

MITIGATED NEGATIVE DECLARATION

FOR

SALMONID RESTORATION FEDERATION
MARSHALL RANCH STREAMFLOW ENHANCEMENT PROJECT

August 2019

Lead Agency:
County of Humboldt



Lead Agency Contact:
Joshua Dorris
Planner
County of Humboldt, Planning Division
3015 H Street
Eureka, CA 95501
(707) 268-3703

DRAFT

TABLE OF CONTENTS

I.	PROJECT SUMMARY	4
II.	PROJECT INTRODUCTION AND BACKGROUND	7
IV.	ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED	18
V.	REFERENCES	51

APPENDICES

- Appendix A: Biological Resources Technical Report for the Marshall Ranch Streamflow Enhancement Project, Humboldt County, California (Stillwater Sciences, August 2019)
- Appendix B: Mitigation Measures, Monitoring and Reporting Program for the Marshall Ranch Streamflow Enhancement Project (Stillwater Sciences, August 2019)
- Appendix C: A Cultural Resources Investigation for the Marshall Ranch Flow Enhancement Project, Brice Land, Humboldt County, California. (William Rich and Associates Cultural Resources Consultants, September 2019)

I. PROJECT SUMMARY

Date: August 2019

Project Title: Marshall Ranch Streamflow Enhancement Project

Lead Agency: County of Humboldt

Lead Agency

Contact: Joshua Dorris
Planner
County of Humboldt, Planning Division
3015 H Street
Eureka, CA 95501
(707) 268-3703

Applicant: Salmonid Restoration Federation
425 Snug Alley, Unit D
Eureka, CA 95501
SRF@calsalmon.org

Contact: Dana Stolzman
707-923-7501 #
srf@calsalmon.org

Preparers: Joshua Dorris, Planner
3015 H Street, Eureka, CA 95501
(707) 445-7541

Stillwater Sciences
Joel Monschke
850 G Street, Suite K, Arcata, CA 95521
707-496-7075

**Current General
Plan Designation:** County of Humboldt APN 220-061-011-000
• Residential Agriculture (RA)

Current Zoning: County of Humboldt
• Unclassified (U)

**Property Owners
And Parcels:**

Humboldt County				
Landowner	Location	Parcel #	Contact	Phone
Velma V. Marshall Estate	Marshall Ranch, Briceland, CA	220-061-011	David Sanchez	707-223-3946

Project Description:

The Salmonid Restoration Federation (SRF) is planning to construct a 16-million-gallon reservoir on the Marshall Ranch, adjacent to Redwood Creek, a tributary to the South Fork Eel River. This Project seeks to improve habitat for coho salmon (*Oncorhynchus kisutch*) and steelhead (*Oncorhynchus mykiss*) in Redwood Creek, an important salmon bearing tributary, by addressing the limiting factor of low summer streamflows. The reservoir has been sited and designed to fill during the winter wet season and release its stored water directly to Redwood Creek throughout the summer dry season.

The South Fork Eel River is one of five priority watersheds selected for flow enhancement projects in California by the State Water Resources Control Board (SWRCB) and California Department of Fish and Wildlife (CDFW) as part of the California Water Action Plan effort (SWRCB 2019). Redwood Creek is a critical tributary to the South Fork Eel River (NMFS, 2014) that historically supported coho and chinook salmon (*Oncorhynchus tshawytscha*) and steelhead.

Coho salmon stocks in the South Fork Eel River Watershed may have historically constituted one of the largest populations of the species in California (NMFS, 2014). Sadly, their population has experienced a precipitous decline, with an approximately 1200% reduction observed between the 1930's and 1991 (BLM et al. 1996, Brown and Moyle 1991). Today, the population remains highly depressed, with the National Marine Fisheries Service assigning a moderate risk of extinction to the Southern Oregon and Northern California Evolutionarily Significant Unit (SONCC ESU). This ESU is currently listed as threatened under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA).

Numerous factors are responsible for the declines in coho salmon abundance, and many of these limiting factors are also impacting chinook salmon and steelhead, which are also severely depressed in abundance relative to historical population estimates. Land use practices including logging and road systems have greatly increased winter runoff resulting in decreased groundwater storage and lower summer streamflows. Widespread removal of large wood from streams has also decreased groundwater storage through channel incision and loss of floodplain connectivity and resulted in fewer and shallower instream pools that are of insufficient size to withstand drought. Cannabis cultivation has also expanded in the last 15 years, which has resulted in increased water diversions that have affected area watercourses and summer stream flows. Industrial logging practices combined with fire suppression have resulted in overly dense even aged forests with higher evapotranspiration rates which significantly contribute to lower dry season flows. The problems of reduced groundwater storage and increased evapotranspiration are intensified in a longer dry season. In low flow years, Redwood Creek has experienced dry conditions at two of the four mainstem Redwood Creek flow gages downstream from the proposed flow enhancement site.

The proposed Project includes construction of a 16 million gallon off-channel pond, cooling gallery, associated pipelines and diversion pump station (requiring Appropriative Water Rights), ancillary water storage and supply for domestic use and fire suppression, erosion control structures within intermittent streams, instream habitat enhancement structures along the Redwood Creek mainstem, and a solar energy generation system to provide revenue to cover the long-term operations and maintenance of the Project.

The Project would provide significant, measurable benefits in terms of dry season flow enhancement for coho salmon, steelhead, and other aquatic habitat along the 5.5 miles (mi) of Redwood Creek mainstem downstream from the Project. The Project is designed to deliver approximately 50 gallons per minute (GPM) of high-quality water during the five month dry season, which will be wholly dedicated to instream values including reasonable and beneficial fish and wildlife uses of the water. Quantifiable long-term objectives include increased summer streamflow, enhanced fish and wildlife habitat, and improved water quality.

Baseline Conditions: The lands surrounding the project consist of private holdings, small family farms, forests used for timber production, conserved lands owned by federal and state agencies, non- profits, and sustainable forestry landowners. The proposed pond construction site is an ancient fluvial terrace primarily covered by grassland utilized for livestock grazing. The grassland is flanked to the east and west by intermittent drainages hosting corridors of bigleaf maple forest alliance. These drainages are incised and actively eroding, exporting deleterious fine sediment to Redwood Creek. Redwood Creek also exhibits anthropogenic degradation as it is incised and lacks large wood relative to historical conditions (CDFW 2014). Over the last several years, Redwood Creek has experienced completely dry conditions at two of the four mainstem Redwood Creek flow gages downstream from the proposed flow enhancement site (Stillwater Sciences, 2019).

Other Public Agencies Whose Approval Is or May Be Required (permits, financing approval, or participation agreement): U.S Army Corps of Engineers, National Marine Fisheries Service, U. S. Fish and Wildlife Service, North Coast Regional Water Quality Control Board, State Water Resources Control Board, California Department of Fish and Wildlife.

CEQA Requirement:

The Project is subject to the requirements of the California Environmental Quality Act (CEQA). The Lead Agency is the County of Humboldt (County), per CEQA Guidelines Section 21067. The purpose of this Initial Study (IS) is to provide a basis for determining whether to prepare an Environmental Impact Report (EIR) or a Negative Declaration. This Initial Study is intended to satisfy the requirements of CEQA (Public Resources Code, Div 13, Sec 21000-21177) and the State CEQA Guidelines (California Code of Regulations, Title 14, Sec 15000-15387).

CEQA encourages lead agencies and applicants to modify their projects to avoid potentially significant adverse impacts (CEQA Section 20180[c][2] and State CEQA Guidelines Section 15070[b][2]).

Section 15063(d) of the State CEQA Guidelines states that an IS shall contain the following information in brief form:

- 1) A description of the project including the project location
- 2) Identification of the environmental setting

- 3) Identification of environmental effects by use of a checklist, matrix, or other method, provided that entries on a checklist or other form are briefly explained to provide evidence to support the entries
- 4) Discussion of means to mitigate significant effects identified
- 5) Examination of whether the project would be consistent with existing zoning, plans, and other applicable land use controls
- 6) The name of the person or persons who prepared and/or participated in the IS

The Finding: Although the projects may have the potential to cause minor short-term impacts on soil, vegetation, wildlife, water quality, and aquatic life, the measures that shall be incorporated into the project will lessen such impacts to a level that is less than significant (see initial study and environmental impacts checklist).

Basis for the Finding: Based on the initial study, it was determined there would be no significant adverse environmental effects resulting from implementing the proposed project. The project is designed to provide environmental benefit by enhancing and maintaining quality salmonid spawning and rearing habitat in the project area and downstream through augmentation of dry season stream flows.

Humboldt County finds that implementing the proposed projects will have no significant environmental impact. Therefore, this mitigated negative declaration is filed pursuant to the California Environmental Quality Act (CEQA), Public Resources Code § 21080 (c2). This proposed mitigated negative declaration consists of all of the following:

II. PROJECT INTRODUCTION AND BACKGROUND

INTRODUCTION

PROJECT SEQUENCE – PERMITTING, FUNDING AND IMPLEMENTATION

The Project aims to secure implementation funding from the CA Wildlife Conservation Board (WCB) Proposition 1 Streamflow Enhancement Program. The Project may also in the future aim to secure funding from other sources including (but not limited to) State Coastal Conservancy (SCC) Proposition 1, California Department of Fish and Wildlife (CDFW) Fisheries Restoration Grant Program (FRGP), Department of Water Resources (DWR) Proposition 1, and CDFW and WCB Proposition 68 Programs. These projects are subject to review under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.).

While the implementation may be funded by different sources over several years, the planning and permitting of the entire Project is funded by the WCB Proposition 1 Streamflow Enhancement Program and the documents that follow address the entire Project. This Initial Study and the MND describe and analyze the potential significant impacts of all Project treatments at all sites. Individual restoration activities will require additional environmental permitting from CDFW, State Water Resources Control Board (SWRCB), North Coast Regional Water Quality Control Board (NCRWQCB), and federal agencies. These individual restoration activities will also include monitoring and analysis of outcomes. It is anticipated that the majority of the implementation will occur during the period of June – October 2021, with the potential for some lesser amounts of work to occur in 2020 and 2022.

PROJECT GOAL AND OBJECTIVES

The primary goal of the Project is to maintain vital salmonid rearing habitat in Redwood Creek through flow augmentation during the dry summer months. Creation and operation of the reservoir has the potential to prevent the drying of stream reaches and resulting salmonid mortality. The reservoir is anticipated to be a valuable management tool that can help improve resiliency of fish stocks to challenging environmental conditions. In addition to flow augmentation, rock weirs and large wood placements will improve fish habitat, and gully stabilization will reduce the delivery of fine sediment to Redwood Creek.

The Project addresses the goals of important statewide plans including the following:

The Project directly addresses the goals of the California Water Action Plan (SWRCB, 2019) and will ensure the restoration of critically important habitat. The Project supports the following actions: 1) Restoration of degraded stream ecosystems to assist in natural water management and improved habitat; 2) Enhancement of water flows in stream systems statewide; 3) Expansion of water storage capacity and improvement of groundwater management; and 4) Management and preparation for dry periods.

The Project addresses Goal B of the WCB strategic plan (WCB, 2014): Work with partners to restore and enhance natural areas, create viable habitat on working lands, manage adaptively, and ensure long-term ecosystem health and strategic direction. It also addresses goal B.1: Invest in projects and landscape areas that help provide resilience in the face of climate change, enhance water resources for fish and wildlife and enhance habitats on working lands. The Project includes a collaborative team of partners, will improve habitat on adjacent

sustainable forestry working land, will include adaptive management, and will help ensure long term ecosystem health and resilience to climate change related drought as well as intensified rainfall events.

The Project also aligns with Goal 2 of the State Wildlife Action Plan (CDFW, 2015) – Enhance Ecosystem Conditions, and Goal 3 – Enhance Ecosystem Functions and Processes: Maintain and improve ecological conditions vital for sustaining ecosystems in California. Most specifically, the project improves the hydrologic regime and increases water quantity and availability vital for sustaining ecosystems.

NOAA Fisheries has prioritized a list of recovery actions for coho salmon in the South Fork Eel River Population chapter of their SONCC Recovery Plan (NMFS, 2014). The proposed strategy universal to the top 10 priority actions is listed as “Improve flow timing or volume.” Additionally, Redwood Creek is repeatedly identified as a “stream where coho would benefit immediately,” and afforded high priority among areas of the South Fork Eel River watershed. While specific action items for this strategy primarily focus on diversion reduction to improve flows, the Project's reservoir surely utilizes the same strategy to accomplish a common goal. Additionally, components of the project do align with specific action items in the recovery plan:

Strategy: Increase Channel Complexity

- SONCC-SFER.2.1.1.2 Place instream structures, guided by assessment results
- SONCC-SFER.2.2.3.1 Identify potential sites to create refugia habitats. Prioritize sites and determine best means to create rearing habitat

Strategy: Decrease water temperature, increase dissolved oxygen

- SONCC-SFER.10.1.48.2 Add LWD, boulders, or sources of structure as guided by assessment to augment habitat at cool water sources

Relevant project actions: Construction of 2 boulder weirs and 4 large wood structures.

Strategy: Reduce delivery of sediment to streams

- SONCC-SFER.8.1.15.3 Upgrade roads, guided by assessment

Relevant project actions: Culvert replacements, installation of drainage features, and surface treatments along the project access road.

The Project will incorporate post-project flow monitoring to measure project benefits and address potential concerns through adaptive management.

Finally, it is SRF's objective to implement this project while not causing a significant adverse effect on the environment, or reducing the number or restricting the range of an endangered, threatened, or rare species. To this end, SRF has formed a working group Technical Advisory Committee (TAC) to provide input needed to ensure avoidance of adverse impacts while achieving the project objectives. The TAC will include representatives from the WCB, CDFW, NOAA, SWRCB, and NCRWQCB.

BACKGROUND

Salmonid Restoration Federation (SRF) is a statewide non-profit organization that promotes restoration and recovery of wild salmon populations through education, outreach, and advocacy. Since 2013, SRF has been conducting low-flow monitoring and community outreach in the 26 square-mile Redwood Creek watershed that is a tributary to the South Fork Eel River.

SRF's low-flow monitoring and targeted outreach campaign was initially funded by the Humboldt Area Foundation (HAF) and CDFW. In 2014, SRF received a NCRWQCB 319(h) grant that enabled development of a Quality Assurance Project Plan for the monitoring project that included data loggers to capture continuous flow data. This grant allowed SRF to work with a prominent consulting hydrologist (Randy Klein) who oversaw our monitoring plan, developed discharge rating curves, and wrote a preliminary hydrology report that informed our planning efforts.

In 2015, SRF received a grant from the CDFW's Drought Solicitation that funded our organization to hire Stillwater Sciences to conduct a feasibility study investigating what types of flow enhancement actions were most likely to increase dry season flows within a portion of Redwood Creek and the Miller Creek sub-watershed. The feasibility study resulted in a prioritized list of actions, with the Marshall Ranch site (described herein as the Project) identified as the project with the greatest potential to increase dry-season flows.

A productive partnership between SRF, Stillwater Sciences, the Marshall Ranch and Hicks Law, as well as support from representatives from multiple state agencies including WCB, CDFW, NOAA, NCRWQCB, and SWRCB, has enabled this planning project to move forward expeditiously. Two additional team members have been brought onto the Project to support the planning and design efforts: SHN Engineers and Geologists to provide support for the geotechnical investigation and engineering design of hydraulic appurtenances, and William Rich and Associates to assess cultural resources.

This project will be integrated alongside a conservation easement encompassing the Marshall Ranch ownership managed by California Rangeland Trust. This conservation easement will prevent the subdivision and sale of the majority of the ranch. These restrictions will be especially beneficial in this area, where small subdivisions are frequently used for cannabis cultivation with detrimental impacts to water quality and supply, and fish and wildlife habitat.

SRF currently has three Wildlife Conservation Board streamflow enhancement planning grants including the grant to develop the Marshall Ranch implementation project.

Additionally, SRF's Executive Director, Dana Stolzman, has written a Collaborative Water Management guidebook to assist other coastal watersheds in flow enhancement planning efforts. This resource can be found at http://www.calsalmon.org/sites/default/files/files/CWM_Final_Report.pdf

SRF was also awarded the 2018 Water Quality Stewardship Award from the North Coast Regional Water Quality Control Board for "exemplary work in advancing the science and practice of stream restoration and salmonid protections on the North Coast."

SRF is excited to be the project proponent of the Marshall Ranch planning and implementation project. We believe that our years of work in this critical tributary and our history of working with this outstanding project team will be a valuable asset to see this restoration project to completion.

Project Planning and Design

Over the past year, the project team has conducted project planning and assessments including topographic surveys, subsurface investigations, biological and cultural resource surveys and reports, pre-project flow monitoring and preparation of 30% and 65% design plans. Agency input has been sought including a field trip to the project sites.

Project design is based on the best available science and is informed by the California Salmonid Stream Habitat Restoration Manual (Flosi et al. 2010) and Ponds – Planning, Design, Construction (USDA 1997). Additionally, the Project is informed by scientific studies and streamflow enhancement techniques that have been used in the Mattole and Russian River watersheds.

Specifically, there are several examples analogous to this Project where stored water is used to directly augment dry-season streamflow. Flow releases from two different agricultural ponds and one municipal groundwater well to tributaries of the Russian River in Sonoma County exhibit encouraging results. As described in Ruiz et al. (2019), the project began in 2015 and is ongoing. Data show that flow augmentations in all years from 2015-2018 were able to appreciably increase wetted habitat, increase stream water dissolved oxygen, and decrease stream water temperature below the stored flow release points. Additionally, releases into Dutch Bill Creek averaging 36 GPM beginning in late August of 2015 were able to cumulatively re-wet more than 2,300 feet of stream channel with effects measurable up to 1.8 miles downstream.

While modest compared to winter flows, these augmentations have the potential to increase pool connectivity and water quality. A foundational hypothesis for this Project, that increased pool connectivity will bolster over-summer salmonid survival, is supported by the work of Obedzinski, Pierce, Horton, and Deitch (2018). Their study found that days of disconnected surface flow showed a strong negative correlation with juvenile coho salmon survival rate in 4 tributaries to the Russian River. Provided this evidence, it is anticipated that the Project's release of approximately 50 GPM into Redwood Creek throughout the dry season can result in significant habitat benefit.

III. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a **"Potentially Significant Impact"** as indicated by the checklist on the following pages.

- | | | |
|--|--|---|
| <input type="checkbox"/> Aesthetics | <input type="checkbox"/> Agricultural and Forestry Resources | <input type="checkbox"/> Air Quality |
| <input checked="" type="checkbox"/> Biological Resources | <input checked="" type="checkbox"/> Cultural Resources | <input checked="" type="checkbox"/> Geology/Soils |
| <input type="checkbox"/> Greenhouse Gas Emissions | <input checked="" type="checkbox"/> Hazards/Hazardous Materials | <input checked="" type="checkbox"/> Hydrology/Water Quality |
| <input type="checkbox"/> Land Use/Planning | <input type="checkbox"/> Mineral Resources | <input type="checkbox"/> Public Services |
| <input checked="" type="checkbox"/> Noise | <input type="checkbox"/> Population/Housing | <input checked="" type="checkbox"/> Tribal Cultural Resources |
| <input type="checkbox"/> Recreation | <input type="checkbox"/> Transportation/Traffic | |
| <input type="checkbox"/> Utilities/Service | <input checked="" type="checkbox"/> Mandatory Findings of Significance | |

An explanation for all checklist responses is included, and all answers take into account the whole action involved, including off-site as well as on-site; cumulative as well as project-level; indirect as well as direct; and construction as well as operational impacts. In the checklist the following definitions are used:

"Potentially Significant Impact" means there is substantial evidence that an effect may be significant.

"Potentially Significant Unless Mitigation Incorporated" means the incorporation of one or more mitigation measures can reduce the effect from potentially significant to a less than significant level.

"Less Than Significant Impact" means that the effect is less than significant and no mitigation is necessary to reduce the impact to a lesser level.

"No Impact" means that the effect does not apply to the Project, or clearly will not impact nor be impacted by the Project.

DETERMINATION: (To be completed by the Lead Agency on the basis of this initial evaluation)

- ☐ I find that the proposed project **could not** have a significant effect on the environment, and a **Negative Declaration** will be prepared.
- ☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A **Mitigated Negative Declaration** will be prepared.
- ☐ I find that the proposed project **may** have a significant effect on the environment, and an **Environmental Impact Report** (EIR) is required.
- ☐ I find that the proposed project **may** have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An **Environmental Impact Report** is required, but it must analyze only those effects that remain to be addressed.
- ☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier **EIR** or **Negative Declaration** pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier **EIR** or **Negative Declaration**, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature

10/18/2019

Date

Joshua Dorris, Planner

For Humboldt County Planning
and Building Department

EVALUATION OF ENVIRONMENTAL IMPACTS

- 1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each questions. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
- 2) All answers must take account of the whole action involved, including offsite as well as onsite, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
- 3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.
- 4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).
- 5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
 - a) Earlier Analysis Used. Identify and state where they are available for review.
 - b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
 - c) Mitigation Measures. For effects that are "Less Than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
- 6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

- 7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
- 8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
- 9) The analysis of each issue should identify:
 - a) the significance criteria or threshold used to evaluate each question; and
 - b) the mitigation measure identified, if any, to reduce the impact to less than significance.

DRAFT

I. Aesthetics. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?			X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?			X	
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?			X	

Discussion:

(a) Less Than Significant Impact: The project will not have a significant effect on a scenic vista. Such an impact will not occur because the project will entail the creation of an aesthetically pleasing water feature which will only be partially visible from Briceland Road and adjacent parcels. Instream work will not be visible from a distance and will serve to restore those areas to a more natural condition.

(b) No Impact: The project will not damage scenic resources such as trees, rock outcroppings, and historic buildings. Such an impact will not occur because the project will not disturb large trees or other scenic features.

(c) Less Than Significant Impact: The project will not substantially degrade the existing visual character or quality of the work sites and their surroundings. Such an impact will not occur because in most cases the restoration project will restore the natural character of disturbed sites. Where non-natural structures such as the reservoir, solar array, and water storage tank are constructed, they will be located such that they will be compatible with the appearance of their surroundings. In addition, planting of native trees, shrubs and other vegetation will be performed at all sites where vegetation has been removed.

(d) Less Than Significant Impact: The project will not create a new source of substantial light which would adversely affect day or nighttime views in the area of the worksites. Such an impact will not occur because none of the restoration project action items requires installation of artificial lighting. It is possible that some glare may be created by the solar panels, however, given the southern orientation of the panels and the lack of development to the south of the reservoir, it will not have a significant impact.

II. Agriculture and Forestry Resources. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?			X	

Discussion:

(a) No Impact: The project will not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program (FMMP) of the California Resources Agency, to non-agricultural use. Such an impact will not occur because all project worksites are located away from FMMP designated farmland.

(b) No Impact: The project will not conflict with existing zoning for agricultural use or a Williamson Act contract.

(c) No Impact: The project will not conflict with existing zoning for, or cause rezoning of, forestland, timberland, or timber zoned Timberland Production.

(d) No Impact: No trees will be removed and no loss or conversion of forest land will occur.

(e) Less Than Significant Impact: The project will not involve other changes in the existing environment, which due to their location or nature, could result in significant conversion of farmland to non-agricultural use. Fisheries habitat restoration actions either are away from, or are compatible with, existing agricultural uses. The proposed reservoir is located in an open grassland and will utilize some of the space that could be used for agriculture. However, it represents a very small percentage of the overall ranch ownership. Additionally, the project design will allow for future cattle grazing within the project footprint, (following several years of revegetation) and will also enhance water availability for livestock while reducing livestock impacts to watercourses via fencing.

DRAFT

III. Air Quality. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?				X
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?				X
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?				X
d) Expose sensitive receptors to substantial pollutant concentrations?				X
e) Create objectionable odors affecting a substantial number of people?				X

Discussion:

(a) No Impact: The project will not conflict with or obstruct implementation of the applicable air quality plan. Such an impact will not occur because implementation of the project does not create any features that would be a source of air pollution.

The work window for restoration activities is generally limited from June 15 to November 1. Under a worst-case scenario, the most work that a project can have in a single field season is eighteen weeks and the most number of years a project has to be completed is four years. Based on the worst-case scenario, each restoration activity will not likely adversely affect air quality plans with the use of vehicle and heavy equipment because of the short duration of each restoration activity. For most projects, work does not occur for the entire eighteen-week field season and most restoration activities do not take four years to implement. In addition, projects do not need to be implemented in consecutive years. Thus, the amount of time it takes to complete a restoration activity varies. Additionally, not all projects require the use of heavy equipment (although heavy equipment may be used to transport materials to the work site) and not all projects occur simultaneously. Calculating the emissions from a single restoration activity to use as an example would not be representative of the other restoration activities for the reasons listed above.

(b) No Impact: The project will not violate any air quality standard or contribute substantially to an existing or projected air quality violation. Such an impact will not occur because of the limited scope of construction activities and the fact that work sites are located in rural areas that are in overall attainment of air quality standards.

(c) No Impact: The project will not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors). Such an impact will not occur because the project involves no ongoing sources of air pollution.

(d) No Impact: The project will not expose sensitive receptors to substantial pollutant concentrations. Such an impact will not occur because the project will not increase pollutant concentrations and is designed in part to reduce sediment pollution in Redwood Creek through bank stabilization measures.

(e) No Impact: The project will not create objectionable odors affecting a substantial number of people.

DRAFT

IV. Biological Resources. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		X		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		X		
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X

Discussion:

(a) Less Than Significant with Mitigation Incorporated: The project will not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife (CDFW), National Oceanic and Atmospheric Administration (NOAA) or U.S. Fish and Wildlife Service (USFWS). Such an impact will not occur because project activities are designed to improve and restore natural hydrologic functions, stream habitat, and provide a long-term benefit to both anadromous salmonids and other fish and wildlife. The project will be implemented in a manner that will avoid short-term adverse impacts to rare plants and animals. Mitigation measures will ensure that any potentially significant impacts are avoided or mitigated to below a level of significance. Species of concern within or adjacent to the Project area are discussed in Appendix A: Biological Resources Technical Report for the Marshall Ranch Streamflow Enhancement Project, Humboldt County, California. Specific mitigation and minimization measures pertinent to those species are discussed in Appendix B: Mitigation Measures, Monitoring and Reporting Program for the Marshall Ranch Streamflow Enhancement Project.

(b) Less than Significant Impact with Mitigation Incorporated: The project will not have a substantial adverse effect on any riparian habitat or other sensitive natural communities

identified in local or regional plans, policies and regulations, or by the California Department of Fish and Wildlife or U. S. Fish and Wildlife Service. Such an impact is unlikely to occur because the project actions are designed to correct past habitat degradation and restore and enhance riparian habitat. In accordance with typical environmental permit conditions, construction is allowed during the summer dry season (generally June 15-November 1) to avoid impacts to aquatic habitats. Work that is permitted after November 1 is limited to hand planting of seedlings. Planting of seedlings generally occurs after December 1, or when there is sufficient rainfall to ensure the best survival rate of the seedlings.

Some minor disturbance of grasses and shrubs will occur where proposed instream structures are keyed into the stream banks. Riparian vegetation will be reestablished where construction activities disturb existing plants, and additional native plants will be planted to enhance the riparian vegetation. Mitigation measures to avoid impacts to riparian habitat are found in Appendix B, Section 2, IV. Biological Resources. Furthermore, the CDFW LSAA will include project-specific terms and conditions that set out reasonable measures determined by CDFW to be necessary to protect fish and wildlife resources that may be affected by the project. Most of the Project disturbance will occur outside of the riparian zone and thus will not impact riparian vegetation.

(c) No impact: The project will not have a substantial adverse effect on federally protected wetlands as defined by § 404 of the Clean Water Act as there are no USACE jurisdictional wetlands within the project area. Two small state jurisdictional isolated wetlands have been mapped on the parcel (Appendix A, Figure 5-1) but will not be disturbed as the result of any proposed project. The project actions will have either no effect on wetlands or will be beneficial to wetlands.

(d) Less Than Significant Impact: The project will not substantially interfere with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. The project will improve the movement of anadromous fish through dry season flow augmentation and construction of large wood and boulder habitat enhancement structures. All of the grade control structures will comply with fish passage guidelines. The habitat structures will additionally enhance rearing habitat.

(e) No Impact: The project will not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. Such an impact will not occur because project actions are designed to restore and enhance biological resources. The Humboldt County Streamside Management Area Ordinance requires a Special Permit for all activities within Streamside Management Areas. This project has been submitted to the Humboldt County Planning Department with a Special Permit application as needed to allow for the project activities within the Streamside Management Areas.

(f) No Impact: The project will not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan. Such a conflict will not occur because the project restoration actions will not have a significant adverse impact on any species or habitat. Project actions are designed to restore the natural character of the fish and wildlife habitat at the project work sites. The project specifically supports the California Salmon, Steelhead Trout and Anadromous Fisheries Program Act (Fish and Game Code § 6900 et. seq.).

Mitigation Measures:

Specific mitigation measures can be found in Appendix B, Section 2, IV. Biological Resources (A-D). These measures include **A)** General Measures for Protection of Biological Resources. **B)** Specific Measures for Endangered, Rare, or Threatened Species That Could Occur at Specific Work Sites. **C)** Riparian and Re-vegetation. **D)** Invasive Bullfrog Avoidance and Management

DRAFT

V. Cultural Resources. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?		X		
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?		X		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X		
d) Disturb any human remains, including those interred outside of formal cemeteries?		X		

Discussion:

(a) Less Than Significant with Mitigation Incorporated: The project will not cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines § 15064.5. While ground disturbance will be required to implement the project at some work sites that have the potential to affect historical resources, this potential impact will be avoided through implementation of the protective measures presented in Appendix B and Appendix C. Resources identified during site-specific surveys will be protected before ground-disturbing activities are permitted at a site. As a result, any potentially significant impacts will be avoided or mitigated to below a level of significance.

(b) Less Than Significant with Mitigation Incorporated: The project will not cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines § 15064.5. While ground disturbance will be required to implement the project at some work sites that have the potential to affect archaeological resources, this potential impact will be avoided through implementation of the protective measures presented in Appendix B and Appendix C for all work sites. Resources identified during site-specific surveys will be protected before ground-disturbing activities are permitted at a site and an archeological monitor will be present during excavation in critical areas. As a result, mitigation measures will ensure that any potentially significant impacts are avoided or mitigated to below a level of significance.

(c) Less Than Significant with Mitigation Incorporated: The project will not directly or indirectly destroy any unique paleontological resources or sites, or unique geologic features. While ground disturbance to implement the project at some work sites has the potential to affect these resources, this potential impact will be avoided through implementation of the protective measures presented in Appendix B and Appendix C. Resources identified during site-specific surveys will be protected before ground-disturbing activities are permitted at a site. As a result, mitigation measures will ensure that any potentially significant impacts are avoided or mitigated to below a level of significance.

(d) Less Than Significant with Mitigation Incorporated: The project is highly unlikely to disturb any human remains, including those interred outside of formal cemeteries. While ground disturbance will be required to implement the project at some work sites that have the potential to affect these resources, this potential impact will be avoided through implementation of the protective measures presented in Appendix B and Appendix C for all work sites. Resources identified during site-specific surveys will be protected before ground-disturbing activities are permitted at a site and an archeological monitor will be present during excavation in critical areas. As a result,

mitigation measures will ensure that any potentially significant impacts are avoided or mitigated to below a level of significance.

Mitigation Measures:

Specific Mitigation Measures can be found in Appendix B, Section 2, V. Cultural Resources (1-9) and in Appendix C.

DRAFT

VI. Geology and Soils. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				X
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
ii) Strong seismic ground shaking?				X
iii) Seismic-related ground failure, including liquefaction?				X
iv) Landslides?				X
b) Result in substantial soil erosion or the loss of topsoil?		X		
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?		X		
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?			X	
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				X

Discussion:

(a) (i-iv) No impact: The project does not propose to construct any structures for human habitation, therefore the project will not expose people or structures to risk of loss, injury, or death involving fault rupture, ground shaking, ground failure, or landslides.

(b) Less Than Significant impact With Mitigation Incorporated: The project will not result in substantial soil erosion or the loss of topsoil. Such an impact will not occur because the Project is designed to contribute to an overall reduction in gully erosion. Existing roads will be used to access work sites. Ground disturbance at most work sites will be minimal, except for construction of the pond. The potential for substantial soil loss associated with pond construction will be avoided through implementation of the mitigation measures presented in Appendix B.

