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PROJECT PROPONENT AND LEAD AGENCY
TRINITY RIVER RESTORATION PROGRAM OFFICE
U. S. DEPARTMENT OF THE INTERIOR, BUREAU OF RECLAMATION

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U. S. Department of the Interior, Bureau of Land Management
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Trinity River Watershed Restoration Environmental Assessment CGB-ED-2025-034 DOI-BLM-CA-N060-2025-0010-EA Project #63121 (Forest Service)

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Mission Statement

The U.S. Department of the Interior (DOI) protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated Island Communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

The Bureau of Land Management's mission is to sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations.

The U.S. Department of Agriculture (USDA) provides leadership on food, agriculture, natural resources, rural development, nutrition, and related issues based on public policy, the best available science, and effective management. The USDA provides economic opportunity through innovation, helping rural America to thrive; to promote agriculture production that better nourishes Americans while also helping feed others throughout the world; and to preserve our Nation's natural resources through conservation, restored forests, improved watersheds, and healthy private working lands.

The U.S. Forest Service's mission is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations.

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
AEAM	Adaptive Environmental Assessment and Management
ACS	Aquatic Conservation Strategy
af	acre-feet
BMPs	best management practices
Basin Plan	Water Quality Control Plan for the North Coast Region
BiOp	biological opinion
BLM	U.S. Bureau of Land Management
Cal BP	calibrated years before the present
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
cfs	cubic feet per second
CM	conservation measure
cm	**c**entimeters
CNDDB	California Natural Diversity Database
CVP	Central Valley Project
DBH	diameter at breast height
DOI	U.S. Department of the Interior
DPS	distinct population segment
Draft SIR	Draft Supplementary Information Report
EA	Environmental Assessment
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
ESU	evolutionarily significant unit
FEIS	Final Environmental Impact Statement
ESA	Endangered Species Act
GPM	general protection measure
USFS	U.S. Forest Service
HUC	Hydrologic Unit Code
HVT	Hoopa Valley Tribe
ITAs	Indian Trust Assets
LRMP	Land and Resource Management Plan
MFF	maximum fishery flow
MWh	megawatt hours
NCIP	Northwest California Integrated Resource Management Plan

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ND	Northern Division
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRIS	Natural Resource Information System
Reclamation	Bureau of Reclamation
Regional Water Board	North Coast Regional Water Quality Control Board
RSI	remote site incubation
RFO	Redding Field Office
ROD	Record of Decision
SHPO	State Historic Preservation Office
SR	seasonal restriction
STNF	Shasta-Trinity National Forest
TEK	Traditional Ecological Knowledge
TCPs	Traditional Cultural Properties
TMC	Trinity Management Council
TMDLs	Total maximum daily loads
TRD	Trinity River Division
TRFES	Trinity River Flow Evaluation Study
TRRP	Trinity River Restoration Program
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WRO	Water Rights Order

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1 Introduction

This Draft Environmental Assessment (Draft EA) for the proposed Trinity River Watershed Restoration Project (Project) has been prepared by the U.S. Department of the Interior's (DOI) Bureau of Reclamation's (Reclamation) Trinity River Restoration Program (TRRP) office, the Bureau of Land Management (BLM), and the United States Department of Agriculture's (USDA) Forest Service (USFS) to meet the requirements of the National Environmental Policy Act (NEPA) and evaluate restoration activities in the Trinity River watershed (Figure 1-1). Reclamation's TRRP office is the lead federal agency for the proposed action and for NEPA authority. BLM and USFS are cooperating agencies.

The Draft EA analyzes the environmental effects of proposed restoration activities intended to improve the ecological function of aquatic and riparian habitat for anadromous fish species. This Draft EA would facilitate the implementation of future restoration actions within the Trinity River watershed through a streamlined NEPA process and applies to activities evaluated in this Draft EA that have a federal nexus (projects on federal lands or funded through federal agencies or funding mechanisms), including site-specific projects on private lands. Project activities analyzed in this document may require site-specific surveys; additional decisions; permitting by regulatory agencies; coordination with the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) in regard to Endangered Species Act (ESA) compliance; and compliance with the National Historic Preservation Act (NHPA), including consultation with the State Historic Preservation Office (SHPO), prior to implementation (Appendix A).

Project activities and potential impacts would typically occur along roads and within areas designated as riparian reserves under the 1994 Northwest Forest Plan[1] (NWFP) within the Trinity River watershed, in Trinity and Humboldt counties, California. The primary objectives of the Project are to enhance habitat conditions for native anadromous fish species (i.e., salmon, steelhead, Pacific lamprey) within the Trinity River watershed and to support the attainment of objectives of the Aquatic Conservation Strategy (ACS), adopted by the BLM and USFS. The two primary objectives of the ACS that would be directly addressed by the Project, are to restore watershed function and to conserve riparian reserves.

All environmental commitments, which are measures designed to protect environmental resources, developed for this EA would be incorporated, in writing or by reference, into future agency decisions for site-specific projects (Appendix B). These are consistent with the ACS, Shasta-Trinity National Forest's (STNF) Land and Resource Management Plan (LRMP), 2012 National Best Management Practices (BMPs) for Water Quality Management on National Forest System Lands[2] (USFS 2012; USDA, Forest Service, Volume 1: National Core BMP Technical Guide, FS-990a) and the BLM's Northwest California Integrated Resource Management Plan (NCIP).

TRRP has collaborated on the Proposed Action with sovereign Tribal partners, including the Hoopa Valley Tribe (HVT) and Yurok Tribe, as well as federal and state regulatory agencies, including: the USFWS, NMFS, California Department of Fish and Wildlife (CDFW), and North Coast Regional Water Quality Control Board (Regional Water Board).

[1] During the preparation of this document, the NWFP was in the process of being amended for USFS with the updated amendment anticipated to be completed in 2026. The NWFP, with the updated amendment, would continue to provide direction for the activities implemented by the USFS. Associated requirements of the updated NWFP would be incorporated into USFS resource and land management plans.

[2] The 2012 USFS BMPs are incorporated into Appendix B.

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1.1 TRRP Background

Congress authorized construction of the Trinity River Division (TRD) of the Central Valley Project (CVP) in 1955 (Public Law 386, 84th Congress, First Session). Authorized water uses from the TRD included irrigation and beneficial uses in the Central Valley and power production. The TRD began operations in 1963, blocking 109 miles of important salmonid habitat above Lewiston Dam and exporting as much as 90% of the Trinity River's inflows into Trinity Lake to the Sacramento River Basin. In the Trinity River, fisheries resource managers had observed an almost-instantaneous decline in the numbers of naturally produced adult salmonids returning to spawn in the Trinity River basin. Returning salmon numbers declined 53 to 96%, depending on the species (USFWS and HVT 1999).

To address these precipitous declines, numerous pieces of legislation and a decades-long study led to the completion of the Trinity River Flow Evaluation Study (TRFES) by USFWS and HVT (1999) and the subsequent Trinity River EIS and 2000 Record of Decision (ROD) (DOI and HVT 2000). The 2000 ROD recognized that salmon recovery required "rehabilitating the river itself" by "restoring the attributes that produce a healthy, functioning alluvial river system" and selected a course of action that included variable annual instream flows, physical channel rehabilitation, sediment management, watershed restoration, and infrastructure improvements guided by an Adaptive Environmental Assessment and Management (AEAM) program.

Following the 2000 ROD, the U.S. Department of the Interior established the TRRP to restore the fisheries of the Trinity River affected by dam construction and related TRD diversions. Administered by Reclamation, TRRP is a partnership of federal and state resource agencies, Tribes, and Trinity County. The Program works to restore the processes and attributes of a properly functioning river and watershed to support the recovery of diminished salmon and steelhead populations while retaining the Trinity and Lewiston dams' delivery of water and power to the Trinity River and California's Central Valley.

1.2 Project Location

The proposed Project would take place along the mainstem and tributaries of the Trinity River, which are located both below and above the Lewiston and Trinity dams (Figure 1-1). The Project activity area includes the Trinity Alps Wilderness. The proposed restoration activities are analyzed at the hydrologic unit code 10 (HUC 10) subwatershed scale. See Table 1-1 below for HUC 10 watersheds included in the Project activity area.

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Table 1-1. Watersheds within the Trinity River subbasin.

Subregion (HUC 4)	Basin (HUC 6)	Subbasin (HUC 8)	Watershed (HUC 10)	HUC 10 Number	Acres in Project Activity Area
Klamath-Northern California Coastal 1801	Northern California Coastal 180102	Trinity California 18010211	Big French Creek-Trinity River[1]	1801021111	153,325
			Browns Creek	1801021106	47,110
			Canyon Creek	1801021108	41,033
			Coffee Creek	1801021101	74,835
			East Fork Trinity River	1801021103	74,335
			Horse Linto Creek-Trinity River[2]	1801021112	0
			New River	1801021110	149,597
			North Fork Trinity River	1801021109	97,483
			Stuart Fork	1801021104	88,264
			Swift Creek-Trinity River	1801021105	121,055
			Tangle Blue Creek-Trinity River	1801021102	101,393
			Weaver Creek	1801021107	142,030
		South Fork Trinity 18010212	Lower South Fork Trinity River[3]	1801021205	44,229
			Lower Hayfork Creek	1801021203	142,161
			Upper Hayfork Creek	1801021202	105,697
			Middle South Fork Trinity River	1801021204	145,776
			Upper South Fork Trinity River	1801021201	73,634

[1] A portion of Big French Creek is excluded from the Project activity area, namely the Sharber Creek HUC 12 subwatershed, because it is in the Six Rivers National Forest.

[2] Horse Linto Creek is located in the Six Rivers National Forest and is not included in the Project activity area.

[3] A portion of Lower South Fork Trinity River is excluded from the Project activity area, namely Grouse, Mingo, and Old Campbell Creeks (HUC 12 subwatersheds), because they are located in the Six Rivers National Forest.

As described by the ACS (USFS 1995), Key Watersheds provide high-quality water, and a large system of refugia that are crucial to at-risk fish species and stocks. These are designated areas that either provide, or are expected to provide, high-quality habitat to be used as refugia for anadromous salmonids and resident fish species. In addition, Key Watersheds may contain degraded areas of habitat with a high potential for restoration. Key Watersheds within the Project activity area are the North Fork Trinity River, South Fork Trinity River, Canyon Creek, and New River. These Key Watersheds are prioritized for restoration activity implementation to provide aquatic and riparian habitat essential to the maintenance, recovery, or enhancement of anadromous fish populations. The Project's compliance with the ACS is described in more detail in Appendix C. It should be noted that though restoration activities are prioritized for Key Watersheds, restoration activities are proposed for all the HUC 10 watersheds within the Project activity area.

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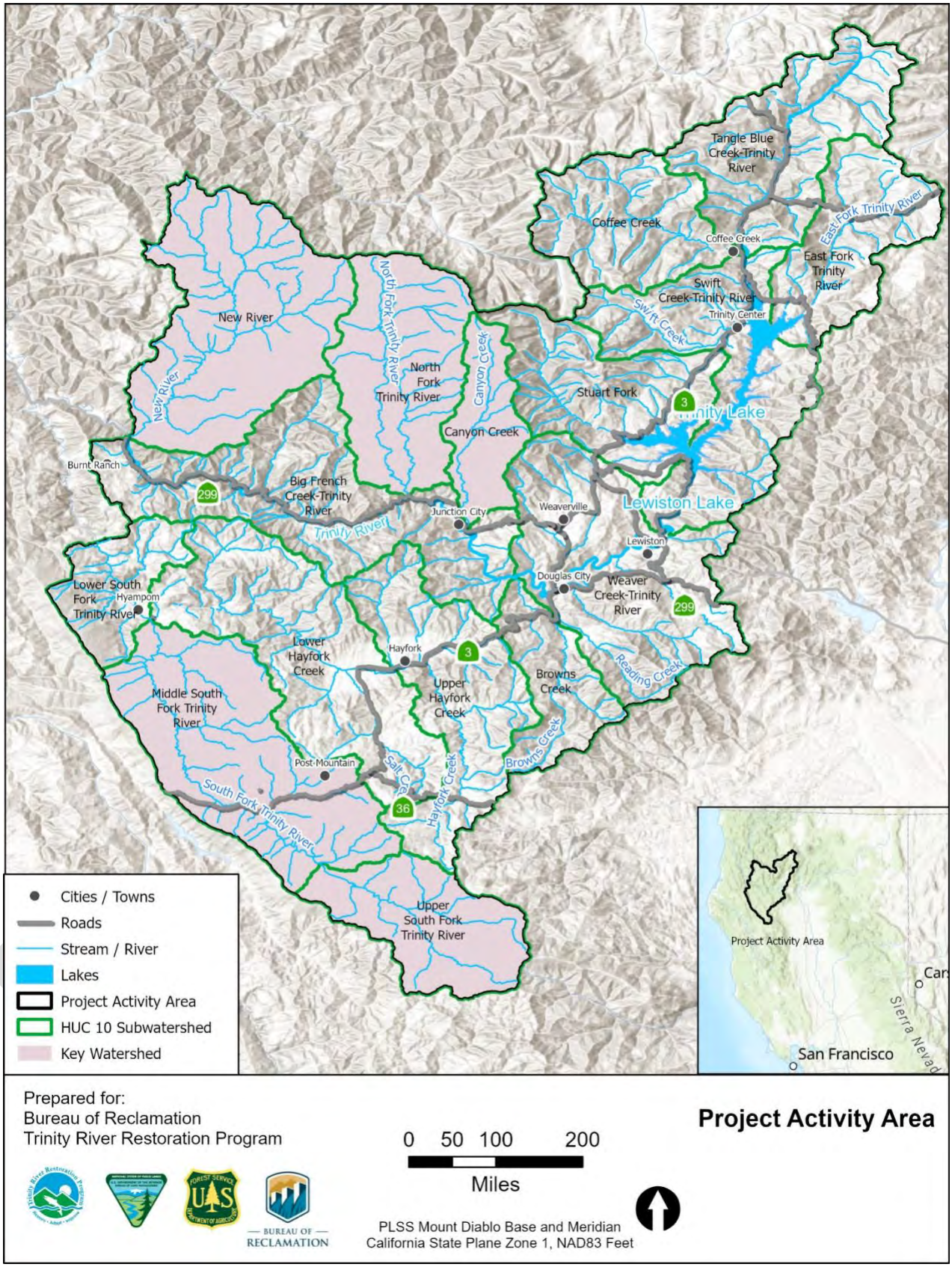

Figure 1-1. Project activity area, where restoration activities would be implemented.

2 Purpose and Need

As previously mentioned, TRRP was established to restore the fisheries of the Trinity River, which had precipitously declined. To that end, the purpose of the Proposed Action is to improve instream and riparian habitat to accelerate the recovery of north coast salmonid populations (coho salmon, steelhead, and Chinook salmon) and other special status aquatic species, thereby fulfilling tribal trust responsibilities and obligations to local communities as well as recreational and commercial fishing industries (per the STNF LRMP, BLM's NCIP, and state and federal recovery plan goals [NMFS 2014, CDFG 2004]).

The following describes the objectives of the Proposed Action:

- Restore and improve instream conditions sufficient to support all life stages of salmonids and other aquatic species;
- Restore upstream and downstream fish passage for all life stages of salmonids;
- Restore continuous paths for wood dispersal, nutrient cycling, sediment transport, and movement of other vegetative material essential for productive aquatic habitat;
- Maintain or restore native plant communities and vegetative structure impacted by invasive plants and pathogens, while rehabilitating eroding streambanks to improve water quality, shade conditions, and large wood recruitment;
- Repair, replace, or remove ineffective instream structures;
- Restore and improve riparian and meadow habitat to promote healthy conditions for aquatic and terrestrial wildlife populations;
- Improve late summer/fall base flow conditions through process-based restoration, water conservation improvements, and meadow restoration;
- Increase nutrient inputs through salmon carcass placement in the watershed; and
- Stabilize upslope areas around road infrastructure to minimize erosion and sediment discharges within the watershed to bring the sediment impaired watersheds into compliance with sediment reduction total maximum daily loads (TMDLs) for the South Fork Trinity and Trinity Mainstem rivers (EPA 1998 & EPA 2001).

