Introduction:

The Eel River Watershed Improvement Group (ERWIG) will implement the Little Van Duzen Habitat Enhancement Project (Project). The Project will improve instream habitat for salmonids in Little Van Duzen River which is in the Van Duzen River Watershed. The Project is necessary because the lack of large wood in the stream channel has negatively affected the quality and quantity of salmonid habitat within Little Van Duzen River by reducing the amount of large channel forming features and limiting complex cover for salmonids. Adding complex large wood features improves geomorphic function by capturing spawning gravels, improving winter and summer instream refugia, backflooding off-channel habitat and improving access to floodplains.

The Permittee shall not proceed with on the ground implementation until all necessary permits, consultations and Notice to Proceed are secured. All habitat improvements will follow techniques in the *California Salmonid Stream Habitat Restoration Manual*, Part VII.

Objective(s):

This project will add 20 structures containing 57 pieces of large wood (LW) along 0.7 miles of the Little Van Duzen River. All Douglas fir logs will be sourced from live trees in the riparian and upper slopes or from the surrounding property. This project will provide habitat to summer and winter runsteelhead trout, which have been documented in the project reach. Additionally, 60 native trees will be planted in the riparian zone along the project reach.

The goal of this project is to increase steelhead reproductive success and juvenile survival by increasing pool area and depth, increasing shelter complexity, sorting substrate for spawning habitat, increasing the frequency of side channel inundation, aggrading the channel, capturing large and small wood, and providing velocity refugia during high flows. ERWIG and a qualified biologist will exclude fish and remove aquatic species from one stream crossing. An equipment operator (EO) will use an excavator to place logs according to design plans. The California Conservation Corps (CCC) will further manipulate the logs into place using a griphoist.

Project Description:

Location:

The project is located on the Little Van Duzen River. The downstream end of the project reach is approximately 2.0 miles upstream from the confluence with the Van Duzen River and approximately 0.8 miles upstream of the confluence with Burr Creek. The project reach extends 0.7 miles up the Little Van Duzen River with 20 total features in the reach. The upstream end of the project reach is 0.26

miles downstream of the confluence with Butte Creek. Center point Project coordinates are latitude 40.45427 North and longitude -123.66061 West.

Project Set Up:

ERWIG will manage all aspects of project implementation and will plant trees. Subcontractors, Edwards Excavation & Restoration (LTO and EO) will be responsible for falling trees as the source of LW. LTO and EO will also be responsible for placing logs and boulders according to design plans when equipment access is available. CCC will anchor the structures according to design and anchoring specifications. The registered professional forester will make sure trees chosen for project use are appropriate.

Materials:

The following materials will be used in the Project: Anchoring materials including one inch rebar, nuts, and plates (washers), and 57 pieces of LW sourced from live trees in the riparian and upper slopes or from the surrounding property, and 60 native trees and plant areas including Douglas fir (*Pseudotsuga menziesii*), oaks (*Quercus* sp.), red alders (*Alnus rubra*), and willow sprigs (*Salix* sp).

Tasks:

Task 1 - Site Preparation
ERWIG will finalize site specific designs based on channel morphology, equipment access, and LW availability. They will submit designs for California Department of Fish and Wildlife (CDFW) Project Manager approval. ERWIG will flag sites for wood selection, staging, and installation, clear brush as needed, and designate staging areas for wood along the project reach. Before construction begins, ERWIG and a qualified biologist will set up block nets at the stream crossing site and ERWIG will assist the biologist in aquatic species removal. Crossing will be used by an excavator as few times as possible (2-6) and by an all-terrain vehicle (ATV) in order to refuel the excavator.

Task 2 - Large Wood Structure Construction and Erosion Control
Upon approval from the CDFW Project Manager, construction will begin on 20 LW features under the direction of ERWIG. Some features may involve cutting down or uprooting trees, which will be accomplished by the LTO or the EO, respectively. The Registered Professional Forester will sign off on all trees chosen for use in the project. The EO will place downed logs into the stream in accordance with design plans. Some logs will be buried by the EO. When necessary, CCC will move logs into position using a griphoist. The project will utilize living riparian trees as anchors by wedging the logs between them where feasible. CCC will anchor the sites according to design and anchoring specifications.