(c) Less Than Significant impact With Mitigation Incorporated: To minimize the risk of the project interacting with or creating geologic instabilities, geomorphic mapping of the greater project area and a geotechnical investigation of the reservoir location were conducted. Geomorphic mapping identified one dormant, one suspended, and one active landslide area, all of sufficient distance and topographic isolation to pose less than significant hazards to project infrastructure. Grade control structure installation in the east and west tributaries and a bank stabilization structure to be installed in Redwood Creek will serve to enhance geologic stability in the project area. Results of the geotechnical investigation indicate that the pond location is suitable for construction of a reservoir of up to approximately 20 million gallons. As the proposed pond is approximately 16 million gallons, a less than significant impact to surrounding slope stability is

expected. Comprehensive results of the geomorphic and geotechnical investigations are contained in the Basis of Design Report & Feasibility Analyses for Marshall Ranch Streamflow Enhancement Project (Stillwater Sciences, 2019). Additionally, best practices for construction will be maintained, including adherence to detailed compaction specifications as well as construction oversight by senior geotechnical and engineering staff.

(d) Less than significant Impact: Geomorphic and Geotechnical investigation suggests that there are expansive soils onsite. However, this project proposes earthen fills and hydraulic appurtenances that will be designed to withstand soil expansion.

(e) No Impact: The project will not create any sources of wastewater requiring a septic system.

Mitigation Measures:

Specific Mitigation Measures can be found in Appendix B, Section 2, VI. Geology and Soils (1-11).

VII. Greenhouse Gas Emissions. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			X	

Discussion:

(a-b) Less Than Significant Impact: The project will emit greenhouse gases (GHG) through the use of fuel to operate vehicles and heavy equipment. The work window for restoration activities is generally limited from June 15 to November 1. Construction is limited to at most eighteen weeks during that window, and work must be completed within four years. However, for most projects, work does not occur for the entire eighteen week field season and most restoration activities do not take four years to implement. Some action items do not require heavy equipment use at the restoration site, but may use vehicles to transport materials. Based on the short duration and small scale of the action items, the project will not generate a significant increase in GHG emissions above existing baseline levels nor conflict with applicable plans, policies, or regulations aimed at reducing greenhouse gas emissions.

VIII. Hazards and Hazardous Materials. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?		X		
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?		X		
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				X
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g) Impair implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized area or where residences are intermixed with wildlands?		X		

Discussion:

(a) Less Than Significant with Mitigation Incorporated: The project will not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Any potential significant hazard associated with the accidental release of coolant and petroleum products used with equipment during construction will be avoided through implementation of the mitigation measures presented in Appendix B, Mitigation Measures, Monitoring and Reporting Program. As a result, mitigation measures will ensure that any potentially significant impacts are avoided or mitigated to below a level of significance.

(b) Less Than Significant with Mitigation Incorporated: The project will not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. At work sites requiring the use of heavy equipment, there is a small risk of an accident upsetting the machine and releasing fuel, oil, and coolant. The potential for accidental release will be reduced to a less than significant level through implementation of the mitigation measures presented in Appendix B.

(c) No Impact: The project will not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. Such impact is avoided because the project will not create any feature that will emit hazardous substances.

(d) No Impact: The project worksites are not located on any site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

(e) No Impact: No project work site is located within an airport land use plan or within two miles of a public airport or public use airport.

(f) No Impact: No project work site is located within the vicinity of a private airstrip.

(g) No Impact: The project will not impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan. The project has no effect on access.

(h) Less Than Significant with Mitigation Incorporated: The project will not expose people or structures to a significant risk of loss, injury, or death involving wild land fires. At work sites requiring the use of heavy equipment, there is a small risk of an accidental spark from equipment igniting a fire. The potential for accidental fire will be reduced to a less than significant level through implementation of the mitigation measures presented in Appendix B, Mitigation Measures, Monitoring and Reporting Program.

Mitigation Measures:

Specific Mitigation Measures can be found in Appendix B, Section 2, VIII. Hazards and Hazardous Materials (1-14).

IX. Hydrology and Water Quality. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?		X		
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner, which would result in substantial erosion or siltation on- or off-site?		X		
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?		X		
e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?		X		
f) Otherwise substantially degrade water quality?		X		
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary of Flood Insurance Rate Map or other flood hazard delineation map?				X
h) Place within a 100-year flood hazard area structures, which would impede or redirect flood flows?				X
i) Expose people or structures to a significant risk or loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
j) Result in inundation by seiche, tsunami, or mudflow?				X

Discussion:

(a) Less Than Significant with Mitigation Incorporated: The project will not violate any water quality standards or waste discharge requirements. There is the potential for minor short-term increase in turbidity during installation of instream structures and/or pond construction, however the mitigation measures described in Appendix B Mitigation, Monitoring and Reporting will assure that the project actions are in compliance with water quality standards. As a result, mitigation measures will ensure that any potentially significant short-term impacts are avoided or mitigated to below a level of significance.

(b) No Impact: The project will not substantially deplete groundwater supplies or interfere substantially with groundwater recharge. The project site is underlain by nearly impervious shale bedrock, with minimal groundwater recharge potential. Construction of grade control structures in the two drainages adjacent to the project site will reduce incision and drainage of shallow groundwater.

(c) Less Than Significant with Mitigation Incorporated: The project will not substantially alter the existing drainage pattern of the work sites in a manner that would result in substantial erosion or siltation on- or off-site. Such an impact will not occur because several of the project actions are designed to result in decreased overall erosion. The instream boulder and large wood placement and rock armor grade control structures in the smaller drainages as well as the pond will alter drainage patterns by slowing the transport of sediment and water. These projects are expected to reduce channel entrenchment, restore alluvial streambeds, and increase water storage capacity. Instream structures will produce a local redistribution of bed load, facilitating the deposition of spawning gravel in riffles and improving scour to maintain pools for juvenile fish habitat. This local redistribution of bed load will not produce a net increase of erosion. Mitigation measures described in Appendix B will assure that all project actions, including construction activities, are in compliance with water quality standards.

(d) Less Than Significant with Mitigation Incorporated: The project will not substantially alter the existing drainage pattern of the work sites, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site. The project will decrease the risk of flooding by capturing runoff in the pond and reducing gully incision that if left unchecked could eventually lead to mass wasting.

(e) Less Than Significant with Mitigation Incorporated: The project will not create or contribute runoff water that would exceed the capacity of existing or planned storm-water drainage systems, or provide substantial additional sources of polluted runoff. Overall, the project aims to reduce storm water runoff through capture of wet-season runoff.

(f) Less Than Significant with Mitigation Incorporated: The project will not substantially degrade water quality. During placement of instream structures and/or pond construction, some minor turbidity may be generated. The potential for degradation of water quality will be reduced to a less than significant level through implementation of the mitigation measures presented in Appendix B. Some short-term and minor increases in turbidity may also occur as the streambed around instream structures adjusts during the first high streamflow event following activity completion. However, this is not expected to produce a significant increase over background turbidity. Mitigation measures will ensure that any potentially significant short-term impacts to water quality are avoided or mitigated to below a level of significance. The goal of the project is to improve water quality in the dry season by adding cool water to Redwood Creek. The project design includes features designed specifically for this objective including a cooling gallery and circulation system in the pond.

(g) No Impact: The project will not place housing within a 100-year flood hazard area as mapped on any flood hazard delineation map. No housing will be created as part of this project.

(h) No Impact: The project will not place within a 100-year flood hazard area structures which would significantly impede or redirect flood flows. Instream structures are built to change the direction and velocity of stream flow. However, these structures are small (sized to affect conditions in the low flow channel) and will not impede flood flows.

(i) Less than Significant Impact: The placement of instream structures will not impede flood flows and will therefore not increase flooding risk to people or structures. The construction of the pond poses a less than significant risk of flooding as geotechnical investigation and engineering design and construction oversight will ensure long-term stability of the pond and dam.

(j) No Impact: The project will not expose people or structures to a significant risk of inundation by seiche, tsunami, or mudflow. Such an impact will not occur because project actions are designed to improve or stabilize conditions at the work sites. Restoration actions will reduce the chance of mudflow by stabilizing disturbed areas and restoring natural drainage patterns. Project work sites are not located in areas at risk to inundation by seiche or tsunami.

Mitigation Measures:

Specific Mitigation Measures can be found in Appendix B, Section 2, IX. Hydrology and Water Quality (1-9).

DRAFT

X. Land Use and Planning. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?				X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				X

Discussion:

(a) No Impact: The project will not physically divide an established community. This impact will not occur because no culvert removal or road decommissioning is proposed in any established community.

(b) No Impact: The activities that compose this project do not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect. Such an impact will not occur because the project's activities are designed to be compatible with local land use plans and ordinances.

(c) No Impact: The project will not conflict with any applicable habitat conservation plan or natural community conservation plan. Such an impact will not occur because project actions are designed to improve aquatic habitat conditions without adversely affecting any other species or their habitats.

XI. Mineral Resources. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X

Discussion:

(a) No Impact: The project will not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state. Such an impact will not occur because no valuable mineral resources are known to exist at the project site.

(b) No Impact: The project will not result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. Such an impact will not occur because no mineral resource recovery sites occur at the project work sites.

XII. Noise. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		X		
b) Expose persons to or generate excessive ground borne vibration or ground borne noise levels?				X
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			X	
d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		X		
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X

Discussion:

(a) Less Than Significant with Mitigation Incorporated: The project will not result in significant exposure of persons to, or generation of noise levels in excess of, standards established in the local general plan or noise ordinance, or applicable standards of other agencies. There will be a temporary increase in noise levels at those work sites requiring the use of heavy equipment. While such short-term increase in noise will not produce a significant increase in the noise level in the general environment, there is a potential for workers to be in close proximity to equipment producing noise ≥ 85 dB, such as excavators, backhoes, or dump trucks. However, personnel operating or working nearby noisy equipment will be required to wear hearing protection. As a result, any potentially significant noise impacts will be avoided or mitigated to below a level of significance.

(b) No Impact: The project will not result in exposure of persons to, or generation of, excessive ground-borne vibration or ground-borne noise levels. Such an impact will not occur because only minor amounts of ground-borne vibration or noise will be generated short-term at those work sites requiring the use of heavy equipment.

(c) Less Than Significant Impact: The majority of the project comprises passive structures that will not generate noise after construction is completed. A pump, however, will be used during the wet season to divert water from Redwood Creek to help fill the pond. While this pump will create an intermittent, long term increase in ambient noise levels, it is powered by an electric motor, will be housed in a pumphouse, and will likely only be audible to those within the immediate proximity. As such, this noise will constitute a less than significant impact.

(d) Less Than Significant with Mitigation Incorporated: The project will not result in a substantial temporary, or periodic, increase in ambient noise levels in the project vicinity above levels

existing without the project. Such an impact will not occur because only minor amounts of noise will be generated temporarily at those work sites requiring the use of heavy equipment. At those locations near nesting or breeding sites for listed species, heavy equipment will only be used outside the sensitive periods for nesting or breeding, as described in Appendix B. Those mitigation measures will ensure that any potentially significant noise impacts are avoided or mitigated to below a level of significance.

(e) No Impact: None of the project work sites are located within two miles of a public airport or public use airport.

(f) No Impact: None of the project work sites are located within the vicinity of a private airstrip.

Mitigation Measures:

Personnel shall wear hearing protection while operating or working near noisy equipment (producing levels ≥ 85 dB, including chain saws, excavators, and back hoes). No other specific mitigation measures are required for noise.

XIII. Population and Housing. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (e.g., by proposing new homes and/or businesses) or indirectly (e.g., through extension of roads or other infrastructure)?				X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X

Discussion:

(a) No Impact: The project will not induce substantial population growth in an area, either directly or indirectly. Such an impact will not occur because the project will not construct any new homes, businesses, roads, or other human infrastructure.

(b) No Impact: The project will not displace any existing housing and will not necessitate the construction of replacement housing elsewhere.

(c) No Impact: The project will not displace any people and will not necessitate the construction of replacement housing elsewhere.

XIV. Public Services. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Fire protection?				X
b) Police protection?				X
c) Schools?				X
d) Parks?				X
e) Other public facilities?				X

Discussion:

(a-e) No Impact: The project will not have any significant environmental impacts associated with new or physically altered governmental facilities. Issuance of restoration grants to government agencies could, in some cases, lead to minor increases in staffing to complete projects. Such increases will not lead to any significant adverse impacts, because the increases are short term, and no significant construction will be required to accommodate additional staff.

XV. Recreation. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

Discussion:

(a) No Impact: The project would not increase the use of existing neighborhood and regional parks, or other recreational facilities. Such an impact will not occur because the project actions will restore anadromous fish habitat and do not significantly alter human use or facilities at existing parks or recreational facilities. Overall, the project is expected to increase recreation opportunities by assisting in restoring populations of anadromous fish.

(b) No Impact: The project does not include recreational facilities and does not require the construction or expansion of recreational facilities.

XVI. Tribal Cultural Resources. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resource Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resource Code section 5020.1 (k), or		X		
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?		X		

Discussion:

(a-b) Less Than Significant with Mitigation Incorporated: The project will not cause substantial adverse change in the significance of a tribal cultural resource listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resource Code 5020.1 (k). Although ground disturbance is required to implement the project, impacts to tribal cultural resources will be avoided through implementation of the protective measures presented in Appendix B and Appendix C for all work sites, where applicable. Resources identified during site-specific surveys will be protected before any ground-disturbing activities are permitted at a site. Mitigation measures will ensure that any potentially significant impacts are avoided or mitigated to below a level of significance.

Mitigation Measures

Mitigation measures stated in Appendix B, Section 2, V. Cultural Resources indicate the procedures that will be followed to minimize any impacts to and protect tribal cultural resources. If it becomes impossible to implement the project at a work site without impacting the significance of tribal cultural resources, then activity at that work site shall be discontinued.

XVII. Transportation/Traffic. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?				X
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?				X
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
d) Substantially increase hazards due to design features (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
e) Result in inadequate emergency access?				X
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?				X

Discussion:

(a) No Impact: The project will not conflict with any applicable plans, ordinances or policies that establish measures of effectiveness for the performance of the circulation systems. Such a conflict will not occur because the project will result in only minor temporary increases in traffic to primarily wildland sites during implementation.

(b) No Impact: The project will not conflict, either individually or cumulatively, with any applicable congestion program established by the county congestion management agency for designated roads or highways. Such an impact will not occur because project actions will not generate a significant amount of traffic.

(c) No Impact: The project will not result in any change in air traffic patterns.

(d) No Impact: The project will not alter roads in any way that will substantially increase hazards to transportation. The proposed project will reduce hazards to transportation, because the proposed project will correct and reduce erosion damage on rural roads within the project area.

(e) No Impact: The project will not result in inadequate emergency access.

(f) No Impact: The project will not conflict with adopted policies, plans, or programs supporting alternative transportation.

DRAFT

XVIII. Utilities and Service Systems. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				X
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
d) Have insufficient water supplies available to serve the project from existing entitlements and resources (i.e., new or expanded entitlements are needed)?				X
e) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				X
f) Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs?				X
g) Violate any federal, state, and local statutes and regulations related to solid waste?				X

Discussion:

(a) No Impact: The project will not produce wastewater.

(b) No Impact: The project will not require, or result in the construction of, new water or wastewater treatment facilities or expansion of existing facilities. Such an impact will not occur because the project will not produce wastewater.

(c) No Impact: The project will not cause significant adverse environmental effects associated with the construction of new storm water drainage facilities or expansion of existing facilities.

(d) No Impact: The project will have sufficient water supplies available to serve the project from existing entitlements and resources.

(e) No Impact: The project will not produce wastewater.

(f) No Impact: The project will not generate a significant volume of solid waste requiring disposal in a landfill.

(g) No Impact: The project will not violate any federal, state, or local statutes or regulations related to solid waste.

XIV. Mandatory Findings of Significance.	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		X		
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects).				X
c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?				X

Discussion:

(a) Less Than Significant with Mitigation Incorporated: The project does have the potential to degrade the quality of the environment. However, the potential is reduced to less than significant by implementing the mitigation measures in Appendix B. The project shall be implemented in a manner that will avoid short-term adverse impacts to rare plants and animals, and cultural resources during construction. The project activities are designed to improve and restore stream habitat, thereby providing long-term benefits to both anadromous salmonids and other fish and wildlife.

(b) No Impact: The project does not have adverse impacts that are individually limited, but cumulatively considerable. Cumulative adverse impacts will not occur because potential adverse impacts of the project are only minor and temporary in nature and will be mitigated to the fullest extent possible. It is the goal of the project that the beneficial effects of habitat enhancement actions will be cumulative over time and contribute to the recovery of listed anadromous salmonids.

(c) No Impact: The project does not have environmental effects that will cause substantial adverse effects on humans. Measures implemented as part of this project will contribute to improved water quantity and quality, increased soil stability, and the recovery of listed salmonids, all of which will be beneficial to human beings.

REFERENCES

- Brown, L.R. and P.B. Moyle. 1991. Status of coho salmon in California. Report to the National Marine Fisheries Service. Department of Wildlife and Fisheries Biology, University of California at Davis.
- California Department of Fish and Wildlife (CDFW). 2014. Coastal Watershed Planning and Assessment Program, SF Eel River Basin Assessment Report. California Department of Fish and Wildlife, Eureka, CA.
- California Department of Fish and Wildlife (CDFW). 2015. California State Wildlife Action Plan, 2015 Update: A Conservation Legacy for Californians. Edited by Armand G. Gonzales and Junko Hoshi, PhD. Prepared with assistance from Ascent Environmental, Inc., Sacramento, CA.
- Flosi, G, S. Downie, M. Bird, R. Coey, and B. Collins. 2003, 2006, 2009, 2010. *California Salmonid Stream Habitat Restoration Manual*. Volume II, Fourth Edition. Calif. Fish and Game. The most current version of the manual is available at: <https://www.wildlife.ca.gov/Grants/FRGP/Guidance>
- NMFS (National Marine Fisheries Service). 2014. Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon (*Oncorhynchus kisutch*). National Marine Fisheries Service. Arcata, CA
- Obedzinski, M., Nossaman Pierce, S., Horton, G. E., & Deitch, M. J. 2018. Effects of Flow-Related Variables on Oversummer Survival of Juvenile Coho Salmon in Intermittent Streams. *Transactions of the American Fisheries Society*, 147(3), 588-605.
- Ruiz et al. 2019. Just Add Water: An overview of small scale flow releases and monitoring tools to support salmonid recovery in the lower Russian River Basin. California Sea Grant. Presentation at 37th Salmonid Restoration Federation Conference, Santa Rosa, CA.
- Stillwater Sciences, 2019. Basis of Design Report & Feasibility Analyses for Marshall Ranch Streamflow Enhancement Project. Prepared by Stillwater Sciences, Arcata, California for Salmonid Restoration Federation, Eureka, California.
- SWRCB (State Water Resources Control Board). 2019. California Water Action Plan – enhance water flows in stream systems statewide. https://www.waterboards.ca.gov/waterrights/water_issues/programs/instream_flows/cwap_enhancing/#background
- United States Department of Agriculture, Natural Resource Conservation Service, 1997. Ponds - Planning, Design, Construction Agricultural Handbook Number 590. Online at: <https://nrcspad.sc.egov.usda.gov/distributioncenter/product.aspx?ProductID=115>
- U.S. Bureau of Land Management (BLM). 1996c. Honeydew Creek Watershed Analysis. Arcata Resource Area, California. November 1996.
- WCB (Wildlife Conservation Board), 2014. Wildlife Conservation Board Strategic Plan 2014. Prepared by WCB Staff, MIG, Inc., Berkeley, CA

Appendix A

*Biological Resources Technical Report
For the Marshall Ranch Streamflow Enhancement Project,
Humboldt County, California (Stillwater Sciences, August 2019)*

DRAFT

AUGUST 2019

Biological Resources Technical Report for the Marshall Ranch Streamflow Enhancement Project, Humboldt County, California



PREPARED FOR
Salmonid Restoration Federation
425 Snug Alley, Unit D
Eureka, CA 95501

PREPARED BY
Stillwater Sciences
850 G Street, Suite K
Arcata, CA 95521

Suggested citation:

Stillwater Sciences. 2019. Biological Resources Technical Report for the Marshall Ranch Streamflow Enhancement Project, Humboldt County, California. Prepared by Stillwater Sciences, Arcata, California for Salmonid Restoration Federation, Eureka, California.

Cover photos: Images of the Marshall Ranch and associated habitat during the biological surveys conducted in May 2019.

Table of Contents

1	PROJECT BACKGROUND.....	1
1.1	Project Location	2
1.2	Report Purpose and Organization	2
2	PROJECT DESCRIPTION	4
2.1	Site Description.....	4
2.2	Proposed Project	4
2.2.1	Off-channel pond.....	5
2.2.2	Cooling gallery	5
2.2.3	Hydraulic appurtenances (piping, valves, pump, etc.)	5
2.2.4	Instream habitat enhancement	5
2.2.5	Gully stabilization	6
2.2.6	Solar array	6
2.2.7	Access road improvements.....	6
3	VEGETATION ASSESSMENT	8
3.1	Methods	8
3.1.1	Desktop review.....	8
3.1.2	Field survey	8
3.2	Results.....	9
3.2.1	<i>Ceanothus incanus</i> Shrubland Alliance.....	11
3.2.2	<i>Pseudotsuga menziesii</i> Forest Alliance	11
3.2.3	<i>Acer macrophyllum</i> Forest Alliance.....	12
3.2.1	<i>Quercus</i> spp. Forest Alliance	12
3.2.2	Annual/perennial grassland	13
4	SPECIAL-STATUS PLANTS.....	13
4.1	Methods	13
4.2	Results.....	14
4.2.1	Desktop review.....	14
4.2.2	Field survey	16
5	WETLANDS AND WATERS.....	16
5.1	Methods	16
5.2	Results.....	17
6	SPECIAL-STATUS FISH AND WILDLIFE	19
6.1	Methods	19
6.1.1	Desktop review.....	19
6.1.2	Fish and wildlife site assessment.....	19
6.2	Results.....	19
6.2.1	Fish	23
6.2.2	Wildlife.....	25
7	POTENTIAL EFFECTS AND MINIMIZATION MEASURES	30
7.1	Special-status Plants and Sensitive Natural Communities.....	30
7.2	Wetlands and Waters	31
7.3	Special-status Fish and Wildlife	31
7.3.1	Fish	31

7.3.2 Wildlife..... 33

8 REFERENCES.....36

Tables

Table 3-1. Vegetation alliances and associations observed in the Project area..... 9

Table 4-1. Special-status plant species with moderate potential to occur in the Project area. 15

Table 6-1. Special-status fish and wildlife species with moderate to high potential to occur.....
in the Project area..... 20

Figures

Figure 1-1. Project location. 3

Figure 2-1. Conceptual Project design. 7

Figure 3-1. Vegetation cover types within the Project area. 10

Figure 5-1. Preliminary waters and wetlands within the Project area. 18

Appendices

Appendix A. Marshall Ranch Streamflow Enhancement Project Design Plans

Appendix B. Scoping List and Map of CNDDB Special-Status Plant and Wildlife Species in the
Project Vicinity

Appendix C. List of Plant Species Observed in the Project Area

1 PROJECT BACKGROUND

The Salmonid Restoration Federation (SRF) is planning to construct a 16-million-gallon reservoir and infiltration gallery on the Marshall Ranch, adjacent to Redwood Creek, a tributary to the South Fork Eel River. This Project seeks to improve habitat for coho salmon (*Oncorhynchus kisutch*) and steelhead (*Oncorhynchus mykiss*), in Redwood Creek, an important salmon bearing tributary, by addressing the limiting factor of low summer streamflows. The South Fork Eel River is one of five priority watersheds selected for flow enhancement projects in California by the State Water Resources Control Board (SWRCB) and California Department of Fish and Wildlife (CDFW) as part of the California Water Action Plan effort (SWRCB 2019). Redwood Creek is a critical tributary to the South Fork Eel River that historically supported coho and Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead.

Coho salmon have experienced precipitous declines in abundance and are currently listed as threatened under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA). Numerous factors are responsible for the declines in coho salmon abundance, and many of these limiting factors are also impacting Chinook salmon and steelhead, which are also severely depressed in abundance relative to historical population estimates. Land use practices including logging and road systems have greatly increased winter run off resulting in decreased groundwater storage capacity and lower summer streamflows. Widespread removal of large wood from streams has also decreased groundwater storage through channel incision and loss of floodplain connectivity and resulted in fewer and shallower instream pools that are of insufficient size to withstand drought. Cannabis cultivation has also expanded in the last 15 years, which has resulted in increased water diversions that have affected area watercourses and summer stream flows. Industrial logging practices combined with fire suppression have resulted in overly dense even aged forests with higher evapotranspiration rates which significantly contribute to lower dry season flows. The problems of reduced groundwater storage and increased evapotranspiration are intensified in a longer dry season. In low flow years, Redwood Creek has experienced dry conditions at two of the four mainstem Redwood Creek flow gages downstream from the proposed flow enhancement site.

The Project would provide significant, measurable benefits in terms of dry season flow enhancement for coho salmon, steelhead, and other aquatic habitat along the 5.5 miles (mi) of Redwood Creek mainstem downstream from the Project. The Project is designed to deliver approximately 50 gallons per minute of high-quality water during the five month dry season, which will be wholly dedicated to instream values including reasonable and beneficial fish and wildlife uses of the water. Quantifiable long-term objectives include increased summer streamflow, enhanced fish and wildlife habitat, and improved water quality.

The Project design is based on the best available science and is informed by the *California Salmonid Stream Habitat Restoration Manual* edition (Flosi et al. 2010), and *Ponds – Planning, Design, Construction* (USDA NRCS 1997). Additionally, the Project is informed by scientific studies and streamflow enhancement techniques that have been used in the Mattole River watershed, California.

1.1 Project Location

The Project is located on a 29.8-acre (ac) area within the 2,942-ac Marshall Ranch property, approximately 3.16 mi east of Redway and just south (0.1 mi) of the unincorporated community of Briceland, Humboldt County, California (Latitude: 40.104256, Longitude: -123.900020) (Figure 1-1). To the west of the Project is Redwood Creek, approximately 5 mi upstream from the confluence of the South Fork Eel River, a tributary to the Eel River and eventually the Pacific Ocean (Figure 1-1). The Project area is in Section 19 of Township 4 South, Range 3 East of the Briceland, U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle. The elevation within the Project area ranges from approximately 570 to 780 feet (ft) above mean sea level. The Project can be accessed from the Briceland Thorn Road after exiting Highway 101 at Redway, California (Figure 1-1).

1.2 Report Purpose and Organization

This biological resource technical report has been developed to describe the special-status and/or sensitive biological resources in or with potential to occur in the Project area (plants, vegetation communities, fish, wildlife, and wetlands and waters) that may be affected by Project construction activities. Potential impacts on biological resources are discussed along with suggested minimization measures to reduce impacts.

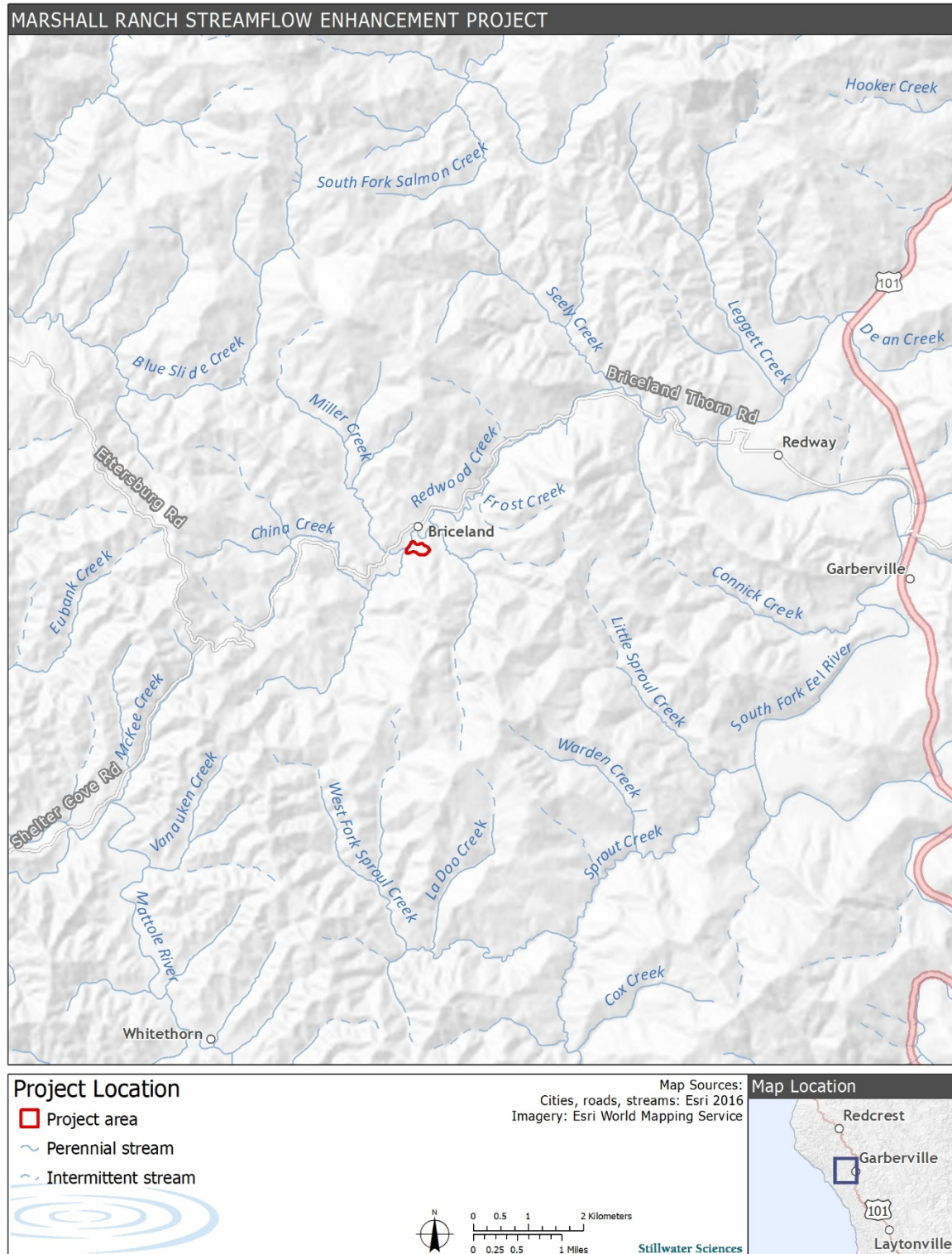


Figure 1-1. Project location.

2 PROJECT DESCRIPTION

The proposed Project includes construction of a 16-million-gallon off-channel reservoir, infiltration gallery, associated pipelines and pump station, ancillary water storage and supply for domestic use and fire suppression, erosion control structures within intermittent streams, instream habitat enhancement structures along Redwood Creek mainstem, and a solar energy generation system to provide long-term operations costs for the Project. Additional Project details are provided below in Section 2.2, Figure 2-1, and in Appendix A.

2.1 Site Description

The Project will occur on the Marshall Ranch in the Redwood Creek watershed, which is located immediately west of the town of Redway in southern Humboldt County (Figure 1-1).

Redwood Creek is a fish-bearing watercourse that is known to contain coho and Chinook salmon and steelhead. Redwood Creek experiences very low or intermittent flows during the summer and fall, inhibiting habitat for these species.

Hillslope and stream channel morphologies in the Redwood Creek watershed are similar to those found throughout the western side of the South Fork Eel River basin, due to the prevalence of the underlying Franciscan Coastal Belt terranes. Although there is variability among the terranes, the strength in Coastal Belt rocks typically leads to steeper, ridge-and-valley topography with organized drainage networks. Small to large-scale landslides are still common in the basins that drain the Coastal Belt terranes, particularly where sedimentary rocks are less competent and in mélange units.

Upper elevations in the Redwood Creek basin are characterized by narrow, steep-walled canyon slopes that are covered by relatively thin soils and dense conifer and hardwood stands and drained by perennial and intermittent streams. At mid-elevations, the steep canyons transition into gently rounded upland ridges supporting grass meadows and shrub and oak woodland vegetation. The valley width greatly expands near Briceland, where Redwood Creek meanders between large elevated terraces. Channel incision in the Redwood Creek basin is likely due to ongoing tectonic uplift related to the nearby Mendocino Triple Junction, extensive anthropogenic land-use practices, and altered hydrologic patterns due to climate change.