The Proposed Action would continue TRRP's restoration efforts through implementors and would streamline future site-specific environmental reviews, which would likely increase the number of restoration activities implemented on an annual basis. In addition, the Proposed Action has broadened the types of restoration activities proposed and these would be implemented at the watershed-scale.

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3 National Environmental Policy Act (NEPA)

This Draft EA has been prepared in accordance with NEPA (42 United States Code [USC] 4321 et seq.) and the DOI Regulations for the Implementation of NEPA (43 CFR Part 46[3]). Governmental agencies are required to publicly disclose information about their proposed activities that may affect the environment and evaluate the potential environmental impacts of their proposed actions before making final decisions to utilize them or formal commitments to implement them.

The proposed Project is subject to NEPA because of the likelihood that a restoration action will occur on federal lands and/or involve federal funding; and would therefore involve one or more Federal agencies (Reclamation, USFS, and/or BLM). These agencies must consider public input as they implement projects that are consistent with the analysis, environmental commitments, and authorizations of their decision. This EA provides the basis for the Federal agencies' determination to implement the Proposed Action consistent with this analysis and environmental commitments in order to ensure that none of these site-specific restoration projects would significantly affect environmental resources.

There are many other laws and regulations that have influenced the scope of the EA including, but not limited to, the Endangered Species Act (ESA), Magnuson-Stevens Act (MSA), and the Clean Water Act (CWA). These and others are described further in regard to their relationship to this Project in Appendix D.

3.1 Future Site-Specific Analyses within the Scope of this NEPA Document

As previously mentioned, Reclamation (through the TRRP that is part of Reclamation's Northern California Area Office [NCAO]) is the Lead Federal Agency for the NEPA process. The cooperating agencies are USFS and BLM. The nature and extent of environmental effects from the restoration activities that are included with the Proposed Action are generally well understood and documented. Therefore, these federal agencies have chosen to evaluate these activities together to gain more consistent environmental impact analyses, streamline contracting and implementation processes, and save costs, ultimately improving habitat conditions for fish and wildlife more efficiently and effectively. The environmental analysis included in this NEPA document would facilitate and streamline future site-specific project analysis and any remaining environmental compliance needs.

Site-specific restoration projects would be evaluated to determine the level of NEPA analysis required, and whether the project proposal would be within the scope of this NEPA document. The extent of future site-specific analyses would be commensurate with the size, scope, and potential environmental impacts of the specific restoration proposal. For each of the federal agencies, the site-specific impact analysis (if deemed to be within the scope of this NEPA document) would be documented in a particular way as summarized below:

- Reclamation (TRRP) would need to complete a Supplemental EA.

[3] Executive Order 14154, Unleashing American Energy (Jan. 20, 2025), and a Presidential Memorandum, Ending Illegal Discrimination and Restoring Merit-Based Opportunity (Jan. 21, 2025), require the Department to strictly adhere to the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 et seq. Further, such Order and Memorandum repeal Executive Orders 12898 (Feb. 11, 1994) and 14096 (Apr. 21, 2023). Because Executive Orders 12898 and 14096 have been repealed, complying with such Orders is a legal impossibility. Reclamation verifies that it has complied with the requirements of NEPA, including the Department's regulations and procedures implementing NEPA at 43 C.F.R. Part 46 and Part 516 of the Departmental Manual, consistent with the President's January 2025 Order and Memorandum.

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- BLM would complete a Determination of NEPA Adequacy (DNA) to ensure the associated effects of each the site-specific restoration projects do not exceed those described in this NEPA document and ensure conformance with the BLM's NCIP.
- USFS would consider future site-specific proposals with a checklist (see Appendix A) that ensures the site-specific project meets the purpose and need for this EA, includes all appropriate environmental commitments, and an interdisciplinary team has determined that the effects of the site-specific project are within those disclosed in this EA. The USFS would also provide public notification and make checklist documentation available when site-specific projects under this EA are planned to be implemented.

For further details, please refer to the Implementation Plan (Appendix A). In addition to the site-specific impact analysis, restoration projects within the scope of this NEPA document would need to incorporate all applicable environmental commitments into restoration designs (Appendix B).

3.2 NEPA Scoping and Public Involvement to Date

TRRP, supported by BLM and USFS, led scoping and public involvement efforts and obtained input on the Project from tribes, stakeholders, future restoration project implementors, and the public. The intent of these efforts has been to provide these groups with information about the Project and NEPA analysis and create forums for these groups to bring forth insights, issues, and concerns. This effort has occurred alongside TRRP's ongoing outreach activities, in which TRRP staff members have met with local groups (e.g., fishing guides, whitewater rafters, and local residents) and individual landowners to obtain stakeholder input and advice and to address general concerns about watershed restoration within the Trinity River watershed. Notice of all public meetings conducted and other pertinent Project information has been announced in local newspapers and/or posted on the TRRP's website[4]. Included below is a summary of the scoping and public involvement efforts completed to date, specific to the Project. Please refer to Appendix G for further detail.

3.2.1 Tribal Consultation

Pursuant to Section 106 of the National Historic Preservation Act (NHPA), federal agencies are required to consult with any Indian Tribe that attaches religious and cultural significance to a historic property that may be affected by an undertaking and the process for consultation is defined in the Advisory Council on Historic Preservation's regulations (36 CFR Part 800). In addition, the USFS, per executive orders and agency policy, is required to have robust and meaningful engagement with Tribes. To meet these requirements, TRRP, USFS, and BLM sent meeting notifications via email and the agencies' resource staff coordinated with their tribal representatives to discuss the Project activity area, proposed and possible restoration activities and opportunities, as well as potential effects to traditional cultural properties (TCPs), sites, practices and beliefs. Traditional ecological knowledge (TEK), which includes cultural/traditional knowledge about plants, animals, and land management practices, would be incorporated into proposed restoration designs and project implementation in part to maintain or protect TCPs.

The Trinity River Watershed has a long cultural history, spanning thousands of years. Evidence of past use is prevalent upon the landscape; material remains are scattered throughout the environment, indicating a use pattern with strong ties to riverine and riparian environments. Remnants of tribal villages, gathering areas, ceremonial grounds, temporary

[4] https://www.trrp.net/

encampments for hunting/fishing or seasonal occupations, historic mining complexes, homesteads, and trails are all alongside streams. Many of the Tribes who have inhabited this land for generations have expressed an interest in the Project, as a possible means to rehabilitate resource areas which have suffered in recent years.

3.2.2 Public Scoping

Public scoping for the Project began on November 4, 2022 and ended on December 5, 2022. At the onset of the public scoping period, notices informing the public of the intent to begin the environmental review process were posted on TRRP, USFS, and BLM websites and at the TRRP Weaverville office. Scoping notices were also mailed and emailed to local landowners and interest groups and published in the Trinity Journal on November 16, 2022. The TRRP, BLM, and USFS hosted a virtual and in-person scoping meeting on November 17, 2022 to outline the proposed Project, receive public input, and to answer questions. During public scoping for this Project, eight individuals or organizations provided comments in response to the public scoping notice and during the public meeting. The summary of public scoping and scoping input is included in Appendix G.

3.2.3 Draft EA Public Review

An in-person open house for the public took place on March 1, 2025 at 4:00 p.m. Pacific Standard Time at the Weaverville Hotel in Weaverville, California. Information about the Draft EA and the public meeting is available on the TRRP's website (see https://www.trrp.net/restoration/watershed-activities/watershed-ea/) Trinity River Watershed Restoration Project page.

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4 Description of Alternatives

This chapter describes the No Action and Proposed Action alternatives for the Project. The agencies are required to study and develop a no action alternative, along with action alternatives, in the event the Proposed Action involves unresolved issues or conflicts concerning alternative uses of available resources, and/or instances, whereby significant impacts can be feasibly avoided or mitigated. The initial study and consideration of public comments received during collaboration and the 30-day scoping period did not reveal any potential for significant impacts, unresolved issues or conflicts. Therefore, the agencies developed the No Action and the Proposed Action alternatives for the Draft EA, as described below.

4.1 No Action

The No Action alternative provides a baseline for comparing predicted effects of the Proposed Action. It represents the environmental setting of the baseline physical conditions to determine whether the Proposed Action would have significant effect(s).

Under the No Action alternative, proposed restoration activities under Proposed Action alternative would be subject to individual NEPA analysis, with no way to streamline permitting needs. The opportunity to streamline environmental compliance and thereby increase the pace and scale of restoration actions within the Trinity River basin, would be foregone. The current limited pace and scale of essential restoration activities in the Trinity River watershed to aid in the recovery of sensitive and threatened fish species would continue, as district staff develop projects and secure funding and resources to fulfill legal mandates for individual project notice and comment, NEPA/California Environmental Quality Act (CEQA) requirements, ESA consultation, and cultural review per applicable laws (e.g., Section 106, Executive Order 13007, etc.).

4.2 Proposed Action

The Proposed Action includes a suite of instream, riparian corridor, and upslope habitat restoration activities that are designed to maintain, enhance, and restore instream processes to benefit aquatic species, riparian and upslope habitats, and water quality. Activities include instream habitat restoration; upslope habitat restoration; and road maintenance, rehabilitation, and decommissioning activities as listed below. Appendix H also includes activity cards that clearly summarize these activity categories.

Instream Habitat Restoration:

1. Restoration and Enhancement of In-Channel Habitat
2. Floodplain Restoration
3. Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures
4. Water Conservation Projects
5. Salmon Carcass Placement
6. Remote Site Incubators

Upslope Habitat Restoration:

7. Bioengineered Bank Stabilization
8. Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement

Road Maintenance, Rehabilitation, and Decommissioning Activities:

9. Road Maintenance

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10. Road Rehabilitation
11. Road Decommissioning

Appendix H includes activity cards that clearly summarize these activity categories. Project activities are described in this EA in as much detail as possible, namely: the conditions that restoration activities would seek to enhance; the environmental commitments that are important for avoiding adverse effects; and the overall effect of those projects on the human environment. As previously mentioned, TRRP, BLM, and USFS would plan future site-specific restoration efforts within the Trinity River HUC 10 watersheds listed in Table 1-1 under this EA. Site-specific analysis and public notification would be implemented as further described in Appendix A. Activity category-specific design guidelines are provided in Appendix B to help the authorizing agencies and individual project proponents: design proposed restoration projects in a manner that is appropriate and sustainable; minimize adverse effects to aquatic habitats; and maximize the ecological benefits to further support the recovery of aquatic species, habitat, and an ecologically functioning watershed.

4.2.1 Instream Habitat Restoration

4.2.1.1 *Restoration and Enhancement of In-Channel Habitat*

The "restoration and enhancement of in-channel habitat" activity category typically applies to reaches of the mainstem Trinity River or tributaries where channel diversity is limited, and habitat complexity needs to be restored and/or enhanced. This activity category also applies to areas where side channels, alcoves, and other backwater habitats have been filled or blocked from the main channel, disconnecting them from most if not all flow events.

This category includes, but is not limited to, the following activities: installation of habitat elements such as vegetation, loose large wood with and without rootwads, structured log jam (SLJ) installation using vibratory pile-driving techniques (stabilizing the SLJs with timber piles), in-stream boulders, beaver dam analogues (BDAs), post-assisted log structures (PALS), spawning gravel, and other low-tech process-based restoration (LTPBR) techniques. Also included in this category is channel excavation, grading of floodplains, the addition of weir-like tailwater control structures (constructed of logs and or rock) that do not impede fish passage, riparian vegetation removal (where necessary), construction of gravel and skeletal bars, construction of floodplain surfaces with elevations allowing periodic inundation, removal of riparian berms, bedrock fracturing (where necessary) using blasting techniques, and revegetation of restored floodplain surfaces. This activity category typically involves reconnecting and creating side-channel, alcove, oxbow, pond, off-channel, floodplain, and other habitats, and potentially removing off-channel fill and plugs. New side-channels and alcoves may be constructed in geomorphic settings that will accommodate such features. Excavators, bulldozers, dump trucks, front-end loaders, vibratory pile driver and similar equipment may be used to implement proposed restoration projects.

The restoration of in-channel habitat would result in:

- Increased instream habitat diversity and complexity;
- Increased cover and flow refugia for salmonids;
- Improved heterogeneity of flows and hydrologic connectivity;
- Long-term nutrient storage and substrate for aquatic macroinvertebrates;
- Moderation of flow disturbances;
- Increased retention of leaf litter; and

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- An overall increase in the quality and quantity of instream habitat.

Proposed restoration and enhancement of off-channel and side-channel habitat projects could provide details about water supply (channel flow, overland flow, and groundwater), water quality, flow reliability, flooding risk of channel changes, and channel and hydraulic grade.

The following describes habitat features that could be installed as part of multiple activity categories.

4.2.1.1.1 Large Wood

A 2011 study conducted for the TRRP recommended that 500 to 600 large wood pieces per RKM (805 to 966 pieces per RM) be present throughout the Trinity River mainstem 40-mile TRRP restoration reach (Cardno Entrix and CH2MHill 2011). During the study, large wood was characterized as having a minimum size of 20 centimeters (cm) diameter at breast height (DBH) and 2 meters (m) in length and was divided further into the following size classes:

- Size 1 – 20 to 30 cm DBH or 4 m in length
- Size 2 – 30 to 70 cm DBH and 4 to 10 m in length
- Size 3 – key pieces, larger than 70 cm DBH or 10 m in length

In 2015, an estimated 32 to 40 wood pieces per RKM (52 to 64 pieces per River Mile [RM]) were present in the Trinity River mainstem within the reaches where no rehabilitation activities had taken place, which suggests that there is a reach-wide deficit of wood. It is likely that there is a deficit of large wood in the tributaries as well.

Placement of large wood in streams is one of the most widespread and common techniques to improve instream habitat for salmonids. Wood is a naturally occurring component of stream and river systems where little or no anthropogenic alteration has occurred, wherein vegetation within the floodplain is recruited into the channel through flooding, erosion, wind throw, disease, beaver activity, or other natural mortality. The presence of wood within the river system also increases channel-floodplain connectivity, which aids in recruitment of wood that has been placed through augmentation or is naturally occurring within the floodplain (Cardno Entrix and CH2MHill 2011).

Though the geomorphic benefits of dispersed wood are often minor, such instream wood often provides shelter from flow allowing sediment to deposit and be exchanged with mobile grains during high flows. Instream wood often also creates scour holes in the river channel that help dissipate the energy of flows, which can benefit aquatic habitat by providing hydraulic diversity for benthic organisms. In addition, wood can increase stream shading, cover for predator avoidance, and floodplain complexity. The hydraulic roughness from instream wood can also increase flow access to floodplains, where salmonids can exploit food resources and grow to larger sizes in shorter timeframes to aid in their survival to adulthood (Sommer et al. 2001).

Techniques for wood placement include dispersing wood throughout the floodplain and construction of engineered instream structures such as SLJs. Large wood would be installed using either anchored or unanchored logs, or both, depending on site conditions and wood availability. Wood-loading methods would include but are not limited to direct felling; whole tree tipping/placement; tree placement by helicopters, grip hoisting, or excavator; and other techniques.

SLJs include an anchoring system, such as rebar pinning, ballast rock, or vertical posts. These structures are designed to redirect flow and change scour and deposition patterns and are patterned after stable natural log jams. They are anchored in place using rebar, rock, or piles (driven into a dewatered area or the streambank, but not in water). SLJs

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create a hydraulic shadow, which is a low-velocity zone downstream that allows sediment to settle. Scour holes develop adjacent to the engineered log jam. While providing valuable fish and wildlife habitat, they also redirect flow and can stabilize a streambank or downstream gravel bar (USFWS 2025).

