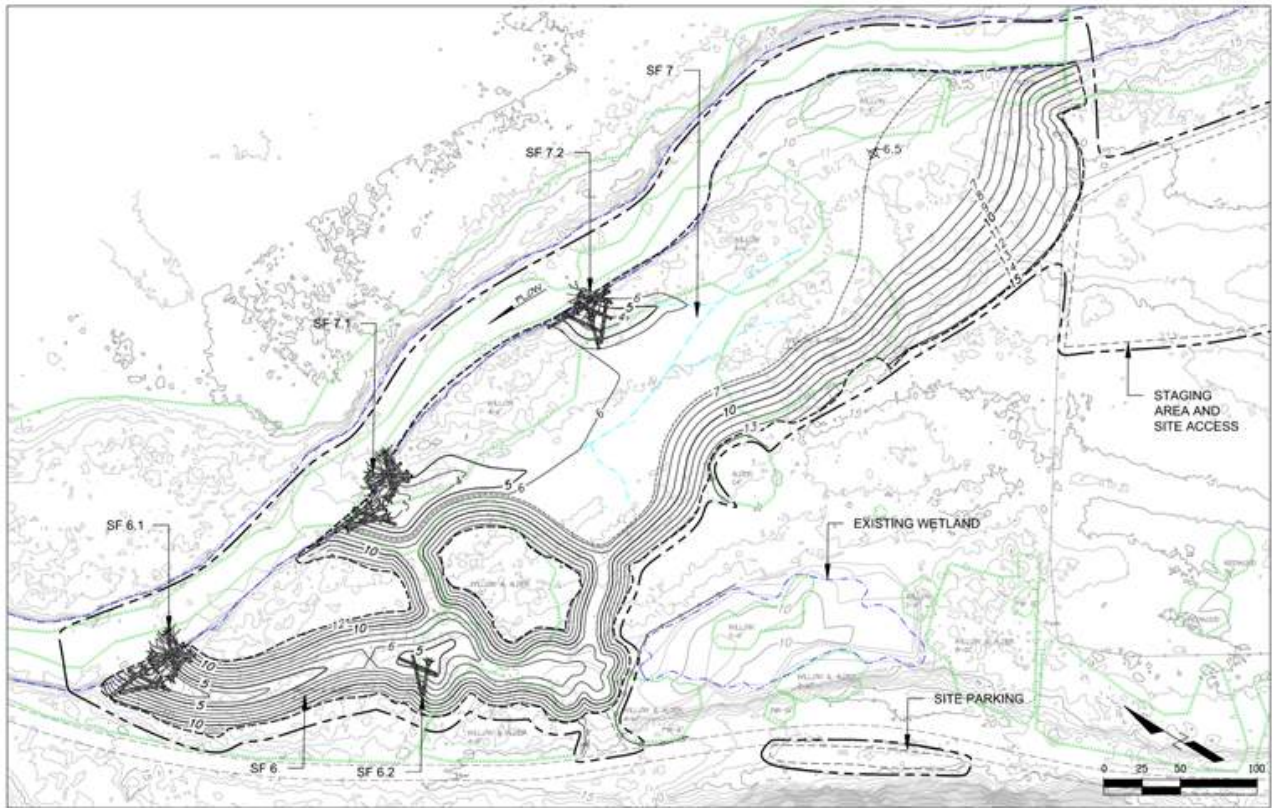
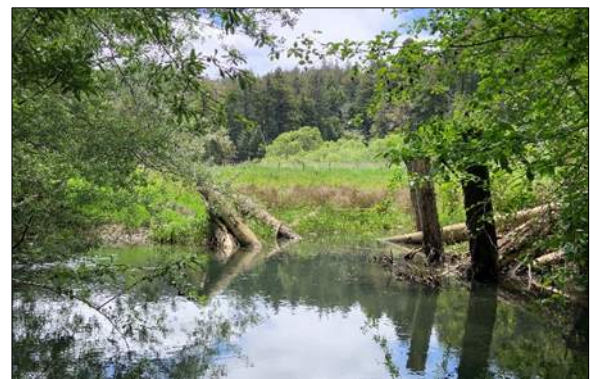


Figure 7. Site plan for SF 6 and SF 7 showing grading, large wood structures, and site access.

