

# Yellowjacket Creek Fish Passage Improvement Project

2016

## Introduction:

The Grantee, Trout Unlimited Incorporated, proposes to achieve the goal of improving the Yellowjacket Creek Fish Passage Improvement Project by modifying an existing concrete diversion weir on Yellowjacket Creek which is a migration barrier to anadromous salmonids. The project will improve fish passage by constructing a series of boulder step-pools, and installing a new fish screen on the diversion at existing concrete weir structure. The project is needed to restore access to 1.9 miles of high quality spawning and rearing habitat upstream of the barrier.

The project will restore salmonid passage at the existing concrete diversion weir and spillway apron structure, which was built in 1902. Given its approximately 40% slope, largely smooth cement surface, and 17 foot elevation drop, the weir structure is considered a total barrier to upstream salmonid passage. The intact portion of the weir structure forms a gradient control that drives the gravity flow diversion system. Immediately downstream of the weir is a very steep concrete spillway apron that drops approximately twenty feet in elevation from the weir crest to the invert of a large scour pool downstream. The project will construct a boulder step-pool structure designed to achieve fish passage criteria, preserve existing aquatic and riparian habitat, increase the thalweg elevation of the incised channel downstream of the structure, and blend with the channel morphology of the intact upstream and downstream reaches.

**Permit Disclosure:** The Grantee shall not proceed with on-the-ground implementation until all necessary permits, consultations, and Notice to Proceed have been obtained.

## Objective(s):

The specific objective of this project is to restore juvenile and adult coho salmon and steelhead trout access to 1.9 miles of spawning and rearing habitat on Yellowjacket Creek by modifying a concrete weir structure, constructing a series of boulder step-pools, and installing a fish screen.

The design includes the following key elements, proceeding from the upstream project extent to the downstream project extent:

A spaced boulder field extending from the left bank (looking downstream) upstream of the flow diversion point and extending parallel to the left bank downstream to the existing weir. This boulder field will protect the new fish screen from damage caused by floating debris and large bed load sediments.

A cone screen system designed to meet required fish screening criteria and maintain permitted water diversion rates.

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A fine sediment clean-out area adjacent to the new cone screen along the margin of the channel.

A six inch high, anchored boulder weir installed on the existing concrete weir to provide improved fish screen performance at low flows.

A system of boulder weirs and step pools constructed on compacted native fill and a layer of impervious clay and filled with engineered streambed material (ESM) along Yellowjacket Creek. Keystone elements of boulder weirs will be composed of two- to four-foot diameter boulders placed on footer boulders of similar diameter. Boulder step height will be a maximum of one foot above the downstream pool water surface elevation. Typical pool lengths of 20 feet will be interspersed with larger refuge pools 30 feet in length that incorporate anchored large wood to provide resting and rearing locations for both adult and juvenile salmonids.

## Project Description:

### Location:

The Yellowjacket Creek Fish Passage Improvement Project is located on Yellow Jacket Creek at 38.63440800<sup>0</sup> north latitude : -122.66333900<sup>0</sup> west longitude, in Section 8 of Township 9 north, Range 7 west, Mount Diablo Base and Meridian. The project is located approximately 1/2 mile above the confluence of Kellogg and Yellowjacket creeks and 9.6 miles above the confluence of Maacama Creek and the Russian River. The project is located near Calistoga, California near Yellowjacket Ranch Road, which is off of the intersection of Clegg Road and State Route 128.

From Calistoga take State Route 128 west for about 6.8 miles. Turn right onto Clegg Road., which becomes Yellowjacket Ranch Road. From Geyserville, head northeast on State Route 128 east toward Railroad Avenue for 4.5 miles., turn right on State Route 128 and travel for 12.6 miles, turn left on Clegg Road. Advance permission is required from the landowner. For site access, contact Bo Bennett at (707) 481-2019 or Bo.Bennett@jfwmail.com.

### Project Set Up:

Grantee Project Manager will provide all contracting oversight and administration including but not limited to obtaining permits, securing contracts with grantors, subcontractors, and landowner, scheduling, implementation oversight, invoicing, reporting and agency communication, and outreach. Grantee Grants Assistant will assist in processing invoices and vendor payments, grant tracking, and reporting. (Tasks 1, 2)

The FlowWest team includes a principal fluvial geomorphologist (Mark Tompkins, P.E., Ph.D.), principal engineer (Paul Frank, P.E., C.E.D) and a senior engineer (Colin Hanley, P.E.) who will provide the necessary interdisciplinary construction contractor selection services and construction oversight/management and support (including field engineering required to optimize final placement of boulder weirs and pools to take advantage of existing riparian vegetation). In addition, Mr. Hanley will oversee construction stakeout to ensure that project features are built to achieve the criteria required for a successful fish passage and fish screen system. Finally, Mr. Frank and Dr. Tompkins will provide post-construction documentation of as-built step-pool structure grades and condition, and conduct post-project fish passage structure performance monitoring. (Tasks 2, 3, 4)

