

Introduction:

The Eel River Watershed Improvement Group (ERWIG) will restore fish passage through the Buck Gulch road crossing by replacing the current culvert with a free-span bridge engineered to pass all life stages at all flows, and to convey 100 year flows. This project is necessary because the culvert is a complete juvenile salmonid barrier and a temporal barrier to adult salmonids.

The Grantee shall not proceed with on the ground implementation until all necessary permits, consultations, and/or Notice to Proceed are secured. All habitat improvements will follow techniques in the *California Salmonid Stream Habitat Restoration Manual* (Part IX and XII <https://www.wildlife.ca.gov/Grants/FRGP/Guidance>).

Objective(s):

The objective of the project is to replace a failing, partial barrier, culvert with a free-span bridge that will provide salmonids with uninhibited access to 0.52 miles of year-round habitat. The bridge will allow full passage to juvenile and adult salmonids and will convey 100-year flows.

Project Description:

Location:

The project is located on Buck Gulch, near the town of Briceland, in Humboldt County, CA. Buck Gulch is a tributary to Miller Creek, tributary to Redwood Creek, in the South Fork Eel River watershed. The project site is 0.13 miles upstream of the confluence with Miller Creek; located at 40.122538 north latitude and -123.914536 west longitude; Township 04 South, Range 03 East, and Section 12, of the Briceland 7.5 Minute U.S. Geological Survey (USGS) Quadrangle Map.

Project Set Up:

ERWIG Staff: ERWIG Executive Director: Task 1. Contract oversight, planning and reporting will be conducted by ERWIG Executive Director.

ERWIG Project Manager: Tasks 3, 5, 6 & 7. Will manage project setup and project implementation. Project manager will collect pre- and post- project metrics, take pre- and post- project photos and plant native trees & plants. Project manager will write annual and final reports.

Subcontractors:

Licensed Engineering Contractor (Wilcox Enterprises): Tasks 3 and 5. Will participate in project planning, will carry out equipment transportation, and will be responsible for all heavy equipment activities including culvert removal, bridge

installation, rock placement, log placement, and any digging necessary to complete the project. Wilcox will also be responsible for dewatering the creek. Conservation Corps (CCC) Corpsmembers: Task 5. CCC will anchor the structures according to design and anchoring specifications. CCC will also install and water willow.

Stillwater Sciences: Tasks 3, 5, and 6. Will produce 100% design plans, will oversee culvert removal, bridge installation, and the construction of large woody debris (LWD) structures and boulder weirs. Will complete the fish passage survey and write a fish passage assessment report.

Electrofisher (Ross Taylor & Associates): Task 4. Will remove aquatic life, primarily fish, from project site and place block nets.

SHN Engineers and Geologists (Special Inspections): Task 5. Will inspect bridge footings, soil compaction, welds, and any other special inspections required by the Humboldt County Building Permit.

William Rich & Associates: Task 2. Will carry out archeological and botanical background and survey work. Will produce reports satisfying CEQA requirements.

Paleontology subcontractor: Task 2. Will conduct paleontology research and surveys and will prepare a report satisfying CEQA requirements.

Materials:

Materials to be purchased by the applicant include:

1. Anchoring materials: for large wood and boulder structures. Steel nuts are required to secure threaded rebar to LWD, live trees, and rock, increasing longevity of intended structural position. Steel washers will be used to lock the steel nut into place once fastened to the threaded rebar.?
2. Straw: to be placed on exposed soil prior to significant rainfall.
3. County Planning and Building Permits: required for the project.

Materials to be purchased by the subcontractor:

1. Boulders to be used to anchor large wood structures, construct gradient control structures, and to armor bank in select places.
3. Cobble & boulder rock armor to be used for bed and bank protection.
4. 3` base road rock for road surfacing.
5. Bridge

Materials to be donated by landowner:

1. Thirteen (13) pieces of large wood to construct five (5) instream structures to provide bank protection, pool scour, habitat complexity, and cover.
2. Willow cuttings to reinforce bank protection rock work and to reestablish riparian vegetation.
3. Lake and Streambed Alteration Agreement

Tasks:

Task 1 - Project Management and Administration -

Grant oversight including invoicing and reporting will be conducted by Grantee Executive Director and Project Manager (Staff). Upon final execution of the Grant and prior to receiving a Notice to Proceed, Grantee shall deliver the following items to the CDFW Grant Manager:

1. Request to spend project funds in order to prepare for implementation (e.g., obtain permits, secure subcontracts, purchase supplies, apply for a Streambed Alteration Agreement, etc.). Requests shall be sent by email or telephone.
2. Subcontractor Agreements. A written copy of the sub agreement shall be submitted to the CDFW Grant Manager. The subcontract shall include specific language which establishes the rights of the auditors of the State to examine the records of the subcontractor relative to the services and materials provided under the grant.
3. CEQA survey interim reports for archaeological and botanical surveys. Interim reports shall be delivered prior to receiving notice to proceed, as part of the Notification of Lake or Streambed Alteration Application (LSAA) package. Final Archaeological, botanical and paleontological surveys shall be delivered prior to the End Term date.
4. Send Grantor LSAA with a check for the most current permit fee.

The Grantee shall notify the CDFW Grant Manager a minimum of 10 business days prior to the beginning of project implementation.

Task 2 - CEQA Surveys - William Rich & Associates will conduct archeological and botanical surveys within the project reach to fulfill CEQA requirements. Interim survey reports will be delivered to CDFW Grant Manager prior to receiving a Notice to Proceed. Paleontological survey crew will conduct paleontological research, surveys and prepare reports.

Task 3 - Site Preparation - Stillwater Sciences will produce 100% design plans with guidance from CDFW and NOAA. Stillwater Engineer or ERWIG Project Manager will flag sites for material delivery and installation, clear brush for equipment as needed, and designate staging areas for equipment and wood. Excavator will be delivered by a lowboy to the staging area. Bridge will be delivered by truck. Boulders will be delivered by a dump truck along the project reach and/or staging areas. Pre-project photos and metrics will be collected. Project materials will be procured, including erosion control materials, anchoring materials, high strength epoxy, boulders and logs. To address concerns over invasive species, this project will follow the ERWIG Aquatic Invasive Species Decontamination Protocol which is in line with the CDFW Aquatic Invasive Species Decontamination Protocol.

Task 4 - Aquatic Species Relocation - Block nets will be set up and fish will be removed from the section of stream that is to be de-watered using an e-fisher,

operated by a qualified professional. Relocated fish will be placed in suitable habitat upstream and/or downstream of the project site. Amphibians will be caught with a dip net and relocated upstream and/or downstream of the section of stream to be de-watered.

Task 5.1 - Dewatering - Licensed equipment operator (Wilcox Enterprises) shall construct coffer dams upstream and downstream of the excavation site (within the fish exclusion zone) and divert all flow from upstream of the upstream dam to downstream of the downstream dam. The coffer dams may be constructed with clean river gravel or sand bags, and may be sealed with sheet plastic. The suction end of the intake pipe shall be fitted with fish screens meeting CDFW and NOAA criteria to prevent entrainment or impingement of small fish. Any turbid water pumped from the work site itself to maintain it in a dewatered state shall be disposed of in an upland location where it will not drain directly into any stream channel. Sand bags and any sheet plastic shall be removed from the stream upon project completion. Clean river gravel may be left in the stream, but the coffer dams must be breached to return the stream flow to its natural channel.

Task 5.2 - Site Construction - With guidance from Stillwater Engineer and ERWIG staff, Equipment Operator (Wilcox Enterprises) will remove the existing culvert. Removal of the existing culvert and fill prism will involve excavation of approximately 1,000 cubic yards of material which will be stored on the adjacent small driveway which will be converted into seasonal 4x4 access only. When fill material is placed for permanent storage, the receiving area will be ripped or decompacted first. The fill will then be placed in 1-foot lifts and shaped to blend with the surrounding topography with final surface grading designed to reduce runoff concentration as much as possible. Upon completion of the fill, woody debris will be scattered over the surface of the area as mulch.

Six new grade control structures will be installed within the new channel reach. Streambed material excavated from the upstream channel will be used to construct the channel between the grade control structures. Some additional imported cobble and boulders may be imported so that the streambed material matches specifications. Logs will be sourced locally and used by the equipment operator to build five (5) LWD structures. Re-enforced concrete abutments will be constructed and bridge will be placed and secured to abutments.

Task 5.3 - Anchoring - California Conservation Corps (CCC) corpsmembers under supervision of ERWIG staff will anchor the sites according to design and anchoring specifications. Site construction, wood placement, and anchoring will follow engineered design plans and will be in accordance with CDFG California Salmonid Stream Habitat Restoration Manual, Section VII (Flosi et al. 2010). Connections to boulders will involve threaded rebar connected via DYWIDAG eye nuts and half-inch alloy screw pin anchors. CCC corpsmembers will stake willow cuttings into rockwork to help guard against erosion, help stabilize the bank and provide riparian function.

Task 5.4 - Erosion Control - Erosion control wattles will be installed and mulching with rice straw and locally available native materials will take place as features are completed to avoid unforeseen erosion. Mulching will take place on all exposed soils which may deliver sediment to a stream. See Erosion Control (Section 11.2) in the Basis of Designs for more detail.

Task 5.5 - Watering and Riparian Planting - Willow stakes will be thoroughly watered by the CCC once per week until the first significant rainfall. In the winter following implementation, 40 native trees and plants will be planted in areas disturbed by the project. Species may include: *Sequoia sempervirens* (Redwood), *Pseudotsuga menziesii* (Douglas fir), *Vaccinium ovatum* (Evergreen huckleberry), *Heteromeles arbutifolia* (Toyon), *Gaultheria shallon* (Salal), *Ribes bracteosum* (stink currant), and *Rubus* sp. (thimbleberry, salmonberry, black-capped raspberry, etc).

Task 6 - Post Project Data and Photo Collection - Following implementation ERWIG and Stillwater Sciences will take post-project photos and quantitative implementation metrics will be collected which satisfy the Project Annual Progress Reports and Final Report. Fish passage surveys will be conducted at low and high flows to assess passage through the new culvert. A post-project, longitudinal profile survey will be conducted.

Task 7 - Reporting - ERWIG Staff will write and deliver Annual Progress Reports, and a Draft and Final Report to CDFW Grant Manager.

Deliverables:

Task 1 - Project Management and Administration - 1600 Permit, Subcontractor Contracts, Access Agreements, Invoices, Invoice Progress Reports.

Task 2 - CEQA Surveys - Finalized 100% Design Plans, Flagged Equipment Access Routes, Pre-project metrics and photos.

Task 3 - Site Preparation - Arch Culvert 54' by 18', five LWD structures (made of redwood (*Sequoia sempervirens*) or Douglas fir (*Pseudotsuga menziesii*) logs, three boulder grade control weirs, 20 native plants and trees.

Task 4 - Aquatic Species Relocation - Post-project metrics and photos, longitudinal profile, fish passage assessment.

Task 5.1 - Dewatering - De-watering data and summary report.

Task 5.2 - Site Construction - Steel bridge, 89' long X 12' wide, five (5) LWD structures (made of redwood (*Sequoia sempervirens*) or Douglas fir (*Pseudotsuga menziesii*), logs, and eight (8) boulder grade control weirs.

Task 5.3 - Anchoring - Five (5) anchored LWD structures.

Task 5.4 - Erosion Control - Erosion control features.

Task 5.5 - Watering and Riparian Planting - A list of species planted at the project site and number of each species.

Task 6 - Post-Project Data and Photo Collection - Post-project metrics and photos, longitudinal profile, fish passage assessment.

Task 7 - Reporting - Annual reports, draft final report, final report.

Timelines:

Task 1 – Project Management and Administration – 4/1/2020 to 3/5/2022

Task 2 – CEQA Surveys – 4/1/2020 to 6/1/2020

Task 3 – Site Preparation – 6/1/2020 to 7/20/2020

Task 4 – Aquatic Species Relocation – 7/20/2020 to 7/31/2020

Task 5.1 – Dewatering – 7/31/2020 to 9/30/2020

Task 5.2 – Site Construction – 8/3/2020 to 9/30/2020

Task 5.3 – Anchoring – 8/10/2020 to 9/30/2020

Task 5.4 – Erosion Control – 8/3/2020 to 9/30/2020

Task 5.5 – Watering and Riparian Planting – 9/1/2020 to 2/26/2021

Task 6 – Post Project Data and Photo Collection – 11/2/2020 to 2/28/2022

Task 7 – Reporting – 11/1/2020 to 3/5/2022

Additional Requirements:

The Grantee will not proceed with on the ground implementation until all necessary permits and consultations are secured. Work in flowing streams is restricted per the Army Corp of Engineers Regional General Permit. Actual project start and end dates, within this timeframe, are at the discretion of the

California Department of Fish and Wildlife.

No equipment maintenance will be performed within or near the stream channel where pollutants (such as petroleum products) from the equipment may enter the channel via rainfall or runoff. Appropriate spill containment devices (e.g., oil absorbent pads, tarpaulins) will be used when refueling equipment. Any and all equipment will be removed from the streambed and flood plain areas at the end of each workday.

All equipment and gear will be brushed with a stiff brush prior to leaving each stretch of stream to avoid the transport of aquatic invasive species (AIS). When transporting traps out of the area, each numbered trap will be bagged in its own bag to avoid cross contamination during transport in and out of the work area. All crew members will decontaminate equipment and shoes for AIS according to the standards detailed in the California Department of Fish & Wildlife Aquatic Invasive Species Decontamination Protocol.

During project activities, all trash that may attract predators will be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris will be removed from work areas.

The Grantee shall notify the Grantor Project Manager a minimum of five working days before the project site is de-watered and the stream flow diverted. The notification will provide a reasonable time for Grantor personnel to oversee the implementation of the water diversion plan and the safe removal and relocation of salmonids and other fish life from the project area. If the project requires dewatering of the site, and the relocation of salmonids, the Grantee will implement the following measures to minimize harm and mortality to listed salmonids:

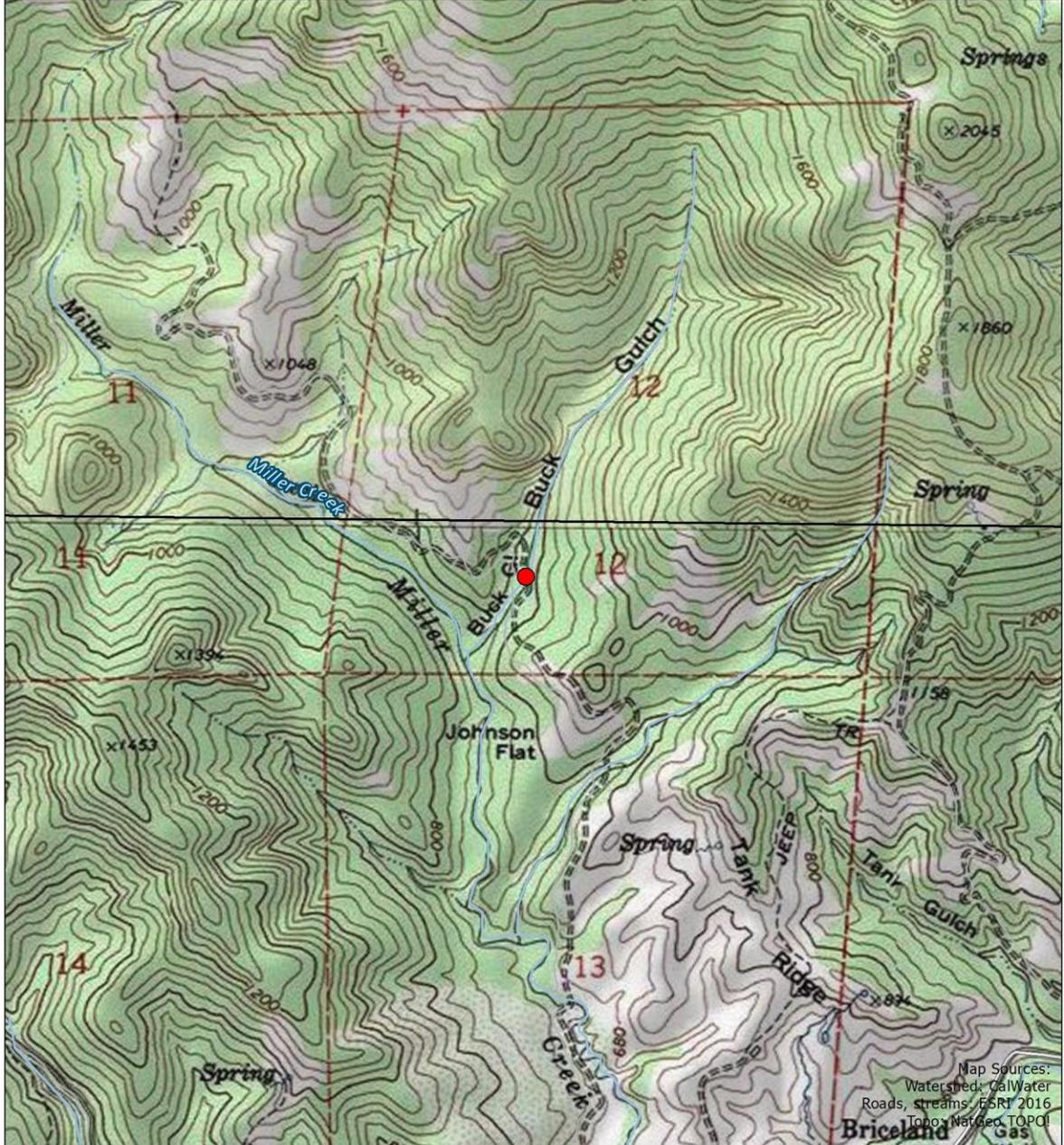
- a. Fish dewatering and relocation activities shall only occur between June 15 and October 31 of each year.
- b. Additional measures to minimize injury and mortality of salmonids during fish relocation and dewatering activities shall be implemented as described in Part IX, pages 52 and 53 of the *California Salmonid Stream Habitat Restoration Manual*.
- c. The Grantee shall minimize the amount of wetted stream channel dewatered at each individual project site to the fullest extent possible as approved by the CDFW Grant Manager and pursuant to conditions in the USACE Regional General Permit and NMFS Biological Opinion.
- d. All electrofishing shall be performed by a qualified fisheries biologist and conducted according to the National Marine Fisheries Service, Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act, June 2000.

