

# Lagunitas Creek Winter Habitat Enhancement 2016 Implementation – Phase II

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## **Introduction:**

Marin Municipal Water District (Grantee) will implement winter habitat enhancement projects that will reconnect the base flow channel to floodplain channels to provide refuge from high winter flows, allowing increased overwinter survival of juvenile coho salmon and steelhead. The projects will also enhance habitat within the main, base flow channel of Lagunitas Creek, where high flow refugia habitat will be installed. In addition, habitat enhancement features will be installed along the reconnected floodplain channels. The goal of this work is to increase the winter habitat carrying capacity for coho and steelhead in Lagunitas Creek.

Permit Disclosure: The Grantee shall not proceed with on the ground implementation until all necessary permits, consultations, and/or Notice to Proceed are secured.

The Grantee will follow techniques in the California Stream Habitat Restoration Manual (list appropriate section of manual)

## **Objective(s):**

The objective will improve winter habitat and refuge for coho, and increase the winter habitat carrying capacity for salmonids in Lagunitas Creek, by constructing habitat enhancement work at the remaining five sites identified in recently completed (2013) assessment and design reports.

## **Project Description:**

### **Location:**

The project sites are between Shafter Bridge (at the confluence of Lagunitas Creek and San Geronimo Creek) and Highway 1 Bridge (in Point Reyes Station) and are all within the Tocaloma reach of lower Lagunitas Creek and all are on lands owned by the National Park Service, Golden Gate National Recreation Area and California Department of Parks and Recreation. The approximate center of the project area is at coordinate point: 38.04980000° N lat: 122.75940000° W long. (GCS NAD83, Decimal Degrees), which corresponds to the intersection of Sir Francis Drake Blvd. and Platform Bridge Road, east of the town of Olema.

The Lagunitas Creek watershed is located in western Marin County, west of Fairfax and east of Point Reyes Station, CA. From the summit of Mt. Tamalpais, the watershed drains northwest and into Tomales Bay. The portion of Lagunitas Creek watershed included in this proposal is between Shafter Bridge (at the confluence of Lagunitas Creek & San Geronimo Creek) and the Highway 1

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Bridge (in Point Reyes Station). The project work will be implemented in the Tocaloma reach of lower Lagunitas Creek, which is in the vicinity of the intersection of Sir Francis Drake Blvd and Platform Bridge Road.

### **Project Set Up:**

The (Grantee) will construct winter habitat enhancement projects at five (5) sites within the Lagunitas Creek watershed. The project sites are referred to as:

- Site #1 – Big Bend Log Deflector Vanes (4 vanes installed);
- Site #2 – Big Bend Bar Apex Jam (1 apex jam installed);
- Site #7 – Fern Rock Log Debris Retention Jams (4 retention jams installed);
- Site #8 – 449 Creek Log Debris Retention Jam and Bar Apex Jam (1 retention, 1 apex jam installed); and
- Site #9 – Olema Creek Log Cross-vane and Log Debris Retention Jams (1 cross-vane, 6 retention jams installed).

Implementation will entail construction of the enhancement sites to the engineered design plans and specifications provided in the following design documents previously reviewed and approved by CDFW/FRGP Engineering staff:

- Basis of Design Report for the Lagunitas Creek Salmonid Winter Habitat Enhancement Project (Kamman Hydrology & Engineering, Inc. 2014)

### **Materials:**

- Logs with rootwads (weir logs and anchor logs; referred to as Caltrans rootwads);
- Logs;
- Pinning logs;
- Plants;
- Creek diversion materials (cofferdams constructed of sand bags, gravel bags, or similar, visqueen, flexible hose, PVC pipe, and/or sheet piling).

### **Tasks:**

#### Project Tasks

With these guidelines established, the site specific projects have been designed. Implementation will involve the project tasks described below.

#### Task 1 – Engineering Consultation

Grantee will consult with a licensed professional to provide engineering, hydrology, and design services, as needed, through the completion of environmental compliance and project construction. Grantee anticipates some onsite construction monitoring services will be needed and it is possible that

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design modifications could become necessary through the environmental review, permitting, and construction implementation. These services will be conducted under the supervision of a licensed engineer, and these costs are included in the budget under Personnel Services and Engineering Consultant Services.

### Task 2 – Environmental Compliance and Landowner Approval

Grantee expects the California Department of Fish and Wildlife (CDFW) will be the lead CEQA agency for this project. Grantee will collaborate with CDFW through the CEQA review, since the Grantee has obtained considerable information on the sensitive resources of Lagunitas Creek.