- **SF 8 – Alcove.** A small alcove set into a wide, tree-covered gravel bench will be excavated to provide complex, low-velocity, off-channel winter habitat in the upper project reach of the project site. The inset floodplain bench supports mature alders established that maintain its stability and provides shade. The floodplain bench gets overtopped at approximately the 2-year flow event, and at winter base flows, the water depth in the alcove will be 1.5- to 2-feet deep. Large wood structures will be installed at the inlet mouth to provide complex cover for rearing salmonids, and to maintain sediment transport hydraulics. The back end of the alcove will slope gently (5:1 slope) up to the existing terrain, and the slopes will be planted with wetland sedges and rush to provide stability.



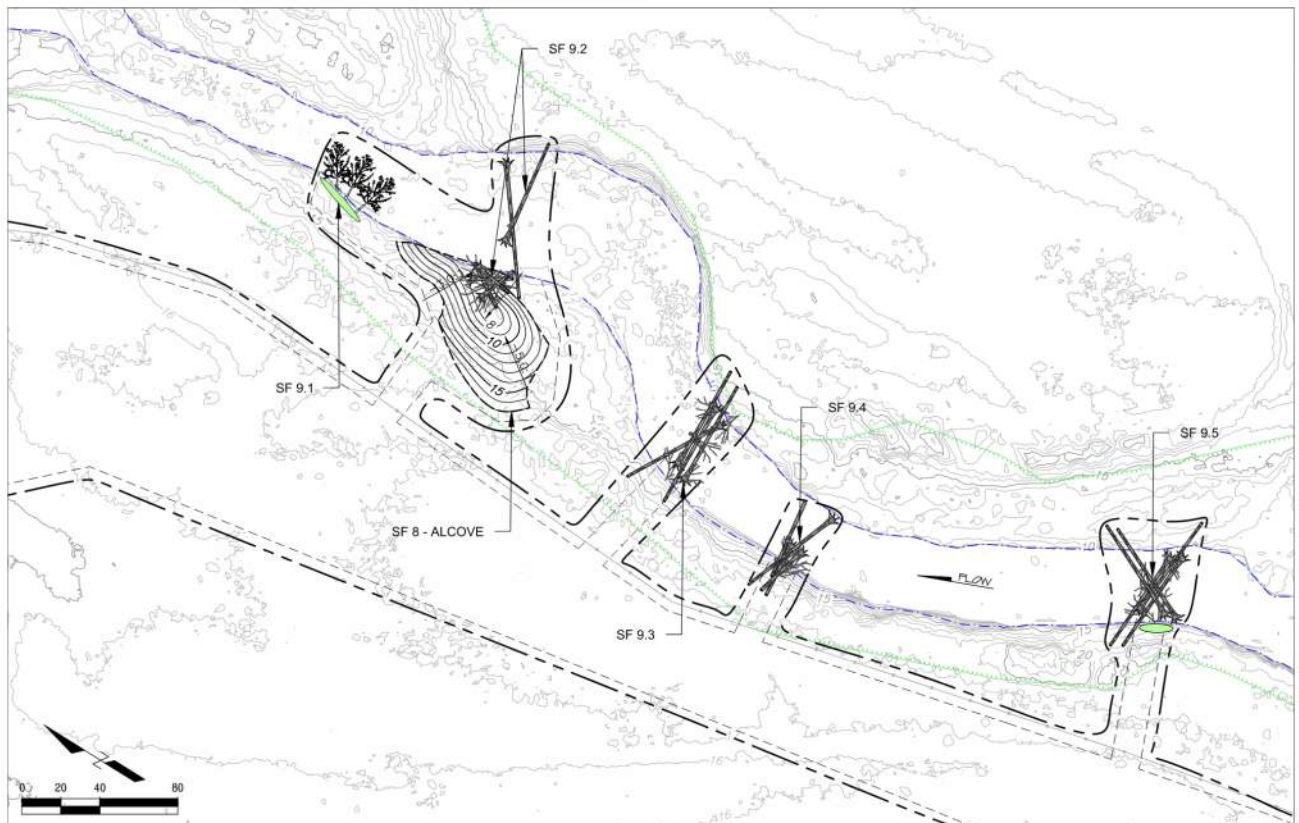
Example alcove with large wood structures from the Phase 1 project.