4.2.1.1.2 Small Wood

Small wood placements are defined as those that use wood that is less than 20 cm DBH and/or 4 m or less in length. Small wood placement includes but is not limited to small, whole tree placement, BDAs, PALS, brush/willow baffles, post lines only, post lines with wicker weaves, construction of starter dams, reinforcement of existing active beaver dams, and reinforcement of abandoned beaver dams as described by Pollock et al. (2012). Small wood placement can improve habitat by flattening local stream gradients, increasing floodplain interactions and groundwater storage, capturing of fine sediment in the channel, pool formation, hyporheic exchange, and riparian habitat recovery. Structures consist of porous channel-spanning or partial spanning structures, riparian cuttings (e.g., willow cuttings) and other inert materials that are structurally reinforced with small diameter driven wood posts. Structures include interstitial spaces that allow water, sediment, fish and other aquatic organisms to move through the structure.

4.2.1.1.3 Boulders

Boulders would be placed in plane-bed streams, streams where boulders had been historically, and other stream conditions where improvements to habitat complexity are warranted. Boulder placements increase instream habitat diversity and complexity, improve flow heterogeneity, provide substrate for aquatic species, and provide flow refugia for fish during elevated flows.

4.2.1.2 Floodplain Restoration

The “floodplain restoration” activity category typically applies to areas where floodplains have been disconnected from adjacent streams and rivers. This activity category is aimed primarily at restoring hydraulic connections and inundation across the floodplain to improve the diversity and complexity of aquatic, wetland, meadow, and riparian habitat, as well as ecosystem function within the watershed.

This activity category may include: the setback, breaching, modification, and removal of levees, berms, and dikes as well as floodplain lowering (e.g., mine tailing excavation) or fill in support of hydraulic reconnection across the floodplain (including restoration to stage zero, which creates streams that are fully connected with their floodplains, typically with multi-thread channels). Also included in this activity category, is rock placement (including engineered stream material, riffle ramps, or weirs); filling or reshaping of on- and off-channel gravel pits; LTPBR techniques such as BDAs and PALS; and other strategies to aggrade the channel and improve connectivity within the floodplain. Levee setback projects include construction of new levees to facilitate removal or breaching of existing levees, and creation of aquatic or riparian habitat. Levees may also be adjusted, or a low levee bench may be created to facilitate floodplain inundation or channel margin habitat. Floodplains should mimic natural or historic flooding patterns and remain flooded/inundated for long enough to activate food webs.

Meadow and floodplain restoration may involve reconnecting down-cut or incising channels to their floodplains to restore hydrologic processes and meadow health; filling incised, entrenched channels; creating new stream channels; regrading floodplains or realigning channels; or installing stabilization structures (e.g., Zeedyk structures). Projects using fill to address channel incision should also incorporate habitat elements that offset the likelihood for incision to re-occur such as adding large wood and channel roughness. These restoration actions may ultimately rely on watershed

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processes to complete work over time to restore a channel network and floodplain that supports wetland, meadow, and/or grassland habitat. Excavators, bulldozers, dump trucks, front-end loaders, and similar equipment may be used to implement these restoration projects.

Floodplain restoration activities would improve ecosystem function by:

- Creating intermittent hydrologic connections between streams and floodplains;
- Increasing the diversity and complexity of aquatic, wetland, and riparian habitat within the floodplain, which would better support aquatic and terrestrial fish and wildlife species;
- Providing opportunities for sediment to deposit on the floodplain seasonally, which enhances meadow vegetation, bird and mammal use, fish rearing and spawning, and refuge from predators and physical stressors;
- Slowing runoff and absorbing excess water during flood events, thereby reducing peak flows and reducing downstream flooding impacts;
- Improving water quality, including hyporheic flow processes;
- Improving the fluvial dynamics of the watershed system, including sediment deposition and channel meander; and
- Providing flow and cold-water refugia for native fish and other aquatic species.

Similar to projects that create off-channel/side-channel habitats, proposed floodplain restoration projects could provide details about water supply (channel flow, overland flow, and groundwater), water quality, flow reliability, flooding risk of channel changes, and channel and hydraulic grade.

4.2.1.3 Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures

The “removal or retrofitting of fish passage barriers, small dams, flood gates, pilings and other in-water structures” activity category typically applies to locations where there are natural or manmade in-stream structures (small dams, fords, diversions, flood gates, pilings, legacy structures, etc.) that are blocking/obstructing hydrologic connectivity, fish passage, and/or habitat function.

This activity category may include: the removal or retrofitting (for fish passage) of small dams, diversions, flood gates, pilings, and legacy structures; separation of streams from artificial impoundments (e.g., ponds or lakes) by realigning and/or rerouting channels around or through these artificial waterbodies and/or through the use of vertical concrete or sheet-pile walls; fish passage enhancement at stream confluences through manual movement of deposited or placed material; and removal or retrofitting (for fish passage) of undersized, deteriorated, or misaligned culverts (culvert replacement is included in the “Road Rehabilitation” activity category) or any other sort of fish passage barrier.

These activities would improve freshwater circulation, flow, and water quality primarily by removing outdated in-stream structures. This activity category is designed to reconnect stream corridors and floodplains; improve fish and wildlife migration; restore more natural channel and flow conditions; restore fisheries access to historical habitat for spawning and rearing; and improve long-term aquatic habitat quality and stream geomorphology. All proposed restoration projects would be designed with seasonal construction considerations to minimize the potential adverse effects to water quality and aquatic species. This project type would include the opportunistic removal and/or management of nonnative

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fish and other nonnative species (e.g., bullfrogs) that would take place during dewatering and in-water work area isolation activities utilizing proper removal protocols.

4.2.1.3.1 Removal of Small Dams

Small dams are removed to restore fish access to historical habitat for spawning and rearing, and to improve long-term habitat quality and fluvial processes. Types of eligible small dams include permanent, flashboard, debris basin, earthen, and seasonal dams that are of non-jurisdictional size, as defined by the California Division of Dam Safety. Those dams are smaller in height or impounding capacity than those defined in California Code 2002 (Division 3, Part 1, Chapter 1, 6002), where "dam" means:

> *Any artificial barrier, together with appurtenant works, which does or may impound or divert water, and which either (a) is or will be 25 feet or more in height from the natural bed of the stream or watercourse at the downstream toe of the barrier, as determined by the department, or from the lowest elevation of the outside limit of the barrier, as determined by the department, if it is not across a stream channel or watercourse, to the maximum possible water storage elevation, or (b) has or will have an impounding capacity of 50 acre-feet or more.*

Implementing small dam removal projects may require the use of heavy equipment (e.g., self-propelled logging yarders, cranes, mechanical excavators, backhoes, or jackhammers). Any use of blasting techniques for small dam removal must be justified by site-specific conditions, including equipment access difficulties. Hydroacoustic effects associated with blasting would need to stay below the 207 decibel (dB) L_{EAK} and 203 $dB_{SELCUMULATIVE}$ sound thresholds (or the most current thresholds accepted by NMFS). It should be noted that blasting and associated conservation measures are pending the reinitiation of the NMFS 2020 Biological Opinion (TRRP BiOp, NMFS 2020a).

Eligible small dam removal projects under the Project should not result in: significant increases to environmental contaminants that exceed freshwater potable effects levels outlined in the NOAA Screening Quick Reference Table guidelines (NOAA 2008); significant release of non-native invasive fish species; or in deposition of sediment that results in significant loss or degradation of downstream spawning or rearing habitat. Dams under Federal Energy Regulatory Commission (FERC) jurisdiction are also generally not eligible for removal under the Project, because they are typically larger than the proposed size criteria described in Water Code Section 6002.

Design guidelines for this activity category include use of one of the following methods (described below) to restore the channel in a small dam removal project: natural channel evolution or "stream simulation" design (NMFS 2019). It is important to note that NMFS stream simulation design is also used in the context of removing, replacing, modifying, retrofitting, installing, or resetting existing culverts, fords, bridges and other stream crossings and water control structures. Therefore, stream simulation design may apply to other activity categories.

4.2.1.3.2 Natural Channel Evolution

The natural channel evolution approach to restoring a channel bed would consist of removing all hardened portions (by hand efforts, heavy equipment, or explosives) of a dam and allowing the stream's natural flows to naturally shape the channel through the project reach over time. This method would only be used in the following situations where:

1. Risks are minimal (or all risks can be mitigated) to any of the downstream habitats and the aquatic organisms inhabiting them (based on the amount and size gradation of the material being stored above the dam) if all of the sediment upstream of the dam is released during a single storm event;

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2. The project reach has sufficient space and can be allowed to naturally adjust based on any land constraints, with minimal risk to riparian habitat;
3. Project implementation follows procedures that have been documented as having been successfully performed elsewhere under similar circumstances; and
4. Notching the dam in increments after periodic storm events to reduce the amount of sediment being released during any individual storm event, provided project funding is sufficient to allow the dam to be completely removed within the proposed project timeframe.

4.2.1.3.3 Stream Simulation

Generally applied at stream crossings (culverts, bridges, etc.), stream simulation design relies on the duplication of morphological conditions observed in a natural reference reach throughout the site-specific project reach. The intent of stream simulation is to create fish passage, sediment transport, and flood and debris conveyance conditions as they would occur naturally in a similar location. Determination of the high and low fish passage design flows, water velocity, and water depth is not required for this option since the stream hydraulic characteristics within the culvert are designed to mimic the upstream and downstream hydrological and geomorphological conditions of the stream (NMFS 2023).

Stream simulation designs could also be used in extreme situations where excessive sediment releases pose a threat to downstream habitat and organisms. Specifically, the sediment upstream of the dam would be physically removed and the channel through the excavated reach would be designed using stream simulation.

Stream simulation designs would be conducted in accordance with known stream restoration and fish passage guidance documents, specifically *NOAA Fisheries Guidelines for Salmonid Passage at Stream Crossings in California* (NMFS 2023). These designs include:

- Identification of a suitable reference reach;
- Quantification of the average cross-sectional shape, bank full width, bed and bank sediment grain size distributions, and geomorphic features of the channel (e.g., pool-riffle sequences, meander lengths, and step pools); and
- Reproduction of the geomorphic features found in the reference reach in the site-specific project reach.

4.2.1.4 Water Conservation Projects

Across the watershed, water use and associated infrastructure warrant improvement and efficiency upgrades to ensure that instream flows are available for fish and wildlife species and associated habitat. Particularly, wherever there are stream diversions that continue to withdraw water when streamflows are at low-flow conditions water conservation systems are warranted.

“Water conservation projects” may include water conservation and efficiency outreach; the Well Grant Program (designed to mitigate for adverse effects of restoration flows on water supplies of private riverside landowners), Instream Flow Dedication (changes to water rights) associated with Water Code Section 1707, storage and forbearance programs and other similar programs; monitoring to determine low-flow thresholds; designing, permitting, and implementing individualized water conservation systems and associated infrastructure (e.g., fish screens). Instream flow restoration from diversion projects would be designed to reduce water withdrawals especially during low-flow conditions. New systems may include more efficient intake hoses (i.e., better overall functioning not higher flow conveyance) and low volume pumps; the installation of slow flow systems such as trickle fill, solar, and ram pumps,

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water storage (off-stream storage tanks and ponds and associated off-channel infrastructure) to raise water tables and other techniques to slow runoff; and full-season forbearance systems to eliminate stream withdrawal during lowest flow periods.

Creation, operation, and maintenance of water conservation projects would be designed to reduce low-flow stream diversions and enhance instream flows, particularly base flows that support fish and wildlife habitat during the dry season. Excavators, bulldozers, dump trucks, ditch-digging equipment, front-end loaders, and similar equipment may be used to install new and/or improved water systems.

4.2.1.5 Salmon Carcass Placement

After spawning, adult salmon die and as salmon carcasses decompose they contribute marine-derived nutrients to the watershed that support many species, including aquatic organisms such as juvenile salmonids. In streams where salmon and steelhead runs have been reduced or eliminated, so too has this component of the nutrient enhancement cycle, which is critical to the health of riverine ecosystems. Therefore, supplementation of these nutrients using salmon carcasses and/or salmon flesh analogs is necessary to support aquatic and riparian food webs.

It is worth noting that salmon carcass placement is included in the NMFS BiOp for the 4d Limit for the Trinity River Coho Salmon Hatchery Genetic Management Plan (HGMP, NMFS 2020b) as Reasonable and Prudent Measure (RPM) 3b:

> *By December 2021, Reclamation shall obtain the necessary permits required to place an amount of adult coho salmon (or adult Chinook salmon or steelhead) carcasses equal to or greater than the number or NOR [natural origin] coho salmon used for broodstock into tributary streams during each winter in order to increase MDN [marine-derived nutrients] in tributaries. By December 2022, Reclamation shall begin to supplement carcasses in tributary streams equal to or greater than the number of NOR coho salmon used for broodstock annually. In years when sufficient carcasses from salmon or steelhead are not available, salmon flesh analogs shall be utilized. Information on numbers of carcasses supplemented and locations shall be included in an annual report to NMFS.*

The salmon carcass placement activity category entails obtaining excess carcasses from the Trinity River Hatchery (TRH) and placing them throughout the Trinity River watershed, where needed. Distribution of carcasses and/or salmon flesh analogs would occur where anadromous fish are known to be present within the watershed or within areas historically accessible to anadromous fish. Carcasses/analogs would be placed randomly within aquatic and riparian areas by placing individual or small groups of carcasses/analogs on the ground, in the water, or wedging them into accumulated wood. Trucks would be used to transport the fish carcasses from the hatchery to the placement sites and hand tools would be used to distribute the carcasses/analogs at the site. This activity would occur when excess carcasses are available as determined by hatchery managers and when technicians are available to perform the carcass placement. If carcasses are not available, salmon flesh analogs would be used.

Salmonids and other fish that spend their lives in coastal streams and rivers in the Pacific Northwest can become infected with an organism called *Neorickettsia helmonthoeca*. If other animals, including dogs, ingest fish carrying this organism, they can become sick with “salmon poisoning disease,” which includes gastrointestinal symptoms and can lead to more serious issues (Oregon VMA 2025). The salmon carcasses utilized in this activity will have been treated through deep-freezing prior to placement and therefore, would not cause salmon poisoning disease.

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4.2.1.6 Remote Site Incubation (RSI) Supplementation

Remote site incubation (RSI) systems have been utilized throughout anadromous streams of the Pacific Coast to incubate, hatch, and stock various salmonid species as a supplementation tool in remote settings. Units consist of a clarifying tank, an incubation tank, a live cart tank, piping between the water intake and the tanks, a head box (at the upstream water intake point), and gravity-fed water (Figure 4-1). Salmonid eggs are loaded into the unit and after several weeks, fry volitionally leave the RSI system upon hatching.

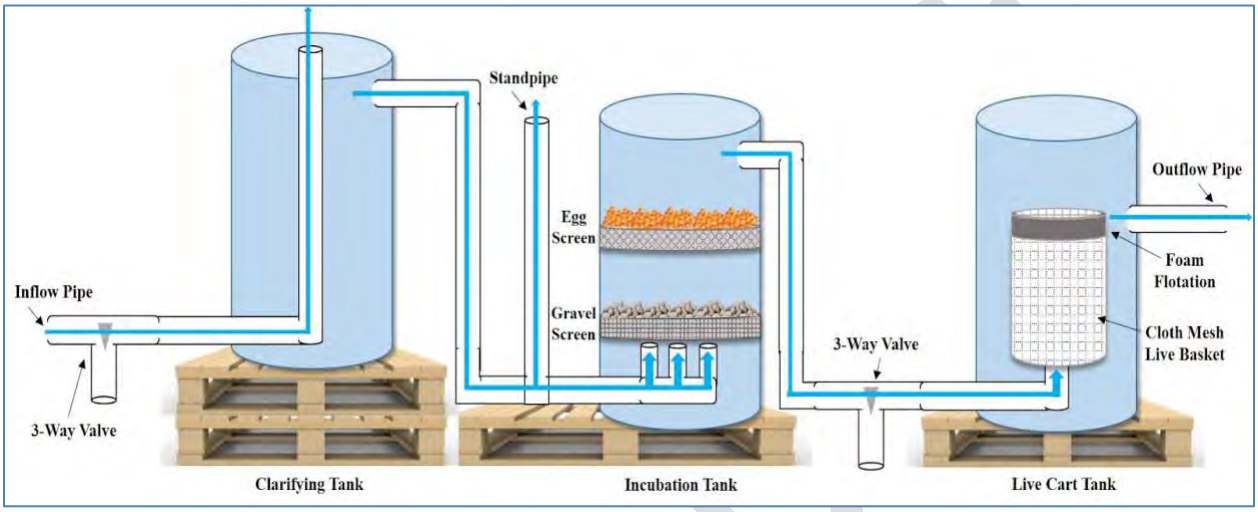

Figure 4-1. Schematic of RSI system (courtesy of NMFS).