- e. USFWS Approved fisheries biologists will provide fish relocation data via the Grantee to the CDFW Grant Manager on a form provided by CDFW.

The bridge design and installation will meet flow carrying capacity required for a 100-year flood event as identified by specifications determined by National Oceanic and Atmospheric Administration (NOAA) Fisheries and the California Department of Fish and Wildlife (CDFW), for adult and juvenile salmonid fish passage. The project will follow the National Marine Fisheries Service (NMFS 2001) Guidelines for Salmonid Passage at Stream Crossings and criteria for fish passage as described in Volume II, Part IX, of the *California Salmonid Stream Habitat Restoration Manual*. The engineered plans for the bridge (culvert) installation shall be visually reviewed and authorized by NOAA Fisheries or California Department of Fish and Wildlife engineers prior to commencement of work.

All habitat improvements will follow techniques described in the *California Salmonid Stream Habitat Restoration Manual*, Volume I, and Volume II Part XI and Part XII. The Grantee/landowner will maintain the new crossing, inspect the crossing in a timely manner and remove debris as necessary during the storm season.

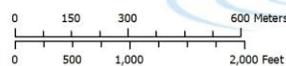
BUCK GULCH FISH PASSAGE IMPLEMENTATION



Project Location Topographic Map

● Site location

Grantee Name: Eel River
Watershed Improvement Group
USGS Quad Name: Briceland
Stream Name: Redwood Creek



Stillwater Sciences

Map Location





Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database



Query Criteria: Quad> IS (Briceland (4012318)> OR Miranda (4012327)> OR Garberville (4012317)> OR Piercy (3912387)> OR Bear Harbor (3912388)> OR Shelter Cove (4012411)> OR Honeydew (4012421)> OR Ettersburg (4012328))

Possible species within the Briceland and surrounding quads for 3066 Bulk Gulch Barrier Removal, Humboldt County

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Accipiter cooperii</i> Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
<i>Antrozous pallidus</i> pallid bat	AMACC10010	None	None	G5	S3	SSC
<i>Aquila chrysaetos</i> golden eagle	ABNKC22010	None	None	G5	S3	FP
<i>Arboremus pomo</i> Sonoma tree vole	AMAFF23030	None	None	G3	S3	SSC
<i>Ascaphus truei</i> Pacific tailed frog	AAABA01010	None	None	G4	S3S4	SSC
<i>Astragalus agnicidus</i> Humboldt County milk-vetch	PDFAB0F080	None	Endangered	G2	S2	1B.1
<i>Bombus caliginosus</i> obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
<i>Bombus occidentalis</i> western bumble bee	IIHYM24250	None	None	G2G3	S1	
<i>Calamagrostis foliosa</i> leafy reed grass	PMPOA170C0	None	Rare	G3	S3	4.2
<i>Castilleja litoralis</i> Oregon coast paintbrush	PDSCR0D012	None	None	G3	S3	2B.2
<i>Castilleja mendocinensis</i> Mendocino Coast paintbrush	PDSCR0D3N0	None	None	G2	S2	1B.2
<i>Clarkia amoena ssp. whitneyi</i> Whitney's farewell-to-spring	PDONA05025	None	None	G5T1	S1	1B.1
<i>Coptis laciniata</i> Oregon goldthread	PDRAN0A020	None	None	G4?	S3?	4.2
<i>Corynorhinus townsendii</i> Townsend's big-eared bat	AMACC08010	None	None	G3G4	S2	SSC
<i>Empidonax traillii brewsteri</i> little willow flycatcher	ABPAE33041	None	Endangered	G5T3T4	S1S2	
<i>Emys marmorata</i> western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
<i>Erethizon dorsatum</i> North American porcupine	AMAFJ01010	None	None	G5	S3	
<i>Erythronium oregonum</i> giant fawn lily	PMLIL0U0C0	None	None	G4G5	S2	2B.2
<i>Erythronium revolutum</i> coast fawn lily	PMLIL0U0F0	None	None	G4G5	S3	2B.2



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Falco peregrinus anatum</i> American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
<i>Gilia capitata ssp. pacifica</i> Pacific gilia	PDPLM040B6	None	None	G5T3	S2	1B.2
<i>Helminthoglypta arrosa monticola</i> mountain shoulderband	IMGASC2035	None	None	G2G3T1	S1	
<i>Kopsiopsis hookeri</i> small groundcone	PDORO01010	None	None	G4?	S1S2	2B.3
<i>Lasthenia californica ssp. macrantha</i> perennial goldfields	PDAST5L0C5	None	None	G3T2	S2	1B.2
<i>Lathyrus palustris</i> marsh pea	PDFAB250P0	None	None	G5	S2	2B.2
<i>Mitellastra caulescens</i> leafy-stemmed mitrewort	PDSAX0N020	None	None	G5	S4	4.2
<i>Montia howellii</i> Howell's montia	PDPOR05070	None	None	G3G4	S2	2B.2
<i>Myotis evotis</i> long-eared myotis	AMACC01070	None	None	G5	S3	
<i>Myotis thysanodes</i> fringed myotis	AMACC01090	None	None	G4	S3	
<i>Myotis yumanensis</i> Yuma myotis	AMACC01020	None	None	G5	S4	
<i>Noyo intersessa</i> Ten Mile shoulderband	IMGASC5070	None	None	G2	S2	
<i>Oncorhynchus kisutch pop. 2</i> coho salmon - southern Oregon / northern California ESU	AFCHA02032	Threatened	Threatened	G4T2Q	S2?	
<i>Oncorhynchus mykiss irideus pop. 36</i> summer-run steelhead trout	AFCHA0213B	None	None	G5T4Q	S2	SSC
<i>Pandion haliaetus</i> osprey	ABNKC01010	None	None	G5	S4	WL
<i>Pekania pennanti</i> fisher - West Coast DPS	AMAJF01021	None	Threatened	G5T2T3Q	S2S3	SSC
<i>Piperia candida</i> white-flowered rein orchid	PMORC1X050	None	None	G3	S3	1B.2
<i>Rana boylei</i> foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	G3	S3	SSC
<i>Rhyacotriton variegatus</i> southern torrent salamander	AAAAJ01020	None	None	G3G4	S2S3	SSC
<i>Sidalcea malachroides</i> maple-leaved checkerbloom	PDMAL110E0	None	None	G3	S3	4.2
<i>Taricha rivularis</i> red-bellied newt	AAAAF02020	None	None	G4	S2	SSC



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Upland Douglas Fir Forest</i> Upland Douglas Fir Forest	CTT82420CA	None	None	G4	S3.1	
<i>Usnea longissima</i> Methuselah's beard lichen	NLLEC5P420	None	None	G4	S4	4.2

Record Count: 42

Jameson Creek Fish Passage Improvement and Restoration Project

2019

Introduction:

The City of Fortuna Public Works (City) will implement the Jameson Creek Fish Passage Improvement Restoration Project. The purpose of the project is to restore access to 1.7 miles of historical coho salmon habitat. The project is necessary because the existing Rohnerville Road culvert has been determined to be a complete barrier to all life stages of salmonids at all flows. Salmonid recovery plans recommend restoring habitat connectivity between coho salmon (*Oncorhynchus kisutch*) populations in coastal and low-gradient inland streams in the lower Eel River Watershed.

The Grantee shall not proceed with on the ground implementation until all necessary permits, consultations, and/or Notice to Proceed are secured. All habitat improvement will follow techniques in the *California Salmonid Stream Habitat Restoration Manual* (Part VII, X, XI and XII <https://www.wildlife.ca.gov/Grants/FRGP/Guidance>).

Objective(s):

The specific objective of this project is to upgrade an undersized culvert to a precast reinforced concrete box (RCB) culvert, approximately 12' High x 14' Wide, with the roughened channel constructed within the culvert to provide a natural stream bottom. Construction will follow 100% agency-approved designs in order to allow access for all salmonid lifestages to approximately 1.7 miles of good quality spawning and rearing habitat in Jameson Creek.

Project Description:

Location:

The project is located on Jameson Creek at Rohnerville Road, in Humboldt County, California. The project starts approximately 0.7 miles upstream of the confluence with Strongs Creek and extends approximately 500 feet upstream. The center point of the project is 40.5785° north latitude, -124.1298° west longitude; Township 02 North, Range 01 West, and Section 1 of the Fortuna 7.5 Minute U.S. Geological Survey (USGS) Quadrangle maps as depicted in the Project Location Map.

Project Set Up:

The City will provide all project oversight and administration. Subcontractor, GHD Inc., will serve as the engineer of record, project manager, perform coordination with the City and subcontractors, and civil engineering expertise and lead the bid

period services, construction management, on-site observation, biological clearance surveys, and project closeout tasks.

Jeremy Svehla will serve as engineer of record and project manager, and will provide civil engineering and fish passage expertise. Brett Vivyan will serve as the construction manager, on-site inspector and perform coordination with the City and subcontractors. Brian Crowell will be the structural engineer and provide structural engineering expertise and on-site inspection for the culvert retrofit. Steve Allen will provide Quality Assurance and Quality Control oversight as needed. Genevieve Rozhon will serve as the qualified biologist to conduct biological clearance surveys. GHD will request the services of qualified CDFW staff to provide aquatic species relocation. If unavailable, GHD will contract with a qualified biologist licensed and permitted for electrofishing, handling, and relocation of relevant aquatic species. Michael Love & Associates, Inc. (MLA) will serve as the fish passage engineers for the project. Michael Love and his team will assist with preparing bid documents and selection of a contractor, oversight of rock chute and rock banklines construction and post implementation monitoring. City personnel will be comprised of Merritt Perry (Director of Public Works/City Engineer/City Manager), Kevin Carter (Deputy Director of Public Works) and a City Account Clerk. The personnel team will provide management and administrative services, including attendance at applicable meetings. Services provided by the City staff will be included in the applicant cost share (hard match). The Contractor awarded the project will have a Class A General Engineering Contractor's License in the state of California and will be responsible for supplying and implementing the project materials.

Materials:

Project materials are to be supplied by the awarded contractor and include: Gravel and fabric for temporary construction entrance/access; temporary shoring and shoring plan for structural stability of culvert during construction of culvert and head/end walls; signs, lights, channelizing devices and notification materials for traffic control; gravel, bags, piping and pump for dewatering, diversion and control of water to conduct in-stream work. Pumps, temporary piping, and bracing to protect and provide utility service during construction; clearing and grubbing equipment and hand tools for vegetation removal; concrete saw cut, demolition and disposal of existing culvert, head/end walls, and existing roadway and appurtenances; excavation (streambed material/rock) for roughened channel; excavation (roadway embankment) for rebuilding roadway embankment; native backfill for road embankment; aggregate base backfill for structural support of culvert and head/end walls; 12' x 14' box culvert to convey roughened channel beneath roadway; structural concrete and reinforcement for culvert notch construction; reinforced concrete sills for bed and water retention; light class rock slope protection (RSP) for culvert outlet scour protection; 1/4 ton

and light class rock slope protection for roughened channel bankline; engineered streambed material for roughened channel; native backfill to fill voids of light class RSP; 30 HDPE stormdrain pipe to replace and reroute existing drainage; 8' CMP downdrain pipe and anchors to drain business parking lot; 6' PVC sanitary sewer pipe to replace existing AC pipe; 10' PVC water pipe to replace existing pipe; hot mix asphalt and concrete for reestablishing the roadway, curbs, gutters, and sidewalks along Rohnerville Road; fencing to replace those that will require removal to construct the project; thermoplastic striping and pavement markings on Rohnerville Road; midwest guardrail and AC dike along Rohnerville Road for safety and improved drainage; biodegradable erosion control mat for erosion control; Container plants for revegetation; willow staking for bank revegetation; straw mulch for seed and erosion control; seed (California brome (*Bromus carinatus*), Rye, Wheatgrass, Fescue and Barley mix) for revegetation; fiber rolls for erosion control; drain inlet protections for sediment control.

Tasks:

Task 1. Stream Dewatering, Aquatic Species Relocation and Biological Clearance Surveys:

Following the Jameson Creek Fish Passage Improvement Project Design, April 2019, temporary cofferdams and fish screens will be installed upstream of the existing inlet and downstream of the proposed roughened channel with a gravity diversion pipe (or optional sump pump) that will convey flow through the construction area, discharging downstream of the project area. All aquatic species will be relocated outside of the project reach. Once all aquatic species have been relocated, the project reach will be dewatered following the approved clear water diversion plan. All methods will follow according to the *California Salmonid Stream Habitat Restoration Manual*, Parts IV, IX and XII. Biological clearance surveys will be conducted for presence/absence of nesting birds prior to construction disturbance. As-needed avian surveys and biological monitoring will be conducted during construction activities.

Task 2. Construction Stakeout: Project stakeout will include establishment of elevation control and placement of stakes to denote the location and stationing of the project components as defined in the approved plan designs. Layout of temporary road and crossing alignment and disturbance limits will be defined for the contractor using flagging and paint.

Task 3. Temporary Access Route: Following CDFW approved design plans, General Construction Contractor will construct a temporary access route in order to access the project location. Additional site access and staging areas will be identified by the City and additional areas secured with private land owners if needed.

Task 4. Fish Passage Improvement Construction: General Construction Contractor will implement the Jameson Creek Fish Passage Improvement and Restoration Project consistent with the 100% design plans dated April 2019.

Task 4.1. Removal of Existing Culvert: The existing roadway will be excavated to remove the existing culvert, and the new culvert would be set approximately 3' below the proposed channel thalweg to accommodate backfilling with streambed material. Existing City maintained utilities within the roadway include a 6" diameter gravity sewer main, a 10" diameter water main and two storm drain outfalls on the upstream and downstream end of the culvert crossing. The construction contractor will temporarily bypass the sewer line between the manholes and the water line would be temporarily braced or realigned during construction. Joint overhead poles exist on the downstream side of the crossing and a 3" diameter gas line exists in the roadway. Upon final design and prior to construction, the City would need to request PG&E relocate their facilities as part of the franchise agreement either temporarily or permanently to accommodate construction of the new crossing. Once the culvert and roughened channel are constructed, the roadway fill prism will be brought back up to grade, and all existing utilities within the fill prism will be replaced in-kind.

Task 4.2. Precast Box Culvert: A 125 foot long x 12 foot high x 14 foot wide reinforced concrete box (RCB) culvert will be installed along with a roughened channel. The roughened channel will be built within the culvert to provide a natural stream bottom at approximately 3.4% slope. The precast box culvert would be placed in sections, and would require foundation preparation prior to installation. The culvert is designed to convey the minimum 100-year flow and meet CDFW/NOAA fish passage guidelines. The box culvert will include cast-in-place concrete head- and end-walls. These walls will serve to accommodate the embankment and channel grading, improve culvert inlet and outlet hydraulic conditions, and provide for a hydraulic cut-off that will help prevent piping beneath the culvert. The cut-off wall will extend 3 feet below the invert of the culvert, which is sufficient to engage firm, native materials.