Jackson Family Wines Vice President, External Affairs and Sustainability, Sr. Vice President, Government Relations and Sustainability Coordinator will assist with contracting, scheduling, and project coordination, communication, and outreach. (Tasks 1, 2) Asset Manager and head of Kellogg Ranch Operations will complete a portion of the construction work required for this project (e.g. material selection, sorting, and stockpiling, clearing and grubbing, and coffer dam installation). (Task 3)

Installation of the boulder step-pool structures will require an experienced instream construction subcontractor. The construction contractor (to be selected) will be required to implement the dewatering system, conduct rough and finished grading, install footer and step boulders, install engineered stream bed material and impervious streambed material (as needed), install rock and large wood habitat elements, implement bioengineered bank protection measures, and install the new fish screen structure (including all associated demolition and concrete anchoring work). (Task 3)

Mike Podlech, a permitted professional fisheries biologist, will perform all fish removal and exclusion. He will be onsite during cofferdam installation and dewatering to relocate any aquatic species that may have eluded the initial relocation efforts and will monitor the removal of the cofferdams and re-watering of the channel to ensure downstream disturbances (e.g., turbidity) are minimized. (Task 3)

**Materials:**

1-foot to 4-foot diameter boulders will be used to form the 32 weirs to improve fish passage by stabilizing the channel profile and dissipating energy over the length of the project reach.

Engineered streambed material (ESM) will be placed to protect the channel bed from excessive scour. This is a mix of fine soil, gravel, cobbles, and small

boulders that will be mixed on site and placed in accordance with the recommendations in the California Department of Fish and Wildlife Salmonid Habitat Restoration Manual to provide a natural, stable streambed through the project reach.

Compacted native fill will be placed over the existing incised channel bed to raise the channel through the reach as the bottom layer of the profile reconstruction. The native fill will be placed under the clay layer and the engineered streambed material and boulder weirs. It would be cost prohibitive to place engineered streambed material through the full depth of the channel profile reconstruction. An 18-inch layer of compacted clay will serve as the base for the engineered streambed material. The purpose of the clay layer is to maintain surface flow throughout the project reach because engineered streambed material can be subject to allow sub-surface flows.

A series of compacted clay aquitards will be placed at every fifth weir to provide redundancy in limiting subsurface flow through the engineered streambed material. This is required to ensure flow stays on the creek surface through the constructed channel reach.

Large woody debris will be placed in the deep pools to improve habitat diversity and cover for fish, and to provide some energy dissipation. This is required to improve habitat for juvenile fish.

Concrete grout will be placed under the most upstream boulder weir to hold the boulder weir in place at the relatively thin layer over the existing concrete diversion weir apron, and to prevent flow from going subsurface at this location where it might otherwise be subject to this risk. This is required to keep flow on the surface adjacent to the existing weir.

Willow-staked coir bank stabilization fabric will be placed to protect the streambanks in areas where they are at risk of erosion. The fabric will be staked with live willow stakes at 9 feet on-center to add strength to the bank and provide fish cover. This is required to protect the banks and improve habitat.

A temporary sandbag dam and diversion pipe will be installed at the upstream end of the site to divert flow around the work area, and it will be removed upon completion of construction. This is required to provide a safe working environment and protect water quality during construction.

**Tasks:**

The Grantee will complete the following tasks:

**Task 1: Project Management and Grant Administration.**

Grantee will provide contracting oversight and administration including but not limited to obtaining permits, securing contracts (grantors, subcontractors, landowner), scheduling, invoicing, reporting and agency communication, and outreach. Jackson Family Wines (JFW) will assist with contracting, scheduling, and project coordination, communication, and outreach (these services are provided as cost share). Project Management and Grant Administration will occur

throughout the life of the Grant.

### **Task 2: Construction Contractor Selection**

This task is to be completed prior to start date of the grant and no Grant funds will be used to complete this task. Grantee and JFW, in consultation with FlowWest, will select a qualified construction contractor for project implementation based upon their work experience, qualifications, cost efficiency, and ability to comply with permit and Grant provisions. It is anticipated that some of the construction work required for this project such as material selection, sorting, and stockpiling, clearing and grubbing, water management system installation, and temporary erosion control will be completed by JFW. However, installation of the boulder step-pool structures will require an experienced instream construction contractor. Grantee, JFW, and FlowWest will attend one on-site consultation meeting to describe the project to prospective contractors, and prepare a response to questions, necessary addendums, and review of budgets. FlowWest will work with Grantee and JFW in the evaluation of contractor's equipment and experience with mobilization, construction access, erosion and sediment control, water management and dewatering, furnishing materials, construction work, and material testing. In addition, FlowWest, in consultation with National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), will develop detailed contractor selection criteria pertaining to instream construction works, specifically construction of boulder step-pool structures, installation of engineered streambed material (ESM), installation of large wood structures, construction of bioengineered bank stabilization measures, and construction of fish screen facilities. This task will occur prior to the start date of the grant with private funding; it is included only for informational purposes here and is not included in the project budget.