The Project site consists of uplifted fluvial terraces and lower floodplain surfaces adjacent to Redwood Creek, which flows from the southwest to the northeast across the Project area. Upland hillslopes border the site to the south and east. The Project site is bound by small intermittent streams to the east and west that are tributaries to Redwood Creek (Figure 1-1).

2.2 Proposed Project

This project includes the following components:

- Construct 16 million gallon off-channel pond and cooling gallery designed to deliver approximately 50 gallons per minute of flow augmentation to Redwood Creek during the 5-month dry season to enhance instream aquatic habitat. The pond will be filled with wet-season runoff including rainwater catchment and water pumped from Redwood Creek.
- Install three large wood habitat enhancement features and two weirs in Redwood Creek.

- Stabilize eroding gullies with approximately 30 rock armor grade control structures, revegetation, and recontouring in two Class III drainages.
- Construct 200 Kilowatts (KW) of energy generation in solar arrays covering 13,000 SF and install associated electrical transmission lines to offset this project's energy use and generate revenue for operations and maintenance activities.
- Upgrade access roads to and within the project area with drainage features and gravel surfacing to provide year-round access.
- Install data collectors to monitor post-project conditions in the pond, groundwater wells, and downstream channel.

Future project components may also include additional water storage in tanks for fire suppression/domestic use and fire suppression water supply infrastructure.

2.2.1 Off-channel pond

Construction of the off-channel pond will include excavation and construction of an earthen berm and two spillways built into the natural topography. Construction will include removal of topsoil from the reservoir area. The topsoil will be saved and spread around the reservoir area along with mulch after construction. All excavated material not used to build the berms will be placed and compacted in several designated fill areas as shown on the plans. The spillways for the reservoir will be engineered for 100-year storm events and armored with rock cobble or other non-erodible materials.

Materials for the reservoir will include rock for the spillways and weed free straw. Equipment will include heavy equipment for clearing and excavation and a sheepsfoot roller for compacting the berm and sealing the reservoir.

2.2.2 Cooling gallery

The cooling gallery will be constructed with one-inch diameter stainless steel piping buried under a minimum of 10 feet of soil. The natural temperature of the subsurface soil will cool the pond outflow, as needed, before delivering the flow augmentation to Redwood Creek.

2.2.3 Hydraulic appurtenances (piping, valves, pump, etc.)

The primary outflow pipe that delivers water from the reservoir to the cooling gallery will be installed via horizontal borehole. A valve will control how much water is released from the reservoir and into the cooling gallery. An offset wet well will be constructed adjacent to Redwood Creek and will be gravity fed by a screened intake in the channel. An electrical pump and associated piping will be utilized to transfer water from the wet well to top off the pond (and other smaller storage tanks) as needed. Water will only be diverted from Redwood Creek when flows are high. Additional hydraulic-related infrastructure includes piping and tanks for fire suppression and domestic use on the property.

2.2.4 Instream habitat enhancement

In association with the offset well intake, instream habitat enhancement features will be constructed to improve summer rearing habitat for salmonids within the vicinity of the Project. This includes the construction of two rock weirs and four large wood habitat enhancement

structures. The proposed structures are also intended to promote channel stability along Redwood Creek mainstem within the vicinity of the flow enhancement Project.

2.2.5 Gully stabilization

Approximately 30 rock armor grade control structures will be installed to stabilize two actively eroding intermittent drainages adjacent to the Project. The grade control structures will be installed with an excavator and designed to promote long-term stability of the gully channels.

2.2.6 Solar array

An approximately 200 KW solar array and associated electrical infrastructure will be installed at the Project site. The intention of the solar array is to offset the electricity used to pump water during the wet season from Redwood Creek into the pond and to generate revenue to cover the cost of operations and maintenance of the Project.

2.2.7 Access road improvements

The access roads within the Project vicinity will be improved to provide year-round access for monitoring and maintenance of all Project components. This will include reshaping and surfacing with gravel.

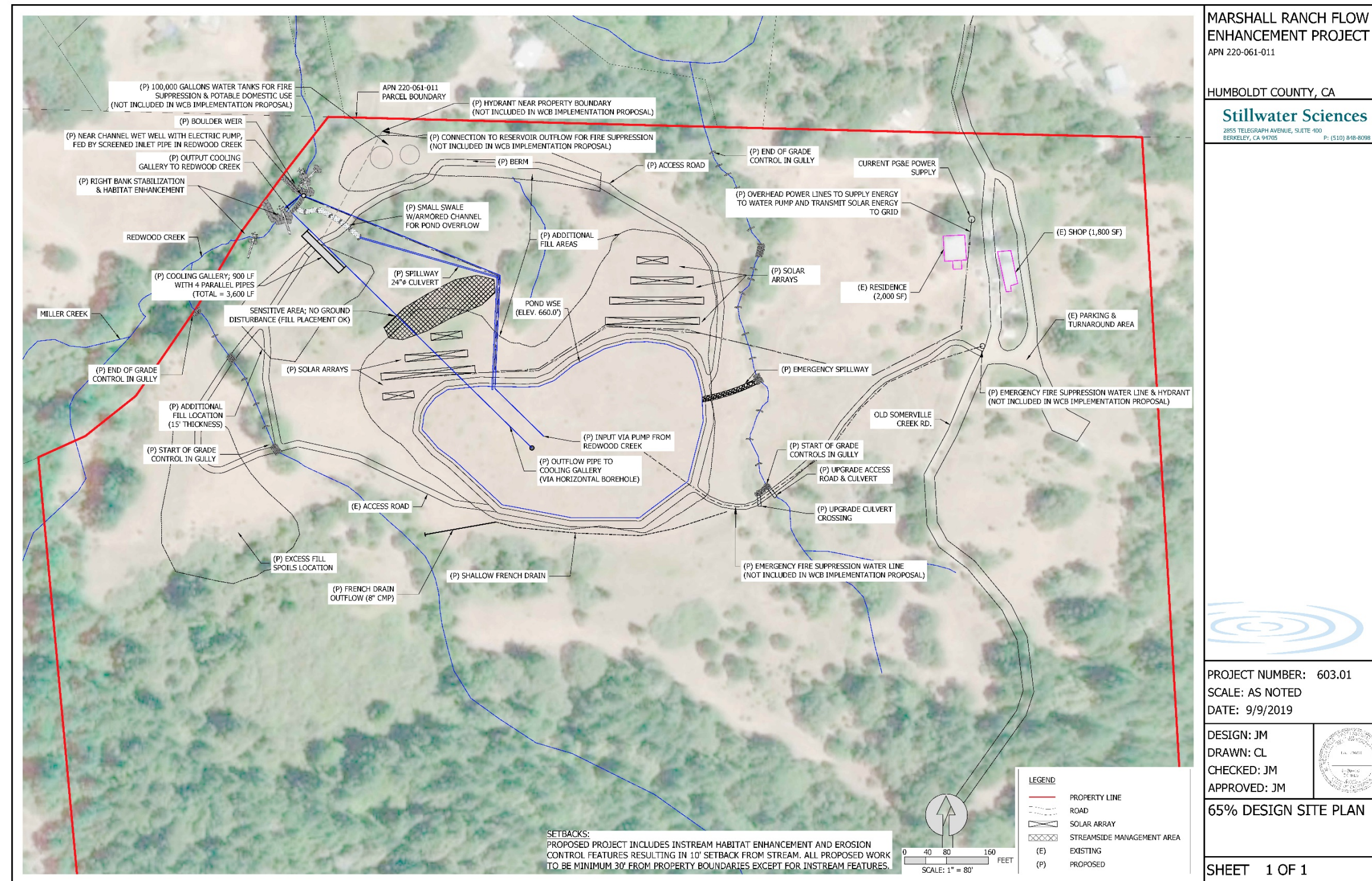


Figure 2-1. 65% Project Design Site Plan.

3 VEGETATION ASSESSMENT

A vegetation assessment was conducted on 3 May 2019 concurrent with the early-blooming botanical survey to map vegetation within the approximately 30-ac Project area to the alliance level following classification using the online edition of *A Manual of California Vegetation* (California Native Plant Society [CNPS] 2019a). The resulting vegetation map was used to: (1) determine if any stands are considered special-status natural communities; (2) assess the likelihood of occurrence for special-status species in the Project area; and (3) inform the Project's potential to impact special-status natural communities and species.

Special-status natural communities are defined as those with a state ranking of S1, S2, or S3 (critically imperiled, imperiled, or vulnerable, respectively) on CDFW's *California Sensitive Natural Communities List* (CDFW 2018a).

3.1 Methods

3.1.1 Desktop review

Prior to the vegetation assessment, existing information from the CALVEG geodatabase (USDA Forest Service 2019) and the USGS regional geologic map (McLaughlin et al. 2000) on vegetation and soils in the Project area were reviewed. These data were transposed onto aerial imagery using geographical information systems (GIS) software to create maps for reference in the field.

The CDFW's California Natural Diversity Database (CNDDDB) (CDFW 2019a) was queried for the U.S. Geological Survey (USGS) 7.5-minute quadrangle where the Project is located (Briceland), and the surrounding seven quadrangles (Garberville, Honeydew, Shelter Cove, Miranda, Bear Harbor, Piercy, and Ettersburg) (hereinafter Project vicinity) to determine if a special-status natural community was recorded in the Project area. The CNDDDB query identified only one special-status natural community, Upland Douglas Fir Forest, in the Project Vicinity.

3.1.2 Field survey

The field survey was conducted by a qualified botanist and ecologist with: (1) experience conducting floristic surveys; (2) knowledge of plant taxonomy and plant community ecology and classification; (3) familiarity with the plant species of the area; and (4) familiarity with appropriate state and federal statutes related to plants and plant collecting. The survey followed the methods of the *CDFW-CNPS Protocol for the Combined Vegetation Rapid Assessment and Relevé Method* (CNPS and CDFW 2018a) and *Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities* (CDFW 2018b).

Field maps with existing vegetation information from CALVEG (USDA Forest Service 2019) were reviewed and representative locations for each stand type were sampled using the rapid assessment method. Plot size varied based on stand size and access. Dominant vegetation and their plant associates, habitat characteristics (e.g., disturbance, substrates/soils, aspects/slopes), known site history, and overall health of the stand were noted on a *CNPS and CDFW Combined Vegetation Rapid Assessment and Relevé Field Form* (CNPS and CDFW 2018b). If plant identification was not possible in the field, the plants were collected for identification in the

laboratory using the “1 in 20” rule (Wagner 1991) or, if a potential special-status plant, according to the botanists’ current CDFW plant voucher collection permit guidelines (e.g., not more than five individuals or 2% of the population, whichever is less, for one voucher sheet). Plants were identified following the taxonomy of *Jepson eFlora* (Jepson Flora Project 2019). Visual estimates of cover were noted for each species as well as its size, strata, and height class. Regeneration within sampling locations was also noted. Photographs were taken at each sampling location to document stand characteristics. A field-assessed vegetation alliance was assigned based on dominant and diagnostic species of the stand. Vegetation sampling points were mapped using a handheld sub-meter geographic positioning system (GPS) and stand boundaries within the Project area were delineated onto field maps. The digital data were post-processed and corrected, then incorporated into a geographical information systems (GIS) database. Data on field maps were digitized onto aerial imagery using GIS software.

Each field-assessed vegetation alliance was keyed using the vegetation composition data and the online edition of *A Manual of California Vegetation* (CNPS 2019a) to determine final vegetation alliances. Where applicable, vegetation was characterized and mapped to the finer association level. The finalized vegetation alliance/association names were checked against CDFW’s *California Sensitive Natural Communities List* (CDFW 2018a) to determine if any of these types are considered special-status natural communities. These alliances were also used to further assess the likelihood of occurrence for special-status plants in the Project (see Section 4).

3.2 Results

Vegetation alliances observed in the approximately 36-ac Project area are listed in Table 3-1 and presented in Figure 3-1. Developed areas (i.e., residential) totaled 0.7 ac in the Project area. One sensitive vegetation alliance with a state rank of S3 (*Acer macrophyllum* Forest Alliance) was observed in the Project area (Table 3-2). Descriptions of the vegetation cover types are provided in the sub-sections below, along with representative photographs.

Table 3-1. Vegetation alliances and associations observed in the Project area.

Cover types	State status ¹	Total area (ac)
<i>Acer macrophyllum</i> Forest Alliance	S3	5.3
Annual/perennial grassland	None	20.9
<i>Ceanothus incanus</i> Shrubland Alliance	S4	1.2
<i>Pseudotsuga menziesii</i> Forest Alliance	S4	1.8
<i>Quercus</i> spp. Forest Alliance	S4	5.6
Total		34.9

¹ State ranks for special-status natural communities:

- S3 Vulnerable—Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.
- S4 Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

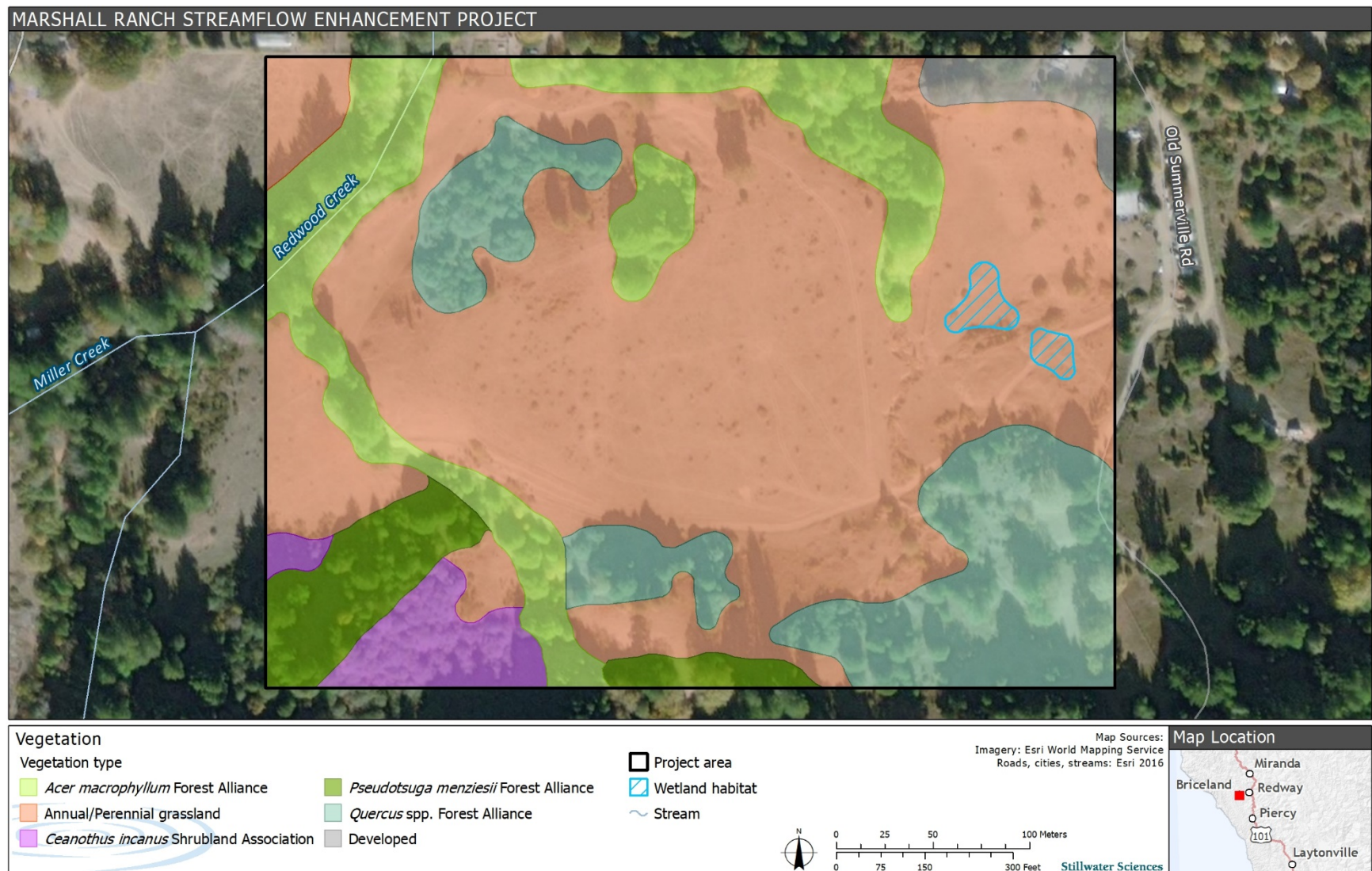


Figure 3-1. Vegetation cover types within the Project area.

3.2.1 *Ceanothus incanus* Shrubland Alliance



The southwestern corner of the Project area contains a dense stand of shrubs predominantly composed by *Ceanothus incanus* (coast whitethorn). Stands of coast whitethorn are described within the *Ceanothus thyrsiflorus* Shrubland Alliance (blue blossom chaparral) (CNPS 2019a) since they are more limited in distribution and are ecologically similar to *Ceanothus thyrsiflorus* (blue blossom) (Klein et al. 2015). Coast whitethorn is dominant in the shrub canopy with low to moderate cover of *Baccharis pilularis* (coyote brush), *Toxicodendron diversilobum* (western poison oak), and *Cytisus scoparius* (Scotch broom).

Herbaceous understory was not observed under the dense shrub canopy.

This alliance is associated with chaparral and coastal bluff scrub habitats. The coast whitethorn shrubland association has a total geographic extent of 1.2 ac in the Project area (Table 3-1, Figure 3-1).

3.2.2 *Pseudotsuga menziesii* Forest Alliance



The Douglas-fir Forest Alliance is composed of continuous canopy cover by Douglas-fir (60%) with low cover of *Acer macrophyllum* (big leaf maple) (15%) and black oak (15%). This alliance can occur along all topographical positions and aspects and on varying substrates (CNPS 2019a). In the Project area, this alliance is present on moderate slopes down to the creek bed. Associate tree species in the Project area included *Umbellularia californica* (California bay laurel) and *Arbutus menziesii* (Pacific madrone). The shrub layer varied from open to low cover of *Polystichum munitum* (western swordfern), *Quercus wislizeni*

(interior live oak) saplings, and western poison oak. Regenerating tree cover was low (2–5%) comprised of California bay laurel and *Notholithocarpus densiflorus* (tanoak) seedlings and Douglas-fir saplings. Herbaceous species observed throughout this alliance included *Oxalis oregana* (redwood sorrel), *Whipplea modesta* (modest whipplea), *Scoliopus bigelovii* (California fetid adder's-tongue), *Viola ocellata* (western heart's ease), *Sanicula crassicaulis* (Pacific sanicula), and *Pteridium aquilinum* var. *pubescens* (western bracken fern).

Douglas-fir forest is associated with broadleaved upland forest, north coast coniferous forest, and lower montane coniferous forest habitats. This forest alliance has a total geographic extent of 1.8 ac in the Project area (Table 3-1, Figure 3-1).

3.2.3 *Acer macrophyllum* Forest Alliance



The bigleaf maple forest alliance is composed primarily of bigleaf maple along with Douglas-fir and various hardwoods including black oak, *Salix sitchensis* (Sitka willow), and California bay laurel to form a continuous, sometimes two-tiered canopy bordering Redwood Creek and other waters in the Project area. This alliance is typically located along raised stream terraces, benches, and lower slopes with seeps (CNPS 2019a) and associated with north coast riparian areas in Douglas-fir forest. The shrub layer varied from open to dense cover by western poison oak, western sword fern, *Corylus cornuta*

(California hazelnut), and *Rubus parviflorus* (thimbleberry). Herbaceous species varied from sparse to moderate cover and included *Oxalis oregana* (redwood sorrel), modest whipplea, California fetid adder's-tongue, and western bracken fern.

This forest alliance is associated with riparian forest and north coast coniferous forest habitats. It has a total geographic extent of 5.3 ac in the Project area (Table 3-1, Figure 3-1). *Acer macrophyllum* Forest Alliance is a sensitive natural community (S3) on CDFW's *California Sensitive Natural Communities List* (CDFW 2018a).

3.2.1 *Quercus* spp. Forest Alliance



The mixed oak forest alliance is present on the upper slopes on the southern side of the Project area and on the sloped transition between the upper and lower terrace. This forest alliance is composed of a mixture of *Quercus wislizeni* (interior live oak) and *Quercus kelloggii* (black oak) with Douglas-fir, *Arbutus menziesii* (Pacific madrone), and *Notholithocarpus densiflorus* (tanoak) in the upper canopy. The shrub layer varied from moderate to dense cover by western poison oak, coast whitethorn, coyote brush, Scotch broom, and Himalayan blackberry.

Herbaceous species cover including western bracken fern and *Lonicera hispidula* (hispid honeysuckle) was low under the oak canopy though this alliance was present within and around annual/perennial grasslands which were dominated by herbaceous species.

The mixed oak forest alliance is associated with cismontane woodland and broadleaved upland forest habitats and has a total geographic extent of 5.6 ac in the Project area (Table 3-1, Figure 3-1).

3.2.2 Annual/perennial grassland



Annual/perennial grasslands in the Project area are managed pastures currently used for livestock grazing. This grassland cover type is best characterized within the Mediterranean California Naturalized Annual and Perennial Grassland Group (Sawyer et al. 2008). This group includes alliances that are primarily composed by nonnative grasses. Grasses observed within areas mapped as grassland included *Bromus hordeaceus* (soft chess), *Anthoxanthum odoratum* (sweet vernal grass), *Aira caryophyllea* (silver hair grass), *Dactylis glomerata* (orchard grass), *Cynosurus echinatus* (bristly dogtail grass), *Elymus glaucus* subsp. *glaucus* (blue

wild-rye), *Avena barbata* (slender wild oat), and *Danthonia californica* (California oat grass). Herbaceous vegetation included *Luzula comosa* var. *comosa* (Pacific wood-rush), western bracken fern, *Eschscholzia californica* (California poppy), *Plantago lanceolata* (English plantain), *Juncus patens* (spreading rush), *Juncus bufonis* var. *bufonis* (toad rush), *Hypochaeris radicata* (rough cat's ear), *Rumex acetosella* (sheep sorrel), and *Trifolium* spp. (various clovers). Small patches of *Rubus armeniacus* (Himalayan blackberry), coyote brush, and Scotch broom were observed throughout this alliance. Species dominance varied through the grassland with California oat grass dominating the upper hill slopes and nonnative grasses soft chess and bristly dogtail grass dominating the lower open grazed pasture. Patches of Himalayan blackberry and western bracken fern were observed throughout the flat lower terrace. Two wetland habitats were observed within this cover type, in which *Carex praegracilis* (freeway sedge), *Ranunculus parviflorus* (few-flowered buttercup), *Mentha pulegium* (pennyroyal), *Juncus bufonius* (toad rush), and *Juncus patens* (spreading rush) were prevalent (Figure 3-1).

This grassland cover type is associated with valley and foothill grassland habitat and has a total geographic extent of 20.9 ac in the Project area (Table 3-1, Figure 3-1).

4 SPECIAL-STATUS PLANTS

Special-status plant species are defined as those listed, proposed, or under review as threatened or endangered under the federal ESA and/or CESA; designated as rare under the California Native Plant Protection Act; and/or taxa that meet the criteria for listing as described in Section 15380 of the California Environmental Quality Act (CEQA) Guidelines including species listed on the CDFW's *Special Vascular Plants, Bryophytes, and Lichens List* (CDFW 2018c); that have a California Rare Plant Rank (CRPR) of 1, 2, 3 or 4; and/or that are considered a locally significant species (i.e., rare or uncommon in the county or region).

4.1 Methods

A list of special-status plants that may occur in the Project area was developed by querying the following resources:

- The U.S. Fish and Wildlife Service (USFWS) online *Information for Planning and Consultation* (IPaC) (USFWS 2019a),

- The California Native Plant Society's (CNPS) online *Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2019b), and
- CDFW's CNDDDB (CDFW 2019a).

The database queries were based on a search of the Project vicinity (as defined in Section 3.1.1). Appendix B (Table B–1) lists special-status plants identified from the sources described above and provides mapped locations of CNDDDB occurrences in the Project vicinity (Appendix B).

The potential for species meeting the above criteria to occur in the Project area was determined by: (1) reviewing the current distribution of each species (i.e., whether it overlaps with the Project area); (2) reviewing the documented occurrence information from the CNDDDB; (3) reviewing existing information on vegetation in the CALVEG geodatabase (USDA Forest Service 2019) and soils in the USGS regional geologic map (McLaughlin et al. 2000); (4) comparing the habitat associations of each species with the vegetation alliances and habitat conditions documented in and adjacent to the Project area; and (5) using professional judgement to evaluate habitat quality and the relevance of occurrence data, or lack thereof.

This review and analysis resulted in the following categories of the likelihood for a special-status species to occur in the Project area:

- None: the Project area is outside the species' current distributional or elevation range and/or the species' required habitat is lacking from the Project area (e.g., coastal dunes).
- Low: the species' known distribution or elevation range overlaps with the Project vicinity but not the Project area, and/or the species' required habitat is of very low quality or quantity in the Project area.
- Moderate: the species' known distribution or elevation range overlaps with the Project area and/or the species' required habitat occurs in the Project area.
- High: the species has been documented in the Project area and/or its required habitat occurs in the Project area and is of high quality.

4.2 Results

4.2.1 Desktop review

A total of 29 special-status plant species were documented as occurring within the Project vicinity (Appendix B). Alliances documented during the vegetation assessment (Section 3.2) are associated with the following habitats: valley and foothill grassland, north coast coniferous forest, cismontane woodland, broadleaved upland forest, lower montane coniferous forest, riparian forest and chaparral (Table 4-1). Based on these habitat associations along with landform, soils, and known elevation range within the Project area, 11 special-status plants have low potential to occur (Appendix B) and eight have moderate potential to occur in the Project area (Appendix B and Table 4-1). Of these eight species with moderate potential to occur, none are federally listed, one is listed with the state as endangered, two have a CRPR of 1B (rare, threatened, or endangered in California and elsewhere), three have a CRPR of 2B (rare, threatened, or endangered in California and more common elsewhere), and two have a CRPR of 4 (plants of limited distribution in California, a watch list species) (Table 4-1). Furthermore, only one species, *Piperia candida* (white-flowered rein orchid), has documented occurrences within one mile of the Project area, all others are located 5 to 10 mi from the Project. A spring survey in May was selected to capture the appropriate phenological stage for all species with low and moderate potential to occur in the Project area.

Table 4-1. Special-status plant species with moderate potential to occur in the Project area.

Scientific name (common name)	Status (Federal, State, CRPR ¹)	Habitat association ²	Source	Likelihood of occurrence
<i>Astragalus agnicidus</i> (Humboldt County milk-vetch)	None/CE/1B.1	Openings, disturbed areas, and sometimes roadsides in broadleafed upland forest and north coast coniferous forest; 390–2,625 ft. Blooming period: April–September	CNPS, CDFW	Moderate: Broadleafed upland and north coast coniferous forest habitats present within Project area. Two occurrences within 5– 10 mi of the Project area.
<i>Coptis laciniata</i> (Oregon goldthread)	None/None/4.2	Mesic meadows and seeps and streambanks in north coast coniferous forest; 0–3,280 ft. Blooming period: (February) March– May (September–November)	CNPS, CDFW	Moderate: North coast coniferous forest habitat present within Project area. Two occurrences within 5– 10 mi of the Project area.
<i>Erythronium oregonum</i> (giant fawn lily)	None/None/2B.2	Sometimes serpentinite, rocky, openings in cismontane woodland and meadows and seeps; 325–3,775 ft. Blooming period: March–June (July)	CNPS, CDFW	Moderate: Cismontane woodland habitat present within Project area. No ultramafic soils mapped or observed in Project area. One occurrence is within 5–10 mi of the Project area.
<i>Erythronium revolutum</i> (coast fawn lily)	None/None/2B.2	Mesic, streambanks, bogs and fens, broadleafed upland forest, and north coast coniferous forest; 0–5,250 ft. Blooming period: March–July (August)	CNPS, CDFW	Moderate: Broadleafed upland and north coast coniferous forest habitats present within Project area. Two occurrences within 5– 10 mi of the Project area.
<i>Gilia capitata</i> subsp. <i>pacifica</i> (Pacific gilia)	None/None/1B.2	Coastal bluff scrub, openings in chaparral, coastal prairie, and valley and foothill grassland; 15–5,465 ft. Blooming period: April–August	CNPS, CDFW	Moderate: Chaparral and valley and foothill grassland habitats present within Project area. Multiple occurrences within 5–10 mi of the Project area.
<i>Montia howellii</i> (Howell's montia)	None/None/2B.2	Vernally mesic, sometimes roadsides in meadows and seeps, north coast coniferous forest, and vernal pools; 0–2,740 ft. Blooming period: (February) March–May	CNPS, CDFW	Moderate: North coast coniferous forest habitat present within Project area. Two occurrences within 5– 10 mi of the Project area.
<i>Piperia candida</i> (white-flowered rein orchid)	None/None/1B.2	Sometimes serpentinite in broadleafed upland forest, lower montane coniferous forest, and north coast coniferous forest; 95–4,300 ft. Blooming period: (March) May– September	CNPS, CDFW	Moderate: Broadleafed upland, lower montane coniferous, and north coast coniferous forest habitats present within Project area. No ultramafic soils mapped or observed in Project area. Multiple occurrences within 1 mi of the Project area.

Scientific name (common name)	Status (Federal, State, CRPR ¹)	Habitat association ²	Source	Likelihood of occurrence
<i>Usnea longissima</i> (Methuselah's beard lichen)	None/None/4.2	On tree branches, usually on old growth hardwoods and conifers in broadleaved upland forest and north coast coniferous forest; 160–4,790 ft. Blooming period: N/A (lichen)	CNPS, CDFW	Moderate: Broadleaved upland and north coast coniferous forest habitats present within Project area. Multiple occurrences within 5–10 mi of the Project area.

¹ Status:

State:

CE California endangered

California Rare Plant Rank (CRPR):

1B Plants rare, threatened, or endangered in California and elsewhere

2B Plants rare, threatened, or endangered in California, but more common elsewhere

4 Plants of limited distribution, on watchlist

CRPR Threat Ranks:

0.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

0.2 Moderately threatened in California (20–80% occurrences threatened / moderate degree and immediacy of threat)

² Months in parentheses are uncommon; N/A = Not applicable

4.2.2 Field survey

No special-status plant species were observed during the 3 May 2019 protocol-level botanical survey conducted in the Project area. A comprehensive list of all plant species observed in the Project area is provided in Appendix C.

5 WETLANDS AND WATERS

Waters and wetlands are under United States Army Corps of Engineers (USACE) jurisdiction pursuant to Section 404 of the Clean Water Act (CWA) regulatory authority and under SWRCB jurisdiction by Section 401 of the CWA. Section 404 of the CWA applies to all waters, including wetlands that have sufficient nexus to interstate commerce (USACE 1986).

A formal delineation of potential USACE jurisdictional waters or wetlands was not conducted as part of the field assessment; however, a wetland characterization within the Project area was conducted in conjunction with the special-status plant survey performed on 3 May 2019 (Section 4) to provide preliminary information on wetland conditions and assist with Project planning.

5.1 Methods

Results of topographic surveys conducted by Stillwater Sciences (Appendix A), were used to characterize watercourses within the Project area. Waters were categorized as perennial (i.e., support water year-round) or seasonal based on the results of the fisheries assessment (Section 6). Connectivity of these waters to traditional navigable waters as defined by the USACE was evaluated in GIS.

Prior to the wetlands assessment, existing information on vegetation, soils, and hydrology for the site was evaluated. Available data from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey website was reviewed for the Project

area and nearby vicinity. Information on potential jurisdictional waters and wetlands in the Project area and nearby vicinity was obtained from the USFWS National Wetlands Inventory (NWI) online application, *Wetlands Mapper* (USFWS 2019b).

Any potential USACE- and/or state-jurisdictional three-parameter wetland observed in the Project area was drawn onto field maps and later digitized using GIS. Evidence of a three-parameter wetland included the observation of at least two of the following wetland parameters: (1) dominant cover by hydrophytic vegetation (i.e., plants with a wetland indicator status of OBL [obligate], FACW [facultative-wet], or FAC [facultative] in the *Western Mountains, Valleys, and Coast Region* [Lichvar et al. 2016]), (2) wetland hydrology (e.g., saturated soils, standing water), and/or (3) mapped hydric soils. Per the 2001 United States Supreme Court issued decision on *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (SWANCC), any three-parameter wetland not adjacent or abutting a USACE-jurisdictional water of the U.S. does not fall under federal jurisdiction. Instead these isolated three-parameter wetlands are potentially state jurisdictional under the *Porter-Cologne Water Quality Control Act at Water Code section 13000 et seq.* (Porter-Cologne Act) by the Regional Water Quality Control Board (RWQCB).