This technology allows for hatchery-produced fish to be stocked into remote areas, and to be exposed to their natural environment at the earliest possible life stage, thus reducing the potential for hatchery domestication and encouraging more life history strategies to be expressed. Additionally, this technology provides the opportunity for imprinting to occur within the targeted release stream at both the embryonic and presmolt life stage which would increase the likelihood of return by the adult salmon (Dittman and Quinn 1996).

This activity would be in collaboration with TRH and would be synchronized with the salmon carcass placement activities described above with the aim of providing streams with nutrients for at least one season prior to and during each season of egg supplementation (for a minimum of three consecutive seasons) to support juvenile salmonid rearing.

It is worth noting that coho supplementation is included in the NMFS BiOp for the 4d Limit for the Trinity River Coho Salmon Hatchery Genetic Management Plan (HGMP, NMFS 2020b) as Reasonable and Prudent Measure (RPM) 3a:

> *Starting in March 2021, Reclamation shall provide all eggs, fry, juvenile, or adult coho salmon in excess of those needed to produce smolts released at TRH to an entity with a supplementation plan approved by NMFS, for supplementation of tributaries (in any of the three Trinity River coho salmon population units) for conservation of the populations. Reclamation shall report the number of eggs or fish provided, entity the eggs or fish were provided to, and location(s) fish or eggs were used for supplementation.*

Specific to coho supplementation, the following streams have been prioritized: Grass Valley; Indian; Weaver; Rush; and Deadwood creeks. However, this activity category would include additional streams throughout the Project activity area and would use RSIs to supplement juvenile coho, Chinook, and steelhead. At the time of the preparation of this

document, the populations of Chinook and steelhead found within the Trinity River watershed were not ESA-listed. If these populations become ESA-listed, additional ESA coverage for supplementation using these fish would be required.

4.2.2 Upslope Habitat Restoration

4.2.2.1 *Bioengineered Bank Stabilization*

Bioengineered bank stabilization techniques are suitable for many low-order, low-gradient stream segments where streambanks are either actively eroding or at threat of eroding in locations where site conditions do not allow for natural channel meander. Streambank erosion may be a result of either scour related to streamflows or stormwater discharges from overland flows. Bioengineered bank stabilization may be incorporated into the design for a site where other restoration activity categories are proposed (e.g., culvert removal).

Bioengineered bank stabilization techniques may include the following activities individually or as in combination: bank reshaping; slope grading; coir log installation; deformable soil reinforcement (e.g., soil lifts, geogrids) using biodegradable materials; revetment consisting of trees, native plant material installation (herbaceous plants, shrubs, trees), or willow walls; willow siltation baffles; brush mattresses; brush check dams; and brush bundles. Bioengineered project types may also include the placement of large wood in combination with buried riprap, overlain with soil and native plantings and protected by livestock exclusion fencing.

Bioengineered bank stabilization techniques use a minimal amount of hard materials (e.g., rock) and are not intended to include traditional hard engineering techniques. Utilize native materials (logs, cobbles, boulders, etc.) whenever possible, particularly in steeper headwater streams where native materials are readily available. The use of boulders should be limited in scope and quantity, to the minimum necessary to stabilize the slope and protect it from expected stream or overland flows during storms. Boulder structures must be part of a larger restoration design and must include a riparian revegetation element. Guidelines for streambank stabilization techniques are described in Part VII, Project Implementation, of the California Salmonid Stream Habitat Restoration Manual (CDFW 2010: Vol. I and II) and Part XI, Riparian Habitat Restoration, contains examples of bioengineering techniques.

These activities would reduce input of fine sediment, enhance aquatic and riparian habitat, and improve water quality by integrating vegetation into bank protection measures. To improve aquatic and riparian habitats and reduce soil erosion and sedimentation of streams and wetlands, bioengineered bank stabilization integrates living woody and herbaceous materials with earthwork and recontouring of streambanks. Both organic and inorganic materials are put into place to stabilize and improve the structure of the soil where site constraints limit opportunities for natural channel meander. Bank stabilization measures that use bioengineering techniques minimize many of the impacts on aquatic resources commonly caused by traditional or conventional engineered bank structures. In addition, bioengineered bank stabilization techniques improve aquatic and riparian habitat by increasing stream shade to lower stream temperatures through revegetation, production of invertebrates, future recruitment of large wood into streams, and bank stability.

The proposed bioengineered bank stabilization techniques may require the use of handtools (when possible) and heavy equipment (e.g., self-propelled logging yarders, excavators, backhoes, or dump trucks).

4.2.2.2 Aquatic, Wetland, Meadow, Riparian, and Upslope Habitat Enhancement

This proposed activity category would occur in aquatic, wetland, meadow, riparian, and upslope areas within the watershed where the vegetative community has been disturbed by past land practices, wildfire, drought, introduction of

nonnative species, or construction activities and where habitat functions (e.g., water quality, biodiversity, etc.) are not properly functioning.

Aquatic, wetland, meadow, riparian, and upslope habitat enhancement may involve removing nonnative terrestrial and aquatic invasive plant species by manual and mechanical methods (i.e., no herbicides); removal of legacy ditches (from prior activities such as mining); removing trees where necessary for watershed restoration (and salvaging for instream placement when appropriate); and revegetating areas with native herbaceous plants (including sedges, rushes, grasses, and forbs), shrubs, and trees. In addition, this activity category includes gathering and installing willow cuttings, stakes, mats, and fences; temporary irrigation; coordination with upstream operators to control dam releases or instream flow levels to provide water during plant establishment; livestock fencing to protect, restore, or establish aquatic or riparian habitat. There are a number of manual and mechanical non-native invasive plant removal methods including prescribed burning, mowing, prescribed grazing, etc. Aquatic, wetland, meadow, riparian, and upslope habitat enhancement may be implemented in correspondence to any of the other restoration activity categories.

These activities are designed to create or improve ecological functions and create or restore the functions of wetlands, meadows, streams, and riparian areas, including upslope watershed sites that could contribute sediment to streams or disrupt floodplain and riparian functions. These actions are designed to restore species composition, structural diversity, and resilience to disturbances. Riparian vegetation helps to maintain shade and promote large wood recruitment. Where existing vegetation exceeds riparian needs and is deemed hazardous (i.e., fuel, dead or dying vegetation near road) or adversely impacts desired conditions (such as conifers encroachment on hardwoods or riparian vegetation), selective vegetation removal may occur. Removed vegetation would be retained primarily for aquatic habitat support (i.e., large wood structures), erosion control, and soil amendment (e.g., mulching).

Revegetation with native plants would mimic the area's naturally occurring wetland, meadow, riparian, or aquatic habitats and use seed or plant stock from the local watershed (as available). Revegetation may occur as a stand-alone project and/or part of larger watershed restoration activities to reduce upslope erosion from past land management practices, including timber harvest, mining, road construction, and development. Recurring wildfire also contributes to fine sediment and erosion reaching downslope aquatic habitats. Areas affected by fire would be targeted for revegetation.

Removing nonnative terrestrial and aquatic invasive species and/or revegetating with native plants improves aquatic, riparian, and wetland habitat for fish and wildlife in a variety of ways. These proposed restoration projects are designed to improve or provide composition, structure, and abundance of native biological communities important for bank stability and species habitat; stream shading, riparian canopy, and understory establishment and diversity; input of large wood and other organic material into streams; nesting and roosting habitat; reduction of soil erosion; water quality improvement; and improved soil health.

Manual and mechanical methods can be used independently or in combination to remove invasive species from aquatic and riparian areas. Sites with a variety of invasive species may receive several different types of treatments. Herbicides would not be applied as part of these watershed restoration efforts.

This project type also includes removal and/or management of nonnative wildlife species (e.g., bullfrogs), as long as the activity is associated with a site-specific restoration project and proper removal protocols are followed.

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4.2.3 Road Decommissioning, Maintenance, and Rehabilitation Activities

The Proposed Action includes upslope actions related to road maintenance, road rehabilitation, and road decommissioning on private and public lands within the Trinity River basin, for the reduction of sediment into the mainstem and tributaries of the Trinity River. The USFS has worked with the State Water Board to help identify these road-related activities. These activities are proposed for locations where road-cuts, fill-slopes along roads, and infrastructure (much of which is aging) are not functioning properly as well as locations where roadside drainage is inadequate as shown by rilled or rutted roads and gullied roadside ditches. These conditions have resulted in fine sedimentation, stream channel erosion, and other road-related conditions that are degrading downslope aquatic habitat. In addition, this activity category would address locations along roadways with undersized, deteriorated, misaligned, or otherwise dysfunctional culverts or bridges that warrant replacement. By improving how these roads function, fine sediment supply to the Trinity River basin could decrease over time, improving water quality, fish passage, and instream habitat for salmonids and increasing the production potential of the watershed, which could ultimately benefit a range of ecological functions within the Trinity River Basin.

4.2.3.1 Road maintenance

Road maintenance activities may include: grading; rocking; and clearing, repairing, or adding drainage structures on existing roads to spread out overland flows and minimize erosion and sedimentation improving downslope hydrologic function. Road-cut, fill-slope, fine sedimentation, and stream channel erosion from aging infrastructures and practices have resulted in poorly maintained roads and are contributing to deterioration of aquatic habitats.

4.2.3.2 Road rehabilitation

Road rehabilitation activities would include out-sloping (shaping the roadway surface to drain toward the fill slope or outside edge of the hillside), roadway rocking, installing rolling dips, the addition of water energy dissipaters, the addition of new drainage structures, addressing subsurface water (e.g., underdrains, French drains, French mattresses, permeable fills, etc.), culvert and bridge replacement, and the installation of rock buttresses to stabilize slopes (following slope failures) in an effort to improve drainage and minimize erosion and sedimentation. Constructing or installing a stream crossing, culvert, or bridge may include site excavation, formation, and pouring of a concrete foundation and walls/abutments; installation of metal piles using impact pile driving techniques (See Section 5.5.2.3.10) for permanent and/or temporary bridge structures; installation of the crossing structure; and placement of bioengineered or rock slope protection (RSP) to protect abutments, piers, and walls. New culverts or bridges would be designed to accommodate a 100-year storm.

4.2.3.3 Road decommissioning

Road decommissioning activities would entail removing stream-crossing structures, culverts, fords, and other types of stream crossings (e.g., “Humboldt crossings”). Depending on slope, soil type, and other factors, these activities could also include reshaping, ripping (the mechanical process to decompact soils), removing berms, seeding, and mulching the decommissioned road surface. If the decommissioned road surface is sloped at all, outsloping would need to occur to the extent feasible so that it self-drains. If the decommissioned road surface drains onto unstable highly erodible slopes, it is appropriate to leave a berm in this area to prevent further erosion of soils.

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4.2.4 Site-Specific Project Development and Design

The Proposed Action would include the application of environmental commitments including a combination of general protection measures (GPMs), design guidelines, and conservation measures (CMs) to site-specific project designs (Appendix B). These environmental commitments were developed based on existing programmatic ESA Section 7 consultations, programmatic CEQA coverage, and other guidance documents and regulatory requirements as discussed further in Appendix B. These environmental commitments were primarily developed based on measures required by the following ESA consultations:

- NMFS 2020 Biological Opinion (BiOp) for the Trinity River Restoration Program's Mechanical Channel Rehabilitation, Sediment Management, Watershed Restoration, and Monitoring Actions in Trinity County, California (2020 TRRP BiOp, WCRO-2019-03827)
- USFWS 2025 Programmatic BiOp for the California Statewide Programmatic Restoration Effort (2025 USFWS Statewide Restoration BiOp, FWS Reference: 2022-0005149-S7).

Each site-specific restoration project would be evaluated by an interdisciplinary team led by the federal agencies, to ensure all environmental commitments necessary to avoid significant impacts would be fully incorporated into the site-specific project designs. It is also worth noting that during the site-specific project planning process, cultural review compliant with applicable laws (e.g., Section 106, Executive Order 13007, etc.) would be required. The implementation plan in Appendix A describes the process that site-specific projects would go through to ensure that each project fits into the Proposed Action described in this Draft EA, incorporates applicable environmental commitments into restoration designs, and enables the lead federal agency to make a streamlined NEPA decision. Each federal agency's process for site-specific analysis is described in Appendix A.

4.2.4.1 Limits on Proposed Activities Frequency and Location

The 2020 TRRP BiOp limits instream watershed restoration projects covered by the BiOp annually to:

- 2 fish passage/dam removal projects;
- 8 channel/floodplain rehabilitation projects (4 mainstem and 4 tributary);
- 2 in-stream habitat enhancement projects;
- 3 streambank stabilization projects; and
- 4 road-related projects with in-water activities (i.e. road decommissioning with culvert removal).

TRRP is in the process of reinitiating consultation with NMFS to include all project activity categories described in the Proposed Action that were not previously analyzed in the 2020 TRRP BiOp. Project limitations will also be reviewed during the reinitiated consultation and are anticipated to change. During meetings with NMFS in regard to the ESA Section 7 consultation for this Project, NMFS recommended setting Project limits to control sedimentation and turbidity that would adversely affect ESA-listed salmonids. Preliminarily, it is being proposed that in addition to utilizing GPMs and CMs, such as erosion and sediment control BMPs, effects of turbidity would be controlled by limiting the number of floodplain reconnection projects that are over 100 acres as well as small dam removals, to one site-specific restoration project (of these specific project types) per HUC-12 watershed, per year. However, the latest applicable BiOp should be referred to, to determine current Project limits during site-specific project implementation.

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Project limits would provide spatial and temporal flexibility during site-specific restoration project development and watershed planning efforts. Implementors within the watershed would continue to collaborate with the assistance of TRRP, USFS, and BLM to ensure significant regional effects would not occur.

4.2.5 Typical Construction Activities and Methods

The construction activities would be specific to each type of restoration activity, the location of the activity, and numerous other variables related to the unique characteristics of a site-specific project. The magnitude and characteristics of construction activities would vary, but construction activities for restoration projects would share many common features. The following is a general discussion of construction activities that can be anticipated to take place during implementation of the site-specific projects.

4.2.5.1 Construction Timing

The duration of construction activities for restoration projects can be as short as a few days for minor site-specific projects; or as long as several years, or only during certain months of the year, for major site-specific projects. Major construction activities are typically concentrated during the dry season (generally May through October), with some mobilization work above the ordinary high water mark (OHWM) occurring earlier in the year. Work windows may be further limited to avoid and/or minimize impacts on special-status species. Construction usually occurs only during daylight hours; however, in rare cases, continuous daytime and nighttime work may be necessary for some activities, expedited projects, and projects where the construction sequencing schedule is nearing the wet season. GPMs and CMs specific to nighttime work would be implemented to minimize effects.

Site-specific project planning applying the environmental commitments in Appendix B would address the timing of site-specific projects as it relates to the following areas:

- Surveys/Progression of Work: Identify and plan to allow for surveys that may need to occur at certain times of year, or that may take multiple years (see vegetation and wildlife conservation measures in Appendix B).
- Sediment: If a construction phase extends into the following year's construction season, the site will be secured and "winterized" before the start of the flood season (typically November 15) to avoid sediment entering the stream (see geology, water quality, and hydrology conservation measures in Appendix B).
- Flows: Restoration, construction, fish relocation, and dewatering activities proposed within any wetted or flowing channel of tributaries to the Trinity River shall be restricted to the dry season (June 15 to October 15 for tributaries and July 15 to October 15 for the mainstem), before listed coho salmon begin spawning in tributaries. Work in intermittent streams may continue beyond November 1, as long as weather conditions permit, and the stream channel remains dry. Construction and restoration work within intermittent stream channels must be completed in the dry (see fishery resources conservation measures in Appendix B).
- Seasonal Restrictions (SR): Wildlife SRs may apply to all or part of a site-specific project based on location and surveys completed (see wildlife CMs in Appendix B).
- Timing and Project Location: Determine through federal agency review if the timing of the project at a specific location may impact cultural practices, recreational uses or other resource areas. Adjust site-specific project areas accordingly to avoid impacts (see cultural, land use, and recreation conservation measures in Appendix B).