Grantee will obtain a CDFW 1600 Streambed Alteration Agreement and project approval from the landowners: National Park Service and State Parks. National Park Service approval will necessitate compliance with the National Environmental Policy Act (NEPA). Grantee will conduct the environmental review needed to complete the 1600 application and NEPA review, which the Grantee anticipates including botanical and wildlife surveys (specifically shrimp, bird, and bat surveys). State Parks approval will be completed through a Right of Entry agreement, which is not expected to necessitate any additional environmental review.

Lagunitas Creek provides habitat for four federally listed species: coho salmon, steelhead, CA red-legged frogs, and CA freshwater shrimp. Pre-construction surveys for red-legged frogs will be conducted by Grantee's Aquatic Ecologist. In the unlikely event of encountering red-legged frogs, frogs will be relocated to suitable habitat downstream, as authorized by US Fish and Wildlife Service.

Coho salmon, steelhead, and California freshwater shrimp occur in the Tocaloma reach of Lagunitas Creek and have been well documented by annual surveys, sponsored by the Grantee. Project site dewatering will likely be a construction impact salmonids and shrimp and their habitat. Mitigation measures for impacts and avoidance of salmonids and freshwater shrimp will need to be developed for the project.

Northern spotted owls are also known to breed near the project area and construction activities will be limited to the owl non-breeding season, August 1 to October 31. In addition, the State Parks portion of the project area (i.e., Sites #1 and #2) is within designated critical habitat for marbled murrelet but prior surveys through Lagunitas Creek have not identified any marbled murrelet breeding. Other species and sensitive biological resources that will need to be addressed include: California red-legged frog, marbled murrelet, western pond turtle, foothill yellow-legged frog, raptors, nesting birds, and bats. Cultural resource issues will also be addressed.

## Task 3 – Construction Contracting

Grantee will select a contractor for construction implementation through a competitive bidding process with qualified contractors. Contractor qualifications will be developed prior to putting the project out to bid. Grantee will perform all construction contract management, which will include onsite monitoring during construction implementation.

## Task 4 – Project Construction Implementation

Project site construction will be implemented as specified in the Project Site Plans, for five sites identified as Site #'s 1, 2, 7, 8, and 9. The site specific construction activities are listed below for each site.

Site #1 – Big Bend Log Deflector Vanes (aka Log Diversion Vanes) Construction elements will include:

- Mobilization/Demobilization
- Materials Delivery
- Clear Vegetation
- Equipment Access Route
- Creek Diversion
- Log Deflector Vane (aka Diversion Vane and Rootwad Revetment) Installation
- Revegetation

Winter habitat enhancement work at this site will include construction of four Log Deflector Vanes (aka Log Diversion Vanes). This work will require creek diversion and there will be site revegetation. These elements are described below.

Deflector Vanes are based on a “bendway weir” design that consists of a core two log pinned by two smaller logs structure (see attached project site plans, Sheets C1 and C11). The structure is designed to invoke channel migration. A total of four Deflector Vanes will installed from either bank, depending on how the channel is to be directed. Deflector vanes are space at 80-foot intervals – equal to approximately 5-times the bankfull channel width to mimic natural riffle-pool spacing. As a secondary benefit, where possible, Deflector Vane installations will be strategically placed just upstream and on the opposite bank from existing large trees in order to direct flow and increase scour and pool depth at the base of the trees. Each Deflector Vane consists of a bottom “weir” log and an upper “anchor” log. The weir log is placed in the creek and aligned pointing upstream at an angle of 60-degrees from the host bank. The upstream end of the log is also angled slightly downward and buried into the channel bed. The rootwad end is keyed into the channel bank. The exposed (non-buried) portion of the weir log

spans from  $\frac{1}{2}$  to  $\frac{3}{4}$  of the bankfull channel width. The weir log acts to deflect the bankfull flow. The anchor log acts to pin or secure the weir log. The rootwad end of the anchor log is keyed into the same host bank, protruding into the creek (at a 90-degree angle from bank) and lying across the top of the weir log. The exposed portion of the anchor log spans roughly  $\frac{1}{3}$  the bankfull channel width and also acts to obstruct flow. The logs cross each other at a 30-degree angle. Two smaller diameter pinning logs (posts driven vertically) were added to the core deflector structure to increase stability and provide additional scour protection.

Clear water creek diversion will be needed because flow in Lagunitas Creek is perennial with expected baseflows estimated at 8.0-cfs during the summer construction season. A significant consideration during construction will be minimizing impacts on creek water quality and aquatic habitat when disturbing channel bed and banks. Diverting water around construction areas is the best approach to minimizing impacts. Cofferdams constructed of sand bags, gravel bags, or similar and secured with visqueen will be constructed and keyed in at creek channel upstream of the work area. Water will be pumped or flow by gravity from the upstream side of the cofferdam through one or more flexible hose or PVC pipe that will run the work area then back into the creek at an outfall located downstream from the work area. Alternative clear water diversions may include installing sheet piling to segregate and dewater only a portion of the creek channel. Additional details on creek diversions is described in the Basis for Design Report, incorporated into this scope of work by reference.