5.2 Results

Based on thalwegs calculated from topographic survey data, the Project area contains 0.98 ac of potential waters of the U.S. These waters are comprised of Redwood Creek (which flows perennially), two intermittently flowing tributaries to Redwood Creek, and an additional intermittent water that has no clear surface water connection to Redwood Creek (Figure 5-1). Redwood Creek accounts for 0.35 ac of potential waters of the U.S. in the Project area and has an approximate width ranging from 20 ft to 46 ft. Unnamed intermittent waters account for 0.63 ac of potential waters of the U.S. in the Project area; these waters have an average approximate width of 10 ft (Figure 5-1).

Per the USFWS NWI query, Redwood Creek was the only surface water noted in the Project area. Potential waters of the U.S. in the Project area are also considered potential waters of the state by CDFW and SWRCB. Furthermore, riparian vegetation adjacent to waters of the state is interpreted by CDFW as being within the streambed and thereby falls under CDFW jurisdiction (Figure 5-1). Riparian vegetation totals 4.5 ac in the Project area and is associated with the *Acer macrophyllum* Forest Association (Figures 3-1 and 5-1).

Two three-parameter wetlands were also observed in the Project area and totaled 0.20 ac. Standing water observed at both locations indicated a high-water table, a primary indicator for wetland hydrology. Recent bioturbation from livestock was noted at both locations. Tadpoles were observed in areas within the larger wetland (0.19 ac) to the north where standing water was present in hoof punch and one adult tree frog was observed in the smaller wetland (0.01 ac) just downslope of the existing access road (Figure 5-1). Both wetlands are located within the Briceland-Tankridge complex, 15–50% slopes soil map unit. All components within this map unit were not listed as a hydric soil (NRCS 2019). Hydrophytic vegetation was evident in these areas and included freeway sedge (FACW), pennyroyal (OBL), toad rush (FACW), and spreading rush (FACW). No surface water connection to a watercourse was observed and these two isolated wetlands were not considered to be potentially USACE-jurisdictional wetlands; however, they may be considered state-jurisdictional wetlands by the RWQCB (Figure 5-1).

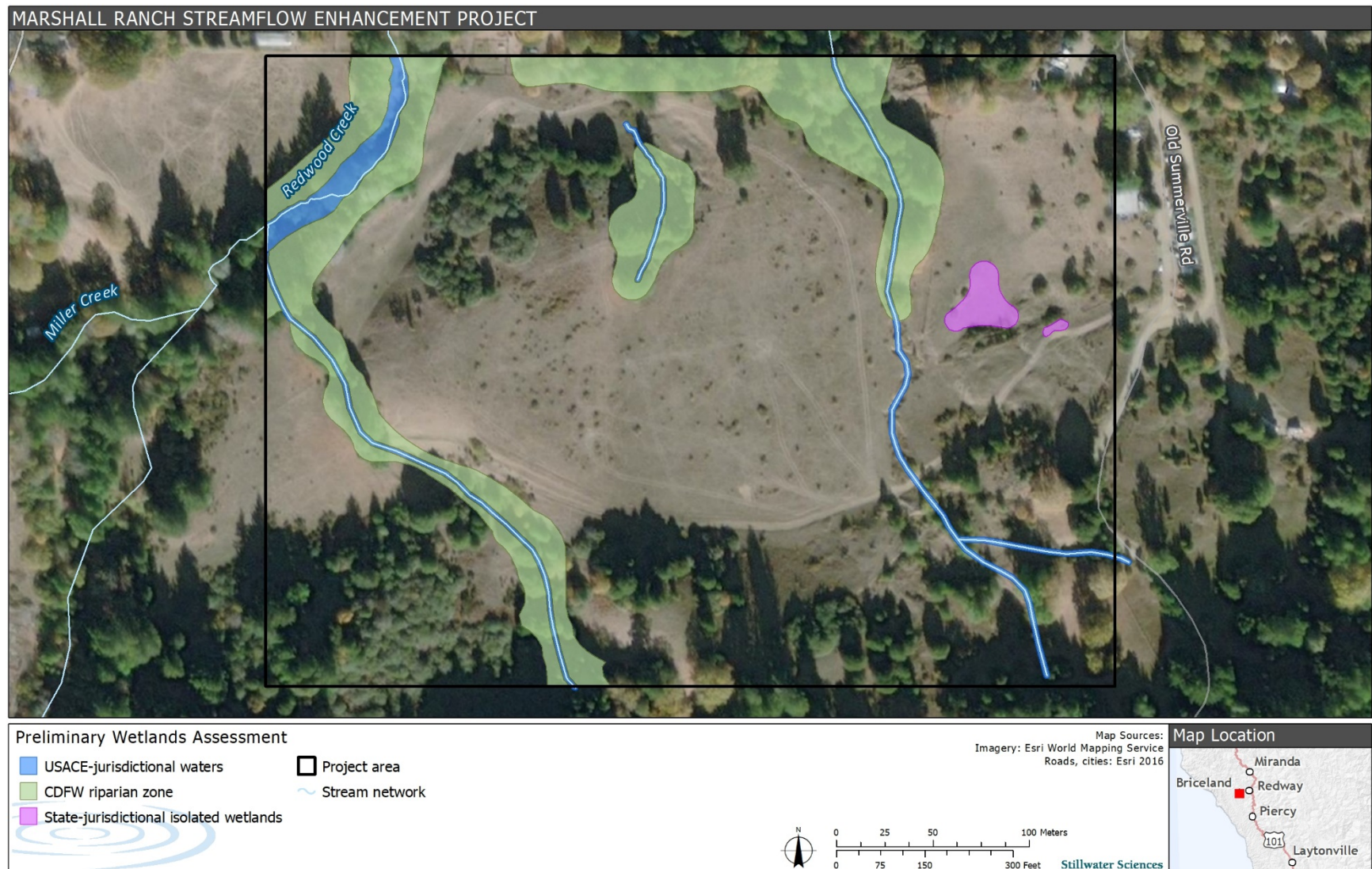


Figure 5-1. Preliminary waters and wetlands within the Project area.

6 SPECIAL-STATUS FISH AND WILDLIFE

6.1 Methods

An assessment of suitable habitat for special-status fish and wildlife was conducted to inform future analysis of the Project's potential to impact such species. Special-status species are defined as those that are:

- listed as endangered or threatened, or are proposed/candidates for listing, under ESA and/or CESA);
- designated by CDFW as a Species of Special Concern

6.1.1 Desktop review

The following biological databases were queried for records of special-status fish and wildlife or critical habitat that have potential to occur in the Project area:

- USFWS species list using the USFWS IPaC portal (USFWS 2019a),
- CDFW's CNDDDB (CDFW 2019a),
- CDFW's CNDDDB northern spotted owl viewer (CDFW 2019b), and
- National Marine Fisheries Service's (NMFS) *California Species List Tools* database (NMFS 2019).

The CNDDDB and USFWS database queries were each based on a search of records within the Project vicinity (see Section 3.1.1). The NMFS database query was based on a query of the Briceland quadrangle. Literature on recent occurrences of special-status species in the region was also consulted to determine which special-status species could occur in the Project area.

6.1.2 Fish and wildlife site assessment

A habitat assessment was conducted on 4 May 2019 to evaluate habitat conditions for special-status fish and wildlife species in the in the Project area. The site visit included a field review of the Project area, general characterization of aquatic and wildlife habitat, and photo documentation. The field survey was conducted in the entire construction zone, along intermittent watercourses and a 450-ft long reach of Redwood Creek, and in an area extending between 450 to 1,200 ft into the forest south of the proposed reservoir area.

6.2 Results

A total of 21 special-status wildlife species were identified from the database queries as having potential to occur in the Project area (Appendix B). Suitable habitat for some of the queried species does not occur in the Project area. Appendix B provides information about queried species without suitable habitat or with a low potential to occur in the Project area and these species are not discussed further in the main body of this document.

There are 12 special-status fish and wildlife species that have a moderate or high potential to occur and/or be affected by Project activities (Table 6-1). These species include Pacific lamprey, which did not appear in the database search results, but are known to occur within the South Fork Eel River in large numbers and likely in Redwood Creek. Each of these species are discussed in further detail in the sections below.

Table 6-1. Special-status fish and wildlife species with moderate to high potential to occur in the Project area.

Species name	Status ¹ Federal/ State	Distribution and habitat associations	Location of suitable habitat in Project area	Likelihood of occurrence
Fish				
<i>Oncorhynchus kisutch</i> (Coho salmon – southern Oregon/ northern California coast Evolutionarily Significant Unit)	FT, CH/ST	Spawn in coastal streams and large mainstem rivers (i.e., Klamath/Trinity rivers) in riffles and pool tails-outs and rear in pools \geq 3 ft deep with overhead cover with high levels oxygen and temperatures between 50–59°F.	Suitable habitat occurs in the South Fork Eel River and Redwood Creek.	High: Present in Redwood Creek.
<i>Oncorhynchus tshawytscha</i> (Chinook salmon – California Coastal ESU)	FT, CH/None	Wild coastal, spring, and fall-run Chinook found in streams and rivers between Redwood Creek, Humboldt County to the north and the Russian River, Sonoma County to the south.	Suitable habitat occurs in the South Fork Eel River and Redwood Creek.	High: Present in Redwood Creek.
<i>Oncorhynchus mykiss</i> (Steelhead – northern California coast Distinct Population Segment)	FT, CH/None	Inhabits small coastal streams to large mainstem rivers with gravel-bottomed, fast-flowing habitat for spawning. However, habitat criteria for different life stages (spawning, fry rearing, juvenile rearing) are can vary significantly.	Suitable habitat occurs in the South Fork Eel River and Redwood Creek.	High: Present in Redwood Creek.
<i>Entosphenus tridentatus</i> (Pacific lamprey)	None/SSC	Similar to anadromous salmonids, inhabits coastal streams and rivers with gravel-bottomed, fast-flowing habitat for spawning. Ammocoetes rear in backwater areas with sand, silt, and organic material for 4 to 10 years before migrating to the ocean.	Suitable habitat is present and spawning/rearing occurs in the South Fork Eel River. Spawning and rearing habitat is likely to occur in Redwood Creek.	High: Suitable habitat present.

Species name	Status ¹ Federal/ State	Distribution and habitat associations	Location of suitable habitat in Project area	Likelihood of occurrence
Amphibians				
<i>Rana boylei</i> (foothill yellow-legged frog)	None/SSC, CT	Associated with partially shaded, shallow streams, and riffles with rocky substrate. Some cobble-sized substrate required for egg laying. Adults move into smaller tributaries after breeding.	Suitable habitat is present and breeding occurs in the South Fork Eel River. Observed in Redwood Creek downstream of Project area.	High: Suitable habitat present.
<i>Taricha rivularis</i> (red-bellied newt)	None/SSC	Ranges from southern Humboldt to Sonoma counties. Found in streams during breeding season. Moist habitats under woody debris, rocks, and animal burrows.	Suitable habitat is present and sightings have occurred in the Mattole River, approximately 5 mi west of the Project area.	High: Habitat present in the Project area.
Birds				
<i>Strix occidentalis caurina</i> (northern spotted owl)	FT/ST	Typically found in large, contiguous stands of mature and old-growth coniferous forest with dense multi-layered structure.	Suitable foraging habitat is present within the Project area. Habitat within the Project area is unsuitable for nesting. The closest activity center is over 1.7 mi to the south-southeast of the Project area.	Moderate: Suitable foraging habitat exists in the Project area.
<i>Asio otus</i> (long-eared owl)	None/SSC	Distributed throughout North America. Recorded in north coast from Bald Hills, Humboldt County to Willits, Mendocino County. In Humboldt County, nest in mixed stands of conifers and oaks with edges and openings such as meadows or prairies.	Suitable nesting and foraging habitat present in the Project area.	High: Habitat present in the Project area.
Reptiles				
<i>Emys marmorata</i> (western pond turtle)	None/SSC	Ponds, marshes, rivers, streams, and irrigation ditches with abundant vegetation, and either rocky or muddy bottoms, in woodland forest and grasslands. Below 6,000 ft elevation. Basking sites are required. Egg-laying sites are located on suitable upland habitats (grassy open fields) up to 1,640 ft from water.	Suitable habitat occurs in the South Fork Eel River. Ponds that may contain western pond turtles are located on neighboring properties.	Moderate. May occur in neighboring ponds.

Species name	Status ¹ Federal/ State	Distribution and habitat associations	Location of suitable habitat in Project area	Likelihood of occurrence
Mammals				
<i>Arborimus pomo</i> (Sonoma tree vole)	None/SSC	Associated nearly exclusively with Douglas-fir trees and occasionally grand fir trees within the north coast fog belt between the northern Oregon border and Sonoma County. Eats Douglas-fir needles exclusively.	Early to mid-seral Douglas-fir stands are present adjacent to the Project area, which could provide nesting and foraging habitat.	High: Recorded occupying timber stands adjacent to the Project area
<i>Corynorhinus townsendii</i> (Townsend's big-eared bat)	None/SSC, CT	Found throughout California in all but subalpine and alpine habitats. Roosts in cavernous habitats, usually in tunnels, caves, buildings, mines, and basal hollows of trees, but also rock shelters, preferentially close to water. Caves near water's edge are favored. Forages in riparian zone and follows creeks and river drainages on foraging bouts. Feeds primarily on moths. Drinks at stream pools.	Suitable foraging habitat throughout most of the Project area; however, barns, old buildings, and bridges for roosting are not present within the Project area.	Moderate: May be present in some of the barns and older structures adjacent to the Project area.
<i>Antrozous pallidus</i> (pallid bat)	None/SSC	Found throughout California. Roosts in rock crevices, outcrops, cliffs, mines, and caves; trees (underneath exfoliating bark of pine and oak) and in basal hollows; and a variety of vacant and occupied structures (e.g., bridges) or buildings. Roost individually or in small to large colonies (hundreds of individuals). Feeds low to or on the ground in a variety of open habitats, primarily on ground-dwelling arthropods. Forages most frequently in riparian zone, in open oak savannah, and open mixed deciduous forest. Drinks at stream pools.	Suitable foraging habitat throughout most of the Project area, however barns, old building, and bridges are not present within the Project area.	Moderate: May be present in some of the older structures adjacent to the Survey Area

¹Status:

Federal

FT Federal Threatened
FC Federal Candidate
CH Designated critical habitat within the Project vicinity

State

ST Threatened
CT Candidate Threatened
SSC CDFW species of special concern

6.2.1 Fish

Fish-bearing watercourses in the Project area are inhabited by coho and Chinook salmon, steelhead, and Pacific lamprey. Suitable habitat for salmon, steelhead, and lamprey spawning and rearing was observed in Redwood Creek adjacent to the Project area during the field reconnaissance. Gravel in the creek was relatively unembedded and a suitable size for spawning. The pool:riffle:flatwater ratio was approximately 50:15:35 with the pools being between 2–5 ft deep. Brief life history discussions for each species are below.

6.2.1.1 Coho salmon, Southern Oregon/Northern California Coast ESU

The Southern Oregon/Northern California Coast evolutionary significant unit (ESU) for coho salmon is listed as threatened under the federal ESA (NMFS 2005a) and was listed as threatened under the California ESA in 2005. Critical habitat was designated in 1999 between the Mattole River in California and the Elk River in Oregon, inclusive (NMFS 1999a). Critical habitat includes all accessible streams and waters of estuarine areas. Coho salmon are known to spawn and rear in the South Fork Eel River and its tributaries. Upon emergence from the gravels, coho fry seek low-velocity areas along shallow stream margins (Shapovalov and Taft 1954). As they grow, juvenile coho move to deeper habitats, although they continue to prefer low-velocity habitat throughout the rearing period.

Coho salmon adults typically migrate upstream from October through December, and spawn from November through January. Spawning generally occurs in low-gradient stream reaches with gravel and cobble substrates. Females dig nests (redds) in the gravel, and deposit 2,500–5,000 eggs in a sequence of egg pockets, which are fertilized by one or more males (Beacham 1982, Sandercock 1991). Egg development is temperature-dependent, with fry emerging from the gravel in the spring, approximately three to four months after spawning. Upon emergence from the gravels, coho fry seek low-velocity areas along shallow stream margins (Shapovalov and Taft 1954). As they grow, juvenile coho move to deeper habitats, although they continue to prefer low-velocity habitat throughout the rearing period. Juveniles typically spend one to two years rearing in fresh water before outmigrating. Emigration from streams to the estuary and ocean generally takes place from February through June. Coho typically spend two years foraging at sea before returning to their natal streams to spawn.

Suitable habitat for coho salmon spawning and rearing was observed in Redwood Creek adjacent to the Project area during the field reconnaissance. Young-of-the-year coho salmon were observed in Redwood Creek during an instream habitat inventory in 2009 (CDFG 2009).

6.2.1.2 Chinook salmon, California coastal ESU

California coastal Chinook salmon were listed in 1999 as threatened under the federal ESA (NMFS 1999b). The California coastal Chinook salmon ESU extends from the Klamath River (exclusive) south to the Russian River (inclusive). Critical habitat for the species was designated in 2005 (NMFS 2005b) and includes the South Fork Eel River and Redwood Creek.

Chinook salmon in the California coastal ESU exhibit life history characteristics of the fall-run ecotype. In California, most adult fall-run Chinook enter streams from August through November, with peak arrival usually occurring in October and November. Spawning occurs from early October through December. Upon arrival at the spawning grounds, adult females dig shallow depressions or pits in gravel and cobble substrate, deposit eggs in the bottom during the act of spawning, and cover them with additional gravel. Female fall-run Chinook deposit an

average of about 5,500 eggs. Egg incubation generally lasts between 40 to 90 days at water temperatures of 42.8 to 53.6°F, and the alevins remain in the gravel for two to three weeks before emerging from the gravel. Fall-run Chinook salmon fry usually begin migrating downstream soon after emergence in February or March, with outmigration continuing into late-July. Chinook spend two or more years at sea before migrating back to their natal streams to spawn.

Suitable habitat for Chinook salmon spawning and rearing was observed in Redwood Creek adjacent to the Project area during the field reconnaissance. Chinook salmon have been identified as being present in Redwood Creek (CWPAP 2014).

6.2.1.3 Steelhead, Northern California Coast DPS

The Northern California Coast steelhead DPS was listed as threatened in 2006 under the federal ESA (NMFS 2006). The Northern California Coast steelhead DPS extends from Redwood Creek in Humboldt County to the Gualala River in Mendocino County (inclusive). Critical habitat for the species was designated in 2005 (NMFS 2005b). Critical habitat includes the South Fork Eel River and its tributaries, including Redwood Creek.

Adult winter steelhead generally begin migrating to spawning areas in October, with the peak migration in December through February. Steelhead spawning occurs in mainstems, tributaries, and intermittent streams in December through May. Spawning occurs in gravel and cobble substrates where the female digs an egg pocket and deposits her eggs, which are fertilized externally by one or more males. Redds typically consist of a series of egg pockets that excavated and subsequently covered during redd construction process. Unlike Chinook and coho salmon, steelhead typically do not remain on the spawning grounds for extended periods to defend the completed redd to reduce the potential for superimposition. Egg development time is inversely proportional to water temperature and varies from about 19 days at 60°F to about 80 days at 42°F. Fry typically emerge from the gravel two to three weeks after hatching. Upon emerging from the gravel, fry move to shallow edgewater habitats to rear, and gradually move into deeper habitats as they grow. During winter, when water temperatures are cold, juveniles are less active and hide in the interstitial spaces between cobbles and boulders. Juvenile steelhead typically rear in fresh water for two to three years prior to migrating downstream to the estuary and ocean. Steelhead spend between six months and three years at sea before returning to their natal streams to spawn. Unlike salmon, steelhead are capable of repeat spawning.

Suitable habitat for steelhead spawning and rearing was observed in Redwood Creek adjacent to the Project area during the field reconnaissance. Young-of-the-year and Age 1+ steelhead were observed in Redwood Creek during an instream habitat inventory in 2009 (CDFG 2009).

6.2.1.4 Pacific lamprey

The Pacific lamprey is a large, widely distributed anadromous species that rears in fresh water before outmigrating to the ocean, where it grows to full size (approximately 16–28 in) prior to returning to freshwater streams to spawn and ultimately die. The species is distributed across the northern margin of the Pacific Ocean, from central Baja California north along the west coast of North America to the Bering Sea in Alaska and off the coast of Japan. Adults migrate into and spawn in a wide range of river systems, from short coastal streams to tributaries of large rivers.

Pacific lampreys typically spawn from March through July depending on water temperatures and local conditions such as seasonal flow regimes (Kan 1975, Brumo et al. 2009, Gunckel et al. 2009). Spawning generally occurs at daily mean water temperatures from 50–64°F, with peak

spawning around 57–59°F (Stone 2006, Brumo 2006). Redds are typically constructed by both males and females in gravel and cobble substrates within pool and run tailouts and low gradient riffles into which eggs are deposited (Stone 2006, Brumo et al. 2009, Gunckel et al. 2009).

Hatching occurs following about 15 days of incubation, the egg-sac larval stage spend another 15 days in the redd gravels during which time they absorb the remaining egg sac, until they emerge at night and drift downstream (Brumo 2006). After drifting downstream, the eyeless larvae, known as ammocoetes, settle out of the water column and burrow into fine silt and sand substrates that often contain organic matter. Within the stream network they are generally found in low-velocity, depositional areas such as pools, alcoves, and side channels (Torgensen and Close 2004). Depending on factors influencing growth rates, they rear in these habitats from 4 to 10 years, filter-feeding on algae and detrital matter prior to metamorphosing into the adult form (Pletcher 1963, Moore and Mallatt 1980, van de Wetering 1998). During metamorphosis, Pacific lampreys develop eyes, a suckoral disc, sharp teeth, and more-defined fins (McGree et al. 2008).

After metamorphosis, smolt-like individuals known as macrophthalmia migrate to the ocean—typically in conjunction with high-flow events between fall and spring (van de Wetering 1998, Goodman et al. 2015). In the ocean, Pacific lampreys feed parasitically on a variety of marine fishes (Richards and Beamish 1981, Beamish and Levings 1991, Murauskas et al. 2013). They are thought to remain in the ocean, feeding for approximately 18–40 months before returning to fresh water as sexually immature adults, typically from winter to early summer (Kan 1975, Beamish 1980, Starcevich et al. 2014, Stillwater Sciences and Wiyot Tribe Natural Resources Department 2016).

Pacific lamprey are known to occur in the South Fork Eel River and its tributaries. Redwood Creek has suitable spawning and rearing habitat for this species.

6.2.2 Wildlife

6.2.2.1 Foothill yellow-legged frog

Foothill yellow-legged frog is a California species of special concern and has recently been designated as a candidate for threatened listing under the CESA. Within California, foothill yellow-legged frogs were historically found in the Sierra Nevada foothills, up to elevations of approximately 6,000 ft, and in the Coast Range from the Oregon state border south to the San Gabriel River in southern California (Stebbins 2003). Currently, populations are thought to have disappeared from the southern Sierra Nevada foothills, in areas south of the Transverse ranges, and along the coast south of Monterey County (Jennings and Hayes 1994).

Foothill yellow-legged frogs are typically found in perennial streams or rivers, and intermittent creeks with pools. The species often breeds in open and sunny, low-gradient stream reaches near junctions with tributary streams, due to the proximity of adult overwintering habitat in tributaries and to the presence of boulders and cobbles in these locations. Egg deposition usually occurs in cobble bars or under large boulders in areas of low-velocity flow. Tadpoles show affinity to the oviposition site, remaining in edgewater habitat with substrate interstices, vegetation, and/or detritus for cover. Adults prefer areas with exposed basking sites and cool, shady areas adjacent to the water's edge.

No foothill yellow-legged frogs were observed within or adjacent to the Project area during the field survey in May 2019. Suitable habitat for foothill yellow-legged frog breeding occurs in the South Fork Eel River where the channel widens and the tree canopy opens to allow sun to reach

the channel for several hours a day. Although the portion of Redwood Creek in the Project area is more heavily shaded than some section of the South Fork Eel River, suitable breeding and larval rearing habitat for foothill yellow-legged frog is present. In addition, Redwood Creek and its tributaries could be used by adults and juveniles of this species for dispersal in the fall.

6.2.2.2 Red-bellied newt

The red-bellied newt is a California species of special concern. In California, this species is found along the coast from near Bodega, Sonoma County, to near Honeydew, Humboldt County, and inland to Lower Lake and Kelsey Creek, Lake County. It lives in coastal woodlands, especially redwood forests.

Adults are terrestrial and become aquatic when breeding. Terrestrial animals spend the dry summer in moist habitats under woody debris, rocks, in animal burrows. Adults forage on the forest floor for a variety of invertebrates. Adults move toward streams in late February at the start of the breeding season, which extends into May. This species avoids ponds or lakes. Females lay eggs under rocks or attached to submerged roots in rocky streams and rivers with moderate to fast flow. Incubation lasts between two weeks to one month. Larval development to metamorphosis occurs over four to six months, after which they emerge from the streams and occupy terrestrial habitat. Juveniles spend most of their time underground and are not active on the surface until near sexual maturity, which occurs at about four to six years of age.

This species was not observed during the field survey in May 2019, however suitable aquatic and terrestrial habitat is present within or adjacent to Redwood Creek.

6.2.2.3 Northern spotted owl

The northern spotted owl is federally and state-listed as threatened. Critical habitat has been designated for this species, but it is not present within or adjacent to the Project area. Northern spotted owls are uncommon year-round residents in the northern California coastal ranges from Marin County north, as well as within the Cascade Range in northern California, southeast to the Pit River in Shasta County below 7,600 ft (Harris 1993, Gutiérrez et al. 1995, USFWS 2010). South of Burney in the southern Cascade Range and Sierra Nevada, the northern spotted owl is replaced by the California spotted owl (*Strix occidentalis occidentalis*) (Gutiérrez et al. 1995).

Northern spotted owls are typically associated with complex mature or old-growth stands dominated by conifers, particularly redwoods with hardwood understories (Pious 1994, USFWS 2011). Roosting sites are characterized by dense canopy cover dominated by large-diameter trees (i.e., greater than 30-in diameter at breast height [dbh]), multiple canopy layers, and north-facing slopes, often in cool shady areas (Gutiérrez et al. 1995, Courtney et al. 2004). Nests tend to be found in tree or snag cavities, on platforms (e.g., abandoned raptor or raven nests, squirrel nests, mistletoe brooms, or debris accumulations), or on broken-top snags (Zeiner et al. 1990a). Northern spotted owls are generally monogamous, forming long-term pair bonds that often last for life (Courtney et al. 2004). In late February or early March, pairs begin roosting in cavities, the tops of broken trees, or abandoned nests; nesting is followed by peak breeding in April and May (Zeiner et al. 1990a, Gutiérrez et al. 1995, Courtney et al. 2004). Northern spotted owls generally lay a single clutch of one to four eggs (Gutiérrez et al. 1995). A pair may use the same nesting location for several years, although breeding may not occur every year (Zeiner et al. 1990a).

Primary prey items for northern spotted owls are small mammals, but birds and insects are also taken (Forsman et al. 1984, Zeiner et al. 1990a). Foraging habitats vary more than roosting and nesting habitats, but are similarly characterized by high canopy closure and complex structure (Thomas et al. 1990). Open areas are also important foraging areas in northern California, as the abundance and diversity of prey is higher in early successional habitats (Folliard et al. 2000). Spotted owls are likely to forage in stands that are young enough to contain an abundance of prey, such as woodrats, but are old enough to allow the owls to fly under the canopy (Thome et al. 1999).

Suitable nesting habitat for northern spotted owl is not present in or adjacent to the Project area; however, species may forage in the area. The forest to the south of the Project area is dominated by a dense stand of 12- to 24-inch dbh Douglas-fir with a lesser amount of hardwoods. No evidence (pellets, nests, whitewash on trees or forest floor, etc.) of owl nesting or occupancy was observed in this area and the trees within it are not suitable for nesting. The nearest activity center (HUM0580) for this species is located approximately 1.7 mi to the southwest and the last recorded observation at this activity center was of a male in 2015 (CDFW 2019b).

6.2.2.4 Long-eared owl

The long-eared owl is considered a species of special concern in California. It occurs and breeds the length and breadth of the state east of the northern humid coastal region and from sea level to 7000 ft (Shuford and Gardali 2008). The species is considered to be “common” to “abundant locally” (Shuford and Gardali 2008). Surveys for the Humboldt County breeding bird atlas found long-eared owls in 11 scattered blocks in the southern half of the county, mainly in the interior (Hunter et al. 2005, as cited in Shuford and Gardali 2008). Prior records for the region representing possible breeding birds extend from Bald Hills, Humboldt County, south to Willits, Mendocino County (Harris 2005, as cited in Shuford and Gardali 2008).

Long-eared owls nests in conifer, oak, riparian, pinyon-juniper, and desert woodlands that are either open or are adjacent to grasslands, meadows, or shrublands. Key habitat components are some dense cover for nesting and roosting, suitable nest platforms, and open foraging areas. In Humboldt County, the owls apparently nest in mixed stands of conifers and oaks with edges and openings such as meadows or prairies (Hunter et al. 2005, as cited in Shuford and Gardali 2008).

Although no evidence (pellets, nests, whitewash on trees or forest floor, etc.) of owl nesting or occupancy was observed during the field survey, the Project area contains suitable nesting and foraging habitat for long-eared owls. The closest sighting occurred in Humboldt Redwoods State Park at Bull Creek, approximately 17.5 mi north of the Project area. However, observation records may be relatively scarce due to the nocturnal habitat of the species.

6.2.2.5 Sonoma tree vole

The Sonoma tree vole is a candidate for state listing as threatened. In California, the Sonoma tree vole is restricted to coastal forests in the humid fog belt from Sonoma County north to the Klamath mountains (Williams 1986, Jameson and Peeters 2004, Adam and Hayes 1998). Distribution of Sonoma tree voles in many parts of their range is patchy (Hall 1981), but this species can be locally common (Williams 1986).

The Sonoma tree vole is a nocturnal rodent that is active year-round (Zeiner et al. 1990b). This species lives, nests, and feeds within the forest canopy, though males are rarely terrestrial (Williams 1986). The home range usually consists of one or more trees (Brown 1985, as cited in

Carey 1991). Both sexes construct nests of Douglas-fir needles, typically located 6–18 m (20–60 ft) above the ground in branches or against trunks of Douglas-fir trees (Williams 1986). In cases where nests were found in species other than Douglas-fir, grand fir, and redwood, nests were on branches interlocking with branches of Douglas-fir. Breeding occurs throughout the year, peaking from February through September. The young are weaned at 30–40 days (Zeiner et al. 1990b). The diet of the red tree vole consists of needles, buds, and the tender bark of twigs of Douglas-fir, western hemlock, grand fir, and Bishop pine (Williams 1986, Wooster 1996). Needle resin ducts are removed before the remaining part is eaten. Young needles may be consumed entirely (Harris 1990). Tree voles obtain water from food or by licking dew or rainwater from coniferous trees (Maser 1965). Where present, tree voles are a common component of spotted owl diets (Forsman et al. 2004).

In Mendocino County, nests have occasionally been located on open ridge tops and in previously heavily logged and/or grazed areas (Wooster 1996). The predominant tree species used by Sonoma tree voles is Douglas-fir, with larger trees able to support colonies of tree voles (Meiselman 1987, Carey 1991, Wooster 1996, Thompson and Diller 2002, Jones 2003). Based on a study by Thompson and Diller (2002), tree voles are hypothesized to start colonizing in tree stands as young as around 20 years old. Density of active vole nests increases significantly as stands mature beyond 20 years old (Thompson and Diller 2002). Tree voles have also been documented nesting in tanoak, presumably due to its common occurrence in many Douglas-fir stands (Thompson and Diller 2002).

Although a stand search for nests and resin ducts (discarded after feeding on fir needles and used for nesting material) did not yield evidence of occupancy by this species, suitable habitat for Sonoma Tree vole is present in the Douglas-fir-dominated forest south of the Project area.

6.2.2.6 Townsend's big-eared bat

Townsend's big-eared bat is a candidate for state listing as threatened and a California species of special concern. This species occurs throughout California and is associated with caves and structures in a variety of habitats from deserts to coastal scrub to montane forests. Townsend's big-eared bats have been documented from sea level to 10,800 ft, although in California maternity roosts appear to be confined to elevations below 5,900 ft (Pierson and Fellers 1998, Sherwin and Piaggio 2005).