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4.2.5.2 Heavy Equipment Use

Heavy equipment would be commensurate with the project and operated in a manner that minimizes adverse effects to the environment (e.g., minimally-sized, low-pressure tires, minimal sharp turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils). Depending on the type and size of the site-specific project, the following are some of the types of equipment that may be used: excavators, scrapers, bulldozers, graders, dredgers, crawlers/tractors, chippers/grinders, compactors (sheepsfoot or tramping-foot rollers, roller compactors, smooth drum compactors), water trucks, haul trucks, dump trucks, front-end loaders, truck-mounted cranes, fueling trucks, pickup trucks, generators, backhoes, truck-mounted augers, hydroseeding trucks, and impact and vibratory pile drivers.

The environmental commitments for using heavy equipment include guidelines for working in or near streams, placement of and spill prevention at onsite refueling locations, road-related activities including water drafting, and considerations for noise, spreading invasive species, etc. (see Appendix B for further details).

4.2.5.3 Mobilization

Construction activities for site-specific projects would begin with a mobilization phase. This phase may involve temporary fencing and gate installation, establishing resource preservation areas, installing temporary construction offices, setting up staging areas, and transporting equipment and materials to work sites.

4.2.5.4 Staging Areas

One or more staging areas would be typically required for storage and distribution of construction materials and equipment. Staging areas would typically include previously disturbed areas to minimize effects to resources. Temporary easements may need to be obtained from landowners. All fuel and chemical storage, servicing, and refueling will be done in an upland staging area or other suitable location (e.g., barges) with secondary containment to prevent spills from traveling to surface water or drains. Site-specific project proponents will establish staging areas for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants in previously disturbed upland areas whenever possible, away from areas suitable for ESA-listed species, and in coordination with resource agencies. Staging areas will have a stabilized entrance and exit and will be at least 100 feet from waterbodies, unless site-specific circumstances do not provide such a setback; in such cases, the maximum setback possible will be used. Staging areas would usually be established in or near active construction areas and may be relocated as construction progresses, especially for long linear restoration projects.

4.2.5.5 Erosion Control

Erosion control would be installed before, during, and after implementation of site-specific projects to ensure project-related sediment mobilization would not reach receiving waters. Erosion and sediment control methods and treatments would be selected to be consistent with the erosion type anticipated at a site. This is generally considered a two-step process, including the installation of short-term erosion control BMPs followed by the establishment of vegetation for long-term soil stability. Erosion control may include grading, seeding, mulching, application of appropriate rolled erosion-control products, and soil bioengineering (brush layers, stakes, etc.). Typically, exposed soils are most vulnerable to erosion during the first rainy season following construction and require short-term erosion control. Short-term erosion control involves placement of erosion control products that will not trap wildlife, to provide immediate stabilization to underlying soil and reduce erosion until new vegetation can grow into the site. Over time, erosion control materials associated with temporary disturbance would either decompose or be manually removed.

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4.2.5.6 Access and Haul Routes

Access and haul routes would be designated to haul materials to and from borrow sites, staging areas, and construction sites. Access routes would also be used for construction worker commuting. These routes would typically consist of existing public roads near construction sites. New off-road routes may also be constructed but would be restored after project completion as described in "Site Restoration and Demobilization" below unless they are needed to achieve long term restoration objectives. Ingress and egress to restoration project sites would depend on the complexity and scope of the site-specific project, and the characteristics of the work site.

4.2.5.7 Site Preparation

Site preparation would typically involve clearing the ground of structures, woody vegetation, nonnative invasive plant species, and any debris (e.g., trash). The clearing operation may be followed by grubbing operations to remove additional trees and other vegetation, stumps, root balls, and below ground infrastructure. In addition to clearing, site preparation would entail salvage and preservation of desirable native plants and materials (e.g., native topsoil, willow clumps, etc.). Projects would be generally designed and implemented to achieve no net loss in wetlands and riparian vegetation and it should be noted that any wooded areas with old growth characteristics, where present, would be preserved. In addition, earthen material from the ground may be stripped as part of site preparation. Site preparation may also include installation of a temporary water diversion or dewatering to minimize impacts to sensitive species.

4.2.5.8 Preparation of Borrow Sites

Borrow sites would be prepared in a fashion similar to that used for construction sites. After structures and woody vegetation are cleared from the surface, stumps, root balls, and infrastructure are removed from below ground. Typically, the borrow area would then be disked to chop any remaining surface vegetation and mix it with the near-surface organic soils. Next, the top layer of earthen material is stripped from the borrow excavation area, and this soil is stockpiled at the borrow site. Borrow is typically respread on the surface after the site has been graded, to support reclamation. Excavation for borrow sites typically range in depth, depending on volume requirements, the quality and extent of material available, and the method of reclaiming the borrow site. Non-commercial borrow sites are restored and regraded using available topsoil, preparing the site for future uses such as farming, restoration, or other appropriate land use.

4.2.5.9 Site Restoration and Demobilization

Upon site-specific project completion, rehabilitation would take place at all disturbed areas in a manner that results in similar or better than pre-work conditions through removal of project-related waste, including flagging, and spreading of stockpiled materials (e.g., soil, LW, trees). Seeding and/or planting with native seed mixes or plants as approved by the project botanist would occur (Appendix B).

When construction activities are complete, any material stripped from the soil surface during site preparation would be placed on any temporarily disturbed areas where topsoil was removed. Temporarily disturbed areas (as appropriate) would be decompacted and then stabilized through revegetation with appropriate native herbaceous seed mixes or plantings of native trees and shrubs, as appropriate to the site and restoration goals.

Temporarily disturbed areas are defined as areas that can be recovered or restored to pre-project conditions so species recruitment is maintained. Irrigation, if necessary to promote establishment of planted woody species would be installed at this time. Erosion control materials would also be placed in areas where steep slopes are at risk of erosion

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during winter rain events; such materials may include weed free straw, biodegradable mesh netting, rock support, and/or bark mulch (Appendix B).

4.2.5.10 Disposal of Excess Materials

Excess material would include construction-generated debris, such as concrete and demolition waste; excess organic materials, such as woody vegetation, grasses, and roots from borrow sites and work sites; excavated material that do not meet levee embankment criteria; and soil not used or not suitable for the earthen structures under construction. Organic materials would typically be used to restore borrow sites and disturbed areas following site-specific project completion.

Debris generated during clearing and grubbing operations would be disposed of via various means, depending on the type of material, local conditions, land ownership, and approval by federal agencies. Excess construction waste materials may be hauled off site to landfills (e.g., building demolition waste) or delivered to recycling facilities (e.g., concrete). Excess organic materials (e.g., organic soils, vegetation, and excavated material) may be sold for commercial use[5] (e.g., to cogeneration facilities), or salvaged to be used during site restoration activities or at upland reclaimed borrow sites (Appendix B). No excess materials generated during site preparation or other project activities would be disposed of by open burning with the exception of burning of invasive plant material.

4.2.5.11 Maintenance and Monitoring Activities to Support Revegetation

Maintenance and monitoring activities necessary to support successful establishment may include temporary installation and use of irrigation systems and equipment; mechanical weed control; replanting and reseeding; fencing and signage; adjustments to grading or soils composition; and installation and operation of monitoring equipment, including but not limited to groundwater wells, flow gauges, depth gauges, cameras, unmanned aerial vehicles, and stakes.

Activities may also include removal of temporary irrigation systems and equipment, temporary erosion control features, and temporary monitoring equipment once plants have become established, soils have been stabilized, and/or monitoring is complete, as appropriate. Temporary installations such as browse protection (e.g., protection from grazing animals such as deer), fencing, and signage may also be removed post-construction, as appropriate. The length of time these activities would continue is dependent on the circumstances of site-specific projects and cannot be predicted at this time.

4.2.6 Potential Site-Specific Projects

There are a number of site-specific projects planned that would seek NEPA coverage under this EA. Table 4-2 below provides a preliminary list of these watershed restoration projects identified by Reclamation, USFS, and BLM. In addition to the site-specific projects listed below, there are more than 80 culvert repair and replacement site-specific projects that are being tracked by USFS and others in order to address sedimentation issues across the Project activity area.

[5] It is worth noting that material removed from public land may not be sold for commercial use.

Table 4-2. Potential future projects within the Trinity River subbasin.

Activity Category	HUC 10 Watershed[1]	Lead Federal Agency	Project Name/Subtype
Instream Habitat Restoration	Big French Creek-Trinity River	TRRP	Evans Bar Channel Rehabilitation
		TRRP	Sky Ranch Channel Rehabilitation
		USFS	Big Ranch BDAs
			Dutch Creek Large Wood Placement
			Manzanita Creek Barrier (Dam) Removal – Fish Passage Improvement
	Lower Hayfork Creek	TRRP	Salt Creek Floodplain Restoration
		USFS	Hayfork Creek BDAs
			SF Headwaters BDAs
			Hayfork Creek Stage Zero
			Upper Tule Creek Culvert Replacement – Fish Passage Improvement
			West Tule Creek Culvert Replacement – Fish Passage Improvement
			Olsen Creek Culvert Replacement – Fish Passage Improvement
			Upper Corral Creek Culvert Replacement – Fish Passage Improvement
	Upper Hayfork Creek	USFS	Hayfork Creek BDAs
			SF Headwaters BDAs
			Hayfork Creek Stage Zero
			Upper Big Creek Culvert Replacement – Fish Passage Improvement
			Lower Big Creek Culvert Replacement – Fish Passage Improvement
	Lower South Fork Trinity River	USFS	SF Headwaters BDAs
			Big Ranch BDAs
			Hyampom Creek Culvert Replacement – Fish Passage Improvement
	Middle South Fork Trinity River	USFS	SF Headwaters BDAs
			Silver Creek Culvert Replacement – Fish Passage Improvement
	Upper South Fork Trinity River	USFS	SF Headwaters BDAs
			White Rock Guard Station BDAs
	East Fork Trinity River	USFS	Upper Trinity BDAs
	Swift Creek-Trinity River	USFS	Upper Trinity BDAs
	Tangle Blue Creek – Trinity River	USFS	Upper Trinity BDAs
	Browns Creek	USFS	SF Headwaters BDAs
	Canyon Creek	USFS	Canyon Creek Large Wood Placement
	Coffee Creek	USFS	Upper Trinity BDAs
	Weaver Creek – Trinity River	TRRP	Indian Creek Fish Passage Barrier Removal
			Little Browns Creek – Remote Site Incubation
			East Weaver Creek – Remote Site Incubation
			Grass Valley Creek – Remote Site Incubation
			Indian Creek – Remote Site Incubation

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Activity Category	HUC 10 Watershed[1]	Lead Federal Agency	Project Name/Subtype
			Deadwood Creek – Remote Site Incubation
			Rush Creek – Remote Site Incubation
			Canyon Creek – Remote Site Incubation
			Clear Gulch – Remote Site Incubation
			Carcass Supplementation
			Deadwood Creek BDAs
		USFS	Weaver Basin BDAs
			Little Browns Creek BDAs
			Rush Creek BDAs
			Little Browns Creek Large Wood Placement
			Rush Creek Large Wood Placement
			Deadwood Creek Large Wood Placement
			West Weaver Creek Stage Zero
			Sydney Gulch Restoration
			Deadwood Creek Gravel Augmentation
			West Weaver Creek Diversion Upgrades – Weaverville CSD
			Yurok RSI Project
		BLM	Panwauket Gulch
Upslope Habitat Restoration	Big French Creek – Trinity River	USFS	Junction City Noxious Weed Removal
	Lower South Fork Trinity River	USFS	Hamptom Reach of SF Trinity Riverbank Stabilization
	North Fork Trinity River	USFS	Grizzly Creek Slide Remediation (Trinity Alps Wilderness)
	Weaver Creek	TRRP	Deadwood Carr Fire Sediment Reduction Phase II
		USFS	Weaver Basin Noxious Weed Removal
Road Maintenance, Rehabilitation, and Decommissioning Activities	Big French Creek – Trinity River	USFS	Sailor Bar – Trinity River Access Improvement
			Private Lands Acquisition and Dutch Creek Road Decommissioning
	Weaver Creek – Trinity River	USFS	East Weaver Creek Sediment Source Reduction
			Private Lands Acquisition and Dutch Creek Road Decommissioning

[1]Some site-specific projects would occur in more than one HUC 10 watershed.

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5 Affected Environment and Environmental Consequences

5.1 Introduction

This chapter describes the affected environment within the Project activity area in the Trinity River basin and analyzes the potential environmental effects by resource associated with implementing the No Action and Proposed Action alternatives. The effects analysis for each resource topic is based on the application of the best available science and uses existing data to determine potential effects of each alternative. Each resource topic section provides a summary of Project-specific analyses or reports prepared by resource specialists at the request of the cooperating federal agencies. These documents are incorporated into the Draft EA by reference and include the 2020 TRRP BiOp; 2025 USFWS Statewide Restoration BiOp; Water Quality and Hydrology Technical Report (Appendix I); Vegetation and Wetlands Technical Report (Appendix J); Fisheries Technical Report (Fisheries BA/BE, Appendix K); Wildlife Technical Report (Wildlife BA/BE, Appendix L); and Climate Technical Report (Appendix M). The intent of these technical analyses is to present a thorough analysis of the environmental effects of the Proposed Action and to discuss how unavoidable impacts would be minimized and mitigated to the extent possible, without the need to repeat this detailed analysis elsewhere.

Reclamation determined that the Proposed Action does not have the potential to cause adverse effects to the resource topics listed in Table 5-1.

Table 5-1. Resource Topics Eliminated from Further Consideration in This EA.

Resource Topic	Comments
Agricultural and Forestry Resources	Neither the Proposed Action or the No Action alternative occur in agriculture or farmland. In addition, neither alternative would result in a more than negligible change to forest conditions. Therefore, there would be no forestry or agricultural-related impacts.
Air Quality	Neither the Proposed Action nor the No Action alternative would involve activities that would result in a discernable increase in emissions that could result in a permanent or long-term increase in air pollutants and there would be no violation of air quality standards.
Cultural Resources	The No Action alternative would have no effect on cultural resources. Site-specific restoration projects associated with the Proposed Action may affect cultural resources and would require their own National Historic Preservation Act (NHPA) Section 106 reviews. Consequently, details of the Proposed Action's effects on properties listed, or eligible for listing, on the National Register of Historic Places is not known at this time. Cultural resources are discussed broadly across the Project activity area below.
Hazardous Materials	Neither the Proposed Action nor the No Action alternative would result in any activities that would include hazardous materials. The Proposed Action does not involve hazardous materials outside of petroleum products used for construction equipment. Water quality BMPs (Appendix B) for equipment use near waterways would be implemented during construction to avoid any spills or chemical contamination. Therefore, no hazardous materials-related effects associated with the Proposed Action are anticipated.
Indian Trust Assets	The No Action alternative would have no effect on Indian Trust Assets (ITAs). Site-specific restoration projects associated with the Proposed Action may affect ITAs and would require site-specific reviews by USFS, BLM, and/or Reclamation. Consequently, details of the Proposed Action's effects to ITAs is not known at this time and is not discussed further in the EA.