Task 4.3. Roughened Channel Construction: Fish passage from the downstream channel will be provided using a combination of rock chutes and pools starting approximately 100 feet downstream of the crossing, continuing through the culvert and ending 450 feet upstream. Once the RCB is placed, the roughened channel would be constructed by placing rock from both ends of the culvert or alternatively from the top, should the contractor choose removable tops allowing rock placement from above.

The rock chutes will be constructed at a 5.5% slope, range from 14.5 to 36.4 feet long, and have drops across the chutes ranging from 0.5 to 2 feet. The pools between the chutes will create a flat-water surface profile and have a residual depth of two feet.

Within the new culvert, rock chute dimensions will be constant, and will be 18.2 feet long, with a drop of one foot across the chute. Pools between the chutes within the culvert will be 11.1 feet long. Upstream and downstream of the crossing, longer pools will be constructed at the two meander bends in the planform. These pools are each 22.2 feet long and have upstream chutes that are 36.4 feet long at a 5.5% slope.

The active channel width of the chutes will be eight feet. The active channel will be V-shaped with 7H:1V side slopes to concentrate lower flows and provide sufficient water depth for low-flow fish passage. It will be constructed of engineered streambed material. The bankfull channel will be 12.3 feet wide and two feet deep. Pools will maintain a bankfull width of 12.3 feet, range from 0 to 2 feet deep, with varying active channel width dependent on the pool depth. Rock bank lines will be constructed at a 1.5H:1V slope to define the bankfull channel banks.

Outside the culvert the rock bank lines will extend to below the pool bottom. Inside the culvert, rock bank lines will be used to define the boundaries of the rock chutes. To maximize the pool volume between the chutes, no rock bank lines will be constructed in the pools within the culvert. Because of space limitations in the stream valley, graded slopes above bankfull elevation will be 1.5H:1V. To maintain bank stability, rock slope protection (RSP) will be placed on both sides of the channel between the bankfull elevation and the 100-year water surface elevation.

The roughened channel will consist of a mix of rock materials. The active channel bed will be constructed of engineered streambed material (ESM). Rock bank lines will be used to define the channel banks to the bankfull elevation. RSP will be placed between the bankfull elevation and the 100-year water surface elevation. The ESM for the project will be composed of a wide gradation of rock sizes. The larger rocks in the mix will be used as structural rocks to enhance the bed stability while producing the hydraulic roughness and flow diversity found in similar sloped natural channels. The smaller material in the ESM mix will fill the voids to control porosity. To create more stability in the ESM, the larger rocks in the ESM mix will be placed as structure rocks in rock bands across the chutes. Three different size structure rocks will be used to define the rocks bands. To ensure the voids are filled between rocks and flow is remaining on the surface, Filler Material composed of the ESM gradation equal to or smaller than 3-inches is also specified.

Task 4.4. Rock Bankline Gradation: Rock banklines will be constructed to form the channel banks along the length of the roughened channel upstream and downstream of the culvert. Inside the culvert, rock banklines will be constructed along the rock chutes, but not in the pools, providing additional pool volume for energy dissipation.

Task 4.5. Rock Slope Protection: The voids between the placed rocks will be filled with salvaged soil, free of clays, to support the growth of riparian vegetation.

Task 4.6. Bed Retention Sills: Cast-in-place concrete bed retention sills will be installed within the box culvert to add additional stability to the ESM chutes. The intent of the sills is to support the footer rocks for each rock bank and to control bed porosity in the ESM. A concrete sill will be placed near the head of each chute within the culvert, just downstream of the upper rock band. These sills will be 3 feet tall at their lowest point, and slope upwards at a 7H:1V slope to form a V-shape such that the crest of the sill will be 1.3 feet below the channel bottom across its entire width.

The second set of sills will be located in the pools, immediately downstream of the rock band at the end of each rock chute. These sills will be 2 feet tall at their lowest point, and slope upwards at a 7H:1V slope to form a V-shape. The tops of these sills will be exposed at the finished grade of the pool bottoms.

Task 5. Revegetation and Erosion Control: Seed and straw mulch shall be applied to all areas disturbed by the project. Seeds shall be obtained from regionally appropriate sources. Straw will be applied at a rate of 2,500 pounds per acre. Approved biodegradable mat will be installed per approved Design following seeding. Approximately 337 native trees and shrubs will be planted per Designs.

Deliverables:

The Jameson Creek crossing at Rohnerville Road will be retrofitted to allow year-round passage to all life stages of coho salmon to over 0.5 miles of upstream cold-water habitat.

Timelines:

June 1, 2021 through June 30, 2021, stream dewatering, aquatic species relocation and biological clearance surveys will take place.

Jameson Creek Fish Passage Improvement and Restoration Project

2019

June 30, 2021 through October 31, 2021, construction stakeout, temporary access route construction, and all fish passage improvement construction. Seed and straw mulch will be applied to all areas outside of the channel disturbed by construction.

December 1, 2021 through February 28, 2022, native riparian plants will be planted and staked.

Additional Requirements:

Grantee will not proceed with on the ground implementation until all necessary permits and consultations are secured. Work in flowing streams is restricted per the Army Corp of Engineers Regional General Permit. Actual project start and end dates, within this timeframe, are at the discretion of CDFW.

No equipment maintenance will be performed within or near the stream channel where pollutants (such as petroleum products) from the equipment may enter the channel via rainfall or runoff. Appropriate spill containment devices (e.g., oil absorbent pads, tarpaulins) will be used when refueling equipment. Any and all equipment will be removed from the streambed and flood plain areas at the end of each workday.

All equipment and gear will be brushed with a stiff brush prior to leaving each stretch of stream to avoid the transport of aquatic invasive species (AIS). When transporting traps out of the area, each numbered trap will be bagged in its own bag to avoid cross contamination during transport in and out of the work area. All crew members will decontaminate equipment and shoes for AIS according to the standards detailed in the CDFW Aquatic Invasive Species Decontamination Protocol.

During project activities, all trash that may attract predators will be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris will be removed from work areas.

The Grantee shall notify the CDFW Project Manager a minimum of five working days before the project site is de-watered and the stream flow diverted. The notification will provide a reasonable time for CDFW personnel to oversee the implementation of the water diversion plan and the safe removal and relocation of salmonids and other fish life from the project area. If the project requires dewatering of the site, and the relocation of salmonids, the Grantee will implement the following measures to minimize harm and mortality to listed salmonids:

- Fish dewatering and relocation activities shall only occur between June 15 and October 31 of each year.
- Additional measures to minimize injury and mortality of salmonids during fish relocation and dewatering activities shall be implemented as described in Part IX, pages 52 and 53 of the *California Salmonid Stream Habitat Restoration Manual*.
- The Grantee shall minimize the amount of wetted stream channel dewatered at each individual project site to the fullest extent possible as approved by the CDFW Grant Manager and pursuant to conditions in the USACE Regional General Permit and NMFS Biological Opinion.
- All electrofishing shall be performed by a qualified fisheries biologist and conducted according to the National Marine Fisheries Service, Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act, June 2000.
- USFWS Approved fisheries biologists will provide fish relocation data via the Grantee to the CDFW Project Manager on a form provided by CDFW.
- The Grantee will provide fish relocation data to CDWF on a form provided by CDWF.

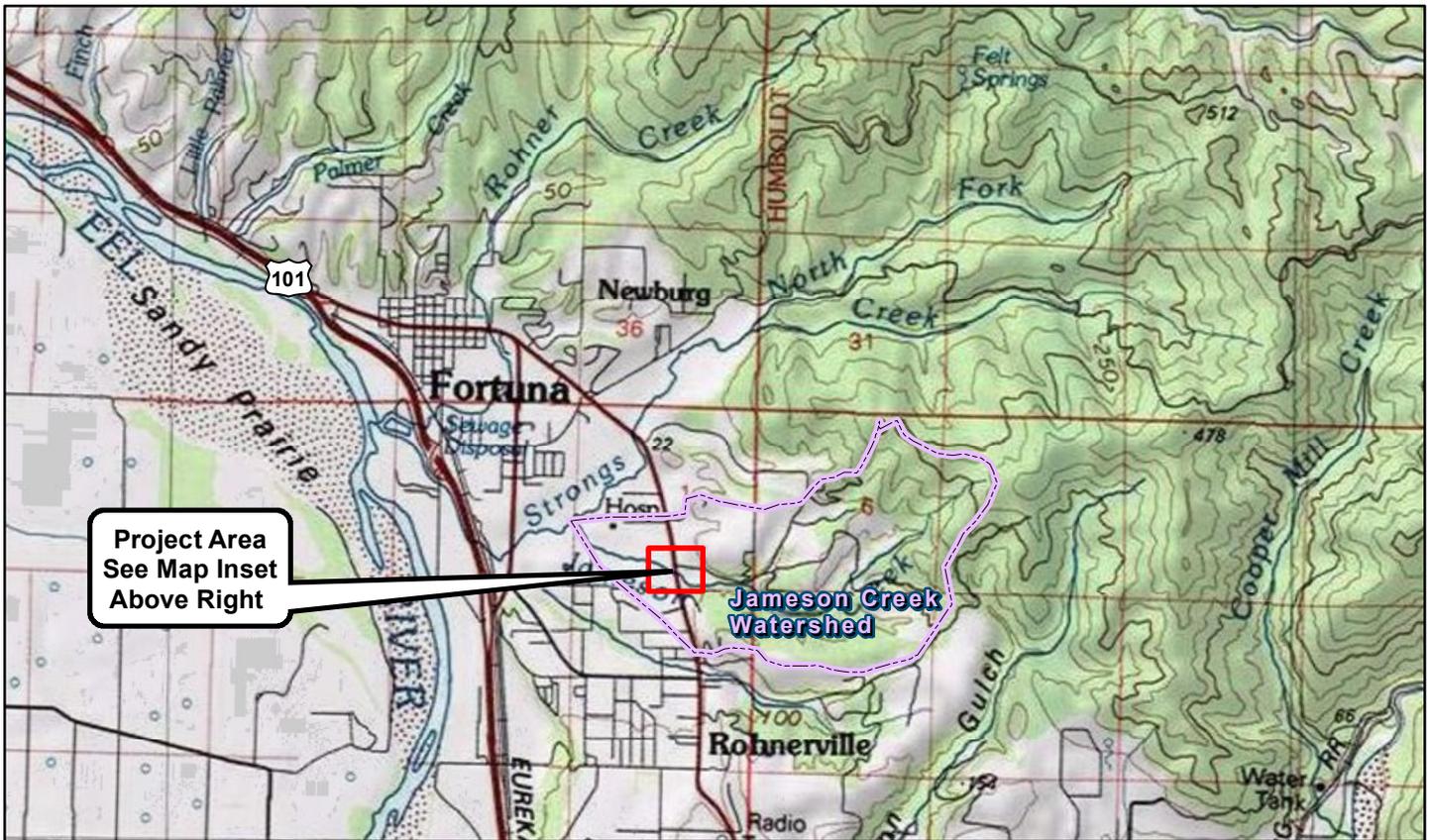
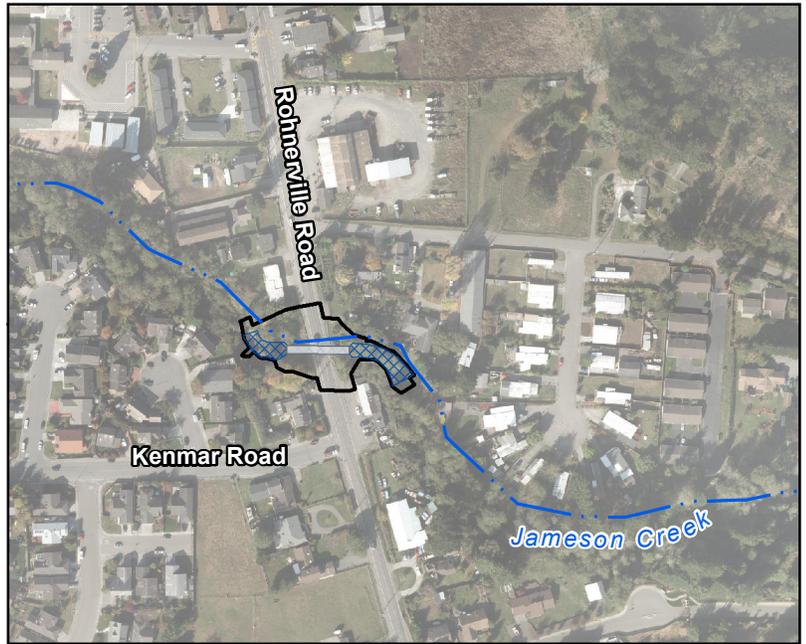
The culvert design and modification will meet flow carrying capacity required for a 100-year flood event as identified by specifications determined by National Oceanic and Atmospheric Administration (NOAA) Fisheries and the CDFW, for adult and juvenile salmonid fish passage. The project will follow the National Marine Fisheries Service (NMFS 2001) Guidelines for Salmonid Passage at Stream Crossings and criteria for fish passage as described in Volume II, Part IX, of the *California Salmonid Stream Habitat Restoration Manual*. The engineered plans for the bridge (culvert) installation shall be visually reviewed and authorized by NOAA Fisheries or CDFW engineers prior to commencement of work.

All habitat improvements will follow techniques described in the *California Salmonid Stream Habitat Restoration Manual*, Volume I, and Volume II Part XI and Part XII. The Grantee/landowner will maintain the new crossing, inspect the crossing in a timely manner and remove debris as necessary during the storm season.

Final structure design and placement will be determined by field consultation between the Grantee and the CDFW Project Managers.

Planting of tree seedlings will take place after December 1 or when sufficient rainfall has occurred to insure the best chance of survival of the seedlings.

All habitat improvements will follow techniques described in the *California Salmonid Stream Habitat Restoration Manual*.

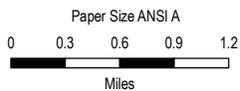


Project Location Quadrangle
(7.5 minute): Fortuna

Adjacent Quadrangles (7.5 minute):
Fields Landing (North), Hydesville (East),
Taylor Park (South), Ferndale (West)

Legend

- · — Existing Creek Centerline
- Project Boundary
- Culvert
- Jameson Creek Watershed
- Roughened Channel



Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California 1 FIPS 0401 Feet



City of Fortuna
Jameson Creek Fish Passage Improvement Project

Project No. 11151142
Revision No. -
Date 12/13/2018

Project Location
2019 FRGP Application

FIGURE 1



Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database



Query Criteria: Quad (Fortuna (4012452) OR McWhinney Creek (4012461) OR Hydesville (4012451) OR Scotia (4012441) OR Taylor Peak (4012442) OR Capetown (4012443) OR Ferndale (4012453) OR Cannibal Island (4012463) OR Fields Landing (4012462))

Possible species within the Fortuna and surrounding quads for 3075 Jameson Creek Fish Passage Improvement and Restoration Project, Humboldt County

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Abronia umbellata</i> var. <i>breviflora</i> pink sand-verbena	PDNYC010N4	None	None	G4G5T2	S2	1B.1
<i>Accipiter cooperii</i> Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
<i>Accipiter striatus</i> sharp-shinned hawk	ABNKC12020	None	None	G5	S4	WL
<i>Acipenser medirostris</i> green sturgeon	AFCAA01030	Threatened	None	G3	S1S2	SSC
<i>Agelaius tricolor</i> tricolored blackbird	ABPBXB0020	None	Threatened	G2G3	S1S2	SSC
<i>Ammodramus savannarum</i> grasshopper sparrow	ABPBXA0020	None	None	G5	S3	SSC
<i>Anodonta californiensis</i> California floater	IMBIV04020	None	None	G3Q	S2?	
<i>Anomobryum julaceum</i> slender silver moss	NBMUS80010	None	None	G5?	S2	4.2
<i>Antrozous pallidus</i> pallid bat	AMACC10010	None	None	G5	S3	SSC
<i>Aplodontia rufa humboldtiana</i> Humboldt mountain beaver	AMAF01017	None	None	G5TNR	SNR	
<i>Aquila chrysaetos</i> golden eagle	ABNKC22010	None	None	G5	S3	FP
<i>Arboremus pomo</i> Sonoma tree vole	AMAFF23030	None	None	G3	S3	SSC
<i>Ardea alba</i> great egret	ABNGA04040	None	None	G5	S4	
<i>Ardea herodias</i> great blue heron	ABNGA04010	None	None	G5	S4	
<i>Ascaphus truei</i> Pacific tailed frog	AAABA01010	None	None	G4	S3S4	SSC
<i>Astragalus pycnostachyus</i> var. <i>pycnostachyus</i> coastal marsh milk-vetch	PDFAB0F7B2	None	None	G2T2	S2	1B.2
<i>Bombus caliginosus</i> obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
<i>Bombus occidentalis</i> western bumble bee	IIHYM24250	None	None	G2G3	S1	
<i>Brachyramphus marmoratus</i> marbled murrelet	ABNNN06010	Threatened	Endangered	G3G4	S1	