## Site #2 – Big Bend Bar Apex Jam

Construction elements will include:

- Mobilization/Demobilization
- Materials Delivery
- Clear Vegetation
- Equipment Access Route
- Creek Diversion
- Construction Dewatering
- Bar Apex Jam Construction
- High Flow Channel Improvements
- Revegetation

Winter habitat enhancement work at this site includes construction of one Bar Apex Jam and High Flow Channel improvements. This work will require creek diversion and construction dewatering and there will be site revegetation. The Bar Apex Jam, High Flow Channel Improvements, and construction dewatering

are described below, and the creek diversion will be as described for Site #1, above.

The general theory and design of Log Bar Apex Jams (BAJ) comes from efforts to restore forested islands and create floodplain side channels (McHenry et al., 2007; Abbe and Montgomery, 1996) in the Pacific Northwest. The design of the BAJ is based on natural log jams in large rivers. For purposes of this project, BAJs are being used to rejuvenate and increase the magnitude, frequency and duration of flow through existing high flow channels on the Lagunitas Creek floodplain. This is achieved by constructing an appropriately located large wood structure that will reduce channel conveyance area and raise (backwater) levels to more easily split and deflect high flows between the mainstem channel and floodplain side channel. The BAJ at Site #2 (and at Site #8 described below) will be located on the mainstem Lagunitas Creek at existing side channel entrance locations.

High flow channel enhancement entails wood debris removal and excavation. During construction, some large wood and vegetation debris removal will be completed along the alignments of targeted high flow side channels to enhance the initial flow of water and energy through them. This material will also serve as rack for BAJ construction. Typically, short alluvial levees have formed across the mouth of side channel inlets. Very limited excavation and lowering of these features may be implemented to enhance the exchange of water from mainstem to side channel, only if excavated material can be reused in construction of log structures.

Dewatering is anticipated for the construction of the BAJ at Site #2 (and Site #8 described below) because the creek channel is composed of alluvium. Dewatering systems shall be designed during construction based on site-specific conditions. The construction contractor will be required to dewater construction areas to provide for proper excavation and filling. Although dewatering methods are left to the discretion of the contractor, the contractor shall prepare a dewatering plan to be approved by the construction manager prior to beginning work. The dewatering system will employ best management practices and be maintained in a manner that will not cause adverse disturbance to water quality and the environment. Additional details on dewatering are described in the Basis for Design Report, incorporated into this scope of work by reference.

Site #7 – Fern Rock Log Debris Retention Jams  
Construction elements will include:

- Mobilization/Demobilization
- Materials Delivery
- Clear Vegetation

- Equipment Access Route
- Creek Diversion
- Log Debris Retention Jam Construction
- High Flow Channel Improvements
- Revegetation

Winter habitat enhancement work at this site includes construction of four log retention jams and high flow channel improvements. This work requires creek diversion and construction dewatering and there will be site revegetation. The log retention jams are described below, the creek diversion will be as described for Site #1, above, and the high flow channel improvements are as described for Site #2, above.

Log Debris Retention Jam (LDRJ) are designed to be channel spanning array/line of logs driven vertically into the bed that will act as a sieve to capture and retain woody debris and ultimately sediment. These structures have been termed “trashracks” and “flood fencing”. For this project, the Grantee will pre-install large wood cross-pieces (horizontal) to accelerate their performance. The desired function of these structures is to ultimately raise local channel bed grades and raise water elevations in the channel and along banks to backwater overbank flows into existing side-channels. Log Debris Retention Jams (LDRJs) are more passive than the BAJs and are selected in channel reaches that are narrower and more entrenched relative to the adjacent floodplain surface.

Site #8 – 449 Creek Log Debris Retention Jam and Bar Apex Jam

Construction elements will include:

- Mobilization/Demobilization
- Materials Delivery 20
- Clear Vegetation
- Equipment Access Route
- Creek Diversion
- Construction Dewatering
- Bar Apex Jam Construction
- Log Debris Retention Jam Construction
- High Flow Channel Improvements
- Revegetation

Winter habitat enhancement work at this site will include construction of a log debris retention jam, a bar apex jam and high flow channel improvements. This work will require creek diversion and construction dewatering and there will be site revegetation; these elements will be as described for Sites #1 and #2, above.

## Site #9 – Olema Creek Log Cross-Vane and Creek Log Debris Retention Jams

Construction elements will include:

- Mobilization/Demobilization
- Materials Delivery
- Clear Vegetation
- Equipment Access Route
- Creek Diversion
- Construction Dewatering
- Log Debris Retention Jam Construction
- Log Cross-Vane Construction
- Revegetation

Winter habitat enhancement work at this site will include construction of a log cross-vane as described below, and six creek log debris retention jams, as described for Sites #7 and #8. This work will require creek diversion and construction dewatering and there will be site revegetation; these elements will be as described for Sites #1 and #2 above.