This cavity-dwelling species roosts and hibernates in caves (commonly limestone or basaltic lava), mines, buildings, bridges (with a cave-like understructure), rock crevices, tunnels, basal hollows in large trees, and cave-like attics (Pierson and Fellers 1998, Pierson and Rainey 2007, Pierson et al. 2001, Pierson and Rainey 1996, Sherwin et al. 2000, Sherwin and Piaggio 2005). Townsend's big-eared bats breed in both transitory migratory sites and hibernacula between September or October and February (CDFW 2013). The maternity season extends from 1 March through 31 October, with colonies forming between March and June and breaking up by September or October (CDFW 2013). Maternity colonies and winter hibernacula (found in caves, tunnels, mines, and buildings [Zeiner et al. 1990b]) are particularly sensitive to disturbance. This species could be directly impacted by removal or disturbance of maternal roosts (e.g., trees, abandoned buildings) during the breeding season (March–October).

Townsend's big-eared bat is a moth specialist with over 90% of its diet composed of lepidopterans. Foraging habitat associations include edge habitats along streams, adjacent to and within a variety of wooded habitats. These bats often travel large distances while foraging, including movements of over 93 mi during a single evening (Sherwin et al. 2000). Evidence of

large foraging distances and large home ranges has also been documented in California (Pierson and Rainey 1996).

Snags and large trees may be important roosts for this species. In northwestern California, Fellers and Pierson (2002, as cited in Woodruff and Ferguson 2005) documented individual Townsend's bats using tree hollows created by fire or rot in very large redwood (*Sequoia sempervirens*) and California bay trees (*Umbellularia californica*). A nursery colony was found using the basal hollows of large redwood trees in northwestern California (Mazurek 2004, as cited in Woodruff and Ferguson 2005) and in Muir Woods National Monument near San Francisco (Heady and Frick 2001, as cited in Woodruff and Ferguson 2005).

There is limited roosting habitat for Townsend's big-eared bat in the Project area (i.e., no caves, buildings, or bridges); however the species has the potential to roost in cavities present in older madrone and oak trees south of the Project area. Foraging habitat for Townsend's big-eared bat is present in the Project area.

6.2.2.7 Pallid bat

Pallid bat is a California species of special concern. This species occurs year-round in California. Pallid bats are associated with a variety of habitats from desert to coastal regions. At low- to mid-elevations, they are particularly associated with oak habitat (oak savannah, black oak, and oak grasslands) (Pierson and Rainey 2002). In natural settings, day and night roosts are in rock crevices and cliffs, but can also be found in trees (underneath exfoliating bark of pine and oak and in hollows) and caves (Sherwin and Rambaldini 2005, Hermanson and O'Shea 1983, Pierson et al. 2001, Pierson and Rainey 1996). However, in more urban settings (e.g., Central Valley and western Sierran foothills), day and night roosts are frequently associated with human structures such as abandoned buildings, old mine workings, and bridges (Sherwin and Rambaldini 2005, Pierson and Rainey 1996, Pierson et al. 2001). Overwintering roosts require relatively cool and stable temperatures out of direct sunlight. Pallid bats primarily forage in open spaces away from water. They can feed on the ground, on vegetation, and in the air by using a 'wing-cupping' method that forces the prey to the ground (Sherwin and Rambaldini 2005). Their generalist diet consists primarily of large ground-dwelling or slow flying insects and arachnids (Zeiner et al. 1990b), but can also include scorpions (pallid bats are immune to the sting), small rodents, and lizards.

The Project area does not contain tunnels, caves, or mines for roosting; however, suitable roosting habitat for the species occurs within the forest south of the Project area. Suitable foraging habitat for pallid bat occurs throughout the Project area.

6.2.2.8 Western pond turtle

Western pond turtle is a California species of special concern. In California, this species is found from the Oregon border along the Pacific Coast Ranges to the Mexican border, and west of the crest of the Cascades and Sierras.

Western pond turtles inhabit fresh or brackish water characterized by areas of deep water, low flow velocities, moderate amounts of riparian vegetation, warm water and/or ample basking sites, and underwater cover elements, such as large woody debris and rocks (Jennings and Hayes 1994). Along major rivers, western pond turtles are often concentrated in side channel and backwater areas. Turtles may move to off-channel habitats, such as oxbows, during periods of high flows (Holland 1994). Although adults are habitat generalists, hatchlings and juveniles require

specialized habitat for survival through their first few years. Hatchlings spend much of their time feeding in shallow water with dense submerged or short emergent vegetation (Jennings and Hayes 1994). Although an aquatic reptile, western pond turtles require upland habitats for basking, overwintering, and nesting, typically within 0.6 mi of aquatic habitats (Holland 1994).

Western pond turtle eggs are typically laid in June and July, though they may be laid throughout the year (Holland 1994, Reese 1996). Egg-laying sites vary from sandy shoreline to forest soil types, though are generally located in grassy meadows, away from trees and shrubs (Holland 1994), with canopy cover commonly less than about 10% (Reese 1996). Young hatch in late fall or overwinter in the nest and emerge in early spring.

Western pond turtles are known to occupy the South Fork Eel River. However, Redwood Creek, adjacent to the Project area has a relatively closed canopy, which would limit the basking opportunities for turtles. In addition, water flow during the summer months is very low or intermittent, which is not the preferred habitat for turtles. However, suitable habitat occurs in ponds on adjacent properties and there is moderate potential for the species to occupy the Project area on at least a seasonal basis.

7 POTENTIAL EFFECTS AND MINIMIZATION MEASURES

7.1 Special-status Plants and Sensitive Natural Communities

No special-status plant species were observed during the protocol-level botanical survey conducted in the Project area on 4 May 2019. In addition, there are no records of special-status plant occurrences within the Project area based on the 2019 CDFW CNDDDB queries (Section 4.1) (CDFW 2019a) and collection records in the Consortium of California Herbaria (ucjeps.berkeley.edu/consortium). As such, Project activities will have no impact on known special-status plant populations.

One sensitive natural community, *Acer macrophyllum* Forest Alliance (S3), was observed within the Project area. This alliance comprised the riparian forest (also under CDFW preliminary jurisdictional throughout the Project area) adjacent to Redwood Creek and its tributaries in the Project. Some disturbance is anticipated within this natural community during the instream habitat enhancement and gully stabilization Project activities. Installation of the off-channel reservoir will not affect this sensitive natural community, as it will replace a portion of the annual/perennial grassland in the Project area.

The following minimization measures will be implemented to reduce potential impacts on sensitive natural communities during Project activities:

- The Project footprint will be minimized to the extent possible.
- Ground disturbance and vegetation clearing and/or trimming will be confined to the minimum amount necessary to facilitate Project implementation.
- Heavy equipment and vehicles will use existing access roads to the extent possible.
- Construction materials will be stored in designated staging areas.
- Measures to prevent the spread of invasive weeds and sudden oak death pathogens will be taken, including, where appropriate, inspecting equipment for soil, seeds, and vegetative matter, cleaning equipment, utilizing weed-free materials and native seed mixes for revegetation, and proper disposal of soil and vegetation. Prior to entering and leaving the

work site, workers will remove all seeds, plant parts, leaves, and woody debris (e.g., branches, chips, bark) from clothing, vehicles, and equipment.

7.2 Wetlands and Waters

Construction activities associated with the proposed streamflow enhancement Project have the potential to affect preliminary waters of the U.S. and CDFW riparian zones as some of the work will take place within the active stream channel. The access road and other Project components will avoid all isolated wetlands within the Project area thus, the Project will not affect potential state-jurisdictional isolated wetlands. The following minimization measures are will be implemented to minimize any potential negative impacts on these waters and avoid impacting waters outside of the Project footprint:

- The Project footprint will be minimized to the extent possible.
- Isolated wetlands in the Project area will be flagged and avoided during all construction activities.
- Heavy equipment and vehicles will use existing access roads to the extent possible.
- Work will be conducted during the dry season to the extent possible.
- Construction materials will be stored in designated staging areas.
- The following erosion, sediment, material stockpile, and dust control best management practices will be employed on-site:
 - Locate temporary storage areas away from vehicular traffic
 - Locate stockpiles a minimum of 50 feet away from concentrated flows of storm water, drainage courses, and inlets
 - Protect all stockpiles from storm water run-on using a temporary perimeter sediment barrier such silt fences, compost socks, or sandbag barriers.
 - Keep stockpiles covered or protected with soil stabilization measures to avoid direct contact with precipitation and to minimize sediment discharge.
 - Implement wind erosion control practices as appropriate on all stockpiled material.
- All construction equipment will be well maintained to prevent leaks of fuels, lubricants, or other fluids and extreme caution will be used when handling chemicals (fuel, hydraulic fluid, etc.). Service and refueling procedures will not be conducted where there is potential for fuel spills to seep or wash into wetlands or waters. Appropriate materials will be on-site to prevent and manage any spills.

7.3 Special-status Fish and Wildlife

7.3.1 Fish

Coho and Chinook salmon, steelhead, and Pacific lamprey are special-status fish species known to occur in Redwood Creek within to the Project area. Indirect Project-related impacts on these species could result from discharge of sediment from reservoir and infiltration gallery excavation, gully stabilization, instream habitat enhancement, and offset well and Ranney-type collector construction. In addition, installation of the habitat enhancements and offset well/collector system could have direct impacts on special-status fish species that could be in the construction footprint. However, long-term beneficial impacts would accrue coho salmon, steelhead, and lamprey from water entering Redwood Creek from reservoir/infiltration gallery inputs. Benefits for juvenile

Chinook salmon would be limited since they typically migrate to the ocean prior to the planned water deliveries to the Redwood Creek associated with the Project.

The following measures will be employed by the Project to avoid, minimize, or mitigate indirect sediment-related impacts on special-status fish species and their habitat.

- The use of cofferdams will contain any turbid water produced during the Project within the work area, thereby avoiding impacts on downstream salmonids. Any turbid water within the confined work areas would be pumped to a receiving site outside the channel or to frak tanks. Any turbid water within the work area would be allowed to settle prior to removal of the cofferdams, thereby minimizing downstream effects on salmonids.
- Discharge of sediment will be controlled and minimized with the implementation of best management practices (BMPs) on all disturbed soils that have the potential to discharge into area watercourses. Applicable BMPs include, but are not limited to, installation of silt fences, straw wattles, and placement of seed-free rice straw. BMPs will be installed at all access points to the work sites, which will minimize the potential for sediment delivery and deleterious effects on salmonids.
- All gully stabilization work will be conducted when the individual sites are dry (i.e. no surface water).

There is the potential for instream Project activities to directly impact salmonid species through contact with heavy equipment and entrainment into dewatering pumps. To minimize the potential for injury or mortality of fish, the following measures will be applied:

- A 15 July–15 October instream work window will be established to allow time for young-of-the-year salmonids to be very mobile and capable of avoiding injury. The work window will also allow downstream migration of smolts to be completed prior to any Project-related channel disturbance taking place. In addition, the work window coincides with the summer low-flow season during which flow in the creek will be at its summer base flow. Finally, the 15 October date will insure all work is done prior to the rainy season and arrival of any upstream migrating adult salmonids.
- Prior to the initiation of any instream work in areas with surface water, a qualified biologist will survey the site to determine fish presence. The biologist will herd or relocate any fish that may be in work sites to suitable habitat downstream. Block nets will be installed to prevent fish from reentering the work area. Any fish remaining in the work area will be captured by hand, dip net, or as a last resort, using a backpack electrofisher. Cofferdams will be constructed in the channel at sites where streamflow is present. Pumps will then be installed outside of the stream channel to divert water around the work area.
- The Project will follow the Fish Screening Criteria for Salmonids (NMFS 1997), NOAA Restoration Center/Army Corps of Engineers programmatic biological opinion requirements.

There is also the potential for accidental release of hydrocarbons into Redwood Creek during construction operations. The following measures will be implemented to minimize the accidental release of hydrocarbons.

- All fueling and servicing of heavy equipment will occur at least 100 ft from any watercourse.
- Spill kits will be on-site in case of an accidental release of fuels, lube oil, or hydraulic fluids from equipment.

There would be long-term beneficial effects resulting from the addition of wood to the stream channel. The increase in wood and construction of channel-spanning post-assisted check dams would result in localized reductions in high flow velocities, allowing for sorting and deposition of bed load materials.

Critical habitat for listed salmonids species would also benefit in the short and long-term. The wood would help create debris jams, increase habitat complexity, stabilize floodplains, create off-channel habitat, improve winter and summer habitat conditions, create scour pools, and increase cover for juvenile and adult salmonids. The input of water during the summer and late fall from the infiltration gallery would increase summer and fall flow in Redwood Creek during the dry season. Stabilization of the gullies on the property would reduce sediment input into Redwood Creek and adverse effects on spawning and rearing habitat for fish.

7.3.2 Wildlife

7.3.2.1 Foothill yellow-legged frog

The reservoir and infiltration gallery construction activities will take place in open meadow areas not utilized by foothill yellow-legged frogs. However, foothill yellow-legged could be affected by proposed activities that would take place within Redwood Creek and at gully stabilization sites. Impacts on adult, juvenile, or larval frogs could occur through direct contact with heavy equipment or disturbed soil. Adverse impacts could occur from instream structure construction, dewatering of work areas, trampling of larvae during instream operations, contact with heavy equipment, and sediment discharge. The gully stabilization sites are not utilized by foothill yellow-legged frogs for breeding or larval rearing and impact on these life history stages would not occur at these locations.

The Project would result in the development of additional instream habitat, which should benefit foothill yellow-legged frogs by maintaining and potentially expanding the amount of instream habitat available for breeding and larval development in Redwood Creek.

The following species-specific conservation measures will be employed to avoid or minimize the potential for impacts on foothill yellow-legged frogs:

- An egg mass survey will be conducted in May prior to the operations season to determine if breeding occurs within the Project reaches.
- A visual observation survey of the Project areas will be conducted within two weeks prior to the start of operations to determine if adult and juvenile foothill yellow-legged frogs are present in the Project area.
- If foothill yellow-legged frogs are present, then a qualified CDFW-approved biologist will be present immediately prior to the start of operations to remove any frogs and relocate them to suitable habitat.
- The Project manager or qualified designee will conduct daily morning inspections of the area slated for work to determine if foothill yellow-legged frogs entered the areas overnight. Any individuals will be captured and relocated by a CDFW-approved biologist prior to the start of the construction work for the day.
- The Project will apply for an incidental take permit or other appropriate take authorization as deemed necessary by CDFW if foothill yellow-legged frogs are present within the Project area and they either remain a candidate for listing or are listed as threatened under CESA.

The following additional general conservation measures will be employed to further avoid or minimize the potential impacts on foothill yellow-legged frogs:

- All gully stabilization work will be conducted when the individual sites are dry (i.e. no surface water).
- All fueling and servicing of heavy equipment will occur at least 100 ft from any watercourse.
- Spill kits will be on-site in case of an accidental release of fuels, lube oil, or hydraulic fluids from equipment.

7.3.2.2 Red-bellied newt

Adult and juvenile red-bellied newts have the potential to be present in terrestrial portions of the Project area during the planned construction period and could be affected by heavy equipment that collapses burrows or moves woody debris. Larval newts have the potential to be present in aquatic portions of the Project area and could be affected by instream operations.

The following conservation measures will be employed to avoid or minimize the potential for impacts on red-bellied newt:

- Terrestrial woody debris will be left in place to the greatest extent practicable during operations within the riparian areas.
- The Project manager or qualified designee will conduct daily morning inspections of the area slated for work to determine if adult newts are present on the ground surface. Any adult newts will be captured and relocated to suitable habitat outside of the Project area by a CDFW-approved biologist prior to the start of construction for the day.
- Prior to the initiation of any instream work in areas with surface water, a qualified biologist will survey the site to determine larval newt presence. If larval red-bellied newts are present, then a CDFW-approved biologist will relocate them to suitable habitat outside the Project area prior to the start of construction for the day.

The Project will result in additional dry season flows in Redwood Creek, which would benefit red-bellied newts by maintaining or improving instream habitat available for this species.

7.3.2.3 Northern spotted owls

The closest northern spotted owl activity center to the Project is approximately 1.7 mi away from the Project area and recent surveys (i.e., within the last four years) have not documented nesting within this activity center. Nesting habitat does not occur within the Project area or in the adjacent forest. The Project activities do not include removal of any trees that could provide habitat for owls. Therefore, there will not be any direct impacts on northern spotted owls or their habitat. However, there is the potential for construction-related noise to affect northern spotted owls that may be on adjacent properties or away from the Project area.

The potential for Project construction to indirectly impact nesting northern spotted owls was preliminary evaluated using USFWS (2006) guidelines. Owls can be affected by noise-related, visual, or physical disturbances, such as created by heavy equipment. USFWS (2006) identifies the distance that sound associated with different types of construction equipment is estimated to

disturb northern spotted owls during the breeding season, relative to ambient noise levels. Most types of standard construction equipment (e.g., backhoes, bulldozers, construction vehicles, etc.) would require disturbance buffers of 330–1,320 ft from nesting spotted owl activity centers. No Project activities utilizing these types of equipment are expected to occur within 1,320 ft of a northern spotted owl nest. In addition, as stated above, recent surveys have not found nesting northern spotted owls with the closest known activity center (1.7 mi from the Project area). Therefore, northern spotted owls are unlikely to be indirectly affected by the Project.

7.3.2.4 Long-eared owl

Long-eared owls have not been observed within 17 mi of the Project area. However, this species nests in conifer and oak woodlands that are either open or are adjacent to grasslands, meadows, or shrublands. These habitats exist within the Project area, although no evidence of occupancy was observed during the field survey. Construction activities associated with the Project would not affect nesting or roosting habitat since no trees would be removed. However, potential foraging habitat could be affected due to the construction of the reservoir and infiltration gallery. In addition, construction noise may affect nesting owls.

Construction of the infiltration gallery would be a temporary impact since the area would revegetate after completion. The construction of the reservoir will result in approximately 6.5 ac of grazed grassland area being permanently converted to open water and associated containment berm features. This conversion could affect the amount of foraging habitat available for long-eared owls. A preliminary estimate of available grasslands in the Briceland area conducted using satellite imagery showed approximately 470 ac of grassland (not including numerous small openings) within a one-mile radius of the Project area. The Project would convert approximately 1.4% of this area to reservoir, a relatively minor impact in consideration of the amount of suitable foraging habitat in the vicinity and the lack of evidence indicating species presence in and around the Project area.

The following conservation measure will be employed to avoid or minimize the potential for impacts on long-eared owls:

- A pre-construction nesting bird survey will be conducted during the breeding season and within two weeks of the start of construction. Appropriate buffers will be established around all active nests within the Project area.

7.3.2.5 Sonoma tree vole

Suitable habitat for Sonoma tree voles is present in the timber stand adjacent to the Project area. The Project will not occur within the forest nor remove any trees; therefore, there will be no impact on this species.

7.3.2.6 Pallid bat

Suitable habitat for pallid bats is present in the timber stand adjacent to the Project area. The Project will not occur within the forest nor remove any trees or structures that could be occupied by this species; therefore, there will be no impact on pallid bat.

7.3.2.7 Townsend's big-eared bat

Suitable habitat for Townsend's big-eared bats is present in the timber stand adjacent to the Project area. The Project will not occur within the forest nor remove any trees or structures that

could be occupied by this species; therefore, there will be no impact on Townsend's big-eared bat.

7.3.2.8 Western pond turtles

Redwood Creek, within the Project area has a relatively closed canopy, which would limit the basking opportunities for turtles. In addition, water flow during the summer months is very low or intermittent, which is not the preferred habitat for turtles. In addition, no ponds are located in the Project area that could contain this species. However, there is the potential that turtles could be within the Project area at the start of construction.

The following conservation measure will be employed to avoid or minimize impacts on western pond turtles:

- Prior to the initiation of any instream work in areas with surface water, a qualified biologist will survey the site to determine turtle presence. The biologist will capture and relocate any turtle that may be in work sites to suitable habitat downstream. Block nets will be installed to prevent turtles from reentering the work area.

8 REFERENCES

- Adam, M. D., and J. P. Hayes. 1998. *Arborimus pomo*. Mammalian Species 593: 1–5.
- Beacham, T. D. 1982. Fecundity of coho salmon (*Oncorhynchus kisutch*) and chum salmon (*O. keta*) in the northeast Pacific Ocean. Canadian Journal of Zoology 60: 1,463–1,469.
- Beamish, R. J. 1980. Adult biology of the river lamprey (*Lampetra ayresii*) and the Pacific lamprey (*Lampetra tridentata*) from the Pacific coast of Canada. Canadian Journal of Fisheries and Aquatic Science: 37. 1906-1923. 10.1139/f80-232.
- Beamish, R. J., and C. D. Levings. 1991. Abundance and freshwater migrations of the anadromous parasitic lamprey, *Lampetra tridentata*, in a tributary of the Fraser River, British Columbia. Canadian Journal of Fisheries and Aquatic Sciences 48: 1,250–1,263.
- Brown, E. R. 1985. Management of wildlife and fish habitats in forests of western Oregon and Washington. Part 2: Appendices. RG-F&WL-192-1985. U.S. Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, Oregon.
- Brumo A. F. 2006. Spawning, larval recruitment, and early life survival of Pacific lampreys in the South Fork Coquille River, Oregon. Master's thesis. Oregon State University, Corvallis, Oregon.
- Brumo, A. F., L. Grandmontagne, S. N. Namitz, and D. F. Markle. 2009. Approaches for monitoring Pacific lamprey spawning populations in a coastal Oregon stream. American Fisheries Society Symposium 72: 203–222.
- Carey, A. B. 1991. The biology of arboreal rodents in Douglas-fir forests. In M. H. Huff, R. S. Holthausen and K. B. Aubry, editors. Biology and management of old-growth forests. General Technical Report PNW-GTR-276. USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon.

CDFG (California Department of Fish and Game). 2009. Stream inventory report – Redwood Creek. Eureka, California.

CDFW (California Department of Fish and Wildlife). 2013. Evaluation of the petition to list the Townsend's big-eared bat (*Corynorhinus townsendii*) as threatened or endangered. Prepared by CDFW, Sacramento, California.

CDFW. 2018a. California sensitive natural communities list. Vegetation classification and mapping program, California Department of Fish and Game. Sacramento, California.

CDFW. 2018b. Protocols for surveying and evaluating impacts to special status native plant populations and natural communities. California Department of Fish and Game, Sacramento, California.

CDFW. 2018c. Special vascular plants, bryophytes, and lichens list. Natural Diversity Database. Quarterly publication. California Department of Fish and Wildlife, Sacramento, California.

CDFW 2019a. California Natural Diversity Database. Rarefind database. California Department of Fish and Wildlife, Sacramento, California.

CDFW. 2019b. California Natural Diversity Database. Spotted owl viewer. California Department of Fish and Wildlife, Sacramento, California.

CNPS (California Native Plant Society). 2019a. A manual of California vegetation. Online edition. California Native Plant Society, Sacramento, California. <http://vegetation.cnps.org>

CNPS. 2019b. Inventory of rare and endangered plants of California. Online edition, version 8-03 0.39. D. P. Tibor, convening editor. Rare Plant Scientific Advisory Committee, California Native Plant Society, Sacramento, California. Website <http://www.rareplants.cnps.org>

CNPS and CDFW. 2018a. CDFW-CNPS protocol for the combined vegetation rapid assessment and relevé field form. <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18599>

CNPS and CDFW. 2018b. Combined vegetation rapid assessment and relevé field form. <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18598>

Courtney, S. P., J. A. Blakesley, R. E. Bigley, M. L. Cody, J. P. Dumbacher, R. C. Fleischer, A. B. Franklin, R. J. Gutiérrez, J. M. Marzluff, and L. Sztukowski. 2004. Scientific evaluation of the status of the northern spotted owl. Sustainable Ecosystems Institute, Portland, Oregon.

CWPAP (Coastal Watershed Planning and Assessment Program). 2014. South Fork Eel River assessment report. Fortuna, California.

Fellers, G. M., and E. D. Pierson. 2002. Habitat use and foraging behavior of Townsend's big-eared bat (*Corynorhinus townsendii*) in coastal California. *Journal of Mammalogy* 83: 167–177.

Flosi, G., S. Downie, J. Hopelain, M. Bird, R. Coey, and B. Collins. 2010. California salmonid stream habitat restoration manual. Fourth edition. Prepared by California Department of Fish and Game, Sacramento, California.

- Folliard, L. B., K. P. Reese, and L. V. Diller. 2000. Landscape characteristics of northern spotted owl nest sites in managed forests of northwestern California. *Journal of Raptor Research* 34: 75–84.
- Forsman, E. D., E. C. Meslow, and H. M. Wight. 1984. Distribution and biology of the spotted owl in Oregon. *Wildlife Monographs* 87: 1–64.
- Forsman, E. D., R. G. Anthony, E. C. Meslow, and C. J. Zabel. 2004. Distribution and abundance of red tree voles in Oregon based on occurrence in pellets of northern spotted owls. *Northwest Science* 78: 294–302.
- Goodman, D. H. and S. B. Reid, N. A. Som, and W. R. Poytress. 2015. The punctuated seaward migration of Pacific lamprey (*Entosphenus tridentatus*): environmental cues and implications for streamflow management. *Canadian Journal of Fisheries and Aquatic Science* 72: 1–12.
- Gutiérrez, R. J., A. B. Franklin, and W. S. Lahaye. 1995. Spotted owl (*Strix occidentalis*). In A. Poole, editor. *The birds of North America online*. Cornell Lab of Ornithology, Ithaca, New York. <http://bna.birds.cornell.edu/bna/species/179/articles/introduction>
- Gunckel, S. L., K. K. Jones, and S. E. Jacobs. 2009. Spawning distribution and habitat use of adult Pacific and western brook lampreys in Smith River, Oregon. Pages 173–189 in L. R. Brown, S. D. Chase, M. G. Mesa, R. J. Beamish, and P. B. Moyle, editors. *Biology, management, and conservation of lampreys in North America*. American Fisheries Society, Symposium 72, Bethesda, Maryland.
- Hall, E. R. 1981. *The mammals of North America*. Second edition. Wiley, New York.
- Harris, P. B. 1990. California Wildlife Habitat Relationships System - California red tree vole (*Arborimus pomo*). California Department of Fish and Game.
- Harris, S. W. 1993. *Northwestern California birds*. Humboldt State University Press, Arcata, California.
- Harris, S. W. 2005. *Northwestern California Birds*, 3rd edition. Living Gold Press, Klamath River, California.
- Heady, P. H., and W. F. Frick. 2001. Bat inventory of Muir Woods National Monument. Final report. Central Coast Bat Research Group, Aptos, California.
- Hermanson, J. W., and T. J. O'Shea. 1983. *Antrozous pallidus*. *Mammalian Species* 213: 1–8.
- Holland, D. C. 1994. The western pond turtle: habitat and history. Final Report. U.S. Department of Energy, Bonneville Power Administration, Portland, Oregon.
- Hunter, J. E., Fix, D., Schmidt, G. A., and Power, J. C. 2005. *Atlas of the Breeding Birds of Humboldt County, California*. Redwood Region Audubon Soc., Eureka, CA.
- Jameson, E. W., Jr., and H. J. Peeters. 2004, revised edition. *Mammals of California*. California Natural History Guides No. 66. University of California Press, Berkeley, California.
- Jepson Flora Project, editors. 2019. Jepson eFlora. <http://ucjeps.berkeley.edu/eflora/>

- Jennings, M. R., and M. P. Hayes. 1994. Amphibian and reptile species of special concern in California. Final Report. Prepared for California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California.
- Jones, J. M. 2003. Habitat associations and ecology of the Sonoma tree vole (*Arborimus pomo*) in northwestern California. M.A. Thesis. Humboldt State University, Arcata, California.
- Kan, T. T. 1975. Systematics, variation, distribution, and biology of lampreys of the genus *Lampetra* in Oregon. Doctoral dissertation. Oregon State University, Corvallis.
- Klein, A., T. Keeler-Wolf, and J. Evens. 2015. Classification of the Vegetation Alliances and Associations of Sonoma County, California Volume 1 of 2 – Introduction, Methods, and Results. Prepared by California Department of Fish and Wildlife Vegetation Classification and Mapping Program and the California Native Plant Society Vegetation Program for The Sonoma County Agricultural Preservation and Open Space District, The Sonoma County Water Agency.
- Lichvar, R. W., M. Butterwick, N. C. Melvin, and W. N. Kirchner. 2014. The national wetland plant list: 2014 update on wetland ratings. *Phytoneuron* 2014-41: 1–42. ISSN 2153 733X.
- Lichvar, R. W., D. L. Banks, W. N. Kirchner, and N. C. Melvin. 2016. Western Mountains, Valleys & Coast 2016 regional wetland plant list in The national wetland plant list: 2016 wetland ratings. *Phytoneuron* 2016-30: 1–17. ISSN 2153 733X.
- Maser, C. 1965. Life histories and ecology of *Phenacomys albipes*, *Phenacomys longicaudus*, and *Phenacomys silvicola*. Master's thesis. Oregon State University, Corvallis.
- Mazurek, M. J. 2004. A maternity roost of Townsend's big-eared bats (*Corynorhinus townsendii*) in coast redwood basal hollows in northwestern California. *Northwestern Naturalist*: 85: 6062.
- McGree M., T. A. Whitesel, and J. Stone. 2008. Larval metamorphosis of individual Pacific lampreys reared in captivity. *Transactions of the American Fisheries Society* 137: 1,866–1,878.
- McLaughlin, R. J., S. D. Ellen, M. C. Blake, Jr., A. S. Jayko, W. P. Irwin, K. R. Aalto, G. A. Carver, and S. H. Clarke, Jr. 2000. Geology of the Cape Mendocino, Eureka, Garberville, and southwestern part of the Hayfork 30 x 60 minute quadrangles and adjacent offshore area, Northern California. Digital database by J. B. Barnes, J. D. Cecil, and K. A. Cyr. USGS Miscellaneous Field Studies Map MF-2336, Online version 1.0.
- Meiselman, N. 1987. Red tree vole habitat and microhabitat utilization in Douglas-fir forests of northern California. Final Report. California Department of Fish and Game, Wildlife Management Division.
- Moore, J. W., and J. M. Mallatt. 1980. Feeding of larval lamprey. *Canadian Journal of Fisheries and Aquatic Sciences* 37: 1,658–1,664.
- Murauskas, J. G. A. M. Orlov, and K. A. Siwicke. 2013. Relationships between the abundance of Pacific lamprey in the Columbia River and their common hosts in the marine environment. *Transactions of the American Fisheries Society* 142: 143–155.

NMFS (National Marine Fisheries Service). 1999a. Designated critical habitat; Central California Coast and Southern Oregon/Northern California Coast coho salmon. Federal Register 64: 24,049–24,062.

NMFS. 1999b. Endangered and threatened species; threatened status for two chinook salmon evolutionarily significant units (ESUs) in California. Federal Register 64: 50,394–50,415.

NMFS. 2005a. Endangered and threatened species; final listing determinations for 16 ESUs of West Coast salmon, and final 4(d) protective regulations for threatened salmonid ESUs. Federal Register 70: 37,160–37,204.

NMFS. 2005b. Endangered and threatened species; designation of critical habitat for seven Evolutionarily Significant Units of Pacific salmon and steelhead in California; final rule. Federal Register 70: 52,488–52,627.

NMFS. 2006. Endangered and threatened species: final listing determinations for 10 Distinct Population Segments of west coast steelhead. Federal Register 71: 834–862.

NMFS. 2019. California species list tools. Electronic database.
http://www.westcoast.fisheries.noaa.gov/maps_data/california_species_list_tools.html

NRCS (Natural Resources Conservation Service). 2019. Custom Soil Resource Report for Humboldt County, South Part, California. National Cooperative Soil Survey.

Pierson, E. D., and G. M. Fellers. 1998. Distribution and ecology of the big-eared bat, *Corynorhinus townsendii* in California. Prepared for U.S. Geological Service, Species at Risk Program.

Pierson, E. D., and W. E. Rainey. 1996. The distribution, status and management of Townsend's big-eared bat (*Corynorhinus townsendii*) in California. Bird and Mammal Conservation Program Report 96-7. Prepared for California Department of Fish and Game, Sacramento, California.

Pierson, E. D., and W. E. Rainey. 2002. Bats. Pages 385–400 in J. E. Vollmar, editor. Wildlife and rare plant ecology of eastern Merced County's vernal pool grasslands. Vollmar Consulting, Berkeley, California.