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Cardamine angulata</i> seaside bittercress	PDBRA0K010	None	None	G4G5	S3	2B.1
<i>Carex leptalea</i> bristle-stalked sedge	PMCYP037E0	None	None	G5	S1	2B.2
<i>Carex lyngbyei</i> Lyngbye's sedge	PMCYP037Y0	None	None	G5	S3	2B.2
<i>Castilleja ambigua var. humboldtiensis</i> Humboldt Bay owl's-clover	PDSCR0D402	None	None	G4T2	S2	1B.2
<i>Castilleja litoralis</i> Oregon coast paintbrush	PDSCR0D012	None	None	G3	S3	2B.2
<i>Charadrius alexandrinus nivosus</i> western snowy plover	ABNNB03031	Threatened	None	G3T3	S2S3	SSC
<i>Charadrius montanus</i> mountain plover	ABNNB03100	None	None	G3	S2S3	SSC
<i>Chloropyron maritimum ssp. palustre</i> Point Reyes salty bird's-beak	PDSCR0J0C3	None	None	G4?T2	S2	1B.2
<i>Clarkia amoena ssp. whitneyi</i> Whitney's farewell-to-spring	PDONA05025	None	None	G5T1	S1	1B.1
Coastal Terrace Prairie Coastal Terrace Prairie	CTT41100CA	None	None	G2	S2.1	
<i>Coccyzus americanus occidentalis</i> western yellow-billed cuckoo	ABNRB02022	Threatened	Endangered	G5T2T3	S1	
<i>Corynorhinus townsendii</i> Townsend's big-eared bat	AMACC08010	None	None	G3G4	S2	SSC
<i>Coturnicops noveboracensis</i> yellow rail	ABNME01010	None	None	G4	S1S2	SSC
<i>Downingia willamettensis</i> Cascade downingia	PDCAM060E0	None	None	G4	S2	2B.2
<i>Egretta thula</i> snowy egret	ABNGA06030	None	None	G5	S4	
<i>Emys marmorata</i> western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
<i>Entosphenus tridentatus</i> Pacific lamprey	AFBAA02100	None	None	G4	S4	SSC
<i>Erethizon dorsatum</i> North American porcupine	AMAFJ01010	None	None	G5	S3	
<i>Erysimum menziesii</i> Menzies' wallflower	PDBRA160R0	Endangered	Endangered	G1	S1	1B.1
<i>Erythronium oregonum</i> giant fawn lily	PMLIL0U0C0	None	None	G4G5	S2	2B.2
<i>Erythronium revolutum</i> coast fawn lily	PMLIL0U0F0	None	None	G4G5	S3	2B.2



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Eucyclogobius newberryi</i> tidewater goby	AFCQN04010	Endangered	None	G3	S3	SSC
<i>Fissidens pauperculus</i> minute pocket moss	NBMUS2W0U0	None	None	G3?	S2	1B.2
<i>Gilia capitata ssp. pacifica</i> Pacific gilia	PDPLM040B6	None	None	G5T3	S2	1B.2
<i>Gilia millefoliata</i> dark-eyed gilia	PDPLM04130	None	None	G2	S2	1B.2
<i>Haliaeetus leucocephalus</i> bald eagle	ABNKC10010	Delisted	Endangered	G5	S3	FP
<i>Hesperevax sparsiflora var. brevifolia</i> short-leaved evax	PDASTE5011	None	None	G4T3	S2	1B.2
<i>Lasiurus cinereus</i> hoary bat	AMACC05030	None	None	G5	S4	
<i>Layia carnosa</i> beach layia	PDAST5N010	Endangered	Endangered	G2	S2	1B.1
<i>Lilium occidentale</i> western lily	PMLIL1A0G0	Endangered	Endangered	G1	S1	1B.1
<i>Lycopodium clavatum</i> running-pine	PPLYC01080	None	None	G5	S3	4.1
<i>Margaritifera falcata</i> western pearlshell	IMBIV27020	None	None	G4G5	S1S2	
<i>Martes caurina humboldtensis</i> Humboldt marten	AMAJF01012	None	Endangered	G5T1	S1	SSC
<i>Montia howellii</i> Howell's montia	PDPOR05070	None	None	G3G4	S2	2B.2
<i>Myotis yumanensis</i> Yuma myotis	AMACC01020	None	None	G5	S4	
<i>Northern Coastal Salt Marsh</i> Northern Coastal Salt Marsh	CTT52110CA	None	None	G3	S3.2	
<i>Nycticorax nycticorax</i> black-crowned night heron	ABNGA11010	None	None	G5	S4	
<i>Oenothera wolfii</i> Wolf's evening-primrose	PDONA0C1K0	None	None	G2	S1	1B.1
<i>Oncorhynchus clarkii clarkii</i> coast cutthroat trout	AFCHA0208A	None	None	G4T4	S3	SSC
<i>Oncorhynchus kisutch pop. 2</i> coho salmon - southern Oregon / northern California ESU	AFCHA02032	Threatened	Threatened	G4T2Q	S2?	
<i>Oncorhynchus mykiss irideus pop. 16</i> steelhead - northern California DPS	AFCHA0209Q	Threatened	None	G5T2T3Q	S2S3	
<i>Packera bolanderi var. bolanderi</i> seacoast ragwort	PDAST8H0H1	None	None	G4T4	S2S3	2B.2



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Pandion haliaetus</i> osprey	ABNKC01010	None	None	G5	S4	WL
<i>Pekania pennanti</i> fisher - West Coast DPS	AMAJF01021	None	Threatened	G5T2T3Q	S2S3	SSC
<i>Piperia candida</i> white-flowered rein orchid	PMORC1X050	None	None	G3	S3	1B.2
<i>Polemonium carneum</i> Oregon polemonium	PDPLM0E050	None	None	G3G4	S2	2B.2
<i>Puccinellia pumila</i> dwarf alkali grass	PMPOA531L0	None	None	G4?	SH	2B.2
<i>Rana aurora</i> northern red-legged frog	AAABH01021	None	None	G4	S3	SSC
<i>Rana boylei</i> foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	G3	S3	SSC
<i>Rhyacotriton variegatus</i> southern torrent salamander	AAAAJ01020	None	None	G3G4	S2S3	SSC
<i>Riparia riparia</i> bank swallow	ABPAU08010	None	Threatened	G5	S2	
<i>Sidalcea malachroides</i> maple-leaved checkerbloom	PDMAL110E0	None	None	G3	S3	4.2
<i>Sidalcea malviflora ssp. patula</i> Siskiyou checkerbloom	PDMAL110F9	None	None	G5T2	S2	1B.2
<i>Sidalcea oregana ssp. eximia</i> coast checkerbloom	PDMAL110K9	None	None	G5T1	S1	1B.2
<i>Sisyrinchium hitchcockii</i> Hitchcock's blue-eyed grass	PMIRI0D0S0	None	None	G2	S1	1B.1
<i>Sitka Spruce Forest</i> Sitka Spruce Forest	CTT82110CA	None	None	G1	S1.1	
<i>Spergularia canadensis var. occidentalis</i> western sand-spurrey	PDCAR0W032	None	None	G5T4	S1	2B.1
<i>Spirinchus thaleichthys</i> longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	
<i>Thaleichthys pacificus</i> eulachon	AFCHB04010	Threatened	None	G5	S3	
<i>Usnea longissima</i> Methuselah's beard lichen	NLLEC5P420	None	None	G4	S4	4.2

Record Count: 79

Aikens Creek Instream Habitat Enhancement Project

2019

Introduction:

The Mid Klamath Watershed Council will implement the Aikens Creek Instream Habitat Enhancement Project. The project will enhance 0.6 mile of stream with 24 large wood structures. These wood structures will increase rearing and spawning habitat for coho salmon (*Oncorhynchus kisutch*). This project will benefit salmonids by addressing limiting conditions identified in Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon (2014) National Marine Fisheries Service. The SONCC Plan lists increasing large woody debris, boulders, or other instream structures as the highest priority actions for recovering the Middle Klamath River coho population.

The Grantee shall not proceed with on the ground implementation until all necessary permits, consultations, and/or Notice to Proceed are secured. All habitat improvement(s) will follow techniques in the *California Salmonid Stream Habitat Restoration Manual* <https://www.wildlife.ca.gov/Grants/FRGP/Guidance>.

Objective(s):

This project will create 24 large woody debris structures within 2,100 feet of Aikens Creek, consisting of 49 logs, all key pieces. These structures will enhance spawning and rearing habitat by increasing and sorting spawning gravel, creating velocity and temperature refugia, and increasing aggradation leading to floodplain connectivity.

Project Description:

Location:

The project is located in Aikens Creek, a tributary to the Klamath River at River Mile 48.9, between the towns of Weitchpec and Orleans, California, Humboldt County. The project reach is within the first 0.6 miles of Aikens Creek, all downstream of the Highway 96 bridge. See project location map. Project coordinates are: Latitude 41.228025 and Longitude -123.65304.

Project Set Up:

Fisheries Program Co-Director I will provide oversight with project administration, and technical management of the Project.

Fisheries Program Co-Director II will complete the following tasks: project reporting, implementation planning, secure subcontractor agreements and regulatory permitting, wood procurement.

Project Coordinator will complete the following tasks: permitting compliance, project logistics, construction management, subcontractor oversight, pre/post project monitoring, progress reporting.

Plants Coordinator will implement and oversee compliance of the Aikens Creek Invasive Species Prevention and Revegetation Plan.

Senior Field Techs I and II will provide labor for wood structure installation, pre and post construction monitoring, traffic control, erosion control, install project information signage.

Plant Field Techs I and II will implement the Aikens Creek Invasive Species Prevention and Revegetation Plan

Summer Interns will provide labor for riparian planting, vegetation maintenance, erosion control, monitoring.

Materials:

All materials will be purchased by the applicant, the Mid Klamath Watershed Council. The following is a list of materials that will be used for this project:

- 1) 49 logs with root wads, lengths of logs vary between 25 and 60 feet long, with a minimum diameter (dbh) of 18". The purpose of these logs are to be the key log pieces in 24 wood structures. The logs will slow the creek down, creating conditions for gravel deposition.
- 2) Approximately 240 cubic yards of rack material will be used in this project. Rack material is wood material ranging in length from 5 to 20 feet with an average diameter of 6 inches. The rack material will be placed under or between key logs to expedite the structures' desired physical functions.
- 3) Native plants, weed free mulch, grass seed, t-posts and planting cages and weed free straw will be used to prevent erosion and minimize the spread of invasive weeds in the project footprint.
- 4) Silt fences will be purchased to prevent erosion into the creek while installing the wood structures.
- 5) Hard hats and gloves will be used for safety.
- 6) Signs for the wood structures will be used to prevent log theft and also inform the public on the purpose of the wood structures.

- 7) Informational booth board, signs and brochures will be used to inform the public about the project. The project site is at a campground and Klamath River access so it is anticipated that there will be a lot of public traffic.
- 8) The Trimble RTK and Total Station will be used to collect post-project information including longitudinal and cross section surveys.

Tasks:

Task 1: Project Management; Grantee will provide technical and administrative services associated with the Project. Secure all permits, administer subcontracts, project tracking, invoicing and payments, submit progress, quarterly and final reports.

Task 2: Project Planning and Coordination; Grantee will secure subcontract agreements with Technical Contractor, Heavy Equipment Contractor, Log Contractor and Cultural Resource Monitor for project implementation. Grantee will complete all required regulatory documentation including securement of necessary permits and CEQA surveys for construction. Grantee will develop and submit a task detailed implementation plan.

Task 3: Site Preparation; Grantee will identify and flag equipment access trails to each of the site locations, establish pre-project photo documentation, and finalizing the site designs for approval by the CDFW Grant Manager. Prepare sites for implementation, areas for equipment storage, re-fuel, maintenance. Identify staging sites for material storage and install pre-construction erosion control measures. Procure logs and woody material for structure implementation.

Task 4: Log Wood Structures; Twenty-four log structures will be constructed in accordance with the Six Rivers National Forest Service - Six Rivers National Forest Aquatic Restoration Action Plan and CDFW's *California Salmonid Stream Habitat Restoration Manual*. Forty-Nine (49) key log pieces with woody vegetation material will be installed in a 2,100 foot section of Aikens Creek.

Task 5: Riparian Planting; Grantee will implement the Aikens Creek Invasive Species Prevention and Revegetation Plan. Native trees, shrubs, and grasses will be planted in the treatment area, invasive vegetation will be removed. Riparian plants will be irrigated and maintained throughout the term of the grant agreement.

Task 6: Post Construction Monitoring; Grantee will conduct post implementation surveys for the following: longitudinal channel profile with cross-

Aikens Creek Instream Habitat Enhancement Project

2019

sections, as-built drawings, pre- & post-construction photo documentation, total number of logs installed. Project monitoring data will be included in the project's final report.

Task 7: Reporting; Grantee will write and deliver Annual Progress Reports, and a Draft and Final Report to CDFW Grant Manager.

Deliverables:

Task 1: Project Management; Subcontractor Contracts, Access Agreements, Invoices, Invoice Progress Reports.

Task 2: Project Planning and Coordination; CEQA Surveys, LSAA Permit, Subcontractor Agreements, Implementation Schedule

Task 3: Site Preparation; Identify Access Lanes and Staging Areas, Pre-project metrics and photos, Finalize Site Design, Log Procurement

Task 4: Log Wood Structure; Install 49 Log Pieces with Root Wads and 240 cubic yards of Woody Material. Construct 24 Wood Structures

Task 5: Riparian Planting; Plant Native Vegetation, Remove Invasive Vegetation, Irrigate, Maintain Riparian Plantings

Task 6: Post Construction Monitoring; As-Built Plan, Longitudinal Channel Profile, Post Monitoring Metrics and Photos

Task 7: Reporting; Annual Reports, Quarterly Reports, Draft and Final Report

Timelines:

Task 1: Project Administration and Management – 03/01/2020 to 12/31/2023

Task 2: Project Planning and Coordination – 03/01/2020 to 08/01/2020

Task 3: Site Preparation – 03/01/2020 to 10/15/2020

Task 4: Log Wood Structures – 08/17/2020 to 11/01/2020

Task 5: Riparian Planting – 03/16/2020 to 11/15/2023

Task 6: Post Construction Monitoring – 11/01/2020 to 11/01/2023

Task 7: Reporting – 11/01/2020 to 12/31/2023

Additional Requirements:

The Grantee will not proceed with on the ground implementation until all necessary permits and consultations are secured. Work in flowing streams is restricted per the Army Corp of Engineers Regional General Permit. Actual project start and end dates, within this timeframe, are at the discretion of the California Department of Fish and Wildlife.

No equipment maintenance will be performed within or near the stream channel where pollutants (such as petroleum products) from the equipment may enter the channel via rainfall or runoff. Appropriate spill containment devices (e.g., oil absorbent pads, tarpaulins) will be used when refueling equipment. Any and all equipment will be removed from the streambed and flood plain areas at the end of each workday.

All equipment and gear will be brushed with a stiff brush prior to leaving each stretch of stream to avoid the transport of aquatic invasive species (AIS). When transporting traps out of the area, each numbered trap will be bagged in its own bag to avoid cross contamination during transport in and out of the work area. All crew members will decontaminate equipment and shoes for AIS according to the standards detailed in the California Department of Fish & Wildlife Aquatic Invasive Species Decontamination Protocol.

During project activities, all trash that may attract predators will be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris will be removed from work areas.

The Grantee shall notify the Grantor Project Manager a minimum of five working days before the project site is de-watered and the stream flow diverted. The notification will provide a reasonable time for Grantor personnel to oversee the implementation of the water diversion plan and the safe removal and relocation of salmonids and other fish life from the project area. If the project requires dewatering of the site, and the relocation of salmonids, the Grantee will implement the following measures to minimize harm and mortality to listed salmonids:

- a. Fish dewatering and relocation activities shall only occur between June 15 and October 31 of each year.
- b. Additional measures to minimize injury and mortality of salmonids during fish relocation and dewatering activities shall be implemented as described in Part IX, pages 52 and 53 of the *California Salmonid Stream Habitat Restoration Manual*.