### **Task 3: Project Construction**

#### **Fish removal and exclusion:**

All fish removal and exclusion will be performed in accordance with FRGP 2015 PSN Part V, Stream Dewatering and Fish Exclusion or Relocation. JFW consulting fisheries biologist, Mike Podlech has evaluated the entire project site and documented fish presence in the large scour pool downstream of the existing 17 ft. elevation drop at the diversion structure. In consultation with CDFW and NOAA NMFS fisheries biologists, JFW will finalize a fish exclusion plan, anticipated to include the following prior to site dewatering, block nets will be placed upstream and downstream of the large scour pool and the upstream and downstream limits of disturbance. Areas outside of the large scour pool will be seined and all aquatic species present, which may include coho and steelhead, will be relocated at least 500 feet outside of the limit of disturbance. The large scour pool will be electrofished, and all aquatic species present will also be relocated at least 500 feet outside of the limit of disturbance. Fish relocation will be performed by agency approved and permitted biologists. The fisheries biologist will also be

onsite during cofferdam installation and dewatering to relocate any aquatic species that may have eluded the initial relocation efforts. At the completion of instream construction activities, the fisheries biologist will monitor the removal of the cofferdams and re-watering of the channel to ensure downstream disturbances are minimized.

**Water diversion and bypass:**

A small earthen coffer sand bag dam, will be constructed approximately fifty feet upstream of the existing diversion control structure and all streamflow will be diverted into the existing diversion canal on river left (looking downstream). At the downstream end of the canal, a pump will be installed to lift diverted flow out of the diversion canal through a pipe to the downstream end of the construction zone. Temporary erosion control and silt retention Best Management Practices (BMPs) will be installed where diverted flow re-enters the channel.

**Clearing and Grubbing:**

Construction staging areas, access routes, and the channel will be prepared for work. Staging areas and access routes will simply be cleared of tall vegetation to minimize risk of fire from vehicle contact with dry vegetation. In the channel, small trees in the channel will be removed. In addition, boulders suitable for use in the boulder weirs will be harvested and stockpiled. Between Station 3+00 and 4+80 at the downstream extent of the project, boulder weir and pool locations will be identified and marked to minimize disturbance where proposed finished grades are close or equal to existing grades.

**Incised Channel Fill:**

Where required to achieve design grades, the incised channel will be filled with a series of lifts. The lower most lifts will be composed of compacted native soil. On top of this layer will be lifts composed of impervious clay. On top of the impervious clay, engineered streambed material (ESM) will be placed. Finally, spaced approximately 100 feet apart, an impervious clay “aquatards” will be placed in lifts from immediately below the ESM to the bottom of the fill prism. The aquatards are designed to prevent longitudinal subsurface flow that could cause loss of low flows from surface water to groundwater.

**Grade Control:**

Construction of a series of boulder step-pool structures with 12-inch vertical steps and pools ranging in length from 20 to 30 feet as specified in the plans. Once the site is completely dewatered and the incised channel has been filled as described in the previous section, boulder weir steps will be constructed to create the hydraulic control step design elevations. The boulder weirs will consist of a row of “footer” rocks installed below finished grade and step rocks at finished grade in an upstream oriented chevron pattern. Boulder weirs will also have a slightly lower elevation “notch” in the middle to direct high flows into the



downstream pool and maintain self-scoured pools. Lateral ends of footer and step boulders will be keyed into the channel banks. Construction of boulder weirs will proceed from downstream to upstream until the entire finished grade elevations have been established. Channel fill and boulder weir construction will result in some disturbance of existing channel banks and riparian vegetation. However, the locations of all mature riparian trees with diameters greater than ten inches have been surveyed, and the design plans either incorporates these trees into the weir and pool designs or protects them from impacts during construction.

**Installation of large wood in refuge pools:**

After the boulder weirs bounding each of the large refuge pools is complete, large wood for rearing and refuge habitat will be installed. Most of the large wood will be downed redwood harvested from the Kellogg Ranch property. Large wood anchoring details are shown in the design plans.