Pierson, E. D., and W. E. Rainey. 2007. Bat distribution in the forested region of northwestern California. Prepared for California Department of Fish and Game, Sacramento, California.

Pierson, E. D., W. E. Rainey, and C. Corben. 2001. Seasonal patterns of bat distribution along an altitudinal gradient in the Sierra Nevada. Report to the California Department of Transportation, California State University at Sacramento Foundation, Yosemite Association, and Yosemite Fund.

Pious, M. 1994. Nesting and roosting habitat of spotted owls in managed redwood/Douglas-fir forests, California. Prepared by Louisiana-Pacific Corporation, Calpella, California for California Department of Fish and Game, Georgia-Pacific Corporation, Louisiana-Pacific Corporation, and U.S. Fish and Wildlife Service.

Pletcher, T. F. 1963. The life history and distribution of lampreys in the Salmon and certain other rivers in British Columbia, Canada. Master's thesis. University of British Columbia, Vancouver.

- Reese, D. A. 1996. Comparative demography and habitat use of western pond turtles in northern California: the effects of damming and related alterations. Unpublished doctoral dissertation. University of California, Berkeley.
- Richards, J. E., and F. W. H. Beamish. 1981. Initiation of feeding and salinity tolerance in the Pacific lamprey *Lampetra tridentata*. *Marine Biology* 63: 73–77.
- Sandercock, F. K. 1991. Life history of coho salmon (*Oncorhynchus kisutch*). Pages 397–445 in C. Groot and L. Margolis, editors. Pacific salmon life histories. University of British Columbia Press, Vancouver, B. C.
- Sawyer, J. O., T. Keeler-Wolf, J. M. Evens. 2008. A manual of California vegetation. Second edition. CNPS, Sacramento, California.
- Shapovalov, L., and A. C. Taft. 1954. The life histories of the steelhead rainbow trout (*Salmo gairdneri gairdneri*) and silver salmon (*Oncorhynchus kisutch*) with special reference to Waddell Creek, California, and recommendations regarding their management. Fish Bulletin 98. California Department of Fish and Game.
- Sherwin, R., and A. Piaggio. 2005. *Corynorhinus townsendii* Townsend's big-eared bat. Species account developed for the Western Bat Working Group 1998 Reno Biennial Meeting; updated for the 2005 Portland Biennial Meeting. Western Bat Working Group, Rapid City, South Dakota. http://wbwg.org/species_accounts/vespertilionidae/coto.pdf.
- Sherwin, R., and D. A. Rambaldini. 2005. *Antrozous pallidus*, pallid bat. Species account developed for the Western Bat Working Group 1998 Reno Biennial Meeting; updated for the 2005 Portland Biennial Meeting. Western Bat Working Group, Rapid City, South Dakota. http://wbwg.org/species_accounts/vespertilionidae/anpa.pdf.
- Sherwin, R. E., D. Stricklan and D. S. Rogers. 2000. Roosting affinities of Townsend's big-eared bat (*Corynorhinus townsendii*) in northern Utah. *Journal of Mammalogy* 81: 939–947.
- Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.
- Starceovich, S. J., S. L. Gunckel, and S. E. Jacobs. 2014. Movements, habitat use, and population characteristics of adult Pacific lamprey in a coastal river. *Environmental Biology of Fishes* 97: 939–953.
- Stebbins, R. C. 2003. A field guide to western reptiles and amphibians. Third edition. Houghton Mifflin Company, Boston-New York.
- Stillwater Sciences and Wiyot Tribe Natural Resources Department. 2016. Monitoring Pacific lamprey in lower Eel River basin: pilot surveys and recommendations for long-term monitoring. Prepared by Stillwater Sciences, Arcata, California and Wiyot Tribe Natural Resources Department, Table Bluff, California for U.S. Fish and Wildlife Service, Sacramento, California.

Stone, J. 2006. Observations on nest characteristics, spawning habitat, and spawning behavior of Pacific and western brook lamprey in a Washington stream. *Northwestern Naturalist* 87: 225–232.

SWRCB (State Water Resources Control Board). 2019. California Water Action Plan – enhance water flows in stream systems statewide.
https://www.waterboards.ca.gov/waterrights/water_issues/programs/instream_flows/cwap_enhancing/#background

Thomas, J. W., E. D. Forsman, J. B. Lint, E. C. Meslow, B. R. Noon, and J. Verner. 1990. A conservation strategy for the northern spotted owl. Report 1990-791-171/20026. Interagency Committee to Address the Conservation of the Northern Spotted Owl (U.S. Forest Service, U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, and National Park Service).

Thome, D. M., C. J. Zabel, and L. V. Diller. 1999. Forest stand characteristics and reproduction of northern spotted owls in managed north-coastal California forests. *Journal of Wildlife Management* 63: 44–59.

Thompson, J. L., and L. V. Diller. 2002. Relative abundance, nest site characteristics, and nest dynamics of Sonoma tree voles on managed timberlands in coastal northwest California. *Northwest Naturalist* 83: 91–100.

Torgersen, C. E. and D. A. Close. 2004. Influence of habitat heterogeneity on the distribution of larval Pacific lamprey (*Lampetra tridentata*) at two spatial scales. *Freshwater Biology* 49: 614–630.

USACE (U.S. Army Corps of Engineers). 1986. Final Rule for Regulatory Programs of the Corps of Engineers. *Federal Register* 51: 41,206–41,260.

USDA Forest Service. 2019. Existing Vegetation - CALVEG, [ESRI personal geodatabase]. USDA-Forest Service, Pacific Southwest Region, McClellan, California.

USFWS (U.S. Fish and Wildlife Service). 2006. Estimating the effects of auditory and visual disturbance to northern spotted owls and marbled murrelets in Northwestern California. Technical Memorandum 8-14-2006-2887. USFWS Arcata Field Office, Arcata, California.

USFWS. 2010. Northern spotted owl (*Strix occidentalis caurina*). Online species account. Arcata Fish and Wildlife Office, California and Nevada Operations, Region 8, California.

USFWS. 2011. Revised recovery plan for the northern spotted owl (*Strix occidentalis caurina*). USFWS, Region 1, Portland, Oregon.

USFWS. 2019a. IPaC, information for planning and consultation online system. Threatened and endangered species list. Electronic database. U.S. Fish and Wildlife Service, Washington D.C.

USFWS. 2019b. National Wetlands Inventory (NWI) wetlands and riparian polygon data. Geospatial wetlands data. USFWS, Arlington, Virginia. Website. <http://www.fws.gov/wetlands/>

van de Wetering, S. J. 1998. Aspects of life history characteristics and physiological processes in smolting Pacific lamprey, *Lampetra tridentata* in a central Oregon coast stream. Master's thesis. Oregon State University, Corvallis, Oregon.

- Wagner, D. 1991. The "1-in-20 rule" for plant collectors. Plant Science Bulletin 37: 11.
- Williams, D. F. 1986. Mammalian species of special concern in California. Wildlife Management Division Administrative Report 86-1. California Department of Fish and Game.
- Woodruff, K., and H. Ferguson. 2005. Townsend's big-eared bat. Volume 4: Mammals. Washington Department of Fish and Wildlife.
- Wooster, T. W. 1996. Red tree vole (*Arborimus pomo*) observations in Humboldt, Mendocino, Sonoma, and Trinity counties, California 1991–1995. Unpublished Report. California Department of Fish and Game, Region 3.
- Zeiner, D. C., W. F. Laudenslayer Jr., K. E. Mayer, and M. White, editors. 1990a. California's wildlife. Volume II, Birds. California Statewide Habitat Relationships System. California Department of Fish and Game.
- Zeiner, D. C., W. F. Laudenslayer Jr., K. E. Mayer, and M. White, editors. 1990b. California's wildlife. Volume III, Mammals. California Statewide Habitat Relationships System. California Department of Fish and Game.

Appendices

Appendix A

Marshall Ranch Streamflow Enhancement Project Design Plans

(Included as Attachment A of the proposal)

Appendix B

Scoping List of CNDDDB Special-Status Plant and Wildlife Species in the Project Vicinity

Table B-1. Comprehensive scoping list of special-status plants in the Project vicinity.

Scientific name (common name)	Lifeform	Status (Federal, State, CRPR ¹)	Habitat associations and blooming period ²	Source	Likelihood of occurrence
<i>Antennaria suffrutescens</i> (evergreen everlasting)	perennial stoloniferous herb	None/None/4.3	Serpentine in lower montane coniferous forest; 1,640–5,250 ft. Blooming period: January–July	CNPS	None: Project area is outside of the known elevation range.
<i>Astragalus agnicidus</i> (Humboldt County milk-vetch)	perennial herb	None/CE/1B.1	Openings, disturbed areas, and sometimes roadsides in broadleaved upland forest and north coast coniferous forest; 390–2,625 ft. Blooming period: April–September	CNPS, CDFW	Moderate: Broadleaved upland and north coast coniferous forest habitats present within Project area. Two occurrences within 5–10 mi of the Project area.
<i>Calamagrostis bolanderi</i> (Bolander's reed grass)	perennial rhizomatous herb	None/None/4.2	Mesic bogs and fens, broadleaved upland forest, closed-cone coniferous forest, coastal scrub, mesic meadows and seeps, freshwater marshes and swamps, and north coast coniferous forest; 0–1,495 ft. Blooming period: May–August	CNPS	Low: Broadleaved upland forest habitat present within Project area. No occurrences within 10 mi of the Project.
<i>Calamagrostis foliosa</i> (leafy reed grass)	perennial herb	None/CR/4.2	Rocky coastal bluff scrub and north coast coniferous forest; 0–4,005 ft. Blooming period: May–September	CNPS, CDFW	None: No suitable habitat present within the Project area.
<i>Castilleja litoralis</i> (Oregon coast paintbrush)	perennial herb (hemiparasitic)	None/None/2B.2	Sandy coastal bluff scrub, coastal dunes, and coastal scrub; 45–330 ft. Blooming period: June	CNPS, CDFW	None: Project area is outside of the known elevation range.
<i>Castilleja mendocinensis</i> (Mendocino Coast paintbrush)	perennial herb (hemiparasitic)	None/None/1B.2	Coastal bluff scrub, closed-cone coniferous forest, coastal dunes, coastal prairie, and coastal scrub; 0–525 ft. Blooming period: April–August	CNPS, CDFW	None: Project area is outside of the known elevation range.
<i>Ceanothus gloriosus</i> var. <i>exaltatus</i> (glory brush)	perennial evergreen shrub	None/None/4.3	Chaparral; 95–2,000 ft. Blooming period: March–June (August)	CNPS	Low: Chaparral habitat present within Project area. No occurrences within 10 mi of the Project.
<i>Clarkia amoena</i> subsp. <i>whitneyi</i> (Whitney's farewell-to-spring)	annual herb	None/None/1B.1	Coastal bluff scrub and coastal scrub; 30–330 ft. Blooming period: June–August	CNPS, CDFW	None: Project area is outside of the known elevation range.

Scientific name (common name)	Lifeform	Status (Federal, State, CRPR ¹)	Habitat associations and blooming period ²	Source	Likelihood of occurrence
<i>Coptis laciniata</i> (Oregon goldthread)	perennial rhizomatous herb	None/None/4.2	Mesic meadows and seeps and streambanks in north coast coniferous forest; 0–3,280 ft. Blooming period: (February) March–May (September–November)	CNPS, CDFW	Moderate: North coast coniferous forest habitat present within Project area. Two occurrences within 5–10 mi of the Project area.
<i>Epilobium septentrionale</i> (Humboldt County fuchsia)	perennial herb	None/None/4.3	Sandy or rocky areas in broadleafed upland forest and north coast coniferous forest; 145–5,905 ft. Blooming period: July–September	CNPS	None: No suitable habitat present within the Project area.
<i>Erigeron biolettii</i> (streamside daisy)	perennial herb	None/None/3	Rocky, mesic areas in broadleafed upland forest, cismontane woodland, and north coast coniferous forest; 95–3,610 ft. Blooming period: June–October	CNPS	None: No suitable habitat present within the Project area.
<i>Erythronium oregonum</i> (giant fawn lily)	perennial herb	None/None/2B.2	Sometimes serpentinite, rocky, openings in cismontane woodland and meadows and seeps; 325–3,775 ft. Blooming period: March–June (July)	CNPS, CDFW	Moderate: Cismontane woodland habitat present within Project area. No ultramafic soils mapped or observed in Project area. One occurrence is within 5–10 mi of the Project area.
<i>Erythronium revolutum</i> (coast fawn lily)	perennial bulbiferous herb	None/None/2B.2	Mesic, streambanks, bogs and fens, broadleafed upland forest, and north coast coniferous forest; 0–5,250 ft. Blooming period: March–July (August)	CNPS, CDFW	Moderate: Broadleafed upland and north coast coniferous forest habitats present within Project area. Two occurrences within 5–10 mi of the Project area.
<i>Gilia capitata</i> subsp. <i>pacifica</i> (Pacific gilia)	annual herb	None/None/1B.2	Coastal bluff scrub, openings in chaparral, coastal prairie, and valley and foothill grassland; 15–5,465 ft. Blooming period: April–August	CNPS, CDFW	Moderate: Chaparral and valley and foothill grassland habitats present within Project area. Multiple occurrences within 5–10 mi of the Project area.
<i>Kopsiopsis hookeri</i> (small groundcone)	perennial rhizomatous herb (parasitic)	None/None/2B.3	North coast coniferous forest; 295–2,905 ft. Blooming period: April–August	CNPS, CDFW	Low: North coast coniferous forest habitat present within Project area. No occurrences within 10 mi of the Project.

Scientific name (common name)	Lifeform	Status (Federal, State, CRPR ¹)	Habitat associations and blooming period ²	Source	Likelihood of occurrence
<i>Lasthenia burkei</i> (Burke's goldfields)	annual herb	FE/CE/1B.1	Mesic meadows and seeps and vernal pools; 45–1,970 ft. Blooming period: April–June	USFWS	None: No suitable habitat present within the Project area.
<i>Lasthenia californica</i> subsp. <i>macrantha</i> (perennial goldfields)	perennial herb	None/None/1B.2	Coastal bluff scrub, coastal dunes, and coastal scrub; 15–1,705 ft. Blooming period: January–November	CNPS, CDFW	None: No suitable habitat present within the Project area.
<i>Lasthenia conjugens</i> (Contra Costa goldfields)	annual herb	FE/None/1B.1	Mesic cismontane woodland, alkaline playas, valley and foothill grassland, and vernal pools; 0–1,540 ft. Blooming period: March–June	USFWS	Low: Cismontane woodland habitat present within Project area. No occurrences within 10 mi of the Project.
<i>Lathyrus palustris</i> (marsh pea)	perennial herb	None/None/2B.2	Mesic bogs and fens, coastal prairie, coastal scrub, lower montane coniferous forest, marshes and swamps, and north coast coniferous forest; 0–330 ft. Blooming period: March–August	CNPS, CDFW	None: Project area is outside of the known elevation range.
<i>Lilium rubescens</i> (redwood lily)	perennial bulbiferous herb	None/None/4.2	Sometimes serpentinite, sometimes roadsides, broadleafed upland forest, chaparral, lower montane coniferous forest, north coast coniferous forest, and upper montane coniferous forest; 95–6,265 ft. Blooming period: April–August (September)	CNPS	Low: Broadleafed upland forest, lower montane coniferous forest, chaparral, and north coast coniferous forest habitats present within Project area. No ultramafic soils mapped or observed in Project area. No occurrences within 10 mi of the Project.
<i>Listera cordata</i> (heart-leaved twayblade)	perennial herb	None/None/4.2	Bogs and fens, lower montane coniferous forest, and north coast coniferous forest; 15–4,495 ft. Blooming period: February–July	CNPS	Low: North coast coniferous and lower montane coniferous forest habitats present within Project area. No occurrences within 10 mi of the Project.
<i>Micranthes marshallii</i> (Marshall's saxifrage)	perennial rhizomatous herb	None/None/4.3	Rocky streambanks and riparian forest; 295–6,990 ft. Blooming period: March–August	CNPS	Low: Riparian forest habitat present within Project area. No occurrences within 10 mi of the Project.

Scientific name (common name)	Lifeform	Status (Federal, State, CRPR ¹)	Habitat associations and blooming period ²	Source	Likelihood of occurrence
<i>Mitellastrum caulescens</i> (leafy-stemmed mitrewort)	perennial rhizomatous herb	None/None/4.2	Mesic, sometimes roadsides broadleaved upland forest, lower montane coniferous forest, meadows and seeps, and north coast coniferous forest; 15–5,575 ft. Blooming period: (March) April–October	CNPS, CDFW	Low: Broadleaved upland, lower montane coniferous, and north coast coniferous forest habitats present within Project area. No occurrences within 10 mi of the Project.
<i>Montia howellii</i> (Howell's montia)	annual herb	None/None/2B.2	Vernally mesic, sometimes roadsides in meadows and seeps, north coast coniferous forest, and vernal pools; 0– 2,740 ft. Blooming period: (February) March–May	CNPS, CDFW	Moderate: North coast coniferous forest habitat present within Project area. Two occurrences within 5–10 mi of the Project area.
<i>Piperia candida</i> (white-flowered rein orchid)	perennial herb	None/None/1B.2	Sometimes serpentinite in broadleaved upland forest, lower montane coniferous forest, and north coast coniferous forest; 95–4,300 ft. Blooming period: (March) May– September	CNPS, CDFW	Moderate: Broadleaved upland, lower montane coniferous, and north coast coniferous forest habitats present within Project area. No ultramafic soils mapped or observed in Project area. Multiple occurrences within 1 mi of the Project area.
<i>Pityopus californicus</i> (California pinefoot)	perennial herb (achlorophyllous)	None/None/4.2	Mesic broadleaved upland forest, lower montane coniferous forest, north coast coniferous forest, and upper montane coniferous forest; 45–7,300 ft. Blooming period: (March–April) May– August	CNPS	Low: Broadleaved upland, lower montane coniferous, and north coast coniferous forest habitats present within Project area. No occurrences within 10 mi of the Project.
<i>Sidalcea malachroides</i> (maple-leaved checkerbloom)	perennial herb	None/None/4.2	Often in disturbed areas in broadleaved upland forest, coastal prairie, coastal scrub, north coast coniferous forest, and riparian woodland; 0–2,395 ft. Blooming period: (March) April– August	CNPS, CDFW	Low: Broadleaved upland forest, riparian woodland, and north coast coniferous forest habitats present within Project area. No occurrences within 10 mi of the Project.

Scientific name (common name)	Lifeform	Status (Federal, State, CRPR ¹)	Habitat associations and blooming period ²	Source	Likelihood of occurrence
<i>Trifolium amoenum</i> (two-fork clover)	annual herb	FE/None/1B.1	Coastal bluff scrub and sometimes serpentine in valley and foothill grassland; 15–1,360 ft. Blooming period: April–June	USFWS	Low: Valley and foothill grassland habitat present within Project area. No ultramafic soils mapped or observed in Project area. No occurrences within 10 mi of the Project.
<i>Usnea longissima</i> (Methuselah's beard lichen)	fruticose lichen (epiphytic)	None/None/4.2	On tree branches, usually on old growth hardwoods and conifers in broadleaved upland forest and north coast coniferous forest; 160–4,790 ft. Blooming period: N/A (lichen)	CNPS, CDFW	Moderate: Broadleaved upland and north coast coniferous forest habitats present within Project area. Multiple occurrences within 5–10 mi of the Project area.

¹ Status:

Federal: FE Federally endangered
State: CE California endangered
CR California rare

California Rare Plant Rank (CRPR):

1B Plants rare, threatened, or endangered in California and elsewhere
2B Plants rare, threatened, or endangered in California, but more common elsewhere
4 Plants of limited distribution, on watchlist

CRPR Threat Ranks:

0.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2 Moderately threatened in California (20–80% occurrences threatened / moderate degree and immediacy of threat)
0.3 Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

² Months in parentheses are uncommon; N/A = Not applicable

Table B-2. Comprehensive scoping list of special-status fish and wildlife in the Project vicinity.

Scientific name (common name)	Status ¹ (Federal/ State)	Distribution and habitat associations	Location of suitable habitat	Likelihood of occurrence in the Project area
<i>Fish</i>				
<i>Oncorhynchus kisutch</i> (coho salmon - southern Oregon / northern California ESU)	FT, CH/ST	Oregon border to Punta Gorda, California. Spawn in coastal streams and large mainstem rivers in riffles and pool tails-outs and rear in pools >3 ft deep with overhead cover with high levels oxygen and temperatures of 50–59°F.	Suitable habitat occurs in the South Fork Eel River and associated tributaries.	High: Present in the Project area.
<i>Oncorhynchus kisutch</i> (coho salmon -Central California Coast ESU)	FE, CH/SE	Punta Gorda, California south to Aptos Creek in Santa Cruz County. Spawn in coastal streams and large mainstem rivers in riffles and pool tails-outs and rear in pools >3 ft deep with overhead cover with high levels oxygen and temperatures of 50–59°F.	Suitable habitat is present in the South Fork Eel River but is unlikely to be occupied since the species range ends at Punta Gorda.	None: Outside of species range.
<i>Oncorhynchus mykiss</i> (steelhead trout – Northern California DPS)	FT, CH/None	Inhabits small coastal streams to large mainstem rivers with gravel-bottomed, fast-flowing habitat for spawning. However, habitat criteria for different life stages (spawning, fry rearing, juvenile rearing) are can vary significantly.	Suitable habitat occurs in the South Fork Eel River and associated tributaries.	High: Present in the Project area.
<i>Oncorhynchus tshawytscha</i> (Chinook salmon – California Coastal ESU)	FT, CH/None	Wild coastal, spring, and fall-run Chinook found in streams and rivers between Redwood Creek, Humboldt County to the north and the Russian River, Sonoma County to the south.	Suitable habitat occurs in the South Fork Eel River and associated tributaries.	High: Present in the Project area.

Scientific name (common name)	Status ¹ (Federal/ State)	Distribution and habitat associations	Location of suitable habitat	Likelihood of occurrence in the Project area
<i>Entosphenus tridentatus</i> (Pacific lamprey)	None/SSC	Similar to anadromous salmonids, inhabits coastal streams and rivers with gravel-bottomed, fast-flowing habitat for spawning. Ammocoetes rear in backwater areas with sand, silt, and organic material for 4 to 10 years before migrating to the ocean.	Suitable habitat is present and spawning/rearing occurs in the South Fork Eel River. Spawning and rearing habitat is likely to occur in Redwood Creek.	High: Suitable habitat present.
<i>Eucyclogobius newberryi</i> (Tidewater goby)	FE/SSC	Tillas Slough (mouth of the Smith River, Del Norte County) to Agua Hedionda Lagoon (northern San Diego County)	Coastal lagoons and the uppermost zone of brackish large estuaries; prefer sandy substrate for spawning, but can be found on silt and rocky mud substrates; can occur in water up to 4 m (15 ft) in lagoons and within a wide range of salinity (0–42 parts per thousand)	None: Habitat not suitable
Amphibians				
<i>Ascaphus truei</i> (Pacific tailed frog)	None/SSC	Associated with high-gradient, perennial and montane streams in hardwood conifer, redwood, Douglas-fir, and ponderosa pine habitats. Tadpoles require water temperatures below 59°F.	Suitable habitat may occur in high gradient watercourses adjacent to the Project area, but not within the Project area.	Low: No habitat present.
<i>Rana boylei</i> (foothill yellow-legged frog)	None/ SSC, SCT	Associated with partially shaded, shallow streams, and riffles with rocky substrate. Some cobble-sized substrate required for egg laying.	Suitable habitat occurs in the South Fork Eel River and associated tributaries.	High: Likely to be present in Redwood Creek and tributaries adjacent to the Project area.
<i>Rhyacotriton variegatus</i> (southern torrent salamander)	None/SSC	Coastal redwood, Douglas-fir, mixed conifer, montane riparian and montane hardwood-conifer habitats. Seeps and small streams in coastal redwood, Douglas-fir, mixed conifer, montane riparian, and montane hardwood-conifer habitats. Seeps and springs need to be relatively unembedded with fine sediment.	Suitable habitat occurs in high-gradient gravelly seeps and springs within redwood and montane riparian habitat types adjacent to, but not within the Project area.	Low: High-gradient seeps are not present in the Project area.

Scientific name (common name)	Status ¹ (Federal/ State)	Distribution and habitat associations	Location of suitable habitat	Likelihood of occurrence in the Project area
<i>Taricha rivularis</i> (red-bellied newt)	None/SSC	Ranges from southern Humboldt to Sonoma counties. Found in streams during breeding season. Moist habitats under woody debris, rocks, and animal burrows.	Suitable habitat is present and sightings have occurred in the Mattole River, approximately 5 mi west of the Project area.	High: Habitat present in the Project area.
Birds				
<i>Brachyramphus marmoratus</i> (marbled murrelet)	FT,CH/SE	Associated with mature conifers (i.e., redwood and Douglas-fir) for nesting. During the breeding season, may be present 6–8 mi inland.	No suitable habitat within or adjacent to the Project area.	None: No suitable habitat
<i>Strix occidentalis caurina</i> (Northern spotted owl)	FE/ST	Typically found in large, contiguous stands of mature and old-growth coniferous forest with dense multi-layered structure.	Suitable foraging habitat is present within the Project area. Habitat within the Project area is unsuitable for nesting. The closest activity center is over 1.7 mi to the south-southeast of the Project area.	Moderate: Suitable foraging habitat exists in the Project area.
<i>Asio otus</i> (Long-eared owl)	None/SSC	Distributed throughout North America. Recorded in north coast from Bald Hills, Humboldt County to Willits, Mendocino County. In Humboldt County, the owls apparently nest in mixed stands of conifers and oaks with edges and openings such as meadows or prairies.	Suitable nesting and foraging habitat present in the Project area.	High: Habitat present in the Project area.

Scientific name (common name)	Status ¹ (Federal/ State)	Distribution and habitat associations	Location of suitable habitat	Likelihood of occurrence in the Project area
<i>Haliaeetus leucocephalus</i> (Bald eagle)	None/SE	Distributed throughout North America. Found at lakes, reservoirs, rivers, and some rangelands and coastal wetlands. Build large stick nests in the upper canopy of the largest trees in the area.	Suitable foraging habitat is present in the South Fork Eel River. Redwood Creek is unsuitable for foraging.	Low. No habitat present.
<i>Empidonax traillii brewsteri</i> (Little willow flycatcher)	None/SE	Typically breeds in wet meadows and montane riparian habitats (with a significant shrub component within or near a taller overstory) from 2,000-8,000 ft in elevation from Tulare County north, along the western side of the Sierra Nevada and Cascades. Common spring (mid-May to early June) and particularly fall (mid-August to early September) migrant in riparian habitats at lower elevations, including the north coast of California.	The nearest recorded sighting of this species was along the South Fork Eel River near Miranda in June 2000. Multi-storied riparian forest or woodland (e.g., alder, cottonwood, willow) habitat is not present in the Project area.	Low: Suitable habitat not present.
<i>Charadrius alexandrinus nivosus</i> (Western snowy plover)	FT/None	Nests on barren to sparsely vegetated dune-backed beaches, barrier beaches, and salt-evaporation ponds, infrequently on bluff-backed beaches.	No ocean beaches or open large gravel bars are located within or adjacent to the Project area	None: No suitable habitat
<i>Phoebastria (Diomedea) albatrus</i> (Short-tailed Albatross)	FE/None	Pacific Ocean (nests in Japan)	Feeds in north Pacific Ocean.	None: Habitat not suitable

Scientific name (common name)	Status ¹ (Federal/ State)	Distribution and habitat associations	Location of suitable habitat	Likelihood of occurrence in the Project area
<i>Coccyzus americanus</i> (Yellow-billed Cuckoo)	FT/SE	Breeds in limited portions of the Sacramento River and the South Fork Kern River; small populations may nest in Butte, Yuba, Sutter, San Bernardino, Riverside, Inyo, Los Angeles, and Imperial counties	Summer resident of valley foothill and desert riparian habitats; nests in open woodland with clearings and low, dense, scrubby vegetation. The nearest recorded sighting of this species was in the Eel River delta area.	None: Habitat not suitable
Reptiles				
<i>Emys marmorata</i> (Western pond turtle)	None/SSC	Ponds, marshes, rivers, streams, and irrigation ditches with abundant vegetation, and either rocky or muddy bottoms, in woodland forest and grasslands. Below 6,000 ft elevation. Basking sites are required. Egg-laying sites are located on suitable upland habitats (grassy open fields) up to 1,640 ft from water.	Suitable habitat occurs in the South Fork Eel River. Ponds that may contain western pond turtles are located on neighboring properties.	Moderate. May occur in neighboring ponds.
Mammals				
<i>Arborimus pomo</i> (Sonoma tree vole)	None/SSC	Associated nearly exclusively with Douglas-fir trees and occasionally grand fir trees within the north coast fog belt between the northern Oregon border and Sonoma County. Eats Douglas-fir needles exclusively.	Small patches of Douglas-fir are present within the Project area.	High: Recorded occupying timber stands adjacent to the Project area
<i>Pekania pennanti</i> (Pacific fisher – West Coast DPS/Northern California ESU)	FC/SSC	Associated with dense advanced-successional conifer forests, with complex forest structure and high percent canopy closure; den in hollow trees and snags.	Habitat in most of the Project area does not correspond to the dense advanced-successional forest this species prefers. Nearest recorded sighting is approximately 10 mi to the southeast near Cooks Valley.	Low. Suitable habitat not present.
<i>Corynorhinus townsendii</i> (Townsend's big-eared bat)	None/SSC, CT	Found throughout California in all but subalpine and alpine habitats. Roosts in cavernous habitats, usually in tunnels,	Suitable foraging habitat throughout most of the Project area; however, barns, old buildings, and bridges for	Moderate: May be present in some of the barns and older structures

Scientific name (common name)	Status ¹ (Federal/ State)	Distribution and habitat associations	Location of suitable habitat	Likelihood of occurrence in the Project area
		caves, buildings, mines, and basal hollows of trees, but also rock shelters, preferentially close to water. Caves near water's edge are favored. Forages in riparian zone and follows creeks and river drainages on foraging bouts. Feeds primarily on moths. Drinks at stream pools.	roosting are not present within the Project area.	adjacent to the Project area.
<i>Antrozous pallidus</i> (Pallid bat)	None/SSC	<p>Found throughout California. Roosts in rock crevices, outcrops, cliffs, mines, and caves; trees (underneath exfoliating bark of pine and oak) and in basal hollows; and a variety of vacant and occupied structures (e.g., bridges) or buildings. Roost individually or in small to large colonies (hundreds of individuals).</p> <p>Feeds low to or on the ground in a variety of open habitats, primarily on ground-dwelling arthropods. Forages most frequently in riparian zone, in open oak savannah, and open mixed deciduous forest. Drinks at stream pools.</p>	Suitable foraging habitat throughout most of the Survey Area, however barns, old building, and bridges are not present within the Survey Area.	Moderate: May be present in some of the older structures adjacent to the Survey Area

¹ Status:

Federal

- FE Federal endangered
- FT Federal threatened
- FCT Federal candidate threatened
- CH Critical habitat designated within the Project vicinity

State

- SE Endangered
- ST Threatened
- SCT State candidate threatened
- SSC CDFW species of special concern

Appendix C

List of Plant Species Observed in the Project Area

Table C-1. Plant species observed during the May 3, 2019 botanical survey.