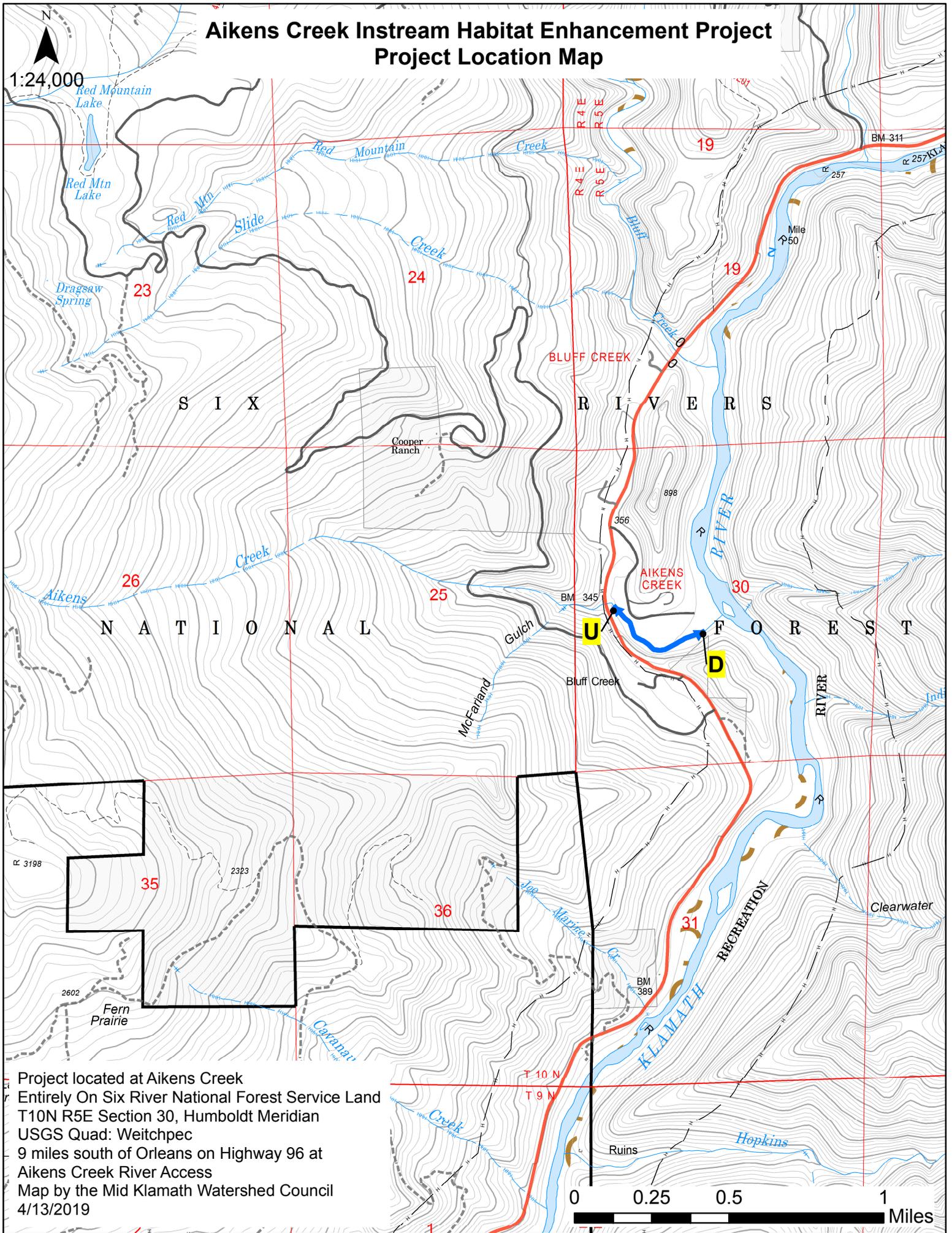
- c. The Grantee shall minimize the amount of wetted stream channel dewatered at each individual project site to the fullest extent possible as approved by the CDFW Grant Manager and pursuant to conditions in the USACE Regional General Permit and NMFS Biological Opinion.
- d. All electrofishing shall be performed by a qualified fisheries biologist and conducted according to the National Marine Fisheries Service, Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act, June 2000.
- e. USFWS Approved fisheries biologists will provide fish relocation data via the Grantee to the CDFW Grant Manager on a form provided by CDFW.

All habitat improvements will follow techniques described in the *California Salmonid Stream Habitat Restoration Manual*, Volume I, and Volume II Part XI and Part XII.

Seeding and mulching of all exposed soils shall be done for all slopes which may deliver sediment to a stream. The standard for success is 80% ground cover for broadcast planting of seed, after a period of three years. Mulching and seeding will take place as sites are completed to avoid unforeseen erosion. Planting of tree seedlings will take place after December 1 or when sufficient rainfall has occurred to insure the best chance of survival of the seedlings.

Aikens Creek Instream Habitat Enhancement Project Project Location Map

1:24,000



Project located at Aikens Creek
Entirely On Six River National Forest Service Land
T10N R5E Section 30, Humboldt Meridian
USGS Quad: Weitchpec
9 miles south of Orleans on Highway 96 at
Aikens Creek River Access
Map by the Mid Klamath Watershed Council
4/13/2019





Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database



Query Criteria: Quad IS (Weitchpec (4112326) OR Orleans (4112335) OR Hopkins Butte (4112325) OR Tish Tang Point (4112315) OR Hoopa (4112316) OR Hupa Mountain (4112317) OR French Camp Ridge (4112327) OR Johnsons (4112337))

Possible species within the Weitchpec and surrounding quads for 3079 Aikens Creek Instream Habitat Enhancement Project, Humboldt County

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Accipiter gentilis</i> northern goshawk	ABNKC12060	None	None	G5	S3	SSC
<i>Ancotrema voyanum</i> hooded lancetooth	IMGAS36130	None	None	G1G2	S1S2	
<i>Anomobryum julaceum</i> slender silver moss	NBMUS80010	None	None	G5?	S2	4.2
<i>Aplodontia rufa humboldtiana</i> Humboldt mountain beaver	AMAF01017	None	None	G5TNR	SNR	
<i>Arborimus pomo</i> Sonoma tree vole	AMAFF23030	None	None	G3	S3	SSC
<i>Ardea herodias</i> great blue heron	ABNGA04010	None	None	G5	S4	
<i>Ascaphus truei</i> Pacific tailed frog	AAABA01010	None	None	G4	S3S4	SSC
<i>Astragalus umbraticus</i> Bald Mountain milk-vetch	PDFAB0F990	None	None	G4	S2	2B.3
<i>Bombus occidentalis</i> western bumble bee	IIHYM24250	None	None	G2G3	S1	
<i>Bombus suckleyi</i> Suckley's cuckoo bumble bee	IIHYM24350	None	None	GU	S1	
<i>Bonasa umbellus</i> ruffed grouse	ABNLC11010	None	None	G5	S3S4	WL
<i>Carex praticola</i> northern meadow sedge	PMCYP03B20	None	None	G5	S2	2B.2
<i>Coptis laciniata</i> Oregon goldthread	PDRAN0A020	None	None	G4?	S3?	4.2
<i>Cornus canadensis</i> bunchberry	PDCOR01040	None	None	G5	S2	2B.2
<i>Corynorhinus townsendii</i> Townsend's big-eared bat	AMACC08010	None	None	G3G4	S2	SSC
<i>Cottus klamathensis polyporus</i> Lower Klamath marbled sculpin	AFC4E02153	None	None	G4T2T4	S2S4	SSC
<i>Cypseloides niger</i> black swift	ABNUA01010	None	None	G4	S2	SSC
<i>Epilobium oregonum</i> Oregon fireweed	PDONA060P0	None	None	G2	S2	1B.2
<i>Erythronium oregonum</i> giant fawn lily	PMLIL0U0C0	None	None	G4G5	S2	2B.2



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Erythronium revolutum</i> coast fawn lily	PMLIL0U0F0	None	None	G4G5	S3	2B.2
<i>Gilia capitata ssp. pacifica</i> Pacific gilia	PDPLM040B6	None	None	G5T3	S2	1B.2
<i>Haliaeetus leucocephalus</i> bald eagle	ABNKC10010	Delisted	Endangered	G5	S3	FP
<i>Helminthoglypta hertleini</i> Oregon shoulderband	IMGASC2280	None	None	G1	S1S2	
<i>Helminthoglypta talmadgei</i> Trinity shoulderband	IMGASC2630	None	None	G2	S2	
<i>Iliamna latibracteata</i> California globe mallow	PDMAL0K040	None	None	G2G3	S2	1B.2
<i>Juncus dudleyi</i> Dudley's rush	PMJUN01390	None	None	G5	S1	2B.3
<i>Klamath/North Coast Fall/Winter Run Chinook Salmon River</i> Klamath/North Coast Fall/Winter Run Chinook Salmon River	CARB2332CA	None	None	GNR	SNR	
<i>Klamath/North Coast Interior Headwater Fishless Stream</i> Klamath/North Coast Interior Headwater Fishless Stream	CARB2220CA	None	None	GNR	SNR	
<i>Klamath/North Coast Rainbow Trout Stream</i> Klamath/North Coast Rainbow Trout Stream	CARB2312CA	None	None	GNR	SNR	
<i>Kopsiopsis hookeri</i> small groundcone	PDORO01010	None	None	G4?	S1S2	2B.3
<i>Lewisia cotyledon var. heckneri</i> Heckner's lewisia	PDPOR04052	None	None	G4T3	S3	1B.2
<i>Margaritifera falcata</i> western pearlshell	IMBIV27020	None	None	G4G5	S1S2	
<i>Martes caurina humboldtensis</i> Humboldt marten	AMAJF01012	None	Endangered	G5T1	S1	SSC
<i>Mielichhoferia elongata</i> elongate copper moss	NBMUS4Q022	None	None	G5	S4	4.3
<i>Montia howellii</i> Howell's montia	PDPOR05070	None	None	G3G4	S2	2B.2
<i>Myotis evotis</i> long-eared myotis	AMACC01070	None	None	G5	S3	
<i>Oenothera wolfii</i> Wolf's evening-primrose	PDONA0C1K0	None	None	G2	S1	1B.1
<i>Oncorhynchus clarkii clarkii</i> coast cutthroat trout	AFCHA0208A	None	None	G4T4	S3	SSC
<i>Oncorhynchus mykiss irideus pop. 36</i> summer-run steelhead trout	AFCHA0213B	None	None	G5T4Q	S2	SSC



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Oncorhynchus tshawytscha</i> pop. 30 chinook salmon - upper Klamath and Trinity Rivers ESU	AFCHA02056	None	Candidate Endangered	G5	S1S2	SSC
<i>Pandion haliaetus</i> osprey	ABNKC01010	None	None	G5	S4	WL
<i>Pekania pennanti</i> fisher - West Coast DPS	AMAJF01021	None	Threatened	G5T2T3Q	S2S3	SSC
<i>Piperia candida</i> white-flowered rein orchid	PMORC1X050	None	None	G3	S3	1B.2
<i>Plethodon elongatus</i> Del Norte salamander	AAAAD12050	None	None	G4	S3	WL
<i>Ptilidium californicum</i> Pacific fuzzwort	NBHEP2U010	None	None	G4G5	S3S4	4.3
<i>Rana aurora</i> northern red-legged frog	AAABH01021	None	None	G4	S3	SSC
<i>Rana boylei</i> foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	G3	S3	SSC
<i>Rhyacotriton variegatus</i> southern torrent salamander	AAAAJ01020	None	None	G3G4	S2S3	SSC
<i>Rorippa columbiae</i> Columbia yellow cress	PDBRA27060	None	None	G3	S2	1B.2
<i>Sanicula tracyi</i> Tracy's sanicle	PDAP11Z0K0	None	None	G4	S4	4.2
<i>Schoenoplectus subterminalis</i> water bulrush	PMCYP0Q1G0	None	None	G4G5	S3	2B.3
<i>Sedum laxum</i> ssp. <i>flavidum</i> pale yellow stonecrop	PDCRA0A0L2	None	None	G5T3Q	S3	4.3
<i>Sidalcea oregana</i> ssp. <i>eximia</i> coast checkerbloom	PDMAL110K9	None	None	G5T1	S1	1B.2
<i>Thermopsis robusta</i> robust false lupine	PDFAB3Z0D0	None	None	G2	S2	1B.2
Upland Douglas Fir Forest Upland Douglas Fir Forest	CTT82420CA	None	None	G4	S3.1	
<i>Vespericola karokorum</i> Karak hesperian	IMGASA4040	None	None	G2	S2	

Record Count: 56

Introduction:

The Eel River Watershed Improvement Group (ERWIG) will add 24 instream structures along 0.7 miles of Little Sproul Creek. The structures will be placed at locations that ERWIG and the California Conservation Corps (CCC) found suitable for large woody debris (LWD) placement and which will be beneficial to coho salmon (*Oncorhynchus kistuch*). The structures will contain a total of 49 logs, including 45 key pieces as defined in Table 1 of the 2019 CDFW FHR PSN. Coho salmon have been documented throughout the project reach. This project will provide immediate shelter, velocity refugia, and increased pool quality, to the benefit of coho salmon.

The Grantee shall not proceed with on the ground implementation until all necessary permits, consultations, and/or Notice to Proceed are secured. All habitat improvement(s) will follow techniques in the *California Salmonid Stream Habitat Restoration Manual* Volume I, Part VII (<https://www.wildlife.ca.gov/Grants/FRGP/Guidance>).

Objective(s):

The objective of this project is to build 24 LWD structures along 0.7 miles of Little Sproul Creek. The structures will contain 49 pieces of LWD, 45 of which will be key pieces. These structures will provide shelter, velocity refugia and will increase pool quality to benefit coho salmon, Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*Oncorhynchus mykiss*). Additionally, 200 redwood seedlings will be planted to increase canopy density and to improve the stream valley microclimate.

Project Description:

Location:

The project is located on Little Sproul Creek, a tributary to Sproul Creek, tributary to the South Fork Eel River. It is located near the town of Garberville, CA in Township 4 South, Range 3 East, Section 28 of the Garberville 7.5 Minute U.S. Geological Survey Quadrangle. The downstream extent of the project reach is 6,500 feet from the confluence with Sproul Creek and extends upstream 0.7 miles. The middle of the project reach is at 40.08174 degrees north latitude and -123.85306 degrees west longitude.

Project Set Up:

ERWIG Staff:

-ERWIG Executive Director: Tasks 1 & 7. Contract oversight and reporting will be conducted by ERWIG Executive Director with assistance from the ERWIG Project Manager.

-ERWIG Project Manager: Tasks 1, 3, 4, 6 and 7. Will assist with contract oversight, invoicing, and reporting. Will manage all aspects of project implementation.

Subcontractors:

-Edwards Excavation & Restoration (LTO): Task 4. Will be responsible for falling trees as the source of Large Wood for the project.

-CCC Corpsmembers: Task 4. Under supervision of the Conservationist 1 will move the logs into place according to design specifications.

-Archaeology/Botany Subcontractor: Task 2. Will conduct botanical and archeological surveys and prepare CEQA reports.

-Paleontology survey crew: Task 2. Will conduct paleontological surveys and prepare CEQA report.

-Registered Professional Forester (RPF): Task 3. Will make sure trees chosen for project use are appropriate.

-Wailaki Nonprofit (Tree Planters): Task 5. Will plant the trees for the project and will check for survival after one year, will re-plant trees if necessary.

Materials:

Materials needed for this project include: Griphoist TU-32: Used to move the biggest logs into place; Griphoist TU-28: Used to move the smaller logs into place; Chainsaws: Used to buck up trees, limb trees, and for clearing dead trees that are hazards or in way of the project; Bio-bar oil: A fish-friendly chainsaw bar oil that will be used in all chainsaws involved in this project; Mainline cables: Used in griphoist to move logs; Redwood seedlings: Used to plant the riparian zone; Misc. Gripping Materials- shear pins, hammers, gripbox handle presses, etc.: used to fix gripboxes that suffer minor breakdowns.

Tasks:

Task 1: Project Management and Administration: Grant oversight including invoicing and reporting will be conducted by Grantee Executive Director and Project Manager (Staff). Upon final execution of the Grant and prior to receiving a Notice to Proceed, Grantee shall deliver the following items to the CDFW Grant Manager: 1. Request to spend project funds in order to prepare for implementation (e.g., obtain permits, secure subcontracts, purchase supplies, apply for a Streambed Alteration Agreement, etc.). Requests shall be sent by email or telephone. 2. Access agreement that will be project specific and meet grant agreement requirements. 3. Subcontractor Agreements. A written copy of the sub agreement shall be submitted to the CDFW Grant Manager. The subcontract shall include specific language which establishes the rights of the auditors of the State to examine the records of the subcontractor relative to the services and materials provided under the grant. 4. CEQA survey interim reports for archaeological and botanical surveys. Interim reports shall be delivered prior to receiving notice to proceed, as part of the Notification of Lake or Streambed

Alteration Application (LSAA) package. Final archaeological, botanical and paleontological surveys shall be delivered prior to the End Term date. 5. Send Grantor LSAA with a check for the most current permit fee. The Grantee shall notify the CDFW Grant Manager a minimum of 10 business days prior to the beginning of project implementation.