- **SF 9 – Simple large wood structures.** Four accelerated recruitment-type large wood structures will be installed at SF9 to serve several functions including backing flows up to initiate inset bench and alcove flooding and to scour and re-distribute gravels to initiate pool/riffle formation in the plane bed reach.

A mix of downed alder, willow slash, and whole redwood trees will be used to form the structures. The structures will be built using a combination of materials, including salvaged alders and willow from the lower reach's excavation areas and whole redwood trees with rootwads that can span the active channel and hold down the salvage wood. The logs will be stabilized in place by wedging them between live alders on the bank. Vertical log anchors will be vibrated into the channel bed at the downstream end of the structures to prevent loose material from floating downstream.



*large wood structure from the Phase 1 project.*



*Figure 8. Site plan SF 8 and SF 9 showing grading, large wood structures, and site access. Green ovals show locations for alder removal and tipping into the channel.*

The current project also includes implementation of adaptive management measures at two locations in the Phase 1 project area. These activities will include:



**SF 16 – Alcove Inlet.** The inlet at SF 16 will be excavated to the alcove to inundate at baseflow conditions to make the constructed side channel accessible to salmonids through a full range of future winter conditions. The inlet will be deepened about 3 feet. The excavated floodplain material will be trucked to the quarry located along the mainstem Ten Mile River. Monitoring indicates the habitat feature is limited to accessibility during high flows only. The inlet adjustment will provide additional accessible habitat for salmonids.



Figure 9: Location of SF 16.

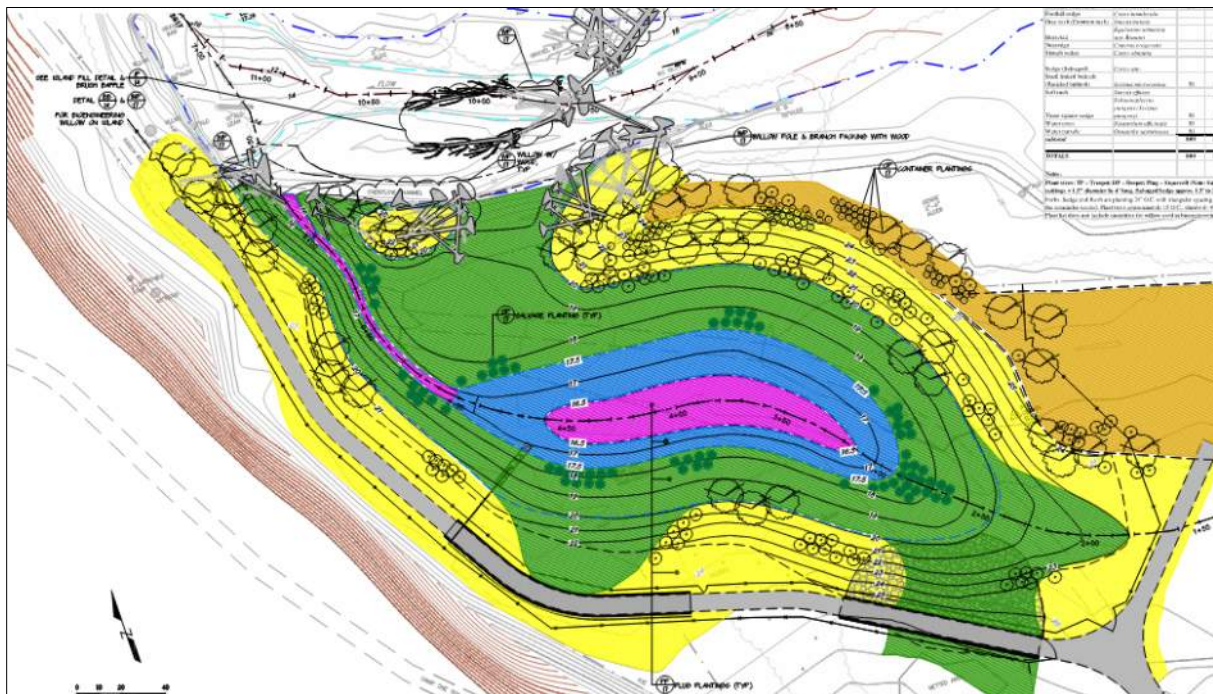


Figure 10: Site plan SF 16. The inlet will be excavated to allow inundation at baseflow conditions.