A single log cross-vane will be installed at the upstream end of the Olema Creek reach to act as a bed grade control structure upstream of an existing knick-point. This structure is intended to provide a hardpoint to resist erosion. It will be used in combination with a LDRJ installed downstream of the knickpoint as a grade control structure that will act as a hydraulic control, creating backwater conditions to reduce energy gradients, reduce erosion and act to trap debris and sediment.

Construction oversight and inspections will be performed daily during any construction activities. The Construction Inspector will ensure that the construction is following the project plans and specification. As part of the inspections, project site photographs will be taken from established photo points.

### Task 5 – Post Longitudinal Profile

The intent and an outcome of the project will be to alter and create variability in the channel grades of the stream bed, in the vicinity of the installed LWD structures. Therefore, post-construction longitudinal profile surveys are warranted and will be conducted. The long profiles will span the entire length of project reaches, as follows:

- Sites 1-2 (Big Bend) = 800’;
- Site 7 (Fern Rock) = 1000’;
- Site 8 (449 Creek) = 500’; and
- Site 9 (Olema Creek) = 900’.



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The longitudinal profiles will be submitted with the Final Report of the grant agreement.

The post-construction longitudinal profile will be compared against the project site topographic surveys that were conducted for the project site plans. The post-construction longitudinal profile, through the mainstem Lagunitas Creek sites (Site #1, #2, #7, and #8), will also be compared against a 2009 longitudinal profile survey of Lagunitas Creek, that ran through the entire project area reach.

## Task 6 – Project Management and Administration

This task includes all activities associated with managing and administering the grant-funded project, providing annual project status reports and invoicing for grant reimbursements, and writing and submitting a Final Report at the conclusion of the project.

### **Deliverables:**

Lagunitas Creek Watershed Winter Habitat Enhancement Implementation – Phase I, will produce the following deliverables listed below.

#### Task 2 – Environmental Compliance and Landowner Approval

Deliverables for this task include:

- CDFW 1600 Streambed Alteration Agreement;
- National Park Service Project Approval
- State Parks Right of Entry Agreement
- Botanical survey report
- Wildlife survey report

#### Task 3 – Construction Contracting

Deliverables for this task include:

- Contractor qualifications and bid package
- Construction contract

#### Task 4

- Site #1 – Big Bend Log Deflector Vanes
- Site #2 – Big Bend Bar Apex Jam
- Site #7 – Fern Rock Log Debris Retention Jams
- Site #8 – 449 Creek Log Debris Retention Jam and Bar Apex Jam
- Site #9 – Olema Creek Log Cross-Vane and Creek Log Debris Retention Jam

Additional Task 4 deliverables:

- Construction Management contract
- Project site construction photographs – photos from all five sites

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## Task 5 – Post Longitudinal Profile

Deliverables for this task include:

- Post-construction longitudinal survey data
- Post-construction longitudinal profile plots

## Task 6 – Project Management and Administration

Deliverables for this task include:

- Periodic status report as requested
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- A. Final grant completion report.

### **Timelines:**

Project activities will begin in the summer of 2016 and will continue for three years, until the summer of 2019. The proposed work will occur according to the following schedule:

- July 2016 – July 2017: Task 1 – Engineering Consultation
- July 2016 – July 2017: Task 2 – Environmental Compliance & National Park Service Approval
- May 2017 – August 2017: Task 3 – Construction Contracting
- August 2017 – November 2018: Task 4 – Project Construction Implementation
- June 2019 – Nov. 2019: Task 5 – Post Longitudinal Profile
- July 2016 – March 2020: Task 6 – Project Management and Administration

### **Additional Requirements:**

1. 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.
2. 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:
  - Fish relocation and dewatering activities shall only occur between June 15 and October 31 of each year.

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- The Grantee shall minimize the amount of wetted stream channel dewatered at each individual project site to the fullest extent possible.
  - 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.
  - The Grantee will provide fish relocation data to the Grantor Project Manager on a form provided by the Grantor.
  - 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*.
3. 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.
  4. 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.