Task 2. CEQA Surveys: Survey teams will conduct archeological and botanical surveys within the project reach to fulfill CEQA requirements for FRGP. Interim survey reports will be delivered to CDFW Grant Manager prior to receiving a Notice to Proceed. Paleontological survey crew will conduct paleontological research and surveys and prepare reports.

Task 3. Site Preparation: The ERWIG Project Manager will finalize site specific designs based on channel morphology, live tree location, and LWD availability. They will submit designs for CDFW Project Manager approval. The ERWIG Project Manager will flag features for wood selection, staging, and installation, clear brush as needed, and work with RPF to identify trees for falling. Pre-project photos and metrics will be collected by ERWIG. Tools and materials will be purchased by ERWIG prior to the start of implementation and on an as needed basis throughout the project.

Task 4. LWD Structure Construction: With approval from the CDFW grant manager and under the direction of the ERWIG Project Manager, site construction on 24 LWD features will begin. Features construction will involve cutting down riparian trees, this will be accomplished by the LTO with guidance from the RPF. CCC Corpsmembers will move LWD into position using a grip hoist come along. Where feasible, the CCC will use live trees to wedge the logs into place. Corpsmembers will be supervised by a trained Conservationist 1 (C1) and the ERWIG Project Manager. Erosion control methods will be employed by the CCC as required at each structure if there is potential for erosion of soil into the stream channel. To address concerns over invasive species this project will follow the ERWIG Aquatic Invasive Species Decontamination Protocol, which is compatible with the CDFW Aquatic Invasive Species Decontamination Protocol.

Task 5. Riparian Planting: A tree planting crew will return in the winter following project implementation to plant 200 redwood seedlings, with a primary focus in areas lacking sufficient conifer cover or riparian vegetation. A random selection of 50 trees will be marked and re-visited a year from planting. If less than 80% of the marked trees survive, additional trees will be planted to bring the number of surviving trees back to 200.

Task 6. Post Project Photo & Data Collection: Following implementation ERWIG will take post-project photos and quantitative implementation metrics will be collected which satisfy the Project Annual Progress Reports and Final Report.

Task 7. Reporting: ERWIG Staff will write and deliver Annual Reports, Draft and Final Report to CDFW Grant Manager.

Deliverables:

Task 1: Project Management and Administration: 1600 Permit, Subcontractor Agreements, Access Agreements, Invoices, Invoice Progress Reports.

Task 2. CEQA Surveys: Interim and Final Survey Reports.

Task 3. Site Preparation: Finalized design plans, flagged equipment access routes, pre-project photos and metrics.

Task 4. LWD Structure Construction: Twenty-four LWD structures made up of 49 logs, including 45 key pieces.

Task 5. Riparian Planting: Planting of 200 redwood seedlings.

Task 6. Post Project Photo & Data Collection: Post-project metrics and photos.

Task 7. Reporting: Yearly Annual Report, Draft Final Report in electronic format, Final Report in electronic and hard copy formats.

Timelines:

Task 1: Project Management and Administration: 04/01/2020 to 02/28/2022.

Task 2. CEQA Surveys: 04/30/2020 to 06/30/2020.

Task 3. Site Preparation: 07/01/2020 to 07/31/2020.

Task 4. LWD Structure Construction: 08/03/2020 to 09/30/2020.

Task 5. Riparian Planting: 12/01/2020 to 01/31/2022.

Task 6. Post Project Photo & Data Collection: 10/01/2020 to 01/31/2021.

Task 7. Reporting: 01/31/2021 to 01/31/2022.

Additional Requirements: The Grantee will not proceed with on the ground implementation until all necessary permits and consultations are secured. Work in flowing streams is restricted per the Army Corp of Engineers Regional General Permit. Actual project start and end dates, within this timeframe, are at the discretion of the California Department of Fish and Wildlife.

No equipment maintenance will be performed within or near the stream channel where pollutants (such as petroleum products) from the equipment may enter the channel via rainfall or runoff. Appropriate spill containment devices (e.g., oil absorbent pads, tarpaulins) will be used when refueling equipment. Any and all

equipment will be removed from the streambed and flood plain areas at the end of each workday.

All equipment and gear will be brushed with a stiff brush prior to leaving each stretch of stream to avoid the transport of aquatic invasive species (AIS). When transporting traps out of the area, each numbered trap will be bagged in its own bag to avoid cross contamination during transport in and out of the work area. All crew members will decontaminate equipment and shoes for AIS according to the standards detailed in the California Department of Fish & Wildlife Aquatic Invasive Species Decontamination Protocol.

During project activities, all trash that may attract predators will be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris will be removed from work areas.

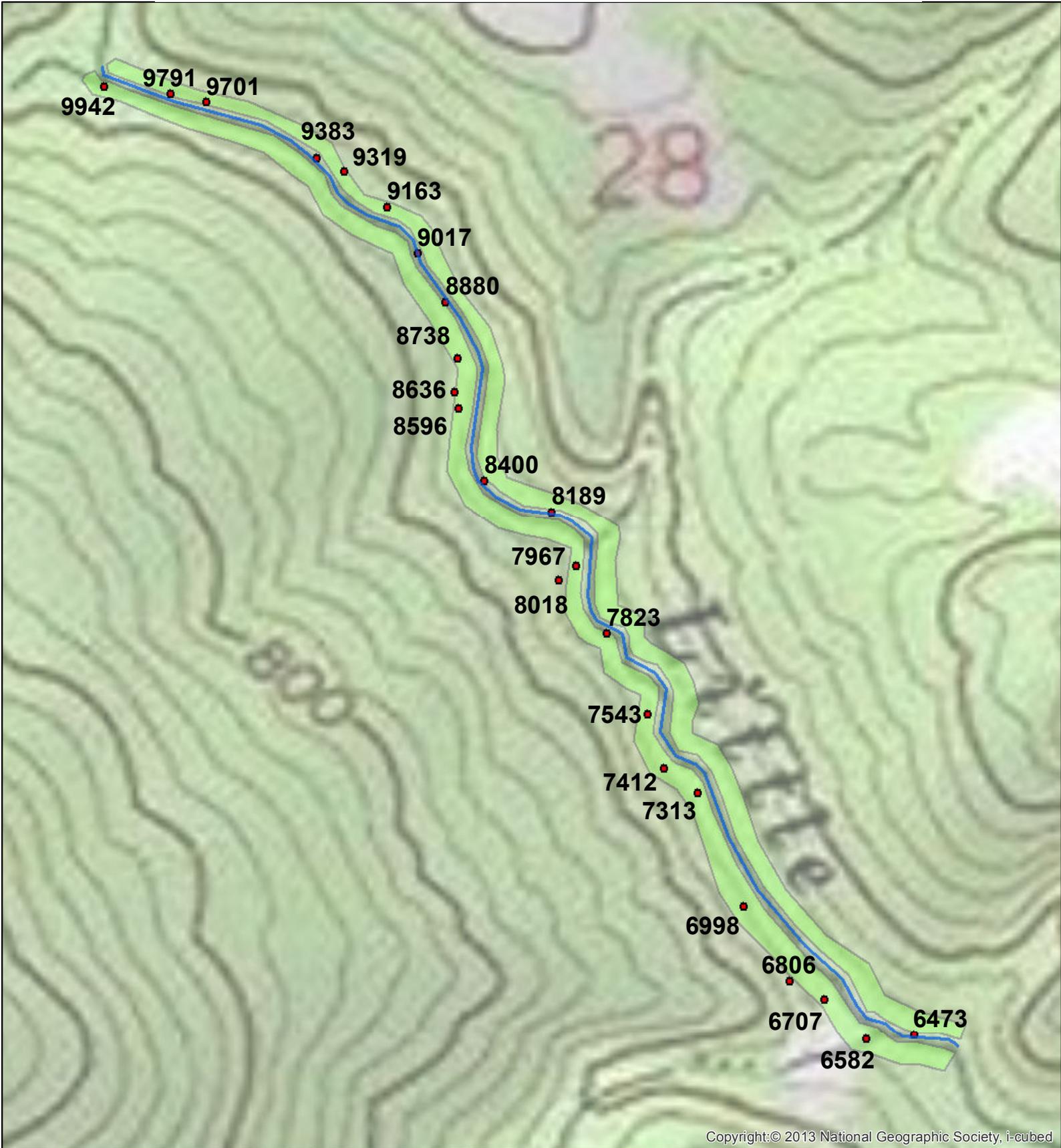
The Grantee shall notify the Grantor Project Manager a minimum of five working days before the project site is de-watered and the stream flow diverted. The notification will provide a reasonable time for Grantor personnel to oversee the implementation of the water diversion plan and the safe removal and relocation of salmonids and other fish life from the project area. If the project requires dewatering of the site, and the relocation of salmonids, the Grantee will implement the following measures to minimize harm and mortality to listed salmonids:

- a. Fish dewatering and relocation activities shall only occur between June 15 and October 31 of each year.
- b. Additional measures to minimize injury and mortality of salmonids during fish relocation and dewatering activities shall be implemented as described in Part IX, pages 52 and 53 of the *California Salmonid Stream Habitat Restoration Manual*.
- c. The Grantee shall minimize the amount of wetted stream channel dewatered at each individual project site to the fullest extent possible as approved by the CDFW Grant Manager and pursuant to conditions in the USACE Regional General Permit and NMFS Biological Opinion.
- d. All electrofishing shall be performed by a qualified fisheries biologist and conducted according to the National Marine Fisheries Service, Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act, June 2000.
- e. USFWS Approved fisheries biologists will provide fish relocation data via the Grantee to the CDFW Grant Manager on a form provided by CDFW.

Final structure design and placement will be determined by field consultation between the Grantee and the Grantor Project Managers. All habitat improvements will follow techniques described in the *California Salmonid Stream Habitat Restoration Manual*.

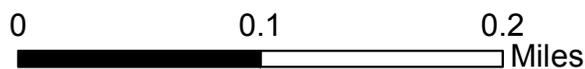
All habitat improvements will follow techniques described in the *California Salmonid Stream Habitat Restoration Manual*. Planting of tree seedlings will take place after December 1 or when sufficient rainfall has occurred to ensure the best chance of survival of the seedlings.

Little Sproul Habitat Enhancement Feature Map
Little Sproul Creek, Garberville Quad, Humboldt County
Eel River Watershed Improvement Group



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- Little Sproul Project Reach
- Little Sproul Features
- Riparian Planting Area



Eel River Watershed Improvement Group
April 2019





Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database



Query Criteria: Quad IS (Garberville (4012317) OR Fort Seward (4012326) OR Harris (4012316) OR Noble Butte (3912386) OR Piercy (3912387) OR Bear Harbor (3912388) OR Briceland (4012318) OR Ettersburg (4012328) OR Miranda (4012327))

Possible species within the Garberville and surrounding quads for 3103 Little Sproul Habitat Enhancement, Humboldt County

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Accipiter cooperii</i> Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
<i>Antrozous pallidus</i> pallid bat	AMACC10010	None	None	G5	S3	SSC
<i>Aquila chrysaetos</i> golden eagle	ABNKC22010	None	None	G5	S3	FP
<i>Arabis mcdonaldiana</i> McDonald's rockcross	PDBRA06150	Endangered	Endangered	G3	S3	1B.1
<i>Arborimus pomo</i> Sonoma tree vole	AMAFF23030	None	None	G3	S3	SSC
<i>Arctostaphylos stanfordiana ssp. raichei</i> Raiche's manzanita	PDERI041G2	None	None	G3T2	S2	1B.1
<i>Ascaphus truei</i> Pacific tailed frog	AAABA01010	None	None	G4	S3S4	SSC
<i>Astragalus agnicidus</i> Humboldt County milk-vetch	PDFAB0F080	None	Endangered	G2	S2	1B.1
<i>Bombus caliginosus</i> obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
<i>Bombus occidentalis</i> western bumble bee	IIHYM24250	None	None	G2G3	S1	
<i>Calamagrostis foliosa</i> leafy reed grass	PMPOA170C0	None	Rare	G3	S3	4.2
<i>Castilleja litoralis</i> Oregon coast paintbrush	PDSCR0D012	None	None	G3	S3	2B.2
<i>Castilleja mendocinensis</i> Mendocino Coast paintbrush	PDSCR0D3N0	None	None	G2	S2	1B.2
<i>Ceanothus foliosus var. vineatus</i> Vine Hill ceanothus	PDRHA040D6	None	None	G3T1	S1	1B.1
<i>Coptis laciniata</i> Oregon goldthread	PDRAN0A020	None	None	G4?	S3?	4.2
<i>Empidonax traillii brewsteri</i> little willow flycatcher	ABPAE33041	None	Endangered	G5T3T4	S1S2	
<i>Emys marmorata</i> western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
<i>Erethizon dorsatum</i> North American porcupine	AMAFJ01010	None	None	G5	S3	
<i>Eriogonum kelloggii</i> Kellogg's buckwheat	PDPGN083A0	None	Endangered	G2	S2	1B.2



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Erythronium oregonum</i> giant fawn lily	PMLIL0U0C0	None	None	G4G5	S2	2B.2
<i>Erythronium revolutum</i> coast fawn lily	PMLIL0U0F0	None	None	G4G5	S3	2B.2
<i>Falco peregrinus anatum</i> American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
<i>Gentiana setigera</i> Mendocino gentian	PDGEN060S0	None	None	G2	S2	1B.2
<i>Gilia capitata ssp. pacifica</i> Pacific gilia	PDPLM040B6	None	None	G5T3	S2	1B.2
<i>Howellia aquatilis</i> water howellia	PDCAM0A010	Threatened	None	G3	S2	2B.2
<i>Kopsiopsis hookeri</i> small groundcone	PDORO01010	None	None	G4?	S1S2	2B.3
<i>Mitellastra caulescens</i> leafy-stemmed mitrewort	PDSAX0N020	None	None	G5	S4	4.2
<i>Montia howellii</i> Howell's montia	PDPOR05070	None	None	G3G4	S2	2B.2
<i>Myotis evotis</i> long-eared myotis	AMACC01070	None	None	G5	S3	
<i>Myotis thysanodes</i> fringed myotis	AMACC01090	None	None	G4	S3	
<i>Myotis yumanensis</i> Yuma myotis	AMACC01020	None	None	G5	S4	
Northern Interior Cypress Forest Northern Interior Cypress Forest	CTT83220CA	None	None	G2	S2.2	
<i>Noyo intersessa</i> Ten Mile shoulderband	IMGASC5070	None	None	G2	S2	
<i>Oncorhynchus kisutch pop. 2</i> coho salmon - southern Oregon / northern California ESU	AFCHA02032	Threatened	Threatened	G4T2Q	S2?	
<i>Oncorhynchus mykiss irideus pop. 36</i> summer-run steelhead trout	AFCHA0213B	None	None	G5T4Q	S2	SSC
<i>Pandion haliaetus</i> osprey	ABNKC01010	None	None	G5	S4	WL
<i>Pekania pennanti</i> fisher - West Coast DPS	AMAJF01021	None	Threatened	G5T2T3Q	S2S3	SSC
<i>Piperia candida</i> white-flowered rein orchid	PMORC1X050	None	None	G3	S3	1B.2
<i>Rana boylei</i> foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	G3	S3	SSC
<i>Rhyacotriton variegatus</i> southern torrent salamander	AAAAJ01020	None	None	G3G4	S2S3	SSC



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Sedum laxum ssp. eastwoodiae</i> Red Mountain stonecrop	PDCRA0A0L1	None	None	G5T2	S2	1B.2
<i>Sidalcea malachroides</i> maple-leaved checkerbloom	PDMAL110E0	None	None	G3	S3	4.2
<i>Silene campanulata ssp. campanulata</i> Red Mountain catchfly	PDCAR0U0A2	None	Endangered	G5T3Q	S3	4.2
<i>Taricha rivularis</i> red-bellied newt	AAAAF02020	None	None	G4	S2	SSC
<i>Tracyina rostrata</i> beaked tracyina	PDAST9D010	None	None	G2	S2	1B.2
Upland Douglas Fir Forest Upland Douglas Fir Forest	CTT82420CA	None	None	G4	S3.1	
<i>Usnea longissima</i> Methuselah's beard lichen	NLLEC5P420	None	None	G4	S4	4.2
<i>Viburnum ellipticum</i> oval-leaved viburnum	PDCPR07080	None	None	G4G5	S3?	2B.3

Record Count: 48

Introduction:

The Mattole Salmon Group will provide high quality winter and summer rearing habitat in the lower Mattole River and provide refuge from high flows and high temperatures to juvenile Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), and steelhead trout (*Oncorhynchus mykiss*). They will do this by excavating 800 feet of side channel and placing large woody debris, which will maintain large areas of low to near-zero velocities at all flows below bankfull, and facilitate access into an extensive network of wetlands at high flows. During summer conditions increasing water elevation will ensure connectivity with the channel even as river flows decline, and day time water temperatures in the channel will remain 1-2°C cooler than in the adjacent river. Maximum summer water temperatures in the lower Mattole mainstem can exceed 24°C as early as mid-June, so the availability of thermal refugia will benefit outward migrating Chinook salmon and steelhead trout smolts, as well as over-summering steelhead trout and Chinook salmon. Planting of woody riparian vegetation will contribute to future habitat complexity and slow floodplain turnover rates, increasing the probability of the development of off-channel habitats and anabranching through natural channel processes.