- **SF 11 – Alcove Pilot Channels.** Monitoring indicates pilot channels are needed in the constructed alcove at SF 10 to create a network of channels through alcove to make the upper alcove more accessible to salmonids. Access to the alcove will follow the same path used for construction.



Figure 11: Location of SF 11.

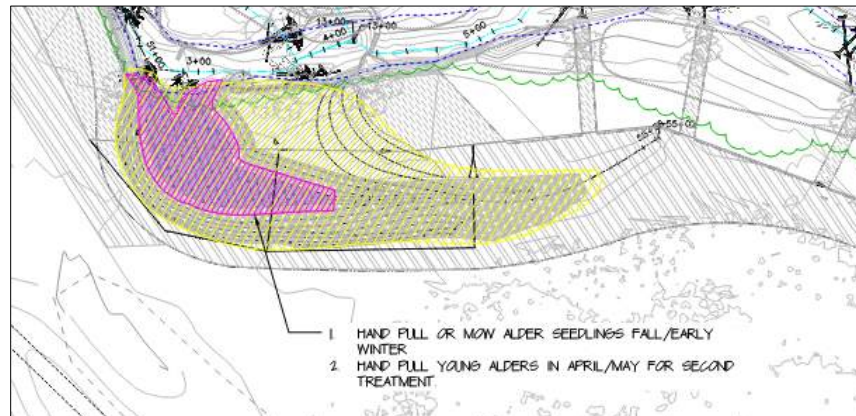


Figure 12: Site plan SF 11. Pilot channels will be excavated into the pink area on the figure to allow fish passage to the alcove during all flow events.

## 5 Project Sizing

The total area in the project limits will be 7.1 acres, of which 2.2 acres will be graded to create the habitat features, 2.8 acres will be disturbed for access and grading, and 2.1 acres will be undisturbed. The project will generate spoil material that will be off-hauled to an old quarry adjacent to the mainstem Ten Mile River where it will be used in site reclamation, or it will be off-hauled and to a quarry and used as aggregate base. Topsoil will be salvaged and re-used on site.

*Table 1: Cut and Fill Quantities*

Location	Cut Quantities (CY)	Fill Quantities *(CY)
SF6 and Connector Channels	2,160	0
SF7	12,010	0
SF8	310	0
Topsoil from SF6	810	
Topsoil replaced at portions of SF6	0	225
Topsoil replaced at portions of SF7	0	515
Topsoil replaced at SF8	0	60
<b>Total</b>	<b>15,290</b>	<b>810</b>

Disturbed sites at SF6/SF7 and SF8 will receive erosion control treatment and will be revegetated depending on various zones ranging from aquatic zones to upland grasslands.

*Table 2: Planting Zones and Treatment Areas*

Planting Zone	Treatment Area (SF / acres)
<b>SF6/SF7</b>	
Aquatic Zone	10,454 / 0.24
Emergent Wetland Zone	43,560 / 1.0
Season Wetland	12,196 / 0.28
Wet Meadow	11,325 / 0.26
Grassland	10,454 / 0.24
<b>Total</b>	<b>87,989 / 2.0</b>
<b>SF8</b>	
Emergent Wetland Zone	373 sq. ft.
Seasonal Wetland	838 sq. ft.
Wet Meadow	1514 sq. ft.
Grassland	485 sq. ft.
Redwood Trees	5 trees

*Table 3: Erosion Control Treatments and Treatment Areas*

Location	Treatment Area (SF / Ac)	Treatment
Access Roads and Staging	117,800 / 2.7	Decompaction, replace topsoil, install pasture seed mix, spread weed free straw, roll or crimp straw
Non-pasture Parking Area/Access Routes	2,000 / 0.05	Decompaction, replace topsoil, install native seed mix, spread weed free straw, roll or crimp straw
Wetland Complex	52,200 / 1.2	Install plug planting
Wetland Complex, Connector Channel	30,900 / 0.71	Replace topsoil, hydromulch, native seed mix
SF8 and Critical Slopes	12,900 / 0.3	Replace topsoil, native seed, weed free straw cover



Location	Treatment Area (SF / Ac)	Treatment
Where needed, straw wattles	1,400 linear fee	Install wattles according to specifications
<b>Total</b>	<b>215,800 / 4.96</b>	