**Streambank bioengineering and revegetation:**

Where construction activities decrease streambank stability or remove existing riparian vegetation, bioengineered bank protection measures will be implemented to provide sufficient initial shear stress and velocity resistance and long term channel bank dynamic equilibrium with the establishment of vegetative erosion control components. Bioengineering approaches are detailed in the design plans and include installation of biodegradable erosion control fabric, hydroseeding, and live staking, as appropriate for each disturbed area.

**Retrofit of weir structure:**

To improve both fish screen performance and pool habitat conditions immediately upstream of the existing diversion weir, small boulders will be embedded using concrete and attached with steel anchors to increase the water surface elevation upstream of the weir by six inches.

**Install new fish screen:**

A new cone fish screen and supporting concrete framework will be installed at the location of the existing diversion. Upon completion of channel fill, boulder weir construction, and temporary streambank protection measures, the upstream flow block will be removed slowly with a series of small notches and the new boulder weir step-pool channel will be re-watered. Next, a second small flow block will be constructed to divert all flow away from the existing diversion structure and canal. The existing diversion structure will then be demolished and the site prepared for the new cone screen system. New concrete anchoring work will be completed and the screen installed and tested. After successful screen operation has been confirmed in the dry, the system of open boulder debris deflectors and the fine sediment clean out area will be installed. Finally, the second flow block will be removed and the screen settings will be tuned to

achieve design fish screening criteria. Finally, all remaining disturbed areas will be seeded with an appropriate native riparian seed mix.

**Task 4: Monitoring.**

The project will be tested during post project performance monitoring at low and high design flow depth and velocity. Monitoring will consist of measurement of step flow heights and pool depths at design flows and measurement of average flow velocities downstream of steps.

**Deliverables:**

**Task 1: Project Management and Grant Administration**

Grantee shall deliver: all contracts with subcontractors, Work summaries with invoices, Annual Progress Reports, outreach materials, Final Progress Report, including post-project longitudinal profile survey and asbuilt plans. The Grantee shall also submit full project records and a project summary to the Clearinghouse for Dam Removal Information.

**Task 2: Construction Contractor Selection**

No Grant deliverables for Task 2. This task will be accomplished before the Grant is fully executed. No Grant funds will be used to complete this task.

**Task 3: Construction**

Activities for project construction will include: on-site material selection and stockpiling, clearing and grubbing and site preparation, channel fill with compacted native soil, impervious clay, and Engineered Stream Material (ESM), installation of 0.17 miles of step-pool fish passage structures, refuge pool large wood and boulder habitat enhancement, bioengineered bank stabilization where specified in project plans, riparian revegetation where specified in project plans. diversion structure retrofit to increase water surface elevation, and new cone fish screen system, including boulder debris deflector and fine sediment cleanout area.

**Task 4: Monitoring**

Grantee shall report on the low and high design flow depth and velocity monitoring measurements in the post-project performance monitoring report.

**Timelines:**

This timeline assumes a Notice to Proceed (NTP) has been issued by July 1, 2017.

Task 1: Project Management and Grant Administration will begin upon receiving a fully-executed Grant Agreement and continue through October 31, 2019.

Task 2: Construction Contractor Selection will occur prior to May 1, 2017. This



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task will occur prior to project start date and is not included in the project budget; it is included here for informational purposes only.

**Task 3: Construction will occur from July 1, 2017 through October 31, 2017.**

**Task 4: Monitoring will occur from October 1, 2017 through October 31, 2019 as needed to capture low and high design flow conditions.**

**Compliance: Grantee shall provide verification of CEQA and permit compliance to the Grantor Project Manager before project work begins. Written permission must be obtained from landowner(s) for access to perform grant work. As may be necessary, the Grantee shall be responsible for obtaining the services of appropriately licensed professionals to comply with the applicable requirements of the Business and Professions Code including but not limited to section 6700 et seq. (Professional Engineers Act) and/or section 7800 et seq. (Geologists and Geophysicists Act).**

**If the Grantee fails to perform in accordance with the provisions of this Agreement, the Grantor retains the right, at its sole discretion, to delay, interrupt, or suspend the work for which the grant monies are supplied.**

### **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 Grantor Project 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 Grantor.**

**Staging or storage areas for equipment, materials, fuels, lubricants, and solvents, will be located outside of the stream's high water channel and associated riparian area where it cannot enter the stream channel. Stationary equipment such as motors, pumps, generators, compressors, and welders located within the dry portion of the stream channel or adjacent to the stream, will be positioned over drip-pans. Vehicles will be moved out of the normal high water area of the stream prior to refueling and lubricating. The grantee shall ensure that contamination of habitat does not occur during such operations. Prior to the onset of work, the Grantee shall provide to Grantor a plan to allow a prompt and effective response to any accidental spills. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.**

**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). 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 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 Grantor Project 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.