This project is necessary because summer habitat conditions in the lower Mattole River and estuary are generally poor for juvenile Pacific salmon. The area is broad, shallow, and lacks complex habitats for fish to hide from predators. Many of the riparian floodplains are void of long-lived riparian tree species that provide shade, floodplain stability, and future wood recruitment. Many mid-elevation islands that were relatively stable and vegetated with riparian trees species such as willow, California black cottonwood (*Populus trichocarpa*), and red alder (*Alnus rubra*) prior to flood events, are now partially vegetated with non-native grasses and forbs and some native shrubs and lack stability and abundant riparian vegetation. In addition, summer water temperatures in the lower river regularly exceed levels thought to be stressful, and even lethal, to Pacific salmon.

The Grantee shall not proceed with on the ground implementation until all necessary permits, consultations, and/or Notice to Proceed are secured. All habitat improvement(s) will follow techniques in the *California Salmonid Stream Habitat Restoration Manual* (Part VII <https://www.wildlife.ca.gov/Grants/FRGP/Guidance>).

Objective(s):

Objective 1. Restore 800 feet of off-channel salmonid habitat and provide connectivity to the Mattole Estuary and Lower Bear Creek through excavation of the Middle Slough Channel, installation of 12 wood structures and three (3) alcoves along the restored channel.

Objective 2. Enhance riparian habitat on floodplain adjacent to the Middle Slough through installation of 3000 feet of willow baffles, planting of 4000 trees and installation of salvaged wetland vegetation, and seeding and mulching.

Project Description:

Location:

The project is located approximately 3500 feet upstream from the mouth of the Mattole River and downstream of the town of Petrolia, CA in Humboldt County. The project sites are located on the south side of the lower Mattole River, in the King Range National Conservation Area (See attached Vicinity Map).

Objective 1 activities will take place at section C2, upstream from section C1. Access to this site is via Lighthouse Road.

Objective 2 activities will take place at BLM30. Access to this site is via Lighthouse Road.

Project coordinates are: 40.290738 N and -124.345652 W at the center point of the excavation at C2 and 40.290206 and -124.340985 W at the center point of where spoils will be relocated, willow baffles will be installed, and riparian planting will take place.

Project Set Up:

Project Team Roles and Responsibilities –

Mattole Salmon Group (MSG) - Prime Contractor/Grantee (C-27): Project oversight, contract management, administration, project management, monitoring, and on-site labor on section C2 restoration tasks. Personnel - Executive director, contract manager, project manager, laborer, monitoring technician

Edwards Excavation (EE) - Heavy equipment sub-contractor (Class A) - Establish access to site C2 and BLM30, clear vegetation in section C2, excavate, haul, and grade spoils in section C2, install 12 wood structures in C2, install 3 alcoves in C2, excavate and backfill willow baffles at BLM30, decommission access upon project completion. Personnel - Equipment operator

Mike Love and Associates (MLA) - Sub-contractor (Licensed Engineer): Pre-construction meetings, survey and stake section C2 boundaries and centerline, check grade on throughout channel in C2, and provide post-project as-built. Personnel - Project Engineer

Native Ecosystems (NE) - Sub-contractor (C-27): Section C2 project management, construction oversight and on-site labor. Personnel - Project manager, laborer

Mattole Restoration Council (MRC) - Sub-contractor (C-27): BLM30 project management and construction oversight; harvest and installation of large willow cuttings at BLM30; riparian and wetland plant installation, seeding and straw mulching, riparian revegetation monitoring at C2 and BLM30; Personnel - Executive director, contract manager, office manager, bookkeeper, project manager, laborer

Roscoe and Associates (JR) - Sub-contractor (Archaeology and Botany): Conduct archaeology and botany surveys pre-project at C2 and BLM30. Personnel - Archaeologist, field botanists, field technician

Project Tasks and Associated Personnel

Task 1. Contract Administration: Prepare annual and final reports and quarterly invoices; apply for LSAA; execute sub-contracts –MSG Executive Director, MSG Contract Manager, NE Project Manager, All sub-contractor personnel.

Task 2. Photo documentation: Establish photopoints and collect pre-project ground and drone photos at Section C2 and BLM30; Collect drone video footage of construction - NE Project Manager, MRC Project Manager.

Task 3. Middle Slough C2 Construction: Project management and construction oversight - NE and MSG Project Managers. Archaeological and botanical surveys - Jaimie Roscoe. On-site labor, dust control, and de-watering - NE and MSG laborers. Open access road to C2 and BLM30; Clear vegetation, tip and stage trees at C2; salvage top soil and wetland vegetation in C2 and stockpile; Excavate, transport and grade spoils from C2 to BLM30; Install wood structure and alcoves; close access- EE Equipment Operator. Survey and stake C2 boundaries, check grade, establish benchmark and hubs - MLA Project Engineer.

Task 4. Riparian Restoration: Excavate and backfill willow trenches - EE Equipment Operator. Willow baffle construction and revegetation project management; Harvest and install large willow cuttings and irrigate as needed; plant riparian trees and wetland plugs; install native seed and straw mulch- MRC Project Manager and MRC Laborers.

Task 5. Off-Channel Habitat Feature Monitoring: At Middle Slough Section C2 complete the following: Collect pre-and post photos and design flow surveys, perform biological surveys of functional use, collect temperature and dissolved oxygen data - MSG Monitoring Technician and MSG Project Manager.

Task 6. Riparian Restoration Monitoring and Maintenance: At BLM30 and C2 perform post project monitoring and maintenance including seedling survival surveys to assess survival of installed containerized plants; perform post project survival of willow baffles by measuring linear feet of willow baffle alive; remove weeds and irrigate containerized plantings as needed - MRC Laborer and MRC Project Manager.

Materials:

Project Materials include the following:

Water pumps – 3” and 4” gasoline powered water pumps will be used to de-water the channel once excavation reaches groundwater, provide temporary irrigation to willow baffles, and deliver water to for dust control. 3” and 4” intake line and discharge hose will be used to move water a minimum of 300 feet from the construction site, water baffles, and provide dust control water. All pumps will be placed in secondary containment with spill pad. Pumps are necessary in order to dewater the treatment area in order to excavate channel, check channel bed elevations, and provide water for irrigation. Water pumps will be rented by MSG and MRC.

Native Plant Materials - Containerized riparian trees, wetland plugs, native seed, and straw will be purchased by the MRC. All plant materials will be installed by hand using shovel, rake, and hoedad. These materials are required to reduce on-site erosion and and restore native riparian vegetation to the project sites that was required to be removed to access the channel for construction.

Chainsaw - Gas powered chainsaws will be used to clear vegetation, cut root wads and boles to length, and harvest large willow cuttings. Chainsaws are required for the project to accomplish project tasks. Chainsaws will be operated by certified sawyers with proper PPE. Chainsaws will be rented by MRC and MSG.

4X4 Truck - 4X4 Trucks will be used and are required to transport crews and materials to and from the project site. Trucks will be rented by MSG and MRC.

Hand Tools - Shovels, picks, hoedads, rockbars, tree-bags, rakes, and McClouds are required for revegetation tasks on the project. These tools will be purchased by MRC.

Fuel - Gasoline will be required to run pumps that will be used for de-watering, dust control, and irrigation. Fuel will be purchased by MRC and MSG.

Tasks:

Task 1 – Contract Administration

Prepare annual and final reports and quarterly invoices. Contract management. Execute Sub-contracts. Obtain final landowner access agreements. Apply for LSAA.

Task 2 – Photo documentation

Establish photo points and collect pre and post-project ground and drone photos at Section C2 and BLM30; Collect drone video footage of construction.

Task 3 – Middle Slough Section C2 Construction

A description of construction activities can be found in attached "Plans for Construction Mattole Estuary, Middle Slough Habitat Enhancement, Final Design". These plans are referred to as 'design plans' below. Construction of section C2 will occur in reference to design plans with field engineering occurring where needed. Please refer to design plans for all reference to station markers. NE project manager and MSG laborers will be on-site during entire length of this task.

Tasks include:

3.1 - Conduct archaeological and botany surveys at C2 and BLM30. Coordination will be done by NE Project Manager

3.2 - Hold pre-construction meeting with heavy equipment contractors, engineer, project manager, laborers and members of the Mattole Estuary TAC to discuss: Project timeline, project design, operations plan, and safety protocols. Meeting will be held by NE and MSG Project Manager.

3.3 - Open access road from Lighthouse Road to C2 and BLM30. Remove vegetation (willow and alder) with an excavator and labor crew. Vegetation will be staged for later use in willow trenches. Road will be graded with a bulldozer. Road will be watered for dust mitigation. Access will not require crossing of any streams or the Mattole River.

3.4 - Vegetation will be cleared along 800 feet of section C2 (Station 750-1550) and haul road with an excavator and labor crew. Red alder and Pacific willow trees within removal areas will be tipped so root wads remain intact and will be staged for future use as in-stream wood structures. Special care will be made to leave wildlife trees and trees that provide shade in-stream. All willow removed will be removed with roots attached and staged for future use in willow baffles and planting into haul road. If staging of willow is required for more than three days, willows will be soaked in temporary pond until installation occurs.

3.5 - Engineer will survey and stake section C2 boundaries and center line with elevation hub stakes placed every 50 feet.

3.6 - Excavator and laborers will salvage on-site native wetland vegetation through vegetative lifts and transfer to salvaged plant material staging area (See Project Map).

3.7 - A 20 feet wide haul road will be installed parallel to the entire length of section C2 with one entrance at station 750 and one entrance at station 1500. The haul road will not require any imported fill material and will be constructed by removing vegetation and grading. Once the haul road is no longer in use, it will be incorporated into the project as a combination of littoral shelf, floodplain, and off-channel pond/alcove that will be field engineered depending on site conditions. The road will be de-compacted and planted with native plant materials, including salvaged vegetation, as these features are built.

3.8 - Excavation of section C2 will take place according to design plans from station 750 to station 1550. Station 1500 to 1550 will consist of a gradual slope out of channel to existing grade at station 1550 to allow for fish passage and future tie in of the Lower Bear Creek project. A laser level, and boom and rod receivers, will be used to assure specified channel bed and littoral shelf elevation targets are being met. MLA Engineer will conduct weekly site visits to assure project is being built to specifications. A 50,000 lb. excavator will dig spoils from channel and load into a 20 cubic yard capacity articulated haul truck. Haul truck operator will transfer top soil to top soil staging area for future use on post-project revegetation and transfer gravel and cobble to spoils area at BLM30 (See Project Map). Spoils will be graded with 20,000 lb. bulldozer. Channel will be shaped to slopes specified in design plans. A 20' wide earth berm will be left at station 750 that will span the entire width of the channel to maintain disconnection between C1 and C2. A turbidity curtain will be installed below station 750 and the berm will be removed as the final step of excavation.

3.9 - De-watering will occur when necessary for excavator to shape channel and efficiently remove spoils. Construction will be scheduled to take place when groundwater levels will be at their lowest in June and July. When de-watering of channel occurs, no fish species will be present due to the channel having no connectivity to surface water. De-watering will require the use of a 4 in. trash pumps, 4 in. intake, and 3 in. discharge line to move water from channel to adjacent floodplains. Water will not be discharged into surface water and will be used to irrigate willow baffles when possible. All pumps and associated fuel will be in secondary containment.

3.10 - During excavation twelve wood structures will be placed in-stream and will be constructed using on-site red alder, Pacific willow (*Salix lucida*) and Douglas fir (*Pseudotsuga menziesii*) when available as shown in

design plans. A minimum of three alcoves and/or off-channel ponds will be constructed as shown in design plans at locations based on field conditions. A littoral shelf will be built as shown in design plans.

Task 4 – Riparian Restoration

4.1 - Hold pre-construction meeting with heavy equipment contractors, project manager, laborers and members of the Mattole Estuary TAC to discuss: Project timeline, project design, operations plan, and safety protocols. Meeting will be held by MRC Project Manager.

4.2 - Willow baffle installation. Some willow baffles will be installed during construction of C2 so that willow from clearing access can be installed immediately after it is removed. All other willow baffles will be installed in late September to decrease the need for irrigation. A 50,000 lb. excavator will dig 3000 ft. of trenches that will be 10 ft. to 15 ft. deep. Trenches will be dug into spoils removed from C2 as well as native soils at project site BLM30. Trenches will be spaced approximately 30 ft. apart and dug from north to south. Laborers will harvest willow cuttings with chainsaw from harvest areas that consist of Sitka willow (*Salix sitchensis*) and Hookers willow (*Salix hookeriana*). Cuttings will range in size from 15 ft. to 20 ft. in length and 3 in. to 6 in. in diameter. Cuttings will be bundled with a cable choker in groups of 15-20 and moved directly to trench with 4X4 truck, excavator, or wheel loader. Cuttings will be installed in trench every 1ft. to 2 ft. with cut ends in a minimum of 1 ft. of groundwater. Slash material from clearing access and C2 will be placed into excavated trench after willow is installed. Laborers will then cut cuttings to 4 ft. above grade and place slash material in trench. Trench will be backfilled with spoils using a 20,000 lb. bulldozer. Spoils will be watered in as they are backfilled to maintain soil moisture. As the bulldozer backfills and grades, a 1 ft. deep ditch line will be installed parallel to the willow baffle to aid in flood irrigation.

4.3 - Installation of salvaged top soil. After willow baffles are installed, the excavator will load dump truck with salvaged top soil and it will be transferred to areas in between trenches. Bulldozer will grade top soil.

4.4. - Irrigation. A temporary irrigation system will be installed to flood irrigate willow baffles until winter rains provide adequate soil moisture. An excavator will dig an open groundwater well into gravel bar adjacent to willow baffles. The well will have no connection to surface water. Safety fencing will be installed around well. A gas powered 3 in. semi-trash pump with 3 in. suction line will be used to move water from well into a 3 in. PVC mainline. The mainline will connect to 2 in. PVC lateral lines that will be placed perpendicular to willow baffles. A 2 in. PVC ball valve will be installed on the lateral line at the intersection of each baffle ditch line. Each willow baffle ditch will be flood irrigated a minimum of 2 hours per

week to maintain adequate soil moisture. This system has already been built and dismantled and has been used on previous phases of the project for the same purpose. Temporary drip irrigation will be installed at containerized planting sites in the summer of 2021 if needed to maintain target survival.

4.5 - Native Plant Installation.

Installation of salvaged vegetative lifts will be installed during decommissioning of haul road at C2. See task 3.7.

Native seed installation will occur at BLM 30 and C2 in September or October of 2020 after the first rains. The riparian seed mix will consist of Oregon ash (*Fraxinus latifolia*), Big leaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), red-flowering currant (*Ribes sanguineum*), thimbleberry (*Rubus parviflorus*), black-capped raspberry (*Rubus lecodermis*), coffee berry (*Frangula californica*), oceanspray (*Holodiscus discolor*), Toyon (*Heteromeles arbutifolia*), Blue wildrye (*Elymus glaucus*), California brome (*Bromus carinatus*) and Douglas iris (*Iris douglasiana*). All seed will be sourced from local collection sites. Mix will be installed at a rate of 40 lbs. per acre on all bare soils into salvaged top soil in between willow baffles and on bare banks and floodplains at C2. Seed will be distributed by hand and raked in to increase soil contact. After installation, seed will be watered with 2 in. hose with fire nozzle and lightly mulched with weed free straw. Straw will be watered in with 2 in. hose with fire nozzle to prevent loss from wind and maintain moisture for seed germination.