California Department of Fish and Game  
Natural Diversity Database  
Selected Elements by Common Name - Portrait  
724702 Lagunitas Creek Winter Habitat Enhancement Implementation - Phase II  
M 02N 08W Section 05  
Marin County

Common Name/Scientific Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1 American badger <i>Taxidea taxus</i>	AMAJF04010			G5	S3	SC
2 Baker's goldfields <i>Lasthenia californica ssp. bakeri</i>	PDAST5L0C4			G3TH	SH	1B.2
3 Baker's larkspur <i>Delphinium bakeri</i>	PDRAN0B050	Endangered	Endangered	G1	S1	1B.1
4 Blasdale's bent grass <i>Agrostis blasdalei</i>	PMPOA04060			G2	S2	1B.2
5 Bolander's water-hemlock <i>Cicuta maculata var. bolanderi</i>	PDAP10M051			G5T3T4	S2	2B.1
6 California beaked-rush <i>Rhynchospora californica</i>	PMCYP0N060			G1	S1	1B.1
7 California black rail <i>Laterallus jamaicensis coturniculus</i>	ABNME03041		Threatened	G3G4T1	S1	
8 California clapper rail <i>Rallus longirostris obsoletus</i>	ABNME05016	Endangered	Endangered	G5T1	S1	
9 California freshwater shrimp <i>Syncaris pacifica</i>	ICMAL27010	Endangered	Endangered	G1	S1	
10 California giant salamander <i>Dicamptodon ensatus</i>	AAAAH01020			G3	S2S3	
11 California red-legged frog <i>Rana draytonii</i>	AAABH01022	Threatened		G2G3	S2S3	SC
12 California tiger salamander <i>Ambystoma californiense</i>	AAAAA01180	Threatened	Threatened	G2G3	S2S3	SC
13 Central Dune Scrub	CTT21320CA			G2	S2.2	
14 Coastal Terrace Prairie	CTT41100CA			G2	S2.1	
15 Coastal and Valley Freshwater Marsh	CTT52410CA			G3	S2.1	
16 Franciscan onion <i>Allium peninsulare var. franciscanum</i>	PMLIL021R1			G5T1	S1	1B.2
17 Franciscan thistle <i>Cirsium andrewsii</i>	PDAST2E050			G3	S3	1B.2
18 Humboldt Bay owl's-clover <i>Castilleja ambigua var. humboldtiensis</i>	PDSCR0D402			G4T2	S2	1B.2
19 Kellogg's horkelia <i>Horkelia cuneata var. sericea</i>	PDROS0W043			G4T2	S2?	1B.1
20 Koch's cord moss <i>Entosthodon kochii</i>	NBMUS2P050			G2	S2	1B.3
21 Lyngbye's sedge <i>Carex lyngbyei</i>	PMCYP037Y0			G5	S2	2B.2
22 Marin County navarretia <i>Navarretia rosulata</i>	PDPLM0C0Z0			G2	S2	1B.2
23 Marin checker lily <i>Fritillaria lanceolata var. tristulis</i>	PMLIL0V0P1			G5T2	S2	1B.1

California Department of Fish and Game  
Natural Diversity Database  
Selected Elements by Common Name - Portrait  
724702 Lagunitas Creek Winter Habitat Enhancement Implementation - Phase II  
M 02N 08W Section 05  
Marin County

Common Name/Scientific Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
24 Marin checkerbloom <i>Sidalcea hickmanii</i> ssp. <i>viridis</i>	PDMAL110A4			G3T1T2	S1S2	1B.3
25 Marin elfin butterfly <i>Callophrys mossii</i> <i>marinensis</i>	IILEPE2207			G4T1	S1	
26 Marin hesperian <i>Vespericola</i> <i>marinensis</i>	IMGASA4140			G2	S2	
27 Marin knotweed <i>Polygonum</i> <i>marinense</i>	PDPGN0L1C0			G2Q	S2	3.1
28 Marin manzanita <i>Arctostaphylos</i> <i>virgata</i>	PDERI041K0			G2	S2	1B.2
29 Marin western flax <i>Hesperolinon</i> <i>congestum</i>	PDLIN01060	Threatened	Threatened	G2	S2	1B.1
30 Mason's ceanothus <i>Ceanothus</i> <i>masonii</i>	PDRHA04200		Rare	G1	S1	1B.2
31 Mason's lilaeopsis <i>Lilaeopsis</i> <i>masonii</i>	PDAPI19030		Rare	G2	S2	1B.1
32 Mt. Tamalpais bristly jewelflower <i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i>	PDBRA2G0J2			G4T2	S2	1B.2
33 Mt. Tamalpais manzanita <i>Arctostaphylos</i> <i>montana</i> ssp. <i>montana</i>	PDERI040J5			G3T3	S3	1B.3
34 Mt. Tamalpais thistle <i>Cirsium hydrophilum</i> var. <i>vaseyi</i>	PDAST2E1G2			G2T2	S2	1B.2
35 Mt. Vision ceanothus <i>Ceanothus gloriosus</i> var. <i>porrectus</i>	PDRHA040F7			G4T2	S2	1B.3
36 Myrtle's silverspot butterfly <i>Speyeria zerene</i> <i>myrtleae</i>	IILEPJ608C	Endangered		G5T1	S1	
37 Napa false indigo <i>Amorpha californica</i> var. <i>napensis</i>	PDFAB08012			G4T2	S2	1B.2
38 North Coast phacelia <i>Phacelia insularis</i> var. <i>continentis</i>	PDHYD0C2B1			G2T2	S2	1B.2
39 North Coast semaphore grass <i>Pleuropogon</i> <i>hooverianus</i>	PMPOA4Y070		Threatened	G2	S2	1B.1
40 Northern Coastal Salt Marsh	CTT52110CA			G3	S3.2	
41 Northern Maritime Chaparral	CTT37C10CA			G1	S1.2	
42 Northern Vernal Pool	CTT44100CA			G2	S2.1	
43 Opler's longhorn moth <i>Adela oplerella</i>	IILEE0G040			G2	S2	
44 Peninsula coast range shoulderband <i>Helminthoglypta</i> <i>nickliniana</i> <i>awania</i>	IMGASC2361			G3T1	S1	
45 Petaluma popcornflower <i>Plagiobothrys</i> <i>mollis</i> var. <i>vestitus</i>	PDBOR0V0Q2			G4?TX	SX	1A
46 Pitkin Marsh lily <i>Lilium pardalinum</i> ssp. <i>pitkinense</i>	PMLIL1A0H3	Endangered	Endangered	G5T1	S1	1B.1