NMFS Approved fisheries biologists will provide fish relocation data via the Grantee to the Grantor Project Manager on a form provided by Grantor.

The Grantee shall deliver from the landowner, to the Grantor Project Manager, an executed 10-year Lake and Streambed Alteration Agreement (1600 Agreement) defining the design, construction, operation, and maintenance of the fish screen according to design standards before initiating construction of the fish screen and associated diversion facilities.

The 1600 Agreement shall identify the party responsible for maintaining the

screen to ensure that it is functioning as designed.

The responsible party must operate and maintain the fish screen project for a period not less than 10 years.

Notwithstanding Fish and Game code Section 6027, the 1600 Agreement must state that the fish screen will be operated whenever water is being diverted.

The responsible party shall operate the fish screen to effectively prevent the entrainment of fish whenever water is being diverted.

The responsible party will maintain the fish screen and bypass return so that they are functioning as designed and are meeting NMFS criteria for fish screens (criteria at time of construction).

This shall include regular inspection during operating periods (at least bi-weekly), cleaning, lubrication, replacement of worn parts, and removal of debris which may affect the operation of the screen.

The Grantee shall be required to test the screen, diversion and associated fish passage structures at no less than two life stage design flows (e.g., fall or winter flows for adult salmonids, and summer flows for juveniles).

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 or landowner will maintain the new fish passage structure, inspect the crossing in a timely manner and remove debris as necessary during the storm season.



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



**Query Criteria:** Quad (3812255) OR  (3812265) OR  (3812257) OR  (3812267) OR  (3812256) OR  (3812275) OR  (3812266) OR  (3812277) OR  (3812276)

Possible species within the Mount St. Helena Quad and surrounding quads for 725154 Yellowjacket Creek Fish Passage Improvement Project, T09N R07W S17, Sonoma County

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<b>adobe-lily</b> <i>Fritillaria pluriflora</i>	PMLIL0V0F0	None	None	G2G3	S2S3	1B.2
<b>American badger</b> <i>Taxidea taxus</i>	AMAJF04010	None	None	G5	S3	SSC
<b>American peregrine falcon</b> <i>Falco peregrinus anatum</i>	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
<b>Baker's navarretia</b> <i>Navarretia leucocephala ssp. bakeri</i>	PDPLM0C0E1	None	None	G4T2	S2	1B.1
<b>bald eagle</b> <i>Haliaeetus leucocephalus</i>	ABNKC10010	Delisted	Endangered	G5	S3	FP
<b>Barr's amphipod</b> <i>Stygobromus cherylae</i>	ICMAL05D60	None	None	G1	S1	
<b>bent-flowered fiddleneck</b> <i>Amsinckia lunaris</i>	PDBOR01070	None	None	G2G3	S2S3	1B.2
<b>Boggs Lake hedge-hyssop</b> <i>Gratiola heterosepala</i>	PDSCR0R060	None	Endangered	G2	S2	1B.2
<b>Bolander's horkelia</b> <i>Horkelia bolanderi</i>	PDR0S0W010	None	None	G1	S1	1B.2
<b>Brandege's eriastrum</b> <i>Eriastrum brandegeae</i>	PDPLM03020	None	None	G1Q	S1	1B.1
<b>Burke's goldfields</b> <i>Lasthenia burkei</i>	PDAST5L010	Endangered	Endangered	G1	S1	1B.1
<b>burrowing owl</b> <i>Athene cunicularia</i>	ABNSB10010	None	None	G4	S3	SSC
<b>California alkali grass</b> <i>Puccinellia simplex</i>	PMPOA53110	None	None	G3	S2	1B.2
<b>California freshwater shrimp</b> <i>Syncaris pacifica</i>	ICMAL27010	Endangered	Endangered	G1	S1	
<b>California giant salamander</b> <i>Dicamptodon ensatus</i>	AAAAH01020	None	None	G3	S2S3	SSC
<b>California linderiella</b> <i>Linderiella occidentalis</i>	ICBRA06010	None	None	G2G3	S2S3	
<b>California satintail</b> <i>Imperata brevifolia</i>	PMPOA3D020	None	None	G3	S3	2B.1
<b>Calistoga ceanothus</b> <i>Ceanothus divergens</i>	PDRHA04240	None	None	G2	S2	1B.2