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Resource Topic	Comments
Indian Sacred Sites	The No Action alternative would have no effect on Indian Sacred Sites. Site-specific restoration projects associated with the Proposed Action may affect ceremonial use of Indian sacred sites on federal lands by Indian religious practitioners or adversely affect the physical integrity of such sacred sites and would require site-specific reviews by USFS, BLM, and/or Reclamation. Consequently, details of the Proposed Action's effects on Indian Sacred Sites are not known at this time and is not discussed further in the EA.
Land Use	The Proposed Action and the No Action alternatives are consistent with federal agency resource management plans and with both the Humboldt County and Trinity County general plans (Humboldt County California 2017; and Trinity County California 1988). Neither alternative would result in changes to land use or alter access. Therefore, there would be no land-use-related impacts.
Socioeconomics, Population, and Housing	Neither the Proposed Action nor the No Action alternative would affect socioeconomics, populations, or population growth and would not displace existing people or housing.
Visual Resources/ Aesthetics	Neither the Proposed Action nor the No Action alternative would involve activities that would result in long-term changes to visual resources or aesthetics. The Proposed Action would use native materials designed to blend into the surrounding environment thereby, not adversely affecting viewsheds in the Trinity River basin.

Effects to Wild and Scenic Rivers within the Project activity area are discussed in Appendix F. In addition to the effects analysis provided below, the Implementation Plan included in Appendix A provides details on how effects would be analyzed for site-specific projects. Each site-specific project would provide additional details on sensitive species information and any applicable conservation measures that would be incorporated into site-specific project designs.

5.1.1 Environmental Setting

The Trinity River originates in the rugged Salmon-Trinity Mountains of northern California in the northeast corner of Trinity County. The entire Trinity River watershed is approximately 2,861 square miles in size and is the largest Klamath River tributary. From Lewiston Dam, the Trinity River flows westward for 112 miles until it enters the Klamath River near the town of Weitchpec on the Yurok Reservation. The Trinity River passes through Trinity and Humboldt counties and the Hoopa Valley (Hoopa Tribe) and Yurok Indian Reservations. The Klamath River flows northwesterly for approximately 40 miles from its confluence with the Trinity River before entering the Pacific Ocean.

5.1.2 Methods

Key considerations for the analysis of potential Project effects to environmental resources include Project activity area characteristics, the scope and nature of Project activities, and the potential effects associated with those activities. This analysis looks at short- and long-term effects that could affect any environmental resources within the Project activity area.

As previously mentioned, individual restoration actions would take place in and along the mainstem and tributaries of the Trinity River (both above and below the Lewiston and Trinity dams) on both private and public lands. Key Watersheds within the restoration activity area include North Fork Trinity River, South Fork Trinity River, Canyon Creek, and New River. As mentioned previously, restoration efforts would be prioritized within these Key Watersheds. Through coordination between TRRP, BLM, and USFS, it was determined that an effects analysis performed at the HUC 10

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watershed scale would be sufficient to adequately characterize Project effects. Therefore, 16 HUC 10 watersheds are analyzed for the effects analysis. See Table 1-1 for HUC 10 names and acreages and Figure 1-1 for an overview map.

For each environmental resource analyzed for the Project, the intensity of effects is generally described by the terms below. However, if more specificity is required, the intensity of effects may be further defined in the environmental consequences section for that resource.

- Negligible/No Effect: Effects would not be measurable, with no perceptible consequences.
- Minor: Effects are detectable but are small and localized.
- Moderate: Effects are detectable, can be measured, and cover a larger area (e.g., a tributary stream).
- Major: Effects are easily measured, regional, and at a larger-scale.

Effect analyses include consideration of environmental commitments (Appendix B) to lessen effects. Compensatory mitigation is not proposed for the Project since the overall intent of the Project is to restore and enhance ecosystem function to benefit fish and wildlife species. Compensatory mitigation means the restoration, establishment, enhancement, and in certain circumstances, preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts that remain after all appropriate and practicable avoidance and minimization has been achieved (33 CFR 332.2).

5.2 Water Quality and Hydrology

5.2.1 Affected Environment

5.2.1.1 Water Quality

Every six years the Regional Water Board evaluates water quality information and identifies waterbodies that do not meet water quality standards and are not supporting their beneficial uses, including municipal and domestic water supply, supporting high-quality for fish, and recreation. The Trinity River basin has been listed by the Regional Water Board as impaired for several parameters as summarized in Table 5-2 below.

Table 5-2. Impaired waterbodies within the Trinity River basin.

Waterbody Name	Listing Extent	Parameter
Lower Trinity River HA[1]	Entire waterbody except: (1) the New River and its tributaries, (2) Big French Creek and its tributaries, (3) the North Fork Trinity River and its tributaries, including the East Fork North Fork Trinity River and its tributaries, and (4) Manzanita Creek and its tributaries.	Sedimentation/ Siltation
Middle Trinity River HA	Entire waterbody	Sedimentation/Siltation
South Fork Trinity HA	Entire waterbody	Sedimentation/Siltation Temperature
Trinity Lake (was Claire Engle Lake)	Entire waterbody	Mercury
Upper Trinity River HA	Entire waterbody except the Stuart Fork and its tributaries	Sedimentation/ Siltation
Upper Trinity HA, Trinity River, East Fork Trinity River	Entire waterbody	Mercury Sedimentation/Siltation

1. HA: Hydrologic Area is a major subdivision of a hydrologic unit utilized by the Regional Water Board in analyzing water quality within waterbodies. Best described as major tributaries of a river, large valley groundwater basin, or a component of a stream or desert basin group.

The Project has potential to affect sedimentation and temperature, and therefore, these parameters were the focus of the water quality effects analysis (Appendix I). The Trinity River was added to the Environmental Protection Agency's (EPA's) list of impaired rivers in 1992, under the provisions of Section 303(d) of the Clean Water Act, in response to the State of California's determination that the river's water quality standards were not being met due to excessive sediment. In 1998, the EPA established a Total Maximum Daily Load (TMDL; EPA 1998) for sediment in the South Fork Trinity River and Hayfork Creek. In 2001, another sediment TMDL (EPA 2001) was issued for the Trinity River.

Since the construction of the TRD, discharges from Lewiston Dam have had a significant effect on water temperatures in the Trinity River downstream. Reservoir releases from Lewiston Dam have altered the natural temperature regime, making the river warmer in the winter and colder in the summer than under pre-dam conditions. Depending on the water year type and time of year, this effect diminishes to varying degrees with distance from Lewiston Dam.

Table 5-3. Basin Plan and Water Rights Order (WRO) 90-05 Temperature Objectives.

Location Measured	Dates	Target or Range
Douglas City	July 1 – September 14	≤60°F (15.5°C)
Douglas City	September 15 – 30	≤56°F (13.3°C)
North Fork Trinity River	October 1 – December 31	≤56°F (13.3°C)

Reclamation has worked to meet water temperature objectives and targets for protecting adult salmonids upstream of the North Fork Trinity River (adult holding targets) and out-migrating juvenile salmonids throughout the mainstem river, as measured at Weitchpec (outmigration targets), since the inception of TRRP in 2000. The adult holding temperature targets (Table 5-3) are implemented as part of the Basin Plan and WRO 90-05 and compliance is monitored by the Regional Water Board.

5.2.1.2 Hydrology

After the establishment of the TRD, flow regulation on the Trinity River eliminated nearly all high flows adequate to form and maintain the alluvial river, and reduced scour by winter floods downstream of Lewiston (USFWS and HVT 1999). At times, 90% of the Trinity River flow was diverted to the Sacramento River basin, also contributing to the decline of Chinook salmon, coho salmon, and steelhead (NMFS 2014). Following the 2000 ROD, the TRRP has been mandated by Congress to restore anadromous fisheries to pre-dam levels and implement variable annual instream flows ("ROD releases") to improve habitat-forming flows within the Trinity River. ROD release volumes from Lewiston Dam are determined by water year type and the flows are released per the recommendations of the Trinity Management Council (TMC). In addition, today, flow diversion from the Trinity River basin to the Sacramento River basin has been adjusted so that about 50% of flows are kept in the Trinity River system downstream of the dams.

5.2.2 Environmental Consequences

5.2.2.1 No Action

If the No Action alternative was selected, it is likely that similar restoration projects that are likely to improve water quality and hydrology in the Trinity River basin would be implemented over time in the basin. However, these projects would take longer to plan and permit compared to the streamlined approach of the Proposed Action alternative. Therefore, improvements to water quality and hydrology as a result of the No Action would be realized more slowly within the Project activity area.

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5.2.2.2 Proposed Action

Project restoration activities that are part of the Proposed Action would have short-term adverse effects on water quality to varying degrees. However, many of the proposed activities are designed and would be implemented to restore more natural watershed processes and in the long-term, the implementation of restoration activities through the Trinity River basin would be expected to improve water quality conditions overall.

The Proposed Action would generally not affect the volume of water flowing through that stream reach; however, the "Water Conservation Project" activity category is intended to increase instream flow in the long-term, thereby improving aquatic habitat for fish and wildlife. Wherever there are stream diversions along tributary streams that continue to withdraw water when streamflows are at low-flow conditions, water conservation systems are warranted and would be proposed under this restoration activity category. Many of these water conservation projects, particularly in small tributaries higher in the subwatersheds, could increase instream flows considerably, depending on the size of stream from which water had originally been diverted. These efforts would have minor beneficial effects to hydrology throughout the Trinity River basin. Effects to hydrology in the Trinity River mainstem would likely be negligible since flow is managed with the Trinity and Lewiston dams.

Effects to water quality and hydrology are summarized in Table 5-4 below (See Appendix I for further details on effects to water quality and hydrology).

Table 5-4. Summary of Project effects to the water quality and hydrology of the Trinity River watershed.

Attributes	Effects Summary
Water Quality	▪ Ground-disturbing restoration activities would have minor short-term sedimentation and turbidity effects to varying degrees. The duration of most turbidity plumes would be limited to hours or days, though large projects may continue to produce turbidity (though gradually declining) for weeks. Pulses of turbidity would be anticipated as flow is returned to the dewatered or dry channels. Turbidity may also occur during the first storm event following restoration. ▪ Minor short-term increases in stream temperatures due to construction-related disturbance of riparian vegetation along stream channels and work area isolation/dewatering activities. ▪ Long-term minor beneficial effects to water quality because of an increase in sediment storage capacity within Project waterways; a decrease of sediment discharge and roadway runoff as a result of the maintenance and decommissioning of roads; and improvements to water temperatures with installation of instream habitat features, aquatic and riparian habitat enhancements, and improved floodplain connectivity.
Hydrology	▪ Long-term minor beneficial effects to instream flow in Trinity River tributaries as a result of water conservation activities.

5.3 Geology and Soils

5.3.1 Affected Environment

The geology of the Project activity area can be characterized as having a complex mix of ultramafic rocks of the Trinity Terrane (complex polygenetic assemblage of disrupted Cambrian, Ordivician, Silurian, and Devonian oceanic crusts). The Trinity Terrane is represented by serpentinized peridotite, gabbro, diabase, and minor volcanic rock. On the western side of the Project activity area, it has been intruded by Mesozoic granitic rocks. The granitic rocks are quartz diorite rocks to

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slightly more silicic rocks of quartz monazite. The eastern side of the Project activity area contains Bragdon metasedimentary shale and Copley greenstone.

The geomorphology of the Project activity area is characterized by a subsection of mountains with rounded summits, steep sides, and narrow canyons formed during the Trinity Alps glaciation period, as Quaternary glacial till and outwash occur in many areas. On the western side of the Project activity area, alluvial glacial outwash that impinged on older metavolcanic formations to the east and older ultramafic sea floor deposits to the north (elevations ranging from about 1,500 to 5,000 feet) occurs. Mass wasting and fluvial erosion are the main geomorphic processes that occur within the Project activity area.

Riparian areas of the Project activity area contain four major soil types: Aquolls, Atter, Copsey, and Xerofluvents series with minor amounts of Morical and Ovall series. The soil types are summarized in Table 5-5 and further described below.

Table 5-5. Trinity County Riparian Soil Map Units.

Soil Map Unit	Name	Surface Texture	Depth	Hydro-Group/Runoff	Slopes (%)
6	Aquolls	gravelly clay loam	moderately deep	D - low	0-20
8	Atter	cobbly sandy loam	moderately deep	D - low	0-20
28	Copsey	clay loam	very deep	C – low	2-10
351	Xerofluvents	cobbly loamy sand	very deep	D - low	0-20

Aquolls consist of shallow to deep poorly drained soils formed in residual and colluvial material weathered from mixed rock sources. They are wet mountain meadows on level to gently sloping benches, flats, and basins. The slopes are from 0 to 20 percent. Atter soils consist of moderately deep and somewhat excessively drained soils formed in mixed cobbly alluvium. They are located on alluvial fans, low stream terraces, and in glacial outwash in mountain valleys with slopes of 0 to 20 percent. Copsey soils consist of very deep, poorly drained soils on alluvial fans. They have formed in alluvium from serpentine rock with slopes of 2 to 10 percent. Xerofluvents are brownish to dark brownish soils that have formed on flood plains, fans and terraces along streams and rivers and are subject to occasional flooding. They occur on level ground to gentle slopes. Textures range from loam fine sandy to loams and are excessively drained to well drained. The amount of coarse fragments, within the profile, varies and is without order.

The soils that formed in these varying lithologies are influenced by climate, organisms, relief, and time. Climatic influences of precipitation and temperature, organisms of animals, plants, insects, fungi and bacteria, slope, aspect, and time all influencing these varying lithologies creating these suites of soils found along lakes, streams, rivers, and ponds.

The STNF LRMP (USFS 1995) provides standards and guidelines for soils. The STNF LRMP provides direction for soil resources in the context of management area-specific forest goals as well as standards and guidelines. The applicable forest goals from the STNF LRMP include the following: maintain or improve soil productivity; and prevent excessive surface erosion, mass wasting and watershed impacts. In addition, the STNF LRMP includes soil quality standards that are discussed in more detail below.

5.3.2 Environmental Consequences

The environmental consequences are discussed within the context of potential adverse effects to soils as a result of the alternatives. These effects considered are analyzed through the lens of the STNF LRMP soil quality standards, including soil productivity, hydrologic function, and environmental health. For the effects analysis, soil stability, soil hydrology,

and nutrient cycling are the soil characteristics that directly relate to the soil quality standards, most relevant to the Project. These are described below.

5.3.2.1 Soil Stability

Erosion is the detachment, transport, and deposition of soil particles by water, wind, or gravity. Vascular plants, soil biotic crusts, and litter cover are the greatest deterrent to surface soil erosion. Visual evidence of surface erosion may include rills, gullies, pedestalling, soil deposition, erosion pavement, or loss of the surface "A" horizon. Erosion models are also used to predict on-site and off-site soil loss (water erosion prediction project [WEPP] and/or the erosion hazard rating [EHR]).

Specific guidance to ensure soil stability is to maintain sufficient soil cover to prevent soil erosion from exceeding the rate of soil formation. Erosion and sediment control BMPs would be implemented so that erosion is less than or equal to 1 ton/acre for sites with parent material of a low erosion hazard rating and of a low slope angle. For steep slopes, the rate of erosion could be as much as 2 tons/acre. Soil cover in the form of rock or vegetation would be necessary to keep erosion less than 1-2 tons/acre (depending on slope):

- Granitics – 90% or greater cover necessary
- Metasediments – 50 to 70% cover necessary

5.3.2.2 Soil Hydrology

Soil hydrology function is the ability of water to move through the soil in a metered way and it is assessed by evaluating or observing changes in surface structure, surface pore space, consistency, bulk density, infiltration, or penetration resistance using appropriate methods. Increases in bulk density or decreases in porosity results in reduced water infiltration, permeability, and moisture available to plants. Compaction and soil moisture are the primary concerns when altering a site during construction activities. To ensure soil hydrology functions as it should, the following are recommended:

- In regard to compaction, maintain at least 90% of the total soil porosity found under natural conditions, as measured at 4 to 8 inches below the soil surface. Soil porosity is the standard to measure compaction relative to soil type. Soil porosity is the area of the soil matrix that is occupied by soil voids (macropores) that circulate air and water through the soil. A 10% reduction in total soil porosity indicates potential detrimental soil compaction (depending on soil type).
- In regard to soil moisture, maintain soil moisture regime and drainage classes. Protect areas where plant growth or plant community composition is dependent upon hydrologic conditions (e.g., wetlands, wet meadows, etc.).