California Department of Fish and Game  
Natural Diversity Database  
Selected Elements by Common Name - Portrait  
724702 Lagunitas Creek Winter Habitat Enhancement Implementation - Phase II  
M 02N 08W Section 05  
Marin County

Common Name/Scientific Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
47 Point Reyes blennosperma <i>Blennosperma nanum var. robustum</i>	PDAST1A022		Rare	G4T2	S2	1B.2
48 Point Reyes blue butterfly <i>Plebejus icarioides parapheres</i>	IILEPG801D			G5T1T2	S1S2	
49 Point Reyes checkerbloom <i>Sidalcea calycosa ssp. rhizomata</i>	PDMAL11012			G5T2	S2	1B.2
50 Point Reyes horkelia <i>Horkelia marinensis</i>	PDROS0W0B0			G2	S2	1B.2
51 Point Reyes jumping mouse <i>Zapus trinotatus orarius</i>	AMAFH01031			G5T1T3Q	S1S3	SC
52 Point Reyes meadowfoam <i>Limnanthes douglasii ssp. sulphurea</i>	PDLIM02038		Endangered	G4T2	S2	1B.2
53 Point Reyes mountain beaver <i>Aplodontia rufa phaea</i>	AMAF01012			G5T2	S2	SC
54 Point Reyes paintbrush <i>Castilleja leschkeana</i>	PDSCR0D1R0			GH	SH	1A
55 Point Reyes rein orchid <i>Piperia elegans ssp. decurtata</i>	PMORC1X011			G4T1	S1	1B.1
56 Point Reyes salty bird's-beak <i>Chloropyron maritimum ssp. palustre</i>	PDSCR0J0C3			G4?T2	S2	1B.2
57 Raiche's red ribbons <i>Clarkia concinna ssp. raichei</i>	PDONA050A2			G5?T1	S1	1B.1
58 Ricksecker's water scavenger beetle <i>Hydrochara rickseckeri</i>	IICOL5V010			G2?	S2?	
59 Sacramento splittail <i>Pogonichthys macrolepidotus</i>	AFCJB34020			GNR	S3	SC
60 San Bruno elfin butterfly <i>Callophrys mossii bayensis</i>	IILEPE2202	Endangered		G4T1	S1	
61 San Francisco Bay Area leaf-cutter bee <i>Trachusa gummifera</i>	IHYM80010			G1	S1	
62 San Francisco Bay spineflower <i>Chorizanthe cuspidata var. cuspidata</i>	PDPGN04081			G2T1	S1	1B.2
63 San Francisco forktail damselfly <i>Ischnura gemina</i>	IIDOD72010			G2	S2	
64 San Francisco owl's-clover <i>Triphysaria floribunda</i>	PDSCR2T010			G2	S2	1B.2
65 San Pablo song sparrow <i>Melospiza melodia samuelis</i>	ABPBXA301W			G5T2?	S2?	SC
66 Serpentine Bunchgrass	CTT42130CA			G2	S2.2	
67 Sonoma alopecurus <i>Alopecurus aequalis var. sonomensis</i>	PMPOA07012	Endangered		G5T1Q	S1	1B.1
68 Sonoma spineflower <i>Chorizanthe valida</i>	PDPGN040V0	Endangered	Endangered	G1	S1	1B.1
69 Swainson's hawk <i>Buteo swainsoni</i>	ABNKC19070		Threatened	G5	S3	