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Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<b>Calistoga popcornflower</b> <i>Plagiobothrys strictus</i>	PDBOR0V120	Endangered	Threatened	G1	S1	1B.1
<b>Central Valley Drainage Rainbow Trout/Cyprinid Stream</b> <i>Central Valley Drainage Rainbow Trout/Cyprinid Stream</i>	CARA2422CA	None	None	GNR	SNR	
<b>Clara Hunt's milk-vetch</b> <i>Astragalus claranus</i>	PDFAB0F240	Endangered	Threatened	G1	S1	1B.1
<b>Clear Lake Drainage Resident Trout Stream</b> <i>Clear Lake Drainage Resident Trout Stream</i>	CARA2520CA	None	None	GNR	SNR	
<b>Coastal and Valley Freshwater Marsh</b> <i>Coastal and Valley Freshwater Marsh</i>	CTT52410CA	None	None	G3	S2.1	
<b>coastal bluff morning-glory</b> <i>Calystegia purpurata ssp. saxicola</i>	PDCON040D2	None	None	G4T2T3	S2S3	1B.2
<b>Cobb Mountain lupine</b> <i>Lupinus sericatus</i>	PDFAB2B3J0	None	None	G2	S2	1B.2
<b>coho salmon - central California coast ESU</b> <i>Oncorhynchus kisutch</i>	AFCHA02034	Endangered	Endangered	G4	S2?	
<b>Colusa layia</b> <i>Layia septentrionalis</i>	PDAST5N0F0	None	None	G2	S2	1B.2
<b>congested-headed hayfield tarplant</b> <i>Hemizonia congesta ssp. congesta</i>	PDAST4R065	None	None	G5T1T2	S1S2	1B.2
<b>dimorphic snapdragon</b> <i>Antirrhinum subcordatum</i>	PDSCR2S070	None	None	G3	S3	4.3
<b>dwarf downingia</b> <i>Downingia pusilla</i>	PDCAM060C0	None	None	GU	S2	2B.2
<b>dwarf soaproot</b> <i>Chlorogalum pomeridianum var. minus</i>	PMLIL0G042	None	None	G5T2T3	S2S3	1B.2
<b>early jewelflower</b> <i>Streptanthus vernalis</i>	PDBRA2G120	None	None	G1	S1	1B.2
<b>elongate copper moss</b> <i>Mielichhoferia elongata</i>	NBMUS4Q022	None	None	G5	S4	4.3
<b>few-flowered navarretia</b> <i>Navarretia leucocephala ssp. pauciflora</i>	PDPLM0C0E4	Endangered	Threatened	G4T1	S1	1B.1
<b>fisher - West Coast DPS</b> <i>Pekania pennanti</i>	AMAJF01021	Proposed Threatened	Candidate Threatened	G5T2T3Q	S2S3	SSC
<b>foothill yellow-legged frog</b> <i>Rana boylei</i>	AAABH01050	None	None	G3	S3	SSC
<b>Freed's jewelflower</b> <i>Streptanthus brachiatus ssp. hoffmanii</i>	PDBRA2G071	None	None	G2T2	S2	1B.2
<b>fringed myotis</b> <i>Myotis thysanodes</i>	AMACC01090	None	None	G4	S3	
<b>Geysers panicum</b> <i>Panicum acuminatum var. thermale</i>	PMPOA24028	None	Endangered	G5T2Q	S2	1B.2



Selected Elements by Common Name  
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Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<b>glandular western flax</b> <i>Hesperolinon adenophyllum</i>	PDLIN01010	None	None	G3	S3	1B.2
<b>great blue heron</b> <i>Ardea herodias</i>	ABNGA04010	None	None	G5	S4	
<b>green jewelflower</b> <i>Streptanthus hesperidis</i>	PDBRA2G510	None	None	G2	S2	1B.2
<b>Greene's narrow-leaved daisy</b> <i>Erigeron greenei</i>	PDAST3M5G0	None	None	G3	S3	1B.2
<b>Hall's harmonia</b> <i>Harmonia hallii</i>	PDAST650A0	None	None	G2	S2	1B.2
<b>hardhead</b> <i>Mylopharodon conocephalus</i>	AFCJB25010	None	None	G3	S3	SSC
<b>hoary bat</b> <i>Lasiurus cinereus</i>	AMACC05030	None	None	G5	S4	
<b>Hoffman's bristly jewelflower</b> <i>Streptanthus glandulosus ssp. hoffmanii</i>	PDBRA2G0J4	None	None	G4T2	S2	1B.3
<b>holly-leaved ceanothus</b> <i>Ceanothus purpureus</i>	PDRHA04160	None	None	G2	S2	1B.2
<b>Jepson's leptosiphon</b> <i>Leptosiphon jepsonii</i>	PDPLM09140	None	None	G3	S3	1B.2
<b>Jepson's milk-vetch</b> <i>Astragalus rattanii var. jepsonianus</i>	PDFAB0F7E1	None	None	G4T3	S3	1B.2
<b>Kenwood Marsh checkerbloom</b> <i>Sidalcea oregana ssp. valida</i>	PDMAL110K5	Endangered	Endangered	G5T1	S1	1B.1
<b>Konocti manzanita</b> <i>Arctostaphylos manzanita ssp. elegans</i>	PDERI04271	None	None	G5T3	S3	1B.3
<b>Lake County stonecrop</b> <i>Sedella leiocarpa</i>	PDCRA0F020	Endangered	Endangered	G1	S1	1B.1
<b>Lake County western flax</b> <i>Hesperolinon didymocarpum</i>	PDLIN01070	None	Endangered	G1	S1	1B.2
<b>legenere</b> <i>Legenere limosa</i>	PDCAM0C010	None	None	G2	S2	1B.1
<b>Loch Lomond button-celery</b> <i>Eryngium constancei</i>	PDAP10Z0W0	Endangered	Endangered	G1	S1	1B.1
<b>long-eared myotis</b> <i>Myotis evotis</i>	AMACC01070	None	None	G5	S3	
<b>many-flowered navarretia</b> <i>Navarretia leucocephala ssp. plieantha</i>	PDPLM0C0E5	Endangered	Endangered	G4T1	S1	1B.2
<b>marsh checkerbloom</b> <i>Sidalcea oregana ssp. hydrophila</i>	PDMAL110K2	None	None	G5T3	S3	1B.2
<b>marsh microseris</b> <i>Microseris paludosa</i>	PDAST6E0D0	None	None	G2	S2	1B.2