Erosion control methods will be employed by the CCC as required at each structure and along equipment corridors to eliminate the possibility of sediment transport to the stream. Any tools that break down will be taken to a repair shop or replaced if necessary. ERWIG will monitor water quality as needed.

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. Consideration of the Pacific lamprey habitat will be taken, and the project will work to follow the Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (USFWS, 2010).

Task 3 - Riparian Planting
ERWIG will return in the winter following project implementation to plant 60 native trees and plants including Douglas fir (Pseudotsuga menziesii), oaks (Quercus sp.), red alders (Alnus rubra) and 300 willow sprigs (Salix species), with a primary focus in areas lacking sufficient conifer cover or riparian vegetation.

Deliverables:
Task 1 - Finalized design plans, flagged equipment access routes, pre-project photos and metrics, fish relocation report.

Task 2 - Twenty LW structures made up of 57 logs and roots. Weekly water quality monitoring reports during construction. Erosion control materials placed where riparian areas have been disturbed resulting in bare ground.

Task 3 – planting of 60 native trees and plants including Douglas fir (*Pseudotsuga menziesii*), oaks (*Quercus* sp.), red alders (*Alnus rubra*), and 300 willow sprigs (*Salix* species).

Timelines:
Task 1 – June 1 through July 10 of the following years, 2022, 2023, and 2024.

Task 2 – June 15 through October 31 of the following years, 2022, 2023 and 2024.

Task 3 – December 1 through January 31 of the 2023 and 2024.

Additional Requirements:

The Permittee 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 Permittee 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 Permittee 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 Permittee 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.

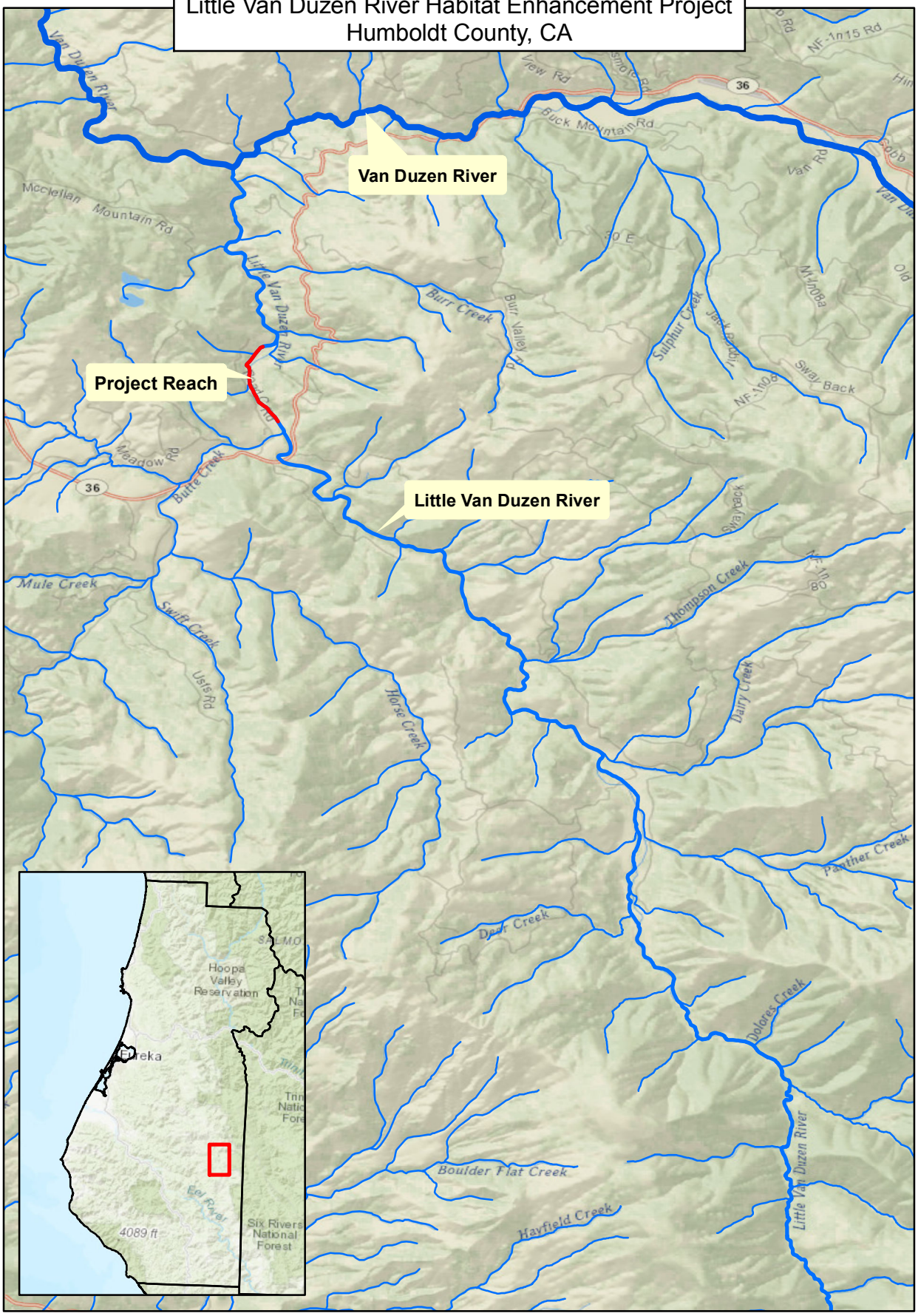
d. All electrofishing shall be performed by a qualified fisheries biologist and conducted according to the National Marine Fisheries Service, Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act, June 2000.