Native plant installation will occur at BLM 30 and C2 after adequate soil moisture is reached from rainfall in November of 2020. All plants will be grown from locally collected seed at the MRC Native Plant Nursery. A total of 500 black cottonwood (*Populus trichocarpa*), 200 Douglas fir, 500 red alder, and 800 Pacific willow will be installed by laborers using a hoedad. Container size for trees will be size D25. Trees will be installed on 8 ft. centers with shallow basins at willow baffle sites at BLM30 and on the bare banks and floodplains at C2. In addition, 3000 small fruited bulrush (*Scripus microcarpus*), 500 common rush (*Juncus effusus*), and 500 gray rush (*Juncus patens*) will be installed by laborers using a hoedad. Container size will be AB34. Wetland plugs will be installed on 3 ft. centers on the bare banks and floodplains at C2.

Task 5 – Off-Channel Habitat Feature Monitoring

Collect pre-and post-photos and design flow surveys, perform biological surveys of functional use, collect water quality data.

Task 6 - Riparian Restoration Monitoring and Maintenance

At BLM30 and C2 perform post project monitoring and maintenance including seedling survival surveys to assess survival of installed containerized plants. Seedling survival surveys and willow baffle monitoring will be completed in spring of 2021, fall of 2020 and 2021. If any point during those surveys seedling survival fall below targets, replacement plants will be installed at no cost. Perform post project survival of willow baffles by measuring linear feet of willow baffle alive. Remove weeds and irrigate containerized plantings as needed.

Deliverables:

Task 1 – Contract Administration

Annual Reports and Final Report
Quarterly invoices
Copies of Sub-contracts
Landowner Access Agreements
Items required for LSAA

Task 2 – Photo documentation

Pre and post photos of C2 and BLM30
Drone footage of construction

Task 3 – Middle Slough Section C2 Construction

Project Photos
Project As-built plans

Task 4 – Riparian Restoration

As-built plans
Project Photos

Task 5 – Off-Channel Habitat Feature Monitoring

Monitoring Report

Task 6 - Riparian Restoration Monitoring and Maintenance

Monitoring Data in Final Report

Timelines:

Task 1 – Contract Administration – 6/1/2020 to 1/30/2022

Task 2 – Photo documentation – 6/1/2020 to 1/30/2022

Task 3 – Middle Slough Section C2 Construction – 6/1/2020 to 10/15/2020

Task 4 – Riparian Restoration – 6/1/2020 to 1/30/2021

Task 5 – Off-Channel Habitat Feature Monitoring – 11/2/2020 to 6/30/2022

Task 6 - Riparian Restoration Monitoring and Maintenance – 5/4/2020 to 12/30/2022

Additional Requirements:

The Grantee will not proceed with on the ground implementation until all necessary permits and consultations are secured and a “notice to proceed” letter has been received from the California Department of Fish and Wildlife (CDFW) Grant Manager. Work in flowing streams is restricted per the Army Corp of Engineers Regional General Permit. Actual project start and end dates, within this timeframe, are at the discretion of CDFW.

No equipment maintenance will be performed within or near the stream channel where pollutants (such as petroleum products) from the equipment may enter the channel via rainfall or runoff. Appropriate spill containment devices (e.g., oil absorbent pads, tarpaulins) will be used when refueling equipment. Any and all equipment will be removed from the streambed and flood plain areas at the end of each workday.

All equipment and gear will be brushed with a stiff brush prior to leaving each stretch of stream to avoid the transport of aquatic invasive species (AIS). When transporting traps out of the area, each numbered trap will be bagged in its own bag to avoid cross contamination during transport in and out of the work area. All crew members will decontaminate equipment and shoes for AIS according to the standards detailed in the California Department of Fish & Wildlife Aquatic Invasive Species Decontamination Protocol.

During project activities, all trash that may attract predators will be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris will be removed from work areas.

The Grantee shall notify the CDFW Grant Manager a minimum of five working days before the project site is de-watered and the stream flow diverted. The notification will provide a reasonable time for CDFW personnel to oversee the implementation of the water diversion plan and the safe removal and relocation of salmonids and other native aquatic species from the project area. If the project requires dewatering of the site and the relocation of listed aquatic species, the Grantee will implement the following measures to minimize harm and mortality to listed species as well as other native aquatic species:

- Fish relocation and dewatering activities shall only occur between June 15 and October 31 of each year.
- The Grantee shall minimize the amount of wetted stream channel dewatered at each individual project site to the fullest extent possible as approved by the CDFW Grant Manager and pursuant to conditions in the USACE Regional

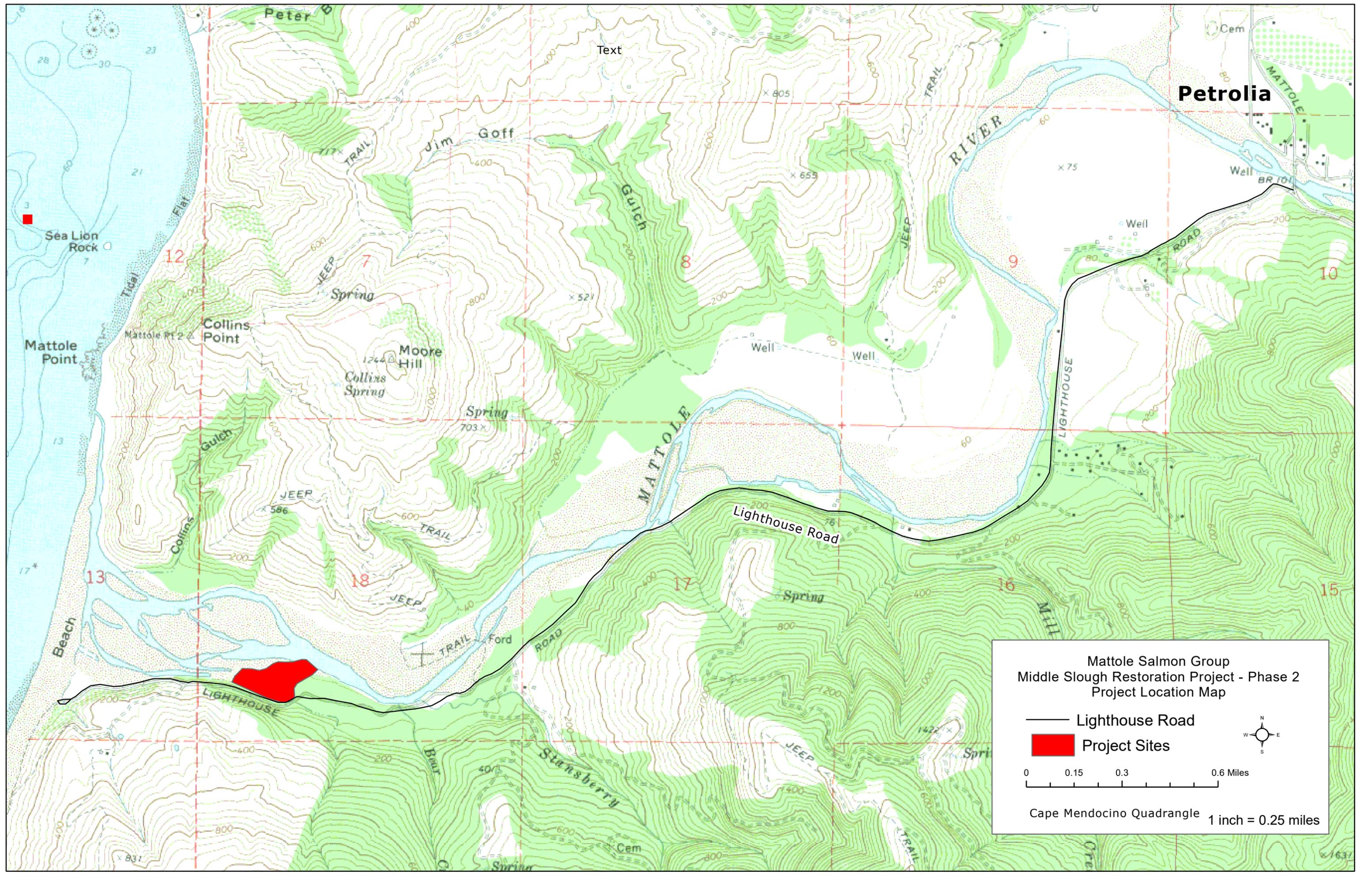
General Permit, NMFS Biological Opinion, and project's Lake and Streambed Alteration Agreement (1600 permit).

- Additional measures to minimize injury and mortality of salmonids during fish relocation and dewatering activities shall be implemented as described in Part IX, pages 52 and 53 of the *California Salmonid Stream Habitat Restoration Manual*.
- Only qualified fisheries biologist that are approved by USFWS and permitted by CDFW under a California Endangered Species Act (CESA) Memorandum of Understanding (MOU) shall handle and relocate CESA listed species.
- All electrofishing shall be performed by a qualified fisheries biologist under the supervision of CDFW and conducted according to the National Marine Fisheries Service, Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act, June 2000.
- USFWS Approved fisheries biologists will provide fish relocation data via the Grantee to the CDFW Grant Manager on a form provided by CDFW.

The bridge (culvert) design and installation will meet flow carrying capacity required for a 100-year flood event as identified by specifications determined by National Oceanic and Atmospheric Administration (NOAA) Fisheries and the California Department of Fish and Wildlife (CDFW), for adult and juvenile salmonid fish passage. The project will follow the National Marine Fisheries Service (NMFS 2001) Guidelines for Salmonid Passage at Stream Crossings and criteria for fish passage as described in Volume II, Part IX, of the *California Salmonid Stream Habitat Restoration Manual*. The engineered plans for the bridge (culvert) installation shall be visually reviewed and authorized by NOAA Fisheries or California Department of Fish and Wildlife engineers prior to commencement of work.

All habitat improvements will follow techniques described in the *California Salmonid Stream Habitat Restoration Manual*, Volume I, and Volume II Part XI and Part XII. The Grantee/landowner will maintain the new crossing, inspect the crossing in a timely manner and remove debris as necessary during the storm season.

Seeding and mulching of all exposed soils shall be done for all slopes which may deliver sediment to a stream. Woody debris will be concentrated on finished slopes adjacent to stream crossings. The standard for success is 80% ground cover for broadcast planting of seed, after a period of three years. Mulching and seeding will take place as sites are completed to avoid unforeseen erosion. Planting of tree seedlings will take place after December 1 or when sufficient rainfall has occurred to insure the best chance of survival of the seedlings.



Petrolia

Sea Lion Rock

Mattole Point

Collins Point

Moore Hill

MATTOLE RIVER

Lighthouse Road

LIGHTHOUSE

Mattole Salmon Group
Middle Slough Restoration Project - Phase 2
Project Location Map

— Lighthouse Road

■ Project Sites



0 0.15 0.3 0.6 Miles

Cape Mendocino Quadrangle 1 inch = 0.25 miles



Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database



Query Criteria: Quad (Petrolia (4012433) OR Taylor Peak (4012442) OR Buckeye Mtn. (4012432) OR Shubrick Peak (4012422) OR Cooskie Creek (4012423) OR Cape Mendocino (4012444) OR Capetown (4012443))

Possible species within the Petrolia and surrounding quads for 3132 Middle Slough Restoration Project - Phase 2, Humboldt County

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Accipiter cooperii</i> Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
<i>Aquila chrysaetos</i> golden eagle	ABNKC22010	None	None	G5	S3	FP
<i>Arborimus pomo</i> Sonoma tree vole	AMAFF23030	None	None	G3	S3	SSC
<i>Ardea alba</i> great egret	ABNGA04040	None	None	G5	S4	
<i>Ardea herodias</i> great blue heron	ABNGA04010	None	None	G5	S4	
<i>Ascaphus truei</i> Pacific tailed frog	AAABA01010	None	None	G4	S3S4	SSC
<i>Astragalus pycnostachyus var. pycnostachyus</i> coastal marsh milk-vetch	PDFAB0F7B2	None	None	G2T2	S2	1B.2
<i>Bombus occidentalis</i> western bumble bee	IIHYM24250	None	None	G2G3	S1	
<i>Calamagrostis foliosa</i> leafy reed grass	PMPOA170C0	None	Rare	G3	S3	4.2
<i>Castilleja litoralis</i> Oregon coast paintbrush	PDSCR0D012	None	None	G3	S3	2B.2
<i>Coastal and Valley Freshwater Marsh</i> Coastal and Valley Freshwater Marsh	CTT52410CA	None	None	G3	S2.1	
<i>Coastal Douglas Fir Western Hemlock Forest</i> Coastal Douglas Fir Western Hemlock Forest	CTT82410CA	None	None	G4	S2.1	
<i>Emys marmorata</i> western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
<i>Entosphenus tridentatus</i> Pacific lamprey	AFBAA02100	None	None	G4	S4	SSC
<i>Erethizon dorsatum</i> North American porcupine	AMAFJ01010	None	None	G5	S3	
<i>Erysimum concinnum</i> bluff wallflower	PDBRA160E3	None	None	G3	S2	1B.2
<i>Erythronium oregonum</i> giant fawn lily	PMLIL0U0C0	None	None	G4G5	S2	2B.2
<i>Erythronium revolutum</i> coast fawn lily	PMLIL0U0F0	None	None	G4G5	S3	2B.2
<i>Fratercula cirrhata</i> tufted puffin	ABNNN12010	None	None	G5	S1S2	SSC



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<i>Gilia capitata ssp. pacifica</i> Pacific gilia	PDPLM040B6	None	None	G5T3	S2	1B.2
<i>Gilia millefoliata</i> dark-eyed gilia	PDPLM04130	None	None	G2	S2	1B.2
<i>Hesperevax sparsiflora var. brevifolia</i> short-leaved evax	PDASTE5011	None	None	G4T3	S2	1B.2
<i>Layia carnosa</i> beach layia	PDAST5N010	Endangered	Endangered	G2	S2	1B.1
<i>Montia howellii</i> Howell's montia	PDPOR05070	None	None	G3G4	S2	2B.2
<i>Oenothera wolfii</i> Wolf's evening-primrose	PDONA0C1K0	None	None	G2	S1	1B.1
<i>Oncorhynchus kisutch pop. 2</i> coho salmon - southern Oregon / northern California ESU	AFCHA02032	Threatened	Threatened	G4T2Q	S2?	
<i>Oncorhynchus mykiss irideus pop. 16</i> steelhead - northern California DPS	AFCHA0209Q	Threatened	None	G5T2T3Q	S2S3	
<i>Oncorhynchus mykiss irideus pop. 36</i> summer-run steelhead trout	AFCHA0213B	None	None	G5T4Q	S2	SSC
<i>Packera bolanderi var. bolanderi</i> seacoast ragwort	PDAST8H0H1	None	None	G4T4	S2S3	2B.2
<i>Pekania pennanti</i> fisher - West Coast DPS	AMAJF01021	None	Threatened	G5T2T3Q	S2S3	SSC
<i>Phalacrocorax auritus</i> double-crested cormorant	ABNFD01020	None	None	G5	S4	WL
<i>Piperia candida</i> white-flowered rein orchid	PMORC1X050	None	None	G3	S3	1B.2
<i>Polemonium carneum</i> Oregon polemonium	PDPLM0E050	None	None	G3G4	S2	2B.2
<i>Rana aurora</i> northern red-legged frog	AAABH01021	None	None	G4	S3	SSC
<i>Rana boylei</i> foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	G3	S3	SSC
<i>Rhyacotriton variegatus</i> southern torrent salamander	AAAAJ01020	None	None	G3G4	S2S3	SSC
<i>Romanzoffia tracyi</i> Tracy's romanzoffia	PDHYD0E030	None	None	G4	S2	2B.3
<i>Sidalcea malachroides</i> maple-leaved checkerbloom	PDMAL110E0	None	None	G3	S3	4.2
<i>Sidalcea malviflora ssp. patula</i> Siskiyou checkerbloom	PDMAL110F9	None	None	G5T2	S2	1B.2
<i>Sisyrinchium hitchcockii</i> Hitchcock's blue-eyed grass	PMIRI0D0S0	None	None	G2	S1	1B.1



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<i>Taricha rivularis</i> red-bellied newt	AAAAF02020	None	None	G4	S2	SSC
<i>Taxidea taxus</i> American badger	AMAJF04010	None	None	G5	S3	SSC
<i>Usnea longissima</i> Methuselah's beard lichen	NLLEC5P420	None	None	G4	S4	4.2

Record Count: 43