Scientific name (common name)	Family	Native status	Cal-IPC rating	WMVC wetland indicator status ¹
<i>Acer macrophyllum</i> (big-leaf maple)	Sapindaceae	native	None	FACU
<i>Acemisson americanus</i> var. <i>americanus</i> (American bird's-foot-trefoil)	Fabaceae	native	None	FACU
<i>Aira caryophylla</i> (silver hair grass)	Poaceae	naturalized	None	FACU
<i>Anthoxanthum odoratum</i> (sweet vernal grass)	Poaceae	naturalized	Limited	FACU
<i>Arbutus menziesii</i> (Pacific madrone)	Ericaceae	native	None	Not Listed—UPL
<i>Arctostaphylos glandulosa</i> subsp. <i>glandulosa</i> (glandular manzanita)	Ericaceae	native	None	Not Listed—UPL
<i>Avena barbata</i> (slender wild oat)	Poaceae	naturalized	Moderate	Not Listed—UPL
<i>Baccharis pilularis</i> (coyote brush)	Asteraceae	native	None	Not Listed—UPL
<i>Bellis perennis</i> (English daisy)	Asteraceae	naturalized	None	Not Listed—UPL
<i>Briza maxima</i> (rattlesnake grass)	Poaceae	naturalized	Limited	Not Listed—UPL
<i>Bromus carinatus</i> (California brome)	Poaceae	native	None	Not Listed—UPL
<i>Bromus diandrus</i> (ripgut grass)	Poaceae	naturalized	Moderate	Not Listed—UPL
<i>Bromus hordeaceus</i> (soft chess)	Poaceae	naturalized	Limited	FACU
<i>Callitriche heterophylla</i> (variable-leaved water starwort)	Plantaginaceae	native	None	OBL
<i>Calocedrus decurrens</i> (California incense-cedar)	Cupressaceae	native	None	Not Listed—UPL
<i>Carduus pycnocephalus</i> subsp. <i>pycnocephalus</i> (Italian thistle)	Asteraceae	naturalized	Moderate	Not Listed—UPL
<i>Carex praegracilis</i> (freeway sedge)	Cyperaceae	native	None	FACW
<i>Ceanothus incanus</i> (coast whitethorn)	Rhamnaceae	native	None	Not Listed—UPL

Scientific name (common name)	Family	Native status	Cal-IPC rating	WMVC wetland indicator status ¹
<i>Cerastium glomeratum</i> (sticky mouse-ear chickweed)	Caryophyllaceae	naturalized	None	FACU
<i>Cirsium vulgare</i> (bull thistle)	Asteraceae	naturalized	Moderate	FACU
<i>Clinopodium douglasii</i> (yerba buena)	Lamiaceae	native	None	FACU
<i>Clintonia andrewsiana</i> (Andrews's clintonia)	Liliaceae	native	None	Not Listed—UPL
<i>Corylus cornuta</i> subsp. <i>californica</i> (California hazel)	Betulaceae	native	None	FACU
<i>Cynosurus echinatus</i> (bristly dogtail grass)	Poaceae	naturalized	Moderate	Not Listed—UPL
<i>Cytisus scoparius</i> (Scotch broom)	Fabaceae	naturalized	High	Not Listed—UPL
<i>Dactylis glomerata</i> (orchard grass)	Poaceae	naturalized	Limited	FACU
<i>Danthonia californica</i> (California oat grass)	Poaceae	native	None	FAC
<i>Daucus carota</i> (Queen Anne's lace)	Apiaceae	naturalized	None	FACU
<i>Elymus glaucus</i> subsp. <i>glaucus</i> (glaucous wild rye)	Poaceae	native	None	FACU
<i>Epilobium ciliatum</i> (ciliate willowherb)	Onagraceae	native	None	FACW
<i>Erodium botrys</i> (long-beaked filaree)	Geraniaceae	naturalized	None	FACU
<i>Eschscholzia californica</i> (California poppy)	Papaveraceae	native	None	Not Listed—UPL
<i>Festuca bromoides</i> (brome fescue)	Poaceae	naturalized	None	FAC
<i>Fragaria vesca</i> (wood strawberry)	Rosaceae	native	None	FACU
<i>Fraxinus latifolia</i> (Oregon ash)	Oleaceae	native	None	FACW
<i>Galium aparine</i> (goose grass)	Rubiaceae	native	None	FACU
<i>Geranium dissectum</i> (dissected geranium)	Geraniaceae	naturalized	Limited	Not Listed—UPL
<i>Glyceria ×occidentalis</i> (western manna grass)	Poaceae	naturalized	None	Not Listed—UPL

Scientific name (common name)	Family	Native status	Cal-IPC rating	WMVC wetland indicator status ¹
<i>Hypericum perforatum</i> subsp. <i>perforatum</i> (klamathweed)	Hypericaceae	naturalized	Limited	Not Listed—UPL
<i>Hypochaeris radicata</i> (rough cat's-ear)	Asteraceae	naturalized	Moderate	FACU
<i>Iris purdyi</i> (Purdy's iris)	Iridaceae	native	None	Not Listed—UPL
<i>Juncus bufonius</i> var. <i>bufonius</i> (common toad rush)	Juncaceae	native	None	Not Listed—UPL
<i>Juncus patens</i> (spreading rush)	Juncaceae	native	None	FACW
<i>Leontodon saxatilis</i> (hairy hawkbit)	Asteraceae	naturalized	None	FACU
<i>Leptosiphon bicolor</i> (bicolored leptosiphon)	Polemoniaceae	native	None	FACU
<i>Linum bienne</i> (pale flax)	Linaceae	naturalized	None	Not Listed—UPL
<i>Lonicera hispidula</i> (hispid honeysuckle)	Caprifoliaceae	native	None	FACU
<i>Lupinus bicolor</i> (miniature lupine)	Fabaceae	native	None	Not Listed—UPL
<i>Luzula comosa</i> var. <i>comosa</i> (Pacific wood-rush)	Juncaceae	native	None	Not Listed—UPL
<i>Lysimachia arvensis</i> (scarlet pimpernel)	Myrsinaceae	naturalized	None	Not Listed—UPL
<i>Lythrum hyssopifolia</i> (hyssop-leaved lythrum)	Lythraceae	naturalized	Moderate	Not Listed—UPL
<i>Mentha pulegium</i> (pennyroyal)	Lamiaceae	naturalized	Moderate	OBL
<i>Myosotis discolor</i> (changing forget-me-not)	Boraginaceae	naturalized	None	FAC
<i>Oxalis oregana</i> (redwood sorrel)	Oxalidaceae	native	None	FACU
<i>Plantago lanceolata</i> (English plantain)	Plantaginaceae	naturalized	Limited	FACU
<i>Plectritis congesta</i> subsp. <i>congesta</i> (sea blush)	Valerianaceae	native	None	FACU
<i>Poa pratensis</i> subsp. <i>pratensis</i> (Kentucky blue grass)	Poaceae	naturalized	Limited	FAC

Scientific name (common name)	Family	Native status	Cal-IPC rating	WMVC wetland indicator status ¹
<i>Polystichum munitum</i> (western sword fern)	Dryopteridaceae	native	None	FACU
<i>Prunella vulgaris</i> (common selfheal)	Lamiaceae	native	None	FACU
<i>Prunus</i> sp. (domestic prunus)	Rosaceae		None	Not Listed—UPL
<i>Pseudotsuga menziesii</i> var. <i>menziesii</i> (Douglas-fir)	Pinaceae	native	None	FACU
<i>Pteridium aquilinum</i> var. <i>pubescens</i> (western bracken fern)	Dennstaedtiaceae	native	None	FACU
<i>Quercus garryana</i> (Oregon oak)	Fagaceae	native	None	FACU
<i>Quercus kelloggii</i> (California black oak)	Fagaceae	native	None	Not Listed—UPL
<i>Quercus wislizeni</i> (interior live oak)	Fagaceae	native	None	Not Listed—UPL
<i>Ranunculus parviflorus</i> (few-flowered buttercup)	Ranunculaceae	naturalized	None	FACU
<i>Rosa nutkana</i> subsp. <i>nutkana</i> (Nootka rose)	Rosaceae	native	None	FAC
<i>Rubus armeniacus</i> (Himalayan blackberry)	Rosaceae	naturalized	High	FAC
<i>Rubus laciniatus</i> (cutleaf blackberry)	Rosaceae	naturalized	None	FACU
<i>Rubus parviflorus</i> (thimbleberry)	Rosaceae	native	None	FACU
<i>Rumex acetosella</i> (sheep sorrel)	Polygonaceae	naturalized	Moderate	FACU
<i>Rumex crispus</i> (curly dock)	Polygonaceae	naturalized	Limited	FAC
<i>Salix sitchensis</i> (Sitka willow)	Salicaceae	native	None	FACW
<i>Sanicula crassicaulis</i> (Pacific sanicula)	Apiaceae	native	None	Not Listed—UPL
<i>Scirpus microcarpus</i> (small-fruited bulrush)	Cyperaceae	native	None	OBL
<i>Scoliopus bigelovii</i> (California fetid adder's-tongue)	Liliaceae	native	None	Not Listed—UPL

Scientific name (common name)	Family	Native status	Cal-IPC rating	WMVC wetland indicator status ¹
<i>Stachys</i> sp. (hedge-nettle)	Lamiaceae		None	Not Listed—UPL
<i>Toxicodendron diversilobum</i> (western poison oak)	Anacardiaceae	native	None	FAC
<i>Trifolium dubium</i> (little hop clover)	Fabaceae	naturalized	None	FACU
<i>Trifolium subterraneum</i> (subterranean clover)	Fabaceae	naturalized	None	Not Listed—UPL
<i>Umbellularia californica</i> (California bay-laurel)	Lauraceae	native	None	FAC
<i>Vaccinium ovatum</i> (California huckleberry)	Ericaceae	native	None	FACU
<i>Veronica</i> sp. (speedwell)	Plantaginaceae		None	Not Listed—UPL
<i>Vicia americana</i> subsp. <i>americana</i> (American vetch)	Fabaceae	native	None	FAC
<i>Vicia hassei</i> (slender vetch)	Fabaceae	native	None	Not Listed—UPL
<i>Viola ocellata</i> (western heart's ease)	Violaceae	native	None	Not Listed—UPL
<i>Whipplea modesta</i> (modest whipplea)	Hydrangeaceae	native	None	Not Listed—UPL

¹ Wetland indicator status (Lichvar et al. 2012 and 2016):

OBL (Obligate Wetland Plants)—Almost always occur in wetlands.

FACW (Facultative Wetland Plants)—Usually occur in wetlands, but may occur in non-wetlands.

FAC (Facultative Wetland Plants)—Occur in wetlands and non-wetlands.

FACU (Facultative Upland Plants)—Usually occur in non-wetlands, but may occur in wetlands.

UPL (Upland Plants)—Almost never occur in wetlands

Not Listed – UPL (Upland Plants)—Plant species not listed in the 2016 *National Wetland Plant List* were considered upland (UPL) species.

Appendix B

Mitigation Measures, Monitoring and Reporting Program for
the Marshall Ranch Flow Enhancement Project (Stillwater
Sciences, August 2019)

DRAFT

APPENDIX B

MITIGATION MEASURES, MONITORING AND REPORTING PROGRAM FOR THE MARSHALL RANCH STREAMFLOW ENHANCEMENT PROJECT

SECTION 1: ADMINISTRATIVE MEASURES

Permittee shall meet each administrative requirement described below.

- 1.1 Documentation at Project Site. Salmonid Restoration Federation (SRF) shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the project site at all times and shall be presented to CDFW personnel, or personnel from another state, federal, or local agency upon request.
- 1.2 Providing Agreement to Persons at Project Site. SRF shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons who will be working on the project at the project site on behalf of Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.
- 1.3 Notification of Conflicting Provisions. SRF shall notify regulatory agencies if SRF determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency.
- 1.4 Project Site Entry. SRF and landowner will allow access to the project site for regulatory authorities provided they provide 24 hours advance notice and allow project permittee, or representative, to be present.

SECTION 2: MITIGATION

Mitigation measures are identified below for each environmental impact where an answer of Less Than Significant with Mitigation Incorporated was given in the Mitigated Negative Declaration. The Permittee is responsible for ensuring the general and specific mitigation measures are implemented.

I. AESTHETICS

No specific mitigation measures are required to protect aesthetics.

II. AGRICULTURE AND FORESTRY RESOURCES

No specific mitigation measures are required to protect agricultural or forestry resources.

III. AIR QUALITY

No specific mitigation measures are required to protect air quality.

IV. BIOLOGICAL RESOURCES

A biological resources technical report has been prepared by Stillwater Sciences to describe the special-status and/or sensitive biological resources (plants, vegetation communities, fish, wildlife, and wetlands and waters) in or with potential to occur in the Project area that may be affected by Project construction activities. This report titled "Biological Resources Technical Report for the Marshall Ranch Flow Enhancement Project, Humboldt County, CA", has been used to inform the

sections below with regard to specific species of concern within the Project area and is included as Appendix A to the Mitigated Negative Declaration.

A. General Measures for Protection of Biological Resources

- 1) Timing: To avoid impacts to aquatic habitat the activities carried out in the Project typically occur during the summer dry season when flows are low or streams are dry.
 - a) Work around streams is restricted to the period of June 15 through November 1 or the first significant rainfall, whichever comes first. Actual project start and end dates, within this timeframe, are at the discretion of the Department of Fish and Wildlife.
 - b) Upslope work generally occurs during the same period as stream work. Off channel ponds, road upgrades, water infrastructure installation and other upslope activities are dependent on soil moisture content. Non jurisdictional upslope projects do not have seasonal restrictions in the Incidental Take Statement but work may be further restricted at some sites to allow soils to dry out adequately.
 - c) In some areas equipment access and effectiveness is constrained by wet conditions.
 - d) All project activities shall be confined to daylight hours.
- 2) Projects shall not disturb or dewater more than 500 feet of contiguous stream reach.
- 3) During all activities at project work sites, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas.
- 4) Staging/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 Permittee shall ensure that contamination of habitat does not occur during such operations. Prior to the onset of work, and as per the Lake and Streambed Alteration Agreement to be developed with CDFW, the Permittee shall prepare 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.
- 5) The number of access routes, number and size of staging areas, and the total area of the work site activity shall be limited to the minimum necessary to complete the restoration action, so as to minimize riparian disturbance. This will be carefully balanced with the goal of not affecting less stable areas, which may increase the risk of channel instability. Existing roads shall be used to access work sites as much as practicable.
- 6) The access and work area limits shall be identified with brightly colored flagging or fencing. Flagging and fencing shall be maintained in good repair for the duration of project activities. All areas beyond the identified work area limits shall not be disturbed.
- 7) Any construction debris shall be prevented from falling into the stream channel. Any material that does fall into a stream during construction shall be immediately removed in a manner that has minimal impact to the streambed and water quality.

- 8) Where feasible, the construction shall occur from the bank, or on a temporary pad underlain with filter fabric.
- 9) Any work within the stream channel shall be performed in isolation from the flowing stream and erosion protection measures shall be in place before work begins.
 - a) Prior to dewatering, the best means to bypass flow through the work area to minimize disturbance to the channel and avoid direct mortality of fish and other aquatic invertebrates shall be determined.
 - b) If there is any flow when work will be done, the Permittee shall construct coffer dams upstream and downstream of the excavation site and divert all flow from upstream of the upstream dam to downstream of the downstream dam.
 - c) No heavy equipment shall operate in the live stream, except as may be necessary to construct coffer dams to divert stream flow and isolate the work site.
 - d) Cofferdams may be constructed with clean river run gravel or sand bags, and may be sealed with sheet plastic. Upon project completion, sand bags and any sheet plastic shall be removed from the stream. Clean river run gravel may be left in the stream channel, provided it does not impede stream flow or fish passage, and conforms to natural channel morphology without significant disturbance to natural substrate.
 - e) Dewatering shall be coordinated with a qualified fisheries biologist to perform fish and wildlife relocation activities.
 - f) The length of the dewatered stream channel and the duration of the dewatering shall be kept to a minimum and shall be expected to be less than 300 contiguous feet or 500 total feet per site.
 - g) When bypassing stream flow around work area, stream flow below the construction site shall be maintained similar to the unimpeded flow at all times.
 - h) The work area shall be periodically pumped dry of seepage. Pumps shall be placed in flat areas, away from the stream channel. Pumps shall be secured by tying off to a tree or staked in place to prevent movement by vibration. Pump intakes shall be covered with 0.125 inch mesh to prevent entrainment of fish or amphibians that may have avoided removal. Pump intakes shall be periodically checked for impingement of fish or amphibians, and shall be relocated according to the approved measures outlined for each species below.
 - i) If necessary, flow shall be diverted around the work site, either by pump or by gravity flow. The suction end of the intake pipe shall be fitted with fish screens meeting CDFW and NOAA criteria to prevent entrainment or impingement of small fish. Any turbid water pumped from the work site itself to maintain it in a dewatered state shall be disposed of in an upland location where it will not drain directly into any stream channel.
 - j) Fish shall be excluded from the work area by blocking the stream channel above and below the work area with fine-meshed net or screen. Mesh shall be no greater than 1/8-inch diameter. The bottom edge of the net or screen shall be completely secured to the channel bed to prevent fish from re-entering the work area. Exclusion screening shall be placed in areas of low water velocity to minimize fish impingement. Screens shall be regularly checked and cleaned of debris to permit free flow of water.

- 10) Where the disturbance to construct coffer dams to isolate the work site would be greater than to complete the action (for example, placement of a single boulder cluster), the action shall be carried out without dewatering and fish relocation. Furthermore, measures shall be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the stream, or placement of a filter berm of clean river gravel. Silt fences and other non-native materials will be removed from the stream following completion of the activity. Gravel berms may be left in the stream channel provided they do not impede stream flow or fish passage, and conform to natural channel morphology without significant disturbance to natural substrate.
- 11) Any equipment entering the active stream (for example, in the process of installing a coffer dam) shall be preceded by an individual on foot to displace wildlife and prevent them from being crushed.
- 12) If any non-special status wildlife are encountered during the course of construction, said wildlife shall be allowed to leave the construction area unharmed, and shall be flushed, hazed, or herded in a safe direction away from the project site. Special status wildlife is defined as any species that meets the definition of endangered, rare, or threatened species in section 15380, article 20 in Title 14 of the California Code of Regulations, also known as the CEQA Guidelines.
- 13) Any red tree vole nests encountered at a work site shall be flagged and avoided during construction.
- 14) For any work sites containing western pond turtles, coastal giant salamander, foothill yellow-legged frogs, northern red legged frog, or tailed frogs, the Permittee shall provide to the CDFW LSAA permit manager for review and approval, a list of the exclusion measures that will be used at their work site to prevent take or injury to any individual pond turtles, salamanders, or frogs that could occur on the site. The Permittee shall ensure that the approved exclusion measures are in place prior to construction. Any turtles or frogs found within the exclusion zone shall be moved to a safe location upstream or downstream of the work site, prior to construction.
- 15) a) All habitat improvements shall be done in accordance with techniques in the California Salmonid Stream Habitat Restoration Manual. The most current version of the manual is available at: <http://www.dfg.ca.gov/fish/Resources/HabitatManual.asp>.

b) All streamflow enhancement improvement methods that are not covered by the CDFW manual shall be done in accordance with the best available science and manuals including The Beaver Restoration Guidebook: Working with Beaver to Restore Streams, Wetlands, and Floodplains. In: P. Version 1.0. United States Fish and Wildlife Service, Oregon. 189 pp. Online at: <http://www.fws.gov/oregonfwo/ToolsForLandowners/RiverScience/Beaver.asp>
- 16) The Permittee shall have dependable radio or phone communication on-site to be able to report any accidents or fire that might occur.
- 17) Installation of bridges, culverts, or other structures shall be done so that water flow is not impaired and upstream and downstream passage of fish is assured at all times. Bottoms of temporary culverts shall be placed at or below stream channel grade.
- 18) Temporary fill shall be removed in its entirety prior to close of work-window.

B. Specific Measures for Endangered, Rare, or Threatened Species That Could Occur at Specific Work Sites

1) Rare Plants

The outcomes of the biological resources technical report (Appendix A) prepared for this Project indicate that no special-status plant species were observed in the Project area during the protocol-level floristic survey conducted on May 4, 2019. In addition, there are no records of special-status plant occurrences within the Project area based on the 2019 CDFW CNDDDB queries and collection records in the Consortium of California Herbaria. Based on the vegetation communities along with landform, soils, and known elevation range within the Project area, 11 special-status plants have low potential to occur and eight have moderate potential to occur in the Project area (Table B-1 of Appendix A).

One sensitive natural community, Acer macrophyllum Forest Alliance (S3), was observed within the Project area. This alliance composed the riparian forest adjacent to Redwood Creek and its tributaries. Some disturbance is anticipated within this natural community during the instream habitat enhancement and gully stabilization Project activities. Installation of the off-channel reservoir will not affect this sensitive natural community, as it will replace a portion of the annual/perennial grassland in the Project area. The protective measures detailed below will be strictly followed during project construction to minimize impacts to this sensitive community.

The following minimization measures are recommended to reduce any potential impacts on special-status plants and natural communities during project activities:

- The Project footprint will be minimized to the extent possible.
- Ponds will be positioned to minimize impacts on existing vegetation to the extent possible.
- Ground disturbance and vegetation clearing and/or trimming will be confined to the minimum amount necessary to facilitate Project implementation.
- Heavy equipment and vehicles will use existing access roads to the extent possible.
- Construction materials will be stored in designated staging areas.
- Measures to prevent the spread of invasive weeds and sudden oak death pathogens will be taken, including, where appropriate, inspecting equipment for soil, seeds, and vegetative matter, cleaning equipment, utilizing weed-free materials and native seed mixes for revegetation, and proper disposal of soil and vegetation. Prior to entering and leaving the work site, workers will remove all seeds, plant parts, leaves, and woody debris (e.g., branches, chips, bark) from clothing, vehicles, and equipment.

2) Chinook salmon (*Oncorhynchus tshawytscha*), Coho salmon (*Oncorhynchus kisutch*), steelhead trout (*Oncorhynchus mykiss*), and Pacific lamprey (*Lampetra tridentata*)

While all of the work proposed under this program will enhance habitat for one or more of these species, some of the work sites proposed as part of the Project could involve instream work in their habitat. In order to avoid any potential for negative impacts to these species, the following measures will be implemented:

- a) Project work within the wetted stream shall be limited to the period between June 15 and November 1, or the first significant rainfall, or whichever comes first. This is to take advantage of low stream flows and to avoid the spawning and egg/alevin incubation period of salmon and steelhead. Actual project start and end dates, within this timeframe, are at the discretion of the Department of Fish and Wildlife. Whenever possible, the work period at individual sites shall be further limited to entirely avoid periods when salmonids

are present (for example, in a seasonal creek, work will be confined to the period when the stream is dry).

- b) Suitable large woody debris that is not used for habitat enhancement shall be left within the riparian zone so as to provide a source for future recruitment of wood into the stream, reduce surface erosion, contribute to amounts of organic debris in the soil, encourage fungi, provide immediate cover for small terrestrial species and to speed recovery of native vegetation.
- c) Prior to dewatering a construction site, fish and amphibian species shall be captured and relocated by CDFW personnel (or designated agents). The following measures shall be taken to minimize harm and mortality to listed salmonids resulting from fish relocation and dewatering activities:
 - i. Fish relocation and dewatering activities shall only occur between June 15 and November 1 of each year.
 - ii. Fish relocation shall be performed by a qualified fisheries biologist, with all necessary State and Federal permits. Captured fish shall be moved to the nearest appropriate site outside of the work area. A record shall be maintained of all fish rescued and moved. The record shall include the date of capture and relocation, the method of capture, the location of the relocation site in relation to the project site, and the number and species of fish captured and relocated. The record shall be provided to CDFW within two weeks of the completion of the work season or project, whichever comes first.
 - iii. Electrofishing shall be conducted by properly trained personnel following NOAA Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act, June 2000.
 - iv. Prior to capturing fish, the most appropriate release location(s) shall be determined. The following shall be determined:
 - a. Temperature: Water temperature shall be similar as the capture location.
 - b. Habitat: There shall be ample habitat for the captured fish.
 - c. Exclusions from work site: There shall be a low likelihood for the fish to re-enter the work site or become impinged on exclusion net or screen.
 - v. The most efficient method for capturing fish shall be determined by the biologist. Complex stream habitat generally requires the use of electrofishing equipment, whereas in outlet pools, fish may be concentrated by pumping-down the pool and then seining or dipnetting fish.
 - vi. Handling of salmonids shall be minimized. However, when handling is necessary, always wet hands or nets prior to touching fish.
 - vii. Temporarily hold fish in cool, shaded, aerated water in a container with a lid. Provide aeration with a battery-powered external bubbler. Protect fish from jostling and noise and do not remove fish from this container until time of release.
 - viii. Air and water temperatures shall be measured periodically. A thermometer shall be placed in holding containers and, if necessary, periodically conduct partial water

changes to maintain a stable water temperature. If water temperature reaches or exceeds 18°C, fish shall be released and rescue operations ceased.

- ix. Overcrowding in containers shall be avoided by having at least two containers and segregating young-of-year (YOY) fish from larger age-classes to avoid predation. Larger amphibians, such as Pacific giant salamanders, shall be placed in the container with larger fish. If fish are abundant, the capturing of fish and amphibians shall cease periodically and shall be released at the predetermined locations.
 - x. Species and year-class of fish shall be visually estimated at time of release. The number of fish captured shall be counted and recorded. Anesthetization or measuring fish shall be avoided.
 - xi. If feasible, initial fish relocation efforts shall be performed several days prior to the start of construction. This provides the fisheries biologist an opportunity to return to the work area and perform additional electrofishing passes immediately prior to construction. In many instances, additional fish will be captured that eluded the previous day's efforts.
 - xii. If mortality during relocation exceeds three percent, capturing efforts shall be stopped and the appropriate agencies shall be contacted immediately.
 - xiii. In regions of California with high summer temperatures, relocation activities shall be performed in the morning when the temperatures are cooler.
 - xiv. The Permittee shall minimize the amount of wetted stream channel that is dewatered at each individual project site to the fullest extent possible.
 - xv. 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.
- d) If these mitigation measures cannot be implemented, or the project actions proposed at a specific work site cannot be modified to prevent or avoid potential impacts to anadromous salmonids or their habitat, then activity at that work site shall be discontinued.

3) Foothill yellow-legged frog (*Rana boylei*)

Foothill yellow-legged frogs (FYLFs) are likely present in the Project area and could be affected by proposed operations. Foothill yellow-legged frogs are present in low-gradient watercourses within and downstream of the Project area. As such, there is the potential for them to be affected by instream restoration activities including instream structure construction, work area dewatering, and discharge of sediment from streambank and pond excavation activities. Adverse impacts could occur from dewatering of work areas, trampling of larvae during instream operations, and contact with heavy equipment.

The Project will result in the development of additional instream habitat, which should benefit foothill yellow-legged frogs by maintaining and potentially expanding the amount of instream habitat available for breeding and larval development.

The following conservation measures will be employed to avoid or minimize the potential for take of foothill yellow-legged frogs:

- An egg mass survey will be conducted in May prior to the operations season to determine if breeding occurs within the Project reaches.

- A visual observation survey of the project areas will be conducted within two weeks prior to the start of operations to determine if adult and juvenile foothill yellow-legged frogs are present in the Project area.
- If foothill yellow-legged frogs are present, then a qualified CDFW-approved biologist will be present immediately prior to the start of operations to remove any frogs and relocate them in suitable habitat.
- The Project manager or qualified designee will conduct daily morning inspections of the area slated for work to determine if foothill yellow-legged frogs entered the areas overnight. Any individuals will be captured and relocated prior to the start of the day's work.

In addition, the following CDFW minimization measures will be followed:

- a) Prior to start of work, all permits necessary to survey, handle, and relocate FYLFs shall be obtained. All best management practices, special conditions, mitigation and avoidance measures of any take permit obtained shall be complied with.
- b) Within 3-5 days prior to entering or working near stream/riparian habitat within the foothill yellow-legged frog range, a qualified biologist shall examine the project site to determine the presence and/or the potential for presence of FYLF adults, juveniles, tadpoles or egg masses within the project area and 300 feet upstream and downstream.
- c) The biologist must be able to recognize all potential age classes of FYLFs relative to other amphibians in the project area.
- d) The CDFW approved biologist(s) shall ensure that their activities do not transmit diseases. To ensure that diseases are not conveyed between work sites by the approved biologist, the fieldwork code of practice developed by the Declining Amphibian Populations Task Force (<http://www.fws.gov/ventura/docs/species/protocols/DAFTA.pdf>) shall be followed at all times.
- e) If any life stage of FYLFs are found, the biologist must consult with CDFW immediately by either telephone, facsimile, or e-mail, and provide a short description of existing conditions and observations, and a list of all species observed during the examination.
- f) Site-specific mitigation measures to avoid or minimize take and to avoid or minimize disturbance to FYLF habitat shall be developed and approved by the CDFW. Work shall not commence until the CDFW has provided written approval of the proposed mitigation measures and any permit to relocate FYLFs have been obtained.
- g) The approved biologist will dispatch and remove from the project area, any individuals of exotic species, such as bullfrogs (*Lithobates catesbeianus*), centrarchid fishes, and non-native crayfish to the maximum extent possible. The biologist will have the responsibility to ensure that their activities are in compliance with the Fish and Game Code.
- h) If these mitigation measures cannot be implemented or the project activities proposed at a specific work site cannot be modified to prevent or avoid potential impacts to FYLF or its habitat, then project activity at that work site shall be discontinued.

4) Red-bellied newt (*Taricha rivularis*)

Adult and juvenile red-bellied newts would likely be occupying terrestrial areas during the operation period and could be affected by heavy equipment that collapses burrows or moves woody debris. Larval newts have the potential to be present in areas that could be affected by instream operations. The following conservation measures will be employed to avoid or minimize the potential for take of red-bellied newt:

- Terrestrial woody debris will be left in place to the greatest extent practicable during operations within the riparian areas.
- The Project manager or qualified designee will conduct daily morning inspections of the area slated for work to determine if adult newts are present on the ground surface. Any newts will be captured and relocated prior to the start of the day's work.
- Prior to the initiation of any instream work in areas with surface water, a qualified biologist will survey the site to determine larval newt presence. If red-bellied newts are present, then a qualified CDFW-approved biologist will be present immediately prior to the start of operations to remove any individuals and relocate them in suitable habitat.

The Project will result in the development of additional instream habitat, which should benefit red-bellied newts by maintaining and potentially expanding the amount of instream habitat available for breeding and larval development.

5) Northern spotted owl (*Strix occidentalis caurina*)

The closest northern spotted owl activity center to the Project is approximately 1.7 mi away. Therefore, there will not be any direct impacts on northern spotted owls or their habitat.

The potential for Project construction to indirectly impact nesting northern spotted owls was preliminarily evaluated using USFWS (2006) guidelines. Owls can be affected by noise-related, visual, or physical disturbances, such as created by heavy equipment. USFWS (2006) identifies the distance that sound associated with different types of construction equipment is estimated to disturb northern spotted owls during the breeding season, relative to ambient noise levels. Most types of standard construction equipment (e.g., backhoes, cranes, construction vehicles, jackhammers) would require disturbance buffers of 100–400 m (330–1,320 ft.) from nesting spotted owl activity centers. None of these types of construction activities are expected to occur within 400 m (1,320 ft.) of a northern spotted owl nest. In addition, recent surveys have not found nesting northern spotted owls within the activity centers that are within 1.7 mi of the Project. Therefore, northern spotted owls are unlikely to be indirectly affected by the Project.

6) Long-eared owl (*Asio otus*)

Long-eared owls have not been observed within 17 mi of the Project area. However, this species nests in conifer and oak woodlands that are either open or are adjacent to grasslands, meadows, or shrublands. These habitats exist within the Project area, although no evidence of occupancy was observed during the field survey. Construction activities associated with the Project would not affect nesting or roosting habitat since no trees would be removed. However, potential foraging habitat could be affected due to the construction of the reservoir and infiltration gallery. In addition, construction noise may affect nesting owls.

Construction of the infiltration gallery would be a temporary impact since the area would revegetate after completion. The construction of the reservoir will result in approximately 6.5 ac

of grazed grassland area being permanently converted to open water and associated containment berm features. This conversion could affect the amount of foraging habitat available for long-eared owls. A preliminary estimate of available grasslands in the Briceland area conducted using satellite imagery showed approximately 470 ac of grassland (not including numerous small openings) within a one-mile radius of the Project area. The Project would convert approximately 1.4% of this area to reservoir, a relatively minor impact in consideration of the amount of suitable foraging habitat in the vicinity and the lack of evidence indicating species presence in and around the Project area.

The following conservation measure will be employed to avoid or minimize the potential for impacts on long-eared owls:

- A pre-construction nesting bird survey will be conducted during the breeding season and within two weeks of the start of construction. Appropriate buffers will be established around all active nests within the Project area.

7) Sonoma tree vole (*Arborimus pomo*)

Suitable habitat for Sonoma tree voles is present in the timber stand adjacent to the Project area. The Project will not occur within the forest nor remove any trees; therefore, there will be no impact on this species.

8) Pallid bat (*Antrozous pallidus*)

Suitable habitat for pallid bats is present in the timber stand adjacent to the Project area. The Project will not occur within the forest nor remove any trees or structures that could be occupied by this species; therefore, there will be no impact on pallid bat.