*Table 4: Temporary Vegetation Disturbance by Vegetation Type*

Impact Area	Vegetation Type/Impact Area (SF/Ac)		
	Grassland	Wetland	Riparian Forest
Grading Extent/Tree Removal	41,643 / 0.96	4,574 / 0.105	48,917 / 2.13
Wood Structure Installation	0	52.3 / 0.001	0
Access and Staging	117,612 / 2.7	130 / 0.003	3,223 / 0.07
<b>Total</b>	<b>159,255 / 3.69</b>	<b>4,756.3 / 0.11</b>	<b>52,140 / 1.2</b>

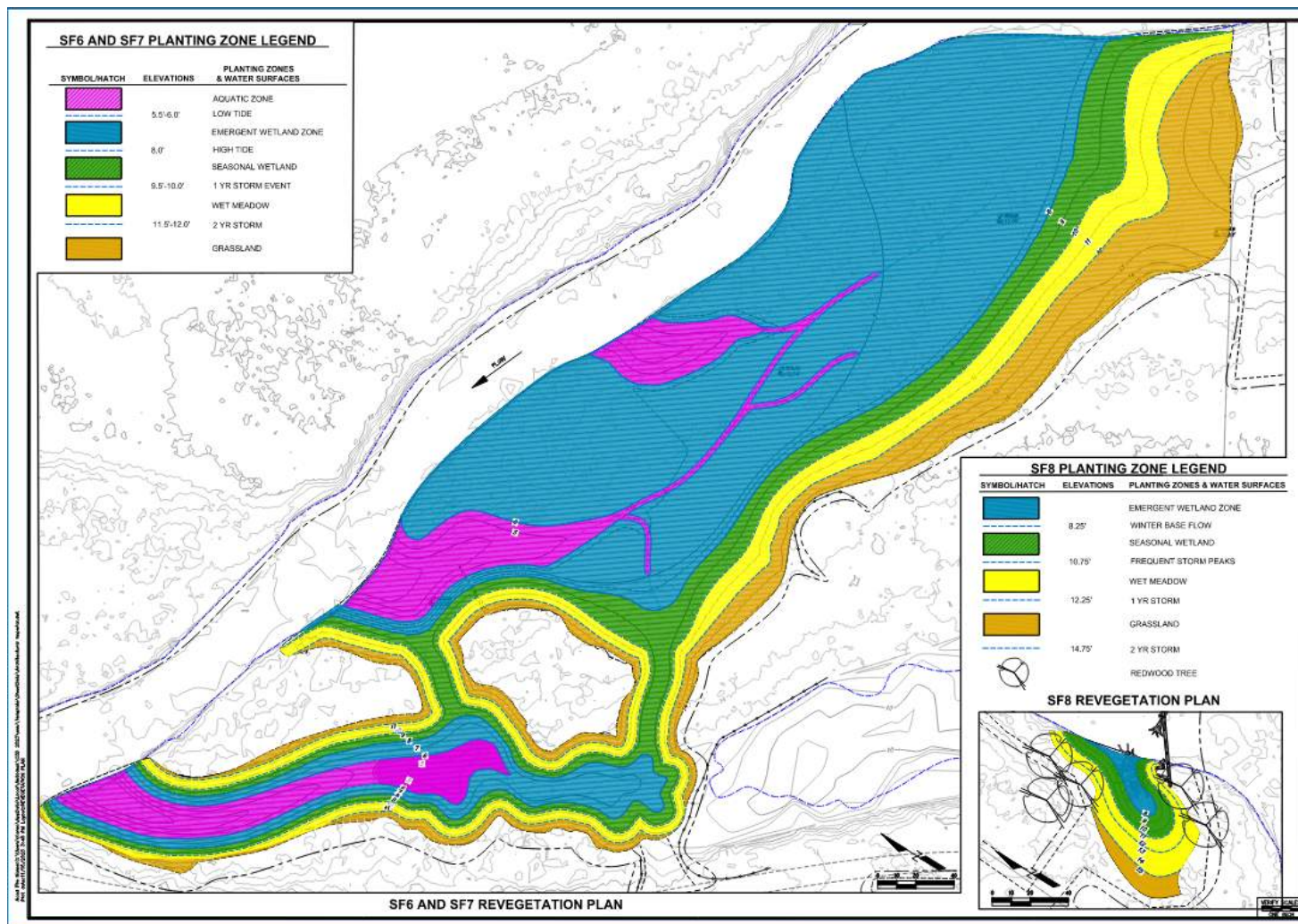


Figure 9. Site Revegetation Plan

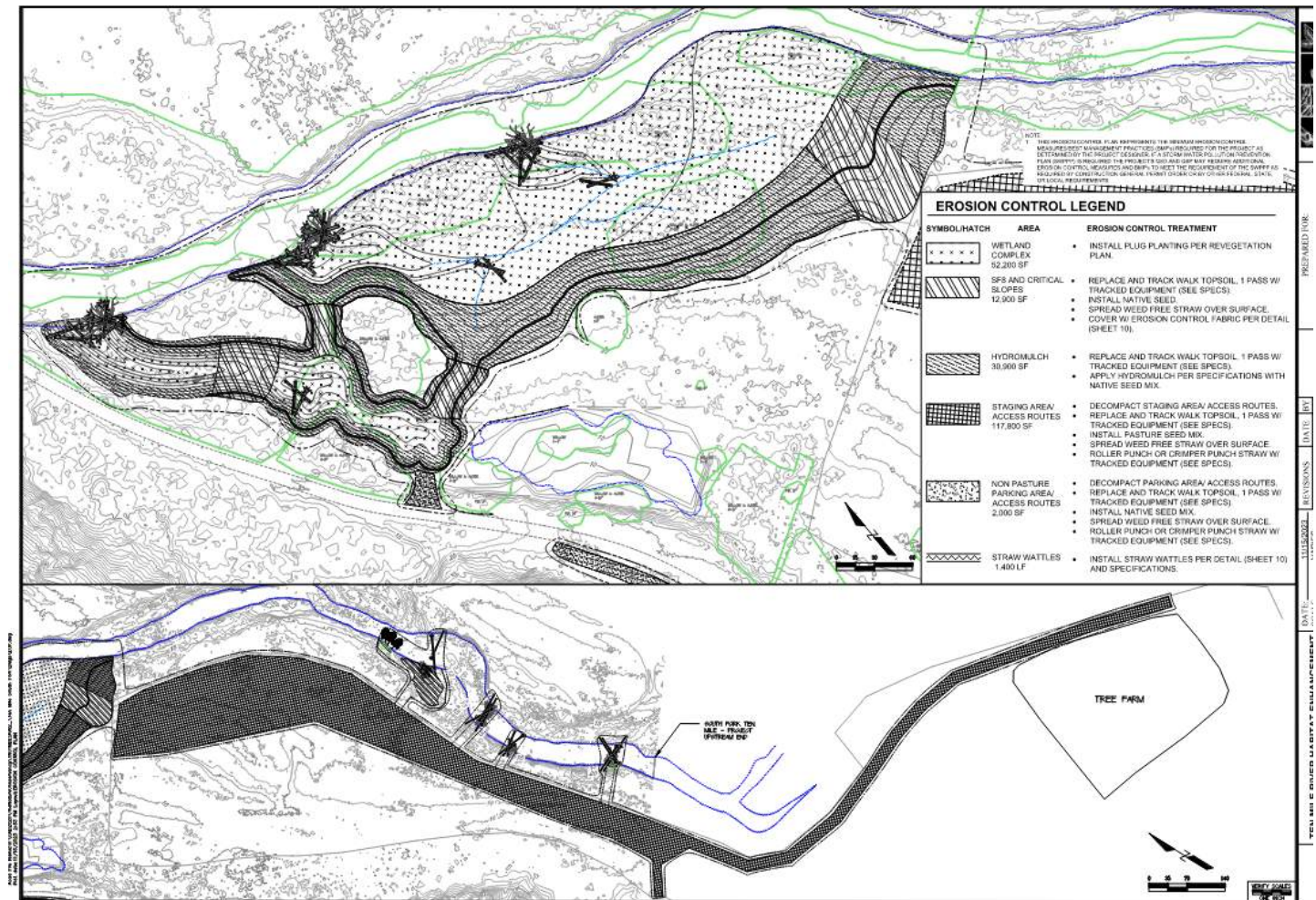


Figure 10. Erosion Control Plan