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70 Tamalpais jewelflower <i>Streptanthus batrachopus</i>	PDBRA2G050			G1	S1	1B.3
71 Tamalpais lessingia <i>Lessingia micradenia</i> var. <i>micradenia</i>	PDAST5S063			G2T1T2	S1S2	1B.2
72 Tamalpais oak <i>Quercus parvula</i> var. <i>tamalpaisensis</i>	PDFAG051Q3			G4T2	S2	1B.3
73 Thurber's reed grass <i>Calamagrostis crassiglumis</i>	PMPOA17070			G3Q	S2?	2B.1
74 Tiburon buckwheat <i>Eriogonum luteolum</i> var. <i>caninum</i>	PDPGN083S1			G5T2	S2	1B.2
75 Tiburon paintbrush <i>Castilleja affinis</i> var. <i>neglecta</i>	PDSCR0D013	Endangered	Threatened	G4G5T1	S1	1B.2
76 Tidestrom's lupine <i>Lupinus tidestromii</i>	PDFAB2B3Y0	Endangered	Endangered	G1	S1	1B.1
77 Tomales isopod <i>Caecidotea tomalensis</i>	ICMAL01220			G2	S2	
78 Tomales roach <i>Lavinia symmetricus</i> ssp. 2	AFCJB19022			G4T2T3	S2S3	SC
79 Townsend's big-eared bat <i>Corynorhinus townsendii</i>	AMACC08010		Candidate Threatened	G3G4	S2	SC
80 Williams' bronze shoulderband <i>Helminthoglypta stiversiana williamsi</i>	IMGASC2034			G2G3T1	S1	
81 alkali milk-vetch <i>Astragalus tener</i> var. <i>tener</i>	PDFAB0F8R1			G2T2	S2	1B.2
82 ashy storm-petrel <i>Oceanodroma homochroa</i>	ABNDC04030			G2	S2	SC
83 beach layia <i>Layia carmosa</i>	PDAST5N010	Endangered	Endangered	G2	S2	1B.1
84 bent-flowered fiddleneck <i>Amsinckia lunaris</i>	PDBOR01070			G2?	S2?	1B.2
85 black swift <i>Cypseloides niger</i>	ABNUA01010			G4	S2	SC
86 blue coast gilia <i>Gilia capitata</i> ssp. <i>chamissonis</i>	PDPLM040B3			G5T2	S2	1B.1
87 bluff wallflower <i>Erysimum concinnum</i>	PDBRA160E3			G3	S3	1B.2
88 bristle-stalked sedge <i>Carex leptalea</i>	PMCYP037E0			G5	S1	2B.2
89 bumblebee scarab beetle <i>Lichnanthe ursina</i>	IICOL67020			G2	S2	
90 burrowing owl <i>Athene cunicularia</i>	ABNSB10010			G4	S3	SC
91 coast lily <i>Lilium maritimum</i>	PMLIL1A0C0			G2	S2	1B.1

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92 coast yellow leptosiphon <i>Leptosiphon croceus</i>	PDPLM09170			G1	S1	1B.1
93 coastal bluff morning-glory <i>Calystegia purpurata ssp. saxicola</i>	PDCON040D2			G4T2T3	S2S3	1B.2
94 coastal marsh milk-vetch <i>Astragalus pycnostachyus var. pycnostachyus</i>	PDFAB0F7B2			G2T2	S2	1B.2
95 coastal triquetrella <i>Triquetrella californica</i>	NBMUS7S010			G2	S2	1B.2
96 coho salmon - central California coast ESU <i>Oncorhynchus kisutch</i>	AFCHA02034	Endangered	Endangered	G4	S2?	
97 congested-headed hayfield tarplant <i>Hemizonia congesta ssp. congesta</i>	PDAST4R065			G5T1T2	S1S2	1B.2
98 dark-eyed gilia <i>Gilia millefoliata</i>	PDPLM04130			G2	S2	1B.2
99 elongate copper moss <i>Mielichhoferia elongata</i>	NBMUS4Q022			G4	S3	2B.2
100 foothill yellow-legged frog <i>Rana boylei</i>	AAABH01050			G3	S3	SC
101 fragrant fritillary <i>Fritillaria liliacea</i>	PMLIL0V0C0			G2	S2	1B.2
102 globose dune beetle <i>Coelus globosus</i>	IICOL4A010			G1G2	S1S2	
103 golden larkspur <i>Delphinium luteum</i>	PDRAN0B0Z0	Endangered	Rare	G1	S1	1B.1
104 great blue heron <i>Ardea herodias</i>	ABNGA04010			G5	S4	
105 great egret <i>Ardea alba</i>	ABNGA04040			G5	S4	
106 hoary bat <i>Lasiurus cinereus</i>	AMACC05030			G5	S4	
107 longfin smelt <i>Spirinchus thaleichthys</i>	AFCHB03010	Candidate	Threatened	G5	S1	SC
108 marbled murrelet <i>Brachyramphus marmoratus</i>	ABNNN06010	Threatened	Endangered	G3G4	S1	
109 marsh microseris <i>Microseris paludosa</i>	PDAST6E0D0			G2	S2	1B.2
110 monarch - California overwintering population <i>Danaus plexippus pop. 1</i>	IILEPP2012			G4T2T3	S2S3	
111 northern curly-leaved monardella <i>Monardella sinuata ssp. nigrescens</i>	PDLAM18162			G3T2	S2	1B.2
112 northern harrier <i>Circus cyaneus</i>	ABNKC11010			G5	S3	SC
113 northern spotted owl <i>Strix occidentalis caurina</i>	ABNSB12011	Threatened	Candidate Threatened	G3T3	S2S3	SC