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<b>Mt. Saint Helena morning-glory</b> <i>Calystegia collina ssp. oxyphylla</i>	PDCON04032	None	None	G4T3	S3	4.2
<b>Napa blue grass</b> <i>Poa napensis</i>	PMPOA4Z1R0	Endangered	Endangered	G1	S1	1B.1
<b>Napa bluecurls</b> <i>Trichostema ruygtii</i>	PDLAM220H0	None	None	G1G2	S1S2	1B.2
<b>Napa checkerbloom</b> <i>Sidalcea hickmanii ssp. napensis</i>	PDMAL110A6	None	None	G3T1	S1	1B.1
<b>Napa false indigo</b> <i>Amorpha californica var. napensis</i>	PDFAB08012	None	None	G4T2	S2	1B.2
<b>narrow-anthered brodiaea</b> <i>Brodiaea leptandra</i>	PMLIL0C022	None	None	G3?	S3?	1B.2
<b>Navarro roach</b> <i>Lavinia symmetricus navarroensis</i>	AFCJB19023	None	None	G4T1T2	S2S3	SSC
<b>Northern Basalt Flow Vernal Pool</b> <i>Northern Basalt Flow Vernal Pool</i>	CTT44131CA	None	None	G3	S2.2	
<b>Northern Hardpan Vernal Pool</b> <i>Northern Hardpan Vernal Pool</i>	CTT44110CA	None	None	G3	S3.1	
<b>northern meadow sedge</b> <i>Carex praticola</i>	PMCYP03B20	None	None	G5	S2	2B.2
<b>Northern Vernal Pool</b> <i>Northern Vernal Pool</i>	CTT44100CA	None	None	G2	S2.1	
<b>obscure bumble bee</b> <i>Bombus caliginosus</i>	IIHYM24380	None	None	G4?	S1S2	
<b>osprey</b> <i>Pandion haliaetus</i>	ABNKC01010	None	None	G5	S4	WL
<b>oval-leaved viburnum</b> <i>Viburnum ellipticum</i>	PDCPR07080	None	None	G4G5	S3?	2B.3
<b>pallid bat</b> <i>Antrozous pallidus</i>	AMACC10010	None	None	G5	S3	SSC
<b>pappose tarplant</b> <i>Centromadia parryi ssp. parryi</i>	PDAST4R0P2	None	None	G3T2	S2	1B.2
<b>prairie falcon</b> <i>Falco mexicanus</i>	ABNKD06090	None	None	G5	S4	WL
<b>purple martin</b> <i>Progne subis</i>	ABPAU01010	None	None	G5	S3	SSC
<b>Raiche's manzanita</b> <i>Arctostaphylos stanfordiana ssp. raichei</i>	PDERI041G2	None	None	G3T2	S2	1B.1
<b>Ricksecker's water scavenger beetle</b> <i>Hydrochara rickseckeri</i>	IICOL5V010	None	None	G2?	S2?	
<b>Rincon Ridge ceanothus</b> <i>Ceanothus confusus</i>	PDRHA04220	None	None	G1	S1	1B.1