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

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

Watershed Map
Little Van Duzen River Habitat Enhancement Project
Humboldt County, CA



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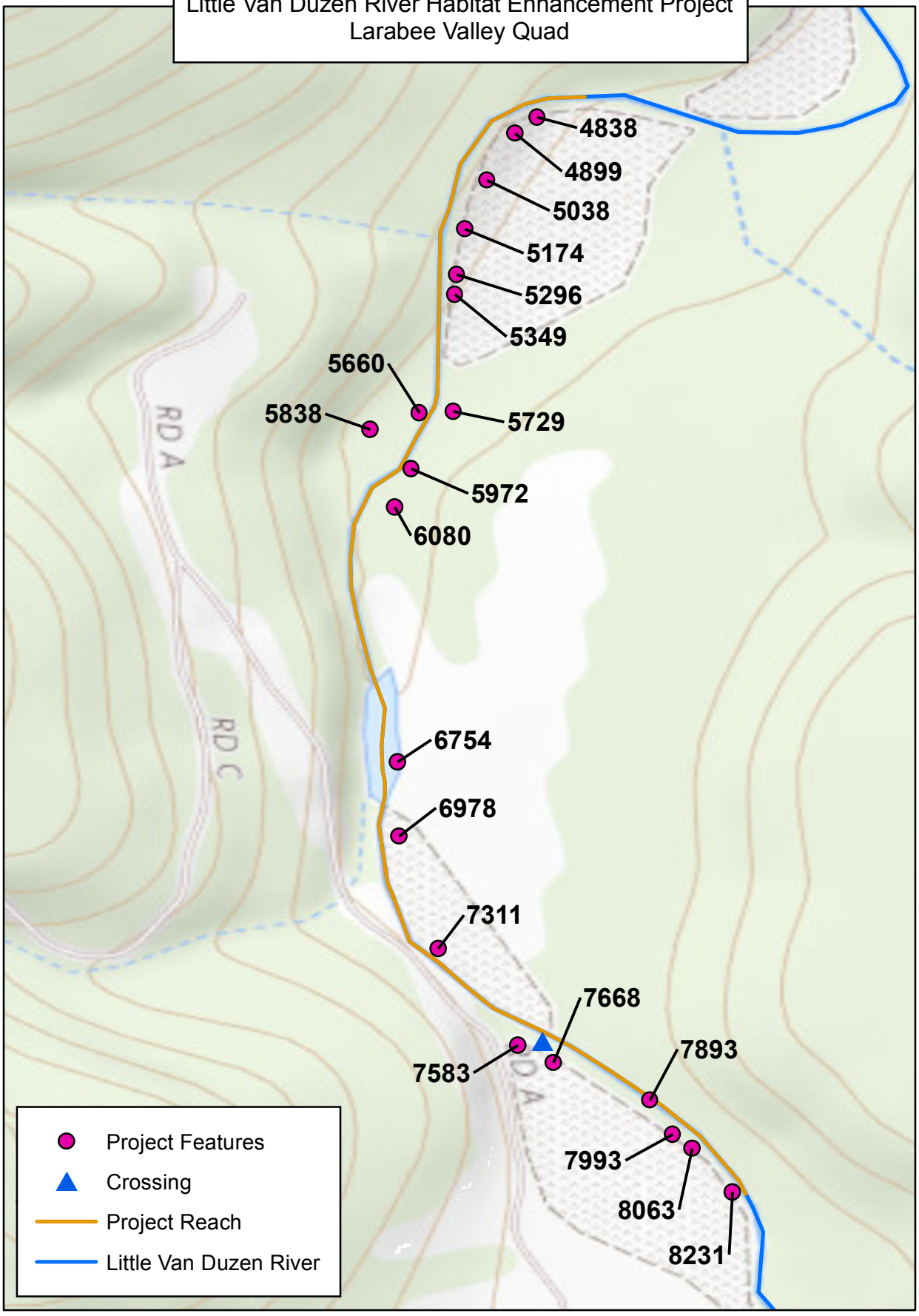
Eel River Watershed Improvement Group
April 2021