9) Townsend's big-eared bat (*Corynorhinus townsendii*)

Suitable habitat for Townsend's big-eared bats is present in the timber stand adjacent to the Project area. The Project will not occur within the forest nor remove any trees or structures that could be occupied by this species; therefore, there will be no impact on Townsend's big-eared bat.

10) Western pond turtle (*Emys marmorata*)

Redwood Creek, within the Project area has a relatively closed canopy, which would limit the basking opportunities for turtles. In addition, water flow during the summer months is very low or intermittent, which is not the preferred habitat for turtles. In addition, no ponds are located in the Project area that could contain this species. However, there is the potential that turtles could be within the Project area at the start of construction.

The following conservation measure will be employed to avoid or minimize impacts on western pond turtles:

- Prior to the initiation of any instream work in areas with surface water, a qualified biologist will survey the site to determine turtle presence. The biologist will capture and relocate any turtle that may be in work sites to suitable habitat downstream. Block nets will be installed to prevent turtles from reentering the work area.

C. Riparian and re-vegetation

- 1) Planting of seedlings shall begin after December 1, or when sufficient rainfall has occurred to ensure the best chance of survival of the seedlings, but in no case after April 1.
- 2) Any disturbed banks shall be fully restored upon completion of construction. Revegetation shall be done using native species. Planting techniques can include seed casting, hydroseeding, or live planting methods using the techniques in Part XI of the California Salmonid Stream Habitat Restoration Manual.
- 3) Disturbed and compacted areas shall be re-vegetated with native plant species. The species shall be comprised of a diverse community structure that mimics the native riparian corridor. Planting ratio shall be 2:1 (two plants to every one removed).
- 4) Unless otherwise specified, the standard for success is 80 percent survival of plantings or 80 percent ground cover for broadcast planting of seed after a period of 3 years.
- 5) To ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible, equipment shall be cleaned of all dirt, mud, and plant material prior to entering a work site. When possible, invasive exotic plants at the work site shall be removed. Areas disturbed by project activities will be restored and planted with native plants.
- 6) Mulching and seeding shall be done on all exposed soil which may deliver sediment to a stream. Soils exposed by project operations shall be mulched to prevent sediment runoff and transport. Mulches shall be applied so that not less than 90% of the disturbed areas are covered. All mulches, except hydro-mulch, shall be applied in a layer not less than two (2) inches deep. Where feasible, all mulches shall be kneaded or tracked-in with track marks parallel to the contour, and tackified as necessary to prevent excessive movement. All exposed soils and fills, including the downstream face of the road prism adjacent to the outlet of culverts, shall be reseeded with a mix of native grasses common to the area, free from seeds of noxious or invasive weed species, and applied at a rate which will ensure establishment.
- 7) If erosion control mats are used in re-vegetation, they shall be made of material that decomposes. Erosion control mats made of nylon plastic, or other non-decomposing material shall not be used.
- 8) The Permittee shall retain as many trees and shrubs as feasible, emphasizing shade producing and bank stabilizing trees and brush to minimize impacts to the riparian corridor.
- 9) If riparian vegetation is to be removed with chainsaws, the Permittee shall use saws that operate with vegetable-based bar oil when possible.
- 10) Disturbed and decompacted areas shall be re-vegetated with native species specific to the project location that comprise a diverse community of woody and herbaceous species.

D: Invasive Bullfrog Avoidance and Management

The potential creation of habitat for bullfrogs and subsequent impacts on native aquatic species has been researched and the following avoidance and minimization measures will be

incorporated in the project design, monitoring and maintenance plan. In order to avoid bullfrogs from infesting the project sites the following strategies will be implemented:

1. Landowner and resident education is one of the most important strategies, as people have been known to intentionally introduce bullfrogs to local bodies of water as a source of food.
2. Monitoring of project sites will also be very important as early detection before populations can get established, is a key component of control. Monitoring will be conducted as per Exhibit A: Bullfrog Monitoring and Management Plan prepared by CDFW.
3. If needed, the off-channel pond may be drained. David Manthorne, CDFW Senior Environmental Scientist recommends draining of ponds if invasive bullfrogs are present to interrupt their life cycle (CDFW Compliance Guidance). According to research by Doubleday et al, 2007, "*Bullfrogs, Disturbance Regimes, and the Persistence of California Red-Legged Frogs*", draining of ponds can be effective for bullfrog management if draining occurs at least every 2 years.
4. If annual monitoring shows that bullfrogs are present, active measures will be taken in consultation with CDFW and will follow the methods described in Exhibit A: Bullfrog Monitoring and Management Plan

V. CULTURAL RESOURCES

An archaeological assessment (Appendix C) and tribal group consultation have indicated that cultural resources are present within a portion of the project site. Potential for inadvertent impacts at all sites will be avoided through implementation of the following mitigation measures:

- 1) The Permittee has contracted with an archaeologist(s) or other historic preservation professional that meets The Secretary of the Interior's Professional Qualifications Standards (36 CFR Part 61, and 48 FR 44716) to complete cultural resource surveys at any sites with the potential to be impacted prior to any ground disturbing activities. The completed report is included as Appendix C. This work may be augmented with the aid of a Native American cultural resources specialist that is culturally affiliated with the project area. Cultural and paleontological resource surveys shall be conducted using standard protocols to meet CEQA Guideline requirements.
- 2) Cultural and/or paleontological resources on the site will be protected by the Permittee through implementation of the following protective measures before work can proceed:
 - a) The site boundary shall be clearly marked during project implementation. Boundary markers such as flagging, stakes, fencing, or other highly visible barrier should be used.
 - b) The area containing the archaeological site shall be completely excluded from ground disturbing activities. The proposed path of the pond intake pipeline and primary spillway have been rerouted to avoid ground disturbance to the identified sensitive area.
 - c) Spoils from pond excavation may be placed directly on the existing site surface, however, no grading or scarifying shall be conducted. Heavy equipment shall not enter the site unless atop a sufficient layer of fill, such that the underlying soil is not displaced.

- d) All ground-disturbing activities and placement of fill material within the known archaeological site shall be monitored by a professional archaeologist familiar with specific project conditions. A monitoring plan should be developed and used to guide monitoring and discovery protocol.
 - e) This archaeological site should be continuously monitored after project construction. The landowner or designee should watch for erosion, unauthorized collecting, and other site damages as a result of this site now being identified.
 - f) In the event additional archaeological material is encountered during project implementation or during future site monitoring efforts, all work shall stop in the area of the find and the discovery protocol initiated as described below in 6).
- 3) The Permittee shall report any previously unknown historic, archeological, and paleontological remains discovered at a project location to the USACE as required in the RGP.
 - 4) The Permittee shall ensure that the implementation contractor or responsible party is aware of these site-specific conditions, and shall inspect the work site before, during, and after completion of the action item.
 - 5) Inadvertent Discovery of Cultural Resources - If cultural resources are encountered during construction activities, all onsite work shall cease in the immediate area and within a 50-foot buffer of the discovery location. A qualified archaeologist will be retained to evaluate and assess the significance of the discovery, and develop and implement an avoidance or mitigation plan, as appropriate. For discoveries known or likely to be associated with Native American heritage (prehistoric sites and select historic period sites), the tribes listed in Section 6.2 and those that the County has on file shall also be contacted immediately to evaluate the discovery and, in consultation with the project proponent, the County, and consulting archaeologist, develop a treatment plan in any instance where significant impacts cannot be avoided. Prehistoric materials which could be encountered include obsidian and chert debitage or formal tools, grinding implements, (e.g., pestles, handstones, bowl mortars, slabs), locally darkened midden, deposits of shell, faunal remains, and human burials. Historic archaeological discoveries may include nineteenth century building foundations, structural remains, or concentrations of artifacts made of glass, ceramics, metal or other materials found in buried pits, wells or privies.
 - 6) Inadvertent Discovery of Human Remains - If human remains are discovered during project construction, work shall stop at the discovery location, within 20 meters (66 feet), and any nearby area reasonably suspected to overlie adjacent human remains (Public Resources Code, Section 7050.5). The county coroner shall be contacted to determine if the cause of death must be investigated. If the coroner determines that the remains are of Native American origin, it is necessary to comply with state laws relating to the disposition of Native American burials, which fall within the jurisdiction of the Native American heritage Commission (NAHC) (Public Resources Code, Section 5097). The coroner will contact the NAHC. The descendants or most likely descendants of the deceased will be contacted, and work shall not resume until they have made a recommendation to the landowner or the person responsible for the excavation work for means of treatment and disposition, with appropriate dignity, of the human remains and any associated grave goods, as provided in Public Resources Code, Section 5097.98.
 - 7) Procedures for treatment of an inadvertent discovery of human remains:

- a) Immediately following discovery of known or potential human remains all ground-disturbing activities at the point of discovery shall be halted.
- b) No material remains shall be removed from the discovery site, a reasonable exclusion zone shall be cordoned off.
- c) The property owner shall be notified and the Permittee Project Manager shall contact the county coroner.
- d) The Permittee shall retain the services of a professional archaeologist to immediately examine the find and assist the process.
- e) All ground-disturbing construction activities in the discovery site exclusion area shall be suspended.
- f) The discovery site shall be secured to protect the remains from desecration or disturbance, with 24-hour surveillance, if prudent.
- g) Discovery of Native American remains is a very sensitive issue, and all project personnel shall hold any information about such a discovery in confidence and divulge it only on a need-to-know basis, as determined by the CDFW.
- h) The coroner has two working days to examine the remains after being notified. If the remains are Native American, the coroner has 24 hours to notify the NAHC in Sacramento (telephone 916/653-4082).
- i) The NAHC is responsible for identifying and immediately notifying the Most Likely Descendant (MLD) of the deceased Native American.
- j) The MLD may, with the permission of the landowner, or their representative, inspect the site of the discovered Native American remains and may recommend to the landowner and Permittee means for treating or disposing, with appropriate dignity, the human remains and any associated grave goods. The descendants shall complete their inspection and make recommendations or preferences for treatment within 48 hours of being granted access to the site (Public Resource Code, Section 5097.98(a)). The recommendation may include the scientific removal and non-destructive or destructive analysis of human remains and items associated with Native American burials.
- k) Whenever the NAHC is unable to identify a MLD, or the MLD identified fails to make a recommendation, or the landowner or his/her authorized representative rejects the recommendation of the MLD and mediation between the parties by the NAHC fails to provide measures acceptable to the landowner, the landowner or his/her authorized representatives shall re-inter the human remains and associated grave offerings with appropriate dignity on the property in a location not subject to further subsurface disturbance in accordance with Public Resource Code, Section 5097.98(e).
- l) Following final treatment measures, the Permittee shall ensure that a report is prepared that describes the circumstances, nature and location of the discovery, its treatment, including results of analysis (if permitted), and final disposition, including a confidential map showing the reburial location. Appended to the report shall be a formal record about the discovery site prepared to current California standards on DPR 523 form(s).

Permittee shall ensure that report copies are distributed to the appropriate California Historic Information Center, NAHC, and MLD.

- 8) Pursuant to RGP78 and in accordance to 36 C.F.R. Section 800.13, in the event of any discovery during construction of human remains, archeological deposits, or any other type of historic property, the Permittee shall notify the USACE archeological staff (Steve Dibble at 213-452-3849 or John Killeen at 213-452-3861) within 24 hours. Construction work shall be suspended immediately and shall not resume until USACE re-authorizes project construction.
- 9) If it becomes impossible to implement the project at a work site without disturbing cultural or paleontological resources, then activity at that work site shall be discontinued.

VI. GEOLOGY AND SOILS

There is no potential for a significant adverse impact to geology and soils; implementation of the streamflow enhancement project will contribute to an overall reduction in stormwater runoff and associated erosion. Existing roads will be used to access work sites. Ground disturbance at most work sites will be minimal, except for construction of the pond. The potential for substantial soil loss will be avoided through implementation of the minimization measures below.

- 1) The Permittee will implement the following measures to minimize harm to listed salmonids resulting from instream construction work:
 - a) All instream structures involving fish passage, shall be reviewed and approved by NOAA (or CDFW) engineers prior to onset of work.
 - b) If the stream in the project location was not passable to, or was not utilized by, all life stages of all covered salmonids prior to the Project, the Project shall pass the life stages and covered salmonid species that historically did pass there.
- 2) The Permittee shall implement the following measures to minimize harm to listed salmonids resulting from pond construction and instream structure installation activities:

Work sites shall be winterized at the end of each day to minimize the eroding of unfinished excavations when significant rains are forecasted. Winterization procedures shall be supervised by a professional trained in erosion control techniques and involve taking necessary measures to minimize erosion on unfinished work surfaces.

Winterization includes the following: smoothing unfinished surfaces to allow water to freely drain across them without concentration or ponding; compacting unfinished surfaces where concentrated runoff may flow with an excavator bucket or similar tool, to minimize surface erosion and the formation of rills; and installation of culverts, silt fences, and other erosion control devices where necessary to convey concentrated water across unfinished surfaces, and trap exposed sediment before it leaves the work site.
- 3) Effective erosion control measures shall be in-place at all times during construction. Construction within the 5-year flood plain shall not begin until all temporary erosion controls (i.e., straw bales or silt fences that are effectively keyed-in) are in place down slope or down stream of project activities within the riparian area. Erosion control measures shall be maintained throughout the construction period. If continued erosion is likely to occur after construction is completed, then appropriate erosion prevention measures shall be implemented and maintained until erosion has subsided.

- 4) An adequate supply of erosion control materials (gravel, straw bales, shovels, etc.) shall be maintained onsite to facilitate a quick response to unanticipated storm events or emergencies.
- 5) Use erosion controls that protect and stabilize stockpiles and exposed soils to prevent movement of materials. Use devices such as plastic sheeting held down with rocks or sandbags over stockpiles, silt fences, or berms of hay bales, to minimize movement of exposed or stockpiled soils.
- 6) When needed, instream grade control structures shall be utilized to control channel scour, sediment routing, and headwall cutting.
- 7) Temporary stockpiling of excavated material shall be minimized. However, excavated material shall be stockpiled in areas where it cannot enter the stream channel. Available sites at or near the project location shall be determined prior to the start of construction. If feasible, topsoil shall be conserved for reuse at project location or use in other areas.
- 8) Upon project completion, all exposed soil present in and around the project site shall be stabilized within 7 days. Soils exposed by project operations shall be mulched to prevent sediment runoff and transport. Mulches shall be applied so that not less than 90% of the disturbed areas are covered. All mulches, except hydro-mulch, shall be applied in a layer not less than two (2) inches deep. Where feasible, all mulches shall be kneaded or tracked-in with track marks parallel to the contour, and tackified as necessary to prevent excessive movement. All exposed soils and fills, including the downstream face of the road prism adjacent to the outlet of culverts, shall be reseeded with a mix of native grasses common to the area, free from seeds of noxious or invasive weed species, and applied at a rate which will ensure establishment.
- 9) Soil compaction shall be minimized by using equipment with a greater reach or that exerts less pressure per square inch on the ground, resulting in less overall area disturbed and less compaction of disturbed areas.
- 10) Disturbed soils shall be decompacted at project completion as heavy equipment exits the construction area.
- 11) At the completion of the project, soil compaction that is not an integral element of the design should be de-compacted.

VII. GREENHOUSE GAS EMISSIONS

No specific mitigation measures are required. Re-vegetation practices will help offset the short term, less than significant, greenhouse gas emissions.

VIII. HAZARDS AND HAZARDOUS MATERIALS

The project will not create a significant hazard to the public or the environment. At work sites requiring the use of heavy equipment, there is a small risk of an accident upsetting the machine and releasing fuel, oil, and coolant, or of an accidental spark from equipment igniting a fire. The potential for these impacts will be reduced to a less than significant level through implementation of the following mitigation measures:

- 1) Heavy equipment that will be used in these activities will be in good condition and will be inspected for leakage of coolant and petroleum products and repaired, if necessary, before work is started.
- 2) When operating vehicles in wetted portions of the stream channel, or where wetland vegetation, riparian vegetation, or aquatic organisms may be destroyed, the responsible party shall, at a minimum, do the following:
 - a) Check and maintain on a daily basis any vehicles to prevent leaks of materials that, if introduced to water, could be deleterious to aquatic life, wildlife, or riparian habitat;
 - b) Take precautions to minimize the number of passes through the stream and to avoid increasing the turbidity of the water to a level that is deleterious to aquatic life; and
 - c) Allow the work area to rest to allow the water to clear after each individual pass of the vehicle that causes a plume of turbidity above background levels, resuming work only after the stream has reached the original background turbidity levels.
- 3) All equipment operators shall be trained in the procedures to be taken should an accident occur. Prior to the onset of work, the Permittee shall prepare a Spill Prevention/Response plan to help avoid spills and allow a prompt and effective response should an accidental spill occur. All workers shall be informed of the importance of preventing spills. Operators shall have spill clean-up supplies on site and be knowledgeable in their proper deployment.
- 4) All activities performed in or near a stream will have absorbent materials designed for spill containment and cleanup at the activity site for use in case of an accidental spill. In an event of a spill, work shall cease immediately. Clean-up of all spills shall begin immediately. The responsible party shall notify the State Office of Emergency Services at 1-800-852-7550 and the CDFW immediately after any spill occurs, and shall consult with the CDFW regarding clean-up procedures.
- 5) All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 65 feet from any riparian habitat or water body and place fuel absorbent mats under pump while fueling. The USACE and the CDFW will ensure contamination of habitat does not occur during such operations. Prior to the onset of work, the Permittee shall prepare a plan to allow a prompt and effective response to any accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.
- 6) Location of staging/storage areas for equipment, materials, fuels, lubricants, and solvents, will be located outside of the streams high water channel and associated riparian area. The number of access routes, number and size of staging areas, and the total area of the work site activity shall be limited to the minimum necessary to complete the restoration action. To avoid contamination of habitat during restoration activities, trash will be contained, removed, and disposed of throughout the project.
- 7) Petroleum products, fresh cement, and other deleterious materials shall not enter the stream channel.
- 8) 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.

- 9) No debris, soil, silt, sand, bark, slash, spoils, sawdust, rubbish, cement, concrete or washings thereof, asphalt, paint, or other coating material; oil or petroleum products; or other organic or earthen material from any construction or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the state. When operations are completed, any excess materials or debris shall be removed from the work area and disposed of in a lawful manner.
- 10) All internal combustion engines shall be fitted with spark arrestors.
- 11) The Permittee shall have an appropriate fire extinguisher(s) and firefighting tools (shovel and axe at a minimum) present at all times when there is a risk of fire.
- 12) Vehicles shall not be parked in tall grass or any other location where heat from the exhaust system could ignite a fire.
- 13) The grantee shall follow any additional rules the landowner has for fire prevention.
- 14) The potential for mercury contamination is largely predicted by the presence of historic hydraulic gold mines and mercury (cinnabar) mines (California's Abandoned Mines: A Report on the Magnitude and Scope of the Issue in the State, DOC 2000). None of the Project sites have potential for mercury contamination.
 - a) Given the limited geographical potential for encountering mercury contamination (from historic mining) within the geographic scope, the following avoidance and mitigation measure will be adhered to: any gravel imported from offsite shall be from a source known to not contain historic hydraulic gold mine tailings, dredger tailings, or mercury mine waste or tailings.

IX. HYDROLOGY AND WATER QUALITY

- 1) Instream work shall be conducted during the period of lowest flow.
- 2) Before work is allowed to proceed at a site, CDFW shall inspect the site to assure that turbidity control measures are in place.
- 3) The waste water from construction area shall be discharged to an upland location where it will not drain sediment-laden water back to stream channel.
- 4) To control erosion during and after project implementation, the Permittee shall implement best management practices, as identified by the appropriate Regional Water Quality Control Board.
- 5) Sediment-laden water caused by construction activity shall be filtered before it leaves the right-of-way or enters the stream network or an aquatic resource area. Silt fences or other detention methods shall be installed as close as possible to culvert outlets to reduce the amount of sediment entering aquatic systems.
- 6) If CDFW determines that turbidity/siltation levels resulting from an activity or activities constitute a threat to aquatic life, all activities associated with the turbidity/siltation shall cease until effective CDFW approved sediment control devices are installed and/or abatement procedures are implemented.

- 7) Prior to use, all equipment shall be cleaned to remove external oil, grease, dirt, or mud. Wash sites shall be located in upland locations so that dirty wash water does not flow into the stream channel or adjacent wetlands.
- 8) Water conservation and flow enhancement projects that include water storage tanks/ponds and a Forbearance Agreement, for the purpose of storing winter water for summer use, require registration of water use pursuant to the Water Code Section 1228.3, and require consultation with CDFW and compliance with all lawful conditions required by CDFW. Diversions to fill storage facilities during the winter and spring months shall be made pursuant to the appropriate type of water right and filed with the State Water Resources Control Board (SWRCB). CDFW will review the appropriation of water to ensure fish and wildlife resources are protected. The following conditions apply to surface water diversions and shall be applied where applicable as determined through consultation with CDFW:
- a) Seasonal Restriction: No pumping is allowed when stream flow drops below a threshold (to be determined by CDFW and SWRCB) except as permitted by CDFW in the event of an emergency.
 - b) Bypass Flows: Pumping withdrawal rates shall not exceed 5% of stream flow. If CDFW determines that the streamflow monitoring data indicate that fisheries are not adequately protected, then the bypass flows are subject to revision by CDFW.
 - c) Pump Intake Screens: Pump intake screens shall comply with the 2000 California Department of Fish and Game Screening Criteria* for California streams that provide habitat for juvenile coho salmon, Chinook salmon and steelhead. The landowner shall be responsible for annual inspection and maintenance of screens. Additionally, the landowner shall be responsible for cleaning screens as needed to keep them free of debris and ensure that screen function complies with the criteria specifications.
 - d) These conditions do not authorize incidental take of any species, removal of riparian vegetation, or bed, bank, or channel alteration.
 - e) CDFW shall be granted access to inspect the pump system. Access is limited to the portion of the landowner's real property where the pump is located and those additional portions of the real property which must be traversed to gain access to the pump site. Landowners shall be given reasonable notice and any necessary arrangements will be made prior to requested access including a mutually-agreed-upon time and date. Notice may be given by mail or by telephone with the landowner or an authorized representative of the landowner. The landowner shall agree to cooperate in good faith to accommodate CDFW access.
- 9) Instream and off-channel ponds will be constructed to minimize erosion through engineering of berms and spillways to carry 100-year flows.

* Fish Screening Criteria are from "State of California Resources Agency Department of Fish and Game Fish Screening Criteria, June 19, 2000." The "approach velocity" shall be calculated according to Section 2C "Screens which are not Self Cleaning."

X. LAND USE AND PLANNING

No specific mitigation measures are required for land use and planning.

XI. MINERAL RESOURCES

No specific mitigation measures are required for mineral resources.

XII. NOISE

Personnel shall wear hearing protection while operating or working near noisy equipment (producing levels ≥ 85 dB, including chain saws, excavators, and back hoes). No other specific mitigation measures are required for noise.

XIII. POPULATION AND HOUSING

No specific mitigation measures are required for population and housing.

XIV. PUBLIC SERVICES

No specific mitigation measures are required for public services.

XV. RECREATION

No specific mitigation measures are required for recreation.

XVI. TRIBAL CULTURAL RESOURCES

The project will not cause adverse change in the significance of a tribal cultural resource. The project will not change the land use.

Mitigation measures stated in Section V: Cultural Resources above indicate the procedures that will be followed to minimize any impacts to and protect tribal cultural resources. If it becomes impossible to implement the project at a work site without impacting the significance of tribal cultural resources, then activity at that work site shall be discontinued.

XVII. TRANSPORTATION/TRAFFIC

No specific mitigation measures are required for transportation/traffic.

XVIII. UTILITIES AND SERVICE SYSTEMS

No specific mitigation measures are required for utilities and service systems.

SECTION 3: MONITORING AND REPORTING

The Project will be funded through agency and foundation grants that include effectiveness monitoring and reporting. Additionally, agency-specific permits will be obtained prior to implementation and the Project will comply with all state, federal and county regulations. The permittee shall implement the following measures to ensure that the treatments at all Project sites will minimize take of listed salmonids, monitor and report take of listed salmonids, and to obtain specific information to account for the effects and benefits of the Project.

- 1) The Permittee shall notify all agencies (CDFW, Humboldt County, NCRWQCB, USACE, NOAA, and USFWS) prior to the commencement of work based on the conditions in the agency-specific permit.
- 2) The Permittee Project Manager shall inspect the work site before, during, and after completion of the action item, to ensure that all necessary mitigation measures to avoid impacts are properly implemented.

- 3) The Permittee shall perform implementation monitoring immediately after the restoration activity is completed to ensure that projects are completed as designed.
- 4) The Permittee shall perform effectiveness/validation monitoring all projects.
- 5) Current monitoring forms and instructions used by CDFW for the implementation monitoring and effectiveness monitoring are found in the California Salmonid Stream Habitat Restoration Manual. Additional monitoring protocols for groundwater and streamflow currently not included in the manual but developed by the Permittee, CDFW, and consulting hydrologists will also be used.
- 6) The Permittee shall provide reports to all agencies, (CDFW, Humboldt County, NCRWQCB, SWRCB, USACE, NOAA, and USFWS) based on requirements of the agency-specific permits obtained for the project.
- 7) The Permittee shall monitor and maintain the structures or work conducted at a given site as per the requirements of agency- specific permits and funding obtained for the project.

EXHIBITS

Exhibit A: Bullfrog Monitoring and Management Plan

EXHIBIT A.

BULLFROG MONITORING AND MANAGEMENT PLAN FOR 1600-2017-0863-R1

GENERAL BULLFROG INFORMATION

The American bullfrog (*Lithobates catesbeianus* = *Rana catesbeiana*); hereafter bullfrog, is an invasive non-native species in California and poses a significant threat to California's native fish and wildlife resources. Bullfrogs were introduced in California over 100 years ago from eastern parts of the United States as a food supply, but have since caused substantial ecological consequences. Bullfrogs are considered highly invasive and are well documented to be prey upon a variety of fish and wildlife species, including some that are rare, threatened, and endangered. Human modifications to the environment provide favorable condition to bullfrogs such as artificially created agricultural ponds, canals and ditches where warm still water occurs. As a result bullfrogs have spread throughout California.

Efforts to control bullfrogs have been met with varying degrees of success because: 1) bullfrogs can be difficult to detect and go dormant from fall through winter, 2) bullfrogs often take cover in difficult areas to manage (e.g. dense vegetation), 3) they can travel long distances to colonize and re-colonize areas, 4) they have high reproductive output, 5) they are wary and readily flee perceived threats, and 6) they can survive physical trauma remarkably well. CDFW scientific staff recognizes there is an urgent and immediate need to develop improved bullfrog management strategies to protect California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. Public support and implementation of bullfrog control in California is an important conservation strategy that will help protect natural resources for future generations.

MONITORING

The Project reservoir(s) shall be monitored for bullfrog presence on an annual basis with a minimum of five total surveys, no less than two weeks apart, throughout the months of May-July

- All pond survey effort must be made by a person knowledgeable in bullfrog identification (see Appendix A for reference photos);
- Survey efforts shall include listening for bullfrog calls and slowly walking the complete perimeter of the pond at night* (dusk or later) while shining a flashlight to detect movement and eye-shine

If bullfrogs are not detected upon completion of five total surveys, or at any other time of the year incidentally, removal efforts are not required that year.

*Day time monitoring can also be conducted to aid detection but is not required under this plan.

SUCCESS CRITERIA

The level of effort needed to successfully manage bullfrog populations varies with infestation levels. This plan shall be considered successfully implemented if sufficient effort is provided to prevent adult bullfrogs from reproducing in the reservoir(s) each year, and no bullfrog life-stages can be detected. Bullfrogs are capable of traveling long distances over-land, and on-going

efforts will be required to ensure dispersing bullfrogs do not colonize the reservoir(s) at a future time.

OPTIONS FOR MANAGEMENT

Two management methods may be employed for controlling bullfrogs under this plan and include:

- Manual direct removal
- Reservoir de-watering (Hydro-modification)

Implementing both reservoir de-watering and manual direct removal is currently believed to be the most effective method of managing bullfrog infestations. For reservoirs that are heavily infested with juvenile bullfrogs and/or tadpoles, reservoir dewatering may be necessary to break the bullfrog's life cycle and prevent on-going reproduction. Prior to conducting reservoir dewatering activities, please coordinate with CDFW Scientist T.O. Smith at timothy.smith@wildlife.ca.gov

Direct Removal

All direct removal efforts must be made by a person knowledgeable in bullfrog identification.

- Removal efforts must occur during, but are not be limited to the active/breeding season, occurring May – July;
- A minimum of **five** efforts throughout the season are considered necessary;
- Direct removal efforts are typically most effective when conducted at night with use of lights but can also be conducted during the day;
- Direct removal must include working the entire perimeter of the reservoir;
- A rubber raft or small boat may be necessary to successfully remove some individuals;
- A team of two individuals or more is often helpful, one person for shining lights and/or operating a boat and the other person to perform removal efforts;
- Bullfrog tadpoles must be removed and dispatched and must not be relocated or kept as pets.

Management Authorization

Take of bullfrogs is specifically allowed in the California Code of Regulations (CCR), Title 14 (T-14) section 5.05(a)(28), under the authority of a sport fishing license. There is no daily bag limit, possession limit or hour restriction, but bullfrogs can only be taken by hand, hand-held dip net, hook and line, lights, spears, gigs, grabs, paddles, bow and arrow or fish tackle.

Alternatively, FGC Section 5501 allows CDFW, as limited by the commission, to issue a permit to destroy fish that are harmful to other wildlife. The regulations have addressed this under Section CCR T-14 226.5 Issuance of Permits to Destroy Harmful Species of Fish in Private Waters for Management Purposes. This allows the CDFW to issue free permits to destroy harmful aquatic species by seining and draining.

Pond Dewatering

Pond dewatering may be appropriate if the reservoir can be successfully dewatered without adversely affecting stream resources. Careful planning and coordination with CDFW, is necessary to ensure potential impacts to stream resources can be addressed, prior to commencing with pond draining. Discharge of polluted water to waters of the state may require permitting from other agencies with permitting authority, such as the Regional Water Quality Control Board.

In general, bullfrog tadpoles require two years to develop into frogs, whereas native amphibians only require one year. Therefore, draining a reservoir every year is intended to interrupt bullfrog tadpole development, dramatically decrease bullfrog populations and allow for reduced efforts as a measure of adaptive management. Typically in Northern California, reservoir draining should occur in September through October to avoid impacts to sensitive native amphibian and fishery resources. While draining occurs, direct removal efforts should be employed as described above if possible.

REPORTING

A written log shall be kept of monitoring and management efforts and shall be provided to CDFW **each year** by December 31. The written log shall include: 1) date and time of each monitoring and management effort, 2) approximate number of each bullfrog life stage detected and/or removed per effort, and 3) amount of time spent for each monitoring and management effort.

APPENDIX A. BULLFROG REFERENCE PHOTOS



This is a photo of a Bullfrog tadpole. (Photo taken by Mike van Hatten).



The photos shown in this Appendix demonstrate a medium sized adult bullfrog that was removed from Ten Mile Creek, Mendocino County. Note the bullfrog has a large tympanum, (circular ear drum shown with an arrow) and **does not** have distinct ridges along its back (dorsolateral folds). Photo taken by Wes Stokes.



The bullfrog has somewhat distinct mottling and the underside of the bullfrogs hind legs are not shaded pink or red.

Appendix C

*A Cultural Resources Investigation for the Marshall Ranch Flow Enhancement Project, Briceland, Humboldt County, California.
(William Rich and Associates Cultural Resources Consultants,
September 2019)*

DRAFT

**A Cultural Resources Investigation for the
Marshall Ranch Flow Enhancement Project
Briceland, Humboldt County, California**



Prepared by:
William Rich, M.A., RPA
William Rich and Associates
P.O. Box 184
Bayside, CA 95524

Prepared for:
Joel Monschke, PE
Stillwater Sciences
850 G Street, Suite K
Arcata, CA 95521

On behalf of the:
Salmonid Restoration Federation
425 Snug Alley, Unit D
Eureka, CA 95501

September 2019

CONFIDENTIAL INFORMATION

Archaeological and other heritage resources can be damaged or destroyed through uncontrolled public disclosure of locational information. This document may contain sensitive information regarding the nature and location of archaeological sites that should not be disclosed to unauthorized persons.

Information regarding the location, character or ownership of a historic resource is exempt from the Freedom of Information Act pursuant to 16 U.S.C. 470w-3 (National Historic Preservation Act) and 16 U.S.C. § 470hh (Archaeological Resources Protection Act) and California State Government Code, Section 6254.10.