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<b>Rincon Ridge manzanita</b> <i>Arctostaphylos stanfordiana</i> ssp. <i>decumbens</i>	PDERI041G4	None	None	G3T1	S1	1B.1
<b>Russian River tule perch</b> <i>Hysterocarpus traski</i> <i>pomo</i>	AFCQK02011	None	None	G5T4	S4	SSC
<b>saline clover</b> <i>Trifolium hydrophilum</i>	PDFAB400R5	None	None	G2	S2	1B.2
<b>Santa Lucia dwarf rush</b> <i>Juncus luciensis</i>	PMJUN013J0	None	None	G3	S3	1B.2
<b>Sebastopol meadowfoam</b> <i>Limnanthes vinculans</i>	PDLIM02090	Endangered	Endangered	G1	S1	1B.1
<b>serpentine cryptantha</b> <i>Cryptantha dissita</i>	PDBOR0A0H2	None	None	G2	S2	1B.2
<b>serpentine cypress wood-boring beetle</b> <i>Trachykele hartmani</i>	IICOLX6010	None	None	G1	S1	
<b>sharp-shinned hawk</b> <i>Accipiter striatus</i>	ABNKC12020	None	None	G5	S4	WL
<b>Sharsmith's western flax</b> <i>Hesperolinon sharsmithiae</i>	PDLIN010E0	None	None	G2Q	S2	1B.2
<b>silver-haired bat</b> <i>Lasionycteris noctivagans</i>	AMACC02010	None	None	G5	S3S4	
<b>slender Orcutt grass</b> <i>Orcuttia tenuis</i>	PMPOA4G050	Threatened	Endangered	G2	S2	1B.1
<b>slender silver moss</b> <i>Anomobryum julaceum</i>	NBMUS80010	None	None	G5?	S2	4.2
<b>slender-leaved pondweed</b> <i>Stuckenia filiformis</i> ssp. <i>alpina</i>	PMPOA4G050	Threatened	Endangered	G2	S2	1B.1
<b>small pincushion navarretia</b> <i>Navarretia myersii</i> ssp. <i>deminuta</i>	PDPLM0C0X2	None	None	G2T1	S1	1B.1
<b>Snow Mountain buckwheat</b> <i>Eriogonum nervulosum</i>	PDPGN08440	None	None	G2	S2	1B.2
<b>Socrates Mine jewelflower</b> <i>Streptanthus brachiatus</i> ssp. <i>brachiatus</i>	PDBRA2G072	None	None	G2T1	S1	1B.2
<b>Sonoma beardtongue</b> <i>Penstemon newberryi</i> var. <i>sonomensis</i>	PDSCR1L483	None	None	G4T2	S2	1B.3
<b>Sonoma ceanothus</b> <i>Ceanothus sonomensis</i>	PDRHA04420	None	None	G2	S2	1B.2
<b>Sonoma sunshine</b> <i>Blennosperma bakeri</i>	PDAST1A010	Endangered	Endangered	G1	S1	1B.1
<b>steelhead - central California coast DPS</b> <i>Oncorhynchus mykiss</i> <i>irideus</i>	AFCHA0209G	Threatened	None	G5T2T3Q	S2S3	
<b>Three Peaks jewelflower</b> <i>Streptanthus morrisonii</i> ssp. <i>elatus</i>	PDBRA2G0S1	None	None	G2T2	S2	1B.2



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<b>Toren's grimmia</b> <i>Grimmia torenii</i>	NBMUS32330	None	None	G2	S2	1B.3
<b>Townsend's big-eared bat</b> <i>Corynorhinus townsendii</i>	AMACC08010	None	Candidate Threatened	G3G4	S2	SSC
<b>tricolored blackbird</b> <i>Agelaius tricolor</i>	ABPBXB0020	None	None	G2G3	S1S2	SSC
<b>two-carpellate western flax</b> <i>Hesperolinon bicarpellatum</i>	PDLIN01020	None	None	G3	S3	1B.2
<b>western bumble bee</b> <i>Bombus occidentalis</i>	IIHYM24250	None	None	G2G3	S1	
<b>western pond turtle</b> <i>Emys marmorata</i>	ARAAD02030	None	None	G3G4	S3	SSC
<b>western red bat</b> <i>Lasiurus blossevillii</i>	AMACC05060	None	None	G5	S3	SSC
<b>white-tailed kite</b> <i>Elanus leucurus</i>	ABNKC06010	None	None	G5	S3S4	FP
<b>woolly meadowfoam</b> <i>Limnanthes floccosa ssp. floccosa</i>	PDLIM02043	None	None	G4T4	S3	4.2
<b>California red-legged frog</b> <i>Rana draytonii</i>	AAABH01022	Threatened	None	G2G3	S2S3	SSC

Record Count: 112

Yellowjacket Creek Fish Passage Improvement Project  
Project Location Map  
T09R07W S17, Mount St. Helena Quad, Sonoma County