Project Location Topographic Map
Little Van Duzen River Habitat Enhancement Project
Larabee Valley Quad



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Eel River Watershed Improvement Group
April 2021

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Larabee Valley (4012346) OR Dinsmore (4012345) OR Black Lassic (4012335) OR Blocksburg (4012336) OR Myers Flat (4012337) OR Bridgeville (4012347) OR Yager Junction (4012357) OR Showers Mtn. (4012356) OR Blake Mountain (4012355))

Possible species within the Larabee Valley and surrounding quads for 1725678 - Little Van Duzen Habitat Enhancement Project, Humboldt County

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Accipiter gentilis northern goshawk	ABNKC12060	None	None	G5	S3	SSC
Ancotrema voyanum hooded lancetooth	IMGAS36130	None	None	G1G2	S1S2	
Anisocarpus scabridus scabrid alpine tarplant	PDASTDU020	None	None	G3	S3	1B.3
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Arborimus pomo Sonoma tree vole	AMAFF23030	None	None	G3	S3	SSC
Arctostaphylos manzanita ssp. elegans Konocti manzanita	PDERI04271	None	None	G5T3	S3	1B.3
Ascaphus truei Pacific tailed frog	AAABA01010	None	None	G4	S3S4	SSC
Astragalus agnicidus Humboldt County milk-vetch	PDFAB0F080	None	Endangered	G2	S2	1B.1
Astragalus umbraticus Bald Mountain milk-vetch	PDFAB0F990	None	None	G4	S2	2B.2
Atractelmis wawona Wawona riffle beetle	IICOL58010	None	None	G3	S1S2	
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	Candidate Endangered	G2G3	S1	
Calycadenia micrantha small-flowered calycadenia	PDAST1P0C0	None	None	G2	S2	1B.2
Carex praticola northern meadow sedge	PMCYP03B20	None	None	G5	S2	2B.2
Coptis laciniata Oregon goldthread	PDRAN0A020	None	None	G4?	S3?	4.2
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G4	S2	SSC
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Erethizon dorsatum North American porcupine	AMAFJ01010	None	None	G5	S3	
Erigeron maniopotamicus Mad River fleabane daisy	PDASTE1050	None	None	G2?	S2?	1B.2
Erythronium oregonum giant fawn lily	PMLIL0U0C0	None	None	G4G5	S2	2B.2
Erythronium revolutum coast fawn lily	PMLIL0U0F0	None	None	G4G5	S3	2B.2
Falco peregrinus anatum American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
Gilia capitata ssp. pacifica Pacific gilia	PDPLM040B6	None	None	G5T3	S2	1B.2
Hosackia yollabolliensis Yolla Bolly Mtns. bird's-foot trefoil	PDFAB2A1F0	None	None	G2	S2	1B.2
Howellia aquatilis water howellia	PDCAM0A010	Threatened	None	G3	S2	2B.2