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114 obscure bumble bee <i>Bombus caliginosus</i>	IHYM24380			G4?	S1S2	
115 osprey <i>Pandion haliaetus</i>	ABNKC01010			G5	S4	
116 pallid bat <i>Antrozous pallidus</i>	AMACC10010			G5	S3	SC
117 perennial goldfields <i>Lasthenia californica ssp. macrantha</i>	PDAST5L0C5			G3T2	S2	1B.2
118 pink sand-verbena <i>Abronia umbellata var. breviflora</i>	PDNYC010N4			G4G5T2	S1	1B.1
119 purple-stemmed checkerbloom <i>Sidalcea malviflora ssp. purpurea</i>	PDMAL110FL			G5T1	S1	1B.2
120 robust walker <i>Pomatiopsis binneyi</i>	IMGASJ9010			G1	S1	
121 rose leptosiphon <i>Leptosiphon rosaceus</i>	PDPLM09180			G1	S1	1B.1
122 round-leaved filaree <i>California macrophylla</i>	PDGER01070			G3?	S3?	1B.2
123 saltmarsh common yellowthroat <i>Geothlypis trichas sinuosa</i>	ABPBX1201A			G5T3	S3	SC
124 sandy beach tiger beetle <i>Cicindela hirticollis gravida</i>	IICOL02101			G5T2	S1	
125 seaside bittercress <i>Cardamine angulata</i>	PDBRA0K010			G5	S1	2B.1
126 short-leaved evax <i>Hesper-evax sparsiflora var. brevifolia</i>	PDASTE5011			G4T3	S2	1B.2
127 silver-haired bat <i>Lasionycteris noctivagans</i>	AMACC02010			G5	S3S4	
128 steelhead - central California coast DPS <i>Oncorhynchus mykiss irideus</i>	AFCHA0209G	Threatened		G5T2T3Q	S2S3	
129 supple daisy <i>Erigeron supplex</i>	PDAST3M3Z0			G2	S2	1B.2
130 swamp harebell <i>Campanula californica</i>	PDCAM02060			G3	S3	1B.2
131 thin-lobed horkelia <i>Horkelia tenuiloba</i>	PDROS0W0E0			G2	S2	1B.2
132 tidewater goby <i>Eucyclogobius newberryi</i>	AFCQN04010	Endangered		G3	S3	SC
133 tricolored blackbird <i>Agelaius tricolor</i>	ABPBXB0020			G2G3	S1S2	SC
134 tufted puffin <i>Fratercula cirrhata</i>	ABNNN12010			G5	S1S2	SC
135 two-fork clover <i>Trifolium amoenum</i>	PDFAB40040	Endangered		G1	S1	1B.1

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136 water star-grass <i>Heteranthera dubia</i>	PMPON03010			G5	S1	2B.2
137 western leatherwood <i>Dirca occidentalis</i>	PDTHY03010			G2	S2	1B.2
138 western pond turtle <i>Emys marmorata</i>	ARAAD02030			G3G4	S3	SC
139 western red bat <i>Lasiurus blossevillii</i>	AMACC05060			G5	S3	SC
140 western snowy plover <i>Charadrius alexandrinus nivosus</i>	ABNNB03031	Threatened		G3T3	S2	SC
141 whiteworm lichen <i>Thamnolia vermicularis</i>	NLTES43860			G3G5	S1	2B.1
142 woolly-headed gilia <i>Gilia capitata ssp. tomentosa</i>	PDPLM040B9			G5T2	S2	1B.1
143 woolly-headed spineflower <i>Chorizanthe cuspidata var. villosa</i>	PDPGN04082			G2T2	S2	1B.2
144 yellow warbler <i>Setophaga petechia</i>	ABPBX03010			G5	S3S4	SC

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