5.3.2.3 Nutrient Cycling

Nutrient cycling, the exchange of elements between the of living and non-living components, within soils is assessed by evaluating the vegetative community composition, litter, duff, coarse woody material, and root distribution. These components are directly related to soil organic matter, which is essential in sustaining long-term soil productivity. Soil organic matter provides a carbon and energy source for soil microbes and provides nutrients needed for plant growth. Projects should maintain organic matter in soils sufficient to prevent significant nutrient cycle deficits, and to avoid detrimental physical and biological soil conditions by implementing the following:

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- Soil organic matter in the upper 12 inches of the soil should be at least 85% percent of the total soil organic matter found under undisturbed or natural conditions.
- Fine organic matter should occur on at least 50% percent of the area, including duff, litter, and woody material less than 3 inches in diameter. Organic matter remaining at the project sites for nutrient recycling following construction should generally entail 4 to 8 tons per acre.
- After project implementation, large woody material in forested areas should entail at least 5 logs per acre in contact with the soil surface depending on existing site conditions.
- Avoid excessive topsoil disturbance within the soil profile to the extent possible.

5.3.2.4 Geology and Soil Effects Intensity

For geology and soil affected by the Project, the intensity of effects is defined below:

- No effect: Effects would be negligible, not measurable, with no alteration to soils in the Project activity area.
- Minor: Effects to soils are detectable, minimal, and limited to specific restoration sites.
- Moderate: Effects to soils are detectable, can be measured, and are regional.
- Major: Effects to soils are easily observed, regional, and alter the character of soil map units within the Project activity area.

5.3.2.5 No Action

Under the No Action alternative, effects on geology and soil resources would remain similar to existing conditions. Restoration efforts could still occur throughout the watershed; however, they would occur at a slower pace due to a lengthened planning process. Therefore, there would be fewer short-term effects to geology and soils but potentially a slight increase in erosion and instream sedimentation.

5.3.2.6 Proposed Action

Many of the Proposed Action activity categories would involve the use of heavy equipment and some amount of ground disturbance. As discussed above, the primary concerns are related to soil stability (preventing erosion), soil hydrology (maintaining soil moisture), and nutrient cycling (maintaining organic matter). Therefore, several measures would be implemented to minimize effects to soils:

- Heavy equipment would be operated in a manner that minimizes adverse effects to the environment (e.g., minimally sized, low-pressure tires, minimal sharp turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils).
- During site preparation, native topsoil (typically 2-4 inches) would be protected to the extent possible. In areas where it would be disturbed, topsoil would be salvaged and desirable native plants and materials would be preserved (e.g., large wood, duff, willow clumps, etc.). In addition, areas with soil hydrology such as wetlands and wet meadows would be flagged and protected during construction activities.
- When construction activities are complete, any material stripped from the soil surface during site preparation would be placed on any temporarily disturbed areas where topsoil was removed. Temporarily disturbed areas and temporary roads (as appropriate, particularly Aquolls and Copsey soils susceptible to compaction) would be decompacted and then stabilized through revegetation with native seed and plantings, as appropriate to the site and restoration goals.

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- Erosion control materials would also be placed in areas where slopes are at risk of erosion during winter rain events, including, but not limited to, weed-free straw, straw wattles, fiber rolls, or erosion control blankets (further details on erosion control BMPs are provided in Appendix B). Erosion control measures may also include grading, seeding, mulching, and soil bioengineering (brush layers, stakes, etc.).
- Existing large wood should be retained at a rate of at least 5 logs/acre (at least greater than 20 centimeters DBH) and two meters long) to prevent erosion and promote nutrient cycling.

These BMPs would be implemented during site-specific restoration projects to ensure compliance with the STNF LRMP and soil quality standards, ultimately protecting geology and soil resources.

Though many of the activities proposed as part of the Proposed Action are ground-disturbing in the short-term, in the long-term, many of the activities benefit geology and soils. The "Aquatic, Wetland, Riparian, and Upslope Enhancement" activity category is intended in part to reduce soil erosion and improve soil health by stabilizing banks and soils, improving the vegetative community, and increasing the amount of organic matter. The "Road Decommissioning, Maintenance, and Rehabilitation" activity category is intended to reduce sediment into the mainstem and tributaries of the Trinity River by stabilizing soils along upslope road systems currently in use or recently decommissioned. This activity category would minimize rutting, slope failures, side-casting, and blockage of drainage facilities which can all lead to erosion and subsequent downslope sedimentation.

In conclusion, the Proposed Action would have minor short-term adverse effects to soils based on the potential for ground-disturbing actions. These effects would be avoided and minimized through the BMPs described above implemented during site-specific restoration projects. In the long-term, the Proposed Action is anticipated to have minor beneficial effects to soils throughout the Trinity River Basin as a result of activities related to revegetation, bank stabilization, and road-related projects.

5.4 Vegetation and Wetlands

5.4.1 Affected Environment

5.4.1.1 Land Cover Types

The National Land Cover Database provides land use data for environmental modelling applications and is used to describe baseline landscape types throughout the Project activity area. The 15 land cover types found within the Project activity area are described in the Vegetation and Wetland Resources Technical Report (Appendix J). Most of the Project activity area is evergreen forest (56%), followed by shrub/scrub (24%), and grassland/herbaceous (12%). The remaining land cover types are below 5% cover. Emergent herbaceous wetlands and woody wetlands have less than 1% cover but are more likely to occur in the riparian reserves where most project activities would occur.

5.4.1.2 Wetlands

Cowardin classes of wetlands and other waters (Cowardin et al. 1979) that occur within the HUC 10 watersheds are summarized in the in the Appendix J. The Cowardin classification system is used in the USFWS National Wetland Inventory (NWI, USFWS 2024b) for describing and categorizing wetlands and deepwater habitats based on a variety of characteristics. The following list describes the general Cowardin classes of wetlands that are known to occur within the Project activity area:

- Freshwater emergent wetlands are classified as palustrine emergent (PEM) wetlands and are dominated by herbaceous species such as pale spikerush (*Eleocharis macrostachya*), annual rabbitsfoot grass (*Polypogon monspeliensis*), annual hairgrass (*Deschampsia danthonioides*), reed canarygrass (*Phalaris arundinacea*), and mugwort (*Artemesia douglasiana*).
- Freshwater Forested wetlands are classified as palustrine forested (PFO) wetlands and are typically dominated by woody riparian species such as cottonwood *(Populus* spp.), big-leaf maple, black walnut, and blue elderberry.
- Freshwater scrub-shrub wetlands are classified as palustrine scrub-shrub (PSS) wetlands and are typically dominated by woody riparian, such as willows (*Salix* spp.), white alder (*Alnus rhombifolia*), Oregon ash (*Fraxinus latifolia*), and Himalayan blackberry (*Rubus armeniacus).*

There area over 5,000 acres of PEM, PSS, and PFO wetlands within the Project activity area. The Trinity River, the North Fork Trinity River, and the South Fork Trinity River, all perennial streams, are considered Waters of the U.S. that are subject to the jurisdiction of the USACE. Other perennial streams located throughout the watershed would also be under USACE jurisdiction, as well as some intermittent streams, both of which would also be Waters of the State of California because of their surface hydrologic connection with the Trinity River. Wetlands adjacent to perennial and intermittent streams would also likely be subject to USACE jurisdiction because of the continuous hydrologic connection with the Trinity River.

Most but not all project activities would occur within riparian reserves, where most wetland and riparian vegetation occurs (PEM, PSS and PFO). Throughout the Trinity River, there are about 196,983 acres of riparian reserves. Many HUC 10 watersheds have over 10,000 acres of riparian reserves, including North Fork Trinity River, Upper Hayfork Creek, Stuart Fork, Middle South Fork Trinity River, New River, Big French Creek Trinity River, and two HUC 10 watersheds (Lower Hayfork Creek and Swift Creek Trinity River) have over 20,000 acres of riparian reserves . Browns Creek watershed has the lowest acreage of riparian reserves with 2,441 acres.

5.4.1.3 Special Status Species

Several special status plant species, including ESA-listed species, California Endangered Species Act- (CESA-) listed species, BLM sensitive species, USFS sensitive species, and species considered rare or endangered in California based on the California Native Plant Society Rare Plant Ranks are known to occur within the HUC 10s, many of which occur within riparian reserves or adjacent to roads. Whitebark pine (*Pinus albicaulis*), a federally listed threatened plant species, is known to occur within the Tangle Blue Creek Trinity River HUC 10 watershed at the upper elevations (USFWS 2024a). This species is also known to occur within riparian reserves. Other occurrences of this species are nearby but are outside the Trinity River watershed boundary. There are a number of other special status species with potential occurrence in HUC 10 watersheds within the Project activity area. These have all been identified in Table 9-1 of Appendix J and analyzed for potential occurrence within riparian reserves and/or within 10 feet of roads where many of the Project activities are proposed.

5.4.1.4 Non-native Invasive Species

Non-native invasive species (NNIS) occur throughout the Trinity River watershed, particularly in areas that have been subject to ground-disturbing activities (e.g., roads and recreation sites). NNIS affect the functions and values of native ecosystems. Some of these species have a California Department of Food and Agriculture (CDFA) Pest rating of either C or as a California Code of Regulations (CCR) 4500 noxious weed (Appendix J) and are listed by STNF as priority species. NNIS known to occur within the Project activity area and within riparian reserves are listed in Appendix J. NNIS can occur with greater density in areas that have been previously disturbed such as road rights-of-way, areas near parking areas,

around buildings, or bare areas from natural or human causes. Two especially prevalent species that are known to occur throughout the watershed are Himalayan blackberry (*Rubus armeniacus*) and yellow star thistle (*Centaurea solstitialis*).

Didymo is an invasive, aquatic algae that forms a slimy mass and attaches to plants and rocks along stream bottoms. This organism can cover up to 100 percent of stream bottoms and has potential to cause ecological damage and disrupt stream ecosystems by causing higher mortality rates in fish and aquatic plants (Spaulding and Elwell 2007). Didymo has been documented to occur in the Trinity River from the Trinity Dam to Helena and spreads easily through contaminated fishing gear, watercraft, or vehicles.

5.4.2 Environmental Consequences

5.4.2.1 No Action

Under the No Action alternative because of a lengthened planning process, the extent and quality of woody and herbaceous wetland, riparian and other native habitat would not be improved or enhanced as readily ; habitat for special status species would not be enhanced as readily; and NNIS would not be controlled at the watershed level.

5.4.2.2 Proposed Action

For the purposes of analysis for vegetation and wetland resources, the intensity of effects is described using the following terms:

- Negligible/No effect: Effects would not be measurable, with no perceptible consequences.
- Minor: Effects are detectable but are small and localized.
- Moderate: Effects are detectable, can be measured, and cover a larger area (e.g., a tributary stream).
- Major: Effects are easily measured, regional, and at the population-or community scale.

Effects have been analyzed for each vegetation resource, including wetland and riparian habitat as well as special status species. Throughout the analysis, all effects are considered adverse unless otherwise stated as beneficial. Effect analyses also consider environmental commitments that would either avoid causing a particular effect or minimize the effect's intensity. Effect analyses do not consider compensatory mitigation.

For non-federally listed special status species (i.e., USFS- or BLM- sensitive species), the following determinations were also used to describe effects on species:

- Project activities will not affect special status species
- Project activities may affect individuals but are not likely to result in a trend toward Federal listing or loss of viability for the special status species.
- Project activities may affect individuals and are likely to result in a trend toward Federal listing or loss of viability for special status species.

5.4.2.2.1 Land Cover Types

Most activities within the Project activity area, including instream and side channel restoration, floodplain restoration, water conservation projects, instream structure removal, bank stabilization, habitat enhancement and road decommissioning at stream crossing would be along streams and within floodplains, which would have the greatest effect on emergent herbaceous wetland and woody wetlands land cover types, which only consist of 0.38 percent of the land cover in the HUC 10 watersheds within the Project activity areas. Effects on NWI-mapped wetlands and riparian

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vegetation, which would overlap with the herbaceous and woody wetland cover types, are discussed in Section 5.4.2.2.2 and not replicated in this section.

A suite of enhancement and invasive species management projects would occur on roads or other disturbed areas. While these effects on vegetation communities along roads and in other upland areas affected by NNIS control would be temporary, effects could last for several months to up to two years before vegetation is re-established. Reducing NNIS would result in a minor beneficial effect on the vegetation communities; however, this beneficial effect may be offset by increases in ground disturbance without herbicide application, which could increase the presence of certain NNIS species. An overall reduction in ecologically important land cover types, such as herbaceous and woody wetlands is unlikely to occur since the Proposed Action would restore habitat throughout the floodplain and in upland areas where revegetation would be implemented. Some roads would be decommissioned and restored with native vegetation, resulting in a gain in native habitat and higher quality vegetation communities.

5.4.2.2.2 Wetlands and other Waters

A suite of restoration and enhancement activities and invasive species management projects would occur within riparian areas and floodplains, which are typically within the riparian reserves. In-channel projects and floodplain enhancement that require heavy equipment would require removal of vegetation for access roads, staging areas, grading of floodplain areas, and re-contouring of streambanks. Effects on NWI-mapped wetlands (PEM, PSS, and PFO) and riparian vegetation within riparian reserves would occur from habitat restoration and enhancement, floodplain restoration, removal or retrofitting of fish passage barriers, small dams, flood gates, pilings, and other in-water structures, bioengineered bank stabilization, and road rehabilitation that entail access roads and staging areas and vegetation removal. While these effects would be temporary, they could last for several months to up to two years before vegetation is re-established. The overall effect of project activities would be a long-term benefit on wetlands.

Implementing water conservation measures would benefit wetland and riparian vegetation by maintaining or increasing instream flow in the long-term. Increasing instream flow levels by reducing withdrawals and increasing use efficiency would increase groundwater levels, especially during the summer and early fall when flows are lowest, providing added hydrologic support for wetland and riparian vegetation.

Project activities would ultimately increase floodplain connectivity and reactivate channel migration across floodplains, which would improve and/or increase riparian and wetland habitat. Restoration activities that target vegetation could increase the quality of wetland and riparian vegetation by increasing species and structural diversity and restoring ecological functions. Dewatering necessary during construction for restoration activities would have a temporary effect on wetlands and riparian vegetation, but no long-term effects are expected from dewatering.

Several CMs, including V-2, V-5, V-9, V-11, V-12, V-13, V-14, and V-15, would be used to avoid and minimize effects on wetland and riparian vegetation. Other CMs that provide mitigation for unavoidable impacts on vegetation communities are listed in Appendix G. With the use of CMs, short-term effects on NWI wetlands, wetland subject to USACE jurisdiction, and riparian vegetation, especially within riparian reserves and Key Watersheds, would be avoided and minimized. The Proposed Action is expected to have short-term adverse effects but would provide a net long-term benefit on wetland and riparian habitat along the mainstem and many Trinity River tributaries, which would be a moderate beneficial effect.

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5.4.2.2.3 Special Status Species

Many special status plant species would not be affected by the Proposed Action because they have not been documented within riparian reserves, or along or on roads, where most of the restoration activities are proposed. Special status species that do occur within the Project activity area are less likely to be affected with the implementation of CMs V-1 and V-2. Although whitebark pine, a federally threatened species, has been documented within riparian reserves, with the implementation of CM V-3, effects on whitebark pine would be avoided, and the project activities would not affect whitebark pine.

Water conservation measures that would benefit wetland and riparian vegetation by maintaining or increasing instream flow and groundwater levels would also provide benefits to special status plant species that occur in riparian habitat. Proposed activities, such as restoration and enhancement of off-channel and side channel habitat, floodplain restoration, and wetland and riparian habitat enhancement could affect species within riparian reserves. For species that have been documented within riparian reserves and/or adjacent to roads, project activities may affect individuals but are not likely to result in a trend toward Federal listing or loss of viability. With the implementation of CM V-1 and V-2, most effects on these species would be avoided. A full list of GMPs, CMs, and design guidelines is in Appendix B. These GMPs, CMs, and design guidelines would ensure that effects would not lead to a special status plant species population decline or result in a trend toward Federal listing or loss of viability. The proposed activities would result in short-term minor effects on species within riparian reserves and/or adjacent to roads but would be a long-term benefit as new habitat is created and disturbed areas are restored.