Iliamna latibracteata California globe mallow	PDMAL0K040	None	None	G2G3	S2	1B.2
Kopsiopsis hookeri small groundcone	PDORO01010	None	None	G4?	S1S2	2B.3
Lathyrus biflorus two-flowered pea	PDFAB25180	None	None	G1	S1	1B.1
Lupinus constancei The Lassics lupine	PDFAB2B490	None	Endangered	G1	S1	1B.1
Lupinus elmeri South Fork Mountain lupine	PDFAB2B1G0	None	None	G2	S2	1B.2
Lycopodium clavatum running-pine	PPLYC01080	None	None	G5	S3	4.1
Martes caurina humboldtensis Humboldt marten	AMAJF01012	Threatened	Endangered	G4G5T1	S1	SSC
Meesia triquetra three-ranked hump moss	NBMUS4L020	None	None	G5	S4	4.2
Montia howellii Howell's montia	PDPOR05070	None	None	G3G4	S2	2B.2
Myotis evotis long-eared myotis	AMACC01070	None	None	G5	S3	
Myotis volans long-legged myotis	AMACC01110	None	None	G4G5	S3	
Navarretia leucocephala ssp. bakeri Baker's navarretia	PDPLM0C0E1	None	None	G4T2	S2	1B.1
North Central Coast Summer Steelhead Stream North Central Coast Summer Steelhead Stream	CARA2634CA	None	None	GNR	SNR	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Noyo intersessa Ten Mile shoulderband	IMGASC5070	None	None	G2	S2	
Oncorhynchus mykiss irideus pop. 36 summer-run steelhead trout	AFCHA0213B	None	Candidate Endangered	G5T4Q	S2	SSC
Packera bolanderi var. bolanderi seacoast ragwort	PDAST8H0H1	None	None	G4T4	S2S3	2B.2
Pandion haliaetus osprey	ABNKC01010	None	None	G5	S4	WL
Pekania pennanti Fisher	AMAJF01020	None	None	G5	S2S3	SSC
Piperia candida white-flowered rein orchid	PMORC1X050	None	None	G3	S3	1B.2
Ptilidium californicum Pacific fuzzwort	NBHEP2U010	None	None	G4G5	S3S4	4.3
Rana aurora northern red-legged frog	AAABH01021	None	None	G4	S3	SSC
Rana boylii foothill yellow-legged frog	AAABH01050	None	Endangered	G3	S3	SSC
Rhyacotriton variegatus southern torrent salamander	AAAAJ01020	None	None	G3G4	S2S3	SSC
Sabulina decumbens The Lassics sandwort	PDCAR0G0Y0	None	None	G1	S1	1B.2
Sanicula tracyi Tracy's sanicle	PDAPI1Z0K0	None	None	G4	S4	4.2
Sedum flavidum pale yellow stonecrop	PDCRA0A0L2	None	None	G3	S3	4.3
Sidalcea malachroides maple-leaved checkerbloom	PDMAL110E0	None	None	G3	S3	4.2
Sidalcea malviflora ssp. patula Siskiyou checkerbloom	PDMAL110F9	None	None	G5T2	S2	1B.2
Thermopsis robusta robust false lupine	PDFAB3Z0D0	None	None	G2	S2	1B.2
Upland Douglas Fir Forest Upland Douglas Fir Forest	CTT82420CA	None	None	G4	S3.1	
Usnea longissima Methuselah's beard lichen	NLLEC5P420	None	None	G4	S4	4.2

Record Count: 57