5.4.2.2.4 Non-native Invasive Species

The Proposed Action would restore and enhance aquatic, wetland, riparian and upslope habitats by removing NNIS and revegetating with native plants. This activity would be a beneficial effect on native plant communities. Implementation of restoration activities could result in the spread of NNIS, some of which are listed on the CDFA noxious weed list and on the STNF priority list. Prior to any disturbance, noxious weeds would be inventoried and managed according to treatment plans for specific species. Several NNIS CMs (Appendix B) are proposed that would reduce the spread of invasive and noxious weeds before, during, and following project activities. Protocols would be followed to ensure vehicles are not spreading seeds or vegetative parts of noxious weeds.

Invasive aquatic species (e.g., didymo) could spread easily into new areas during instream activities if construction vehicles, hand tools, or contractors' boots have been in areas where these species exist and are not cleaned properly. CM NNIS-11 would eliminate the possibility of these species spreading from project activities. CMs such as educating the contractors working on restoration projects and thoroughly cleaning equipment coming from other streams would prevent the spread of didymo. With the use of CMs, the effect of the Proposed Action on the spread of invasive aquatic species would be minor.

Herbicides would not be used to control NNIS in the Project activity area. Some species, including Himalayan blackberry, scotch broom (*Cytisus scoparius*), tree of heaven (*Ailanthus altissima*), and yellow star thistle, are difficult to impossible to control without herbicides. For example, tree of heaven has been observed to come back aggressively within five years with more stems and vegetative volume when it is chopped or mowed. Management of these species would likely be labor and time intensive through manual or mechanical removal and continued monitoring and management. Without the use of herbicides, these species may spread into more areas than they currently occupy. For other species, BMPs and CMs would avoid and minimize the spread of NNIS from the implementation of project activities. The net

effect of controlling existing NNIS, using BMPs, CMs and design guidelines to prevent new infestations and replanting native species, would be an overall benefit on native vegetation communities, but the benefits may be diminished by the increase in Himalayan blackberry, tree of heaven, scotch broom, and yellow star thistle, which would be a minor adverse effect.

5.5 Fisheries

5.5.1 Affected Environment

The native anadromous fish species of interest in the mainstem Trinity River and its tributaries are Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), steelhead (*Oncorhynchus mykiss irideus*), and Pacific lamprey (*Entosphenus tridentatus*). There are two spawning races of Chinook salmon, spring- and fall-run, and two spawning races of steelhead, winter- and summer-run.

Per the ACS, the BLM and USFS are tasked to conserve and restore native anadromous fish habitat, and TRRP exists to re-establish anadromous salmonid populations to the Trinity River, in part through restoration activities within the tributaries. Federal and state special-status fish species of particular concern that occur within the Project activity area include:

- Southern Oregon/Northern California Coast (SONCC) coho salmon ESU[6] (federal and California state ESA-listed as threatened, with designated critical habitat [CH])
- Upper Klamath-Trinity rivers (UKTR) spring-run Chinook salmon ESU (federal candidate species, California state ESA-listed as endangered, USFS sensitive).

The UKTR Chinook salmon ESU, while not a federal ESA-listed species and no CH has been designated, is a stock covered under the Pacific Coast Salmon Fishery Management Plan (FMP). Therefore, its habitat within the Trinity River watershed is considered essential fish habitat (EFH). SONCC coho habitat is also considered EFH. EFH receives federal protection under the MSA.

Table 5-6 below displays all special-status fish and freshwater mussel species with the potential to occur within the Trinity River watershed according to the California Natural Diversity Database (CDFW 2024), BLM sensitive species Redding Field Office list, USFS sensitive species list for the Shasta-Trinity National Forest, University of California Davis PISCES Database fish distribution maps (CalFish 2024), and consultation with local expertise, namely TRRP. Table 5-6 includes the species status, documented HUC 10 presence within the Project activity area, and whether designated CH is present within the analysis area.

[6] Evolutionarily Significant Unit

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Table 5-6. Special-status fish and freshwater mussel species with potential to occur within the Project activity area.

Common Name	Scientific Name	Federal Status[1]	Other Status[2]	Documented HUC 10 Presence	Designated CH in the Watershed?
Fish Species					
Coho salmon, SONCC ESU	*Oncorhynchus kisutch*	FT	ST, S2	Big French Creek, East Fork Trinity River, New River, Stuart Fork, Swift Creek-Trinity River, Weaver Creek, Lower Hayfork Creek, Middle South Fork Trinity River	Yes
Spring Chinook salmon, UKTR ESU	*Oncorhynchus tshawytscha*	FC	SE,SSC, USFS-S, S2	Big French Creek, Browns Creek, Canyon Creek, Coffee Creek, East Fork Trinity River, New River, North Fork Trinity River, Stuart Fork, Swift Creek-Trinity River, Tangle Blue Creek-Trinity River, Weaver Creek, Lower South Fork Trinity River, Lower Hayfork Creek, Upper Hayfork Creek, Middle South Fork Trinity River, Upper South Fork Trinity River	No
Steelhead, Klamath Mountains Province DPS[3]	*Oncorhynchus mykiss irideus*	NL	SSC,USFS-S, S2	Canyon Creek, Coffee Creek, East Fork Trinity River, New River, North Fork Trinity River, Stuart Fork, Swift Creek-Trinity River, Tangle Blue Creek-Trinity River, Weaver Creek, Lower South Fork Trinity River, Lower Hayfork Creek, Middle South Fork Trinity River, Upper South Fork Trinity River	No
Green sturgeon, Northern DPS[3]	*Acipenser medirostris*	NL	SSC, S1	Big French Creek[4]	No
Pacific lamprey	*Entosphenus tridentatus*	NL	SSC, USFS-S, BLM-S, S3	Big French Creek, Browns Creek, Canyon Creek, Coffee Creek, New River, North Fork Trinity River, Tangle Blue Creek-Trinity River, Weaver Creek, Lower South Fork Trinity River, Lower Hayfork Creek, Upper Hayfork Creek, Middle South Fork Trinity River	No
Freshwater Mussel Species					
Western pearlshell	*Margaritifera falcata*	NL	S1S2	Common in the Trinity River and tributaries	No
California floater	*Anodonta californiensis*	NL	USFS-S, S2	Documented in low numbers in the Klamath and Trinity rivers	No

[1] FT = Federally-listed as threatened and species likely to become endangered within the foreseeable future; FC = Federal candidate for listing; NL = Not listed.

[2] SSC = California Species of Special Concern; SE = State-listed as endangered; ST = State-listed as threatened; BLM-S = BLM sensitive species, USFS-S = USFS sensitive species; NatureServe California State Rank S1 = critically imperiled, S2 = imperiled, S3 = vulnerable.

[3] Distinct Population Segment

[4] Green sturgeon are found outside the Project activity area in this HUC 10 watershed.

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In addition to these special status species there are a number of other fish species present within the Project activity area:

- Native fish: Klamath smallscale sucker (*Catostomus rimiculus*), Klamath speckled dace (*Rhinichthys osculus klamathensis*), UKTR fall Chinook salmon, inland threespine stickleback (*Gasterosteus aculeatus microcephalus*), Klamath River lamprey *(Entosphenus similis*), chum salmon (*Oncorhynchus keta*), white sturgeon (*Acipenser transmontanus*); and
- Nonnative fish: brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), sockeye (Kokanee) salmon (*Oncorhynchus nerka*), green sunfish (*Lepomis cyanellus*), golden shiner (*Notemigonus crysoleucas*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), brown bullhead (*Ameiurus nebulosus*), western mosquitofish (*Gambusia affinis*), and bluegill (*Lepomis macrochirus*).

5.5.1.1 Aquatic Habitat

Historically, the Trinity River functioned as a dynamic river reach that provided quality spawning and rearing habitat for anadromous fish. In 1960, the Trinity River Division (TRD) began operations, blocking 109 miles of important salmonid habitat above the Lewiston Dam and exporting as much as 90% of the Trinity River's inflows into Trinity Lake to the Sacramento River Basin. In addition to the development of TRD, logging practices, road construction, mining, and floodplain development within the Trinity River watershed also contributed significantly to instream habitat degradation (USFWS and HVT 1999). Clear-cut logging, along with hundreds of miles of unpaved roads and skid trails, promoted increased sediment loading in the Trinity River and its tributaries, and removal of streamside vegetation increased water temperatures. This has reduced the biological productivity and fish-carrying capacity of much of the Trinity River Subbasin (USFWS and HVT 1999; EPA 2001).

Critical habitat for SONCC coho was designated on May 5, 1999 (64 FR 24049) and includes the mainstem Trinity River and accessible tributary reaches that are occupied by freshwater life stages of coho and also provide certain physical and biological features (PBFs). SONCC coho PBFs include all the water, riverbed, and bank areas as well as adjacent riparian areas within the ESU boundaries (with the exception all tribal lands in northern California and areas that are above certain dams). Adjacent riparian area is defined as, "the area adjacent to a stream that provides the following functions: shade, sediment, nutrient, or chemical regulation, streambank stability, and input of large woody debris or organic matter" (64 FR 24049, May 5, 1999). PBFs essential to the conservation of SONCC coho include juvenile summer and winter rearing areas, juvenile migration corridors, areas for growth and development to adulthood, adult migration corridors, and spawning areas (64 FR 24049, May 5, 1999).

In addition to critical habitat, waters and substrates necessary for spawning, breeding, feeding, or growth to maturity for coho and Chinook salmon (within the Trinity River basin) are protected as EFH per the MSA.

One of the most critical features of aquatic habitat to anadromous fish species (e.g., coho, Chinook, Pacific lamprey, steelhead) as well as other species is the accessibility of habitat, also known as "fish passage." There are numerous fish passage barriers and diversions within the Project activity area. In the SONCC coho recovery plan (NMFS 2014), dams and diversions were identified as a key limiting factor for populations of SONCC coho in the Trinity River. Numerous small-scale wells and diversions for domestic uses, stock watering, and small agricultural operations occur throughout the watershed and reduce streamflows during critical low-flow periods in the late summer and fall.

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Table 5-7. Fish passage within the Project activity area.[1]

Natural Partial Barriers	Natural Total Barriers	Partial Barriers	Total Barriers	Unscreened Diversions	Unknown/ Unassessed	Remediated Barriers[2]
21	150	110	115	125	512	26

[1] CalFish 2023.

[2]Fish response unconfirmed.

Table 5-7 shows the number and type of in-water structures affecting fish passage within the Project activity area. With 512 unknown or unassessed in-water structures (e.g., culverts) and 225 manmade partial and total barriers, there are many opportunities to improve fish passage throughout the basin. There are also 125 unscreened diversions that have the potential to cause fish stranding deaths.

5.5.2 Environmental Consequences

Key considerations for the analysis of potential Project effects to fish and freshwater mussel species include the presence of a species in or near the Project activity area, the scope and nature of Project activities, and the potential effects associated with those activities. Specific to fish and freshwater mussel species, short-term construction-related effects are those that result in immediate physical harm or death to individuals, or the disruption of key behaviors that also harm individuals. Long-term effects include impacts to habitat (e.g., flow, water quality, riparian and aquatic vegetation, etc.) or that occur later in time (e.g., a decrease in foraging opportunities) that would affect individuals and populations.

5.5.2.1 Fisheries Effects Intensity

For the purposes of the fisheries analysis for this Project, the intensity of effects is described using the following terms:

- Negligible/No effect: Effects would not be measurable, with no perceptible consequences.
- Minor: Effects are detectable but are small and localized.
- Moderate: Effects are detectable, can be measured, and cover a larger area (e.g., a tributary stream).
- Major: Effects are easily measured, regional, and at the population-scale.

5.5.2.2 No Action

Under the No Action alternative, fish and freshwater mussel populations as well as associated aquatic habitat would be maintained at the current condition generally. That is, the poor aquatic habitat conditions that currently exist within the Trinity River basin as a result of flow management, logging practices, road construction, mining, and floodplain development would remain unaltered. These conditions would continue to impact the biological productivity and fish carrying capacity within the Trinity River basin. Some restoration projects could occur over time and would improve aquatic habitat at a local level; however, this restoration would occur at a slower pace lengthened planning process compared to the Proposed Action.

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5.5.2.3 Proposed Action

The Proposed Action includes eleven categories of restoration activities. Each activity entails a certain amount of construction. The table below summarizes the potential construction components or construction impacts by restoration activity category that could affect individual fish and their habitat. Effects of particular concern are described in more detail below in Table 5-8.

Table 5-8. Construction-related effects on special-status fish per activity category.

Restoration Activity Category	Potential Construction-Related Effects with CMs Implemented
1. Restoration and Enhancement of In-Channel Habitat	Construction impacts to riparian vegetation, in-channel heavy equipment use, turbidity, incidental chemical contamination, bedrock fracturing hydroacoustic noise, dewatering, fish relocation, hydroacoustic noise from installation of wood
2. Floodplain Restoration	Construction impacts to riparian vegetation, in-channel heavy equipment use, turbidity, incidental chemical contamination, dewatering, fish relocation, hydroacoustic noise from installation of wood
3. Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings, and Other In-water Structures	Construction impacts to riparian vegetation, in-channel heavy equipment use, sedimentation, incidental chemical contamination, dewatering, fish relocation, blasting hydroacoustic noise
4. Water Conservation Projects	Turbidity, incidental chemical contamination, potential for dewatering/fish relocation associated with fish screen installation
5. Salmon Carcass Placement	No adverse construction effects anticipated
6. Remote Site Incubators	Minor streambed disturbance during install of system and demobilization.
7. Bioengineered Bank Stabilization	Construction impacts to riparian vegetation, incidental chemical contamination, sedimentation, hydroacoustic noise from installation of wood
8. Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement	Construction impacts to riparian vegetation, incidental chemical contamination, sedimentation, hydroacoustic noise from installation of wood
9. Road Maintenance	Incidental chemical contamination, sedimentation
10. Road Rehabilitation	Construction impacts to riparian vegetation, in-channel heavy equipment use, sedimentation, incidental chemical contamination, dewatering, fish relocation, hydroacoustic noise from pile driving
11. Road Decommissioning	Incidental chemical contamination, sedimentation

Specific construction elements that are known to cause adverse effects to fish and freshwater mussel species are listed and summarized below. Additional details can be found in the Fisheries Technical Report in Appendix K.

5.5.2.3.1 Dewatering and Fish Relocation

This work would take place during seasonally low flow, and salmonids are likely to be exposed to potential adverse effects. Any pumps used during dewatering would be required to use fish screens per NMFS guidance. Adults are physically able to avoid work activity and are not expected to be present during fish removal, but in the unlikely event that adults are found in the work areas, they will be safely removed via herding to the extent possible. Electrofishing may be necessary if seining or herding is not successful. See Section 5.5.2.3.5 below for a summary about electrofishing.

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5.5.2.3.2 Desiccation or Mechanical Crushing During In-Channel Heavy Equipment Use

In-channel construction activities would be conducted during the summer to early fall low-flow conditions (June 15 through October 15), avoiding the potential for construction-related effects on spawning coho salmon and alevins, since this period is outside the adult migration, spawning, and egg incubation season in the action area (Shaw et al. 1997). Heavy equipment would also operate in a slow, deliberate manner, allowing fish to avoid contact with equipment in an open channel. Seining would be employed at some sites to herd fish out of the site before block nets are placed, preventing reentry of juvenile fish into the work area.

5.5.2.3.3 Increased Suspended Sediment Concentrations

Fish would be exposed to increased sediment mobilization by Project activities, but several measures would reduce the potential impact of suspended sediment. Erosion and sediment control BMPs would be maintained to ensure compliance with the turbidity thresholds specified by the Project's Section 401 water quality certification (i.e., more than 20 NTUs at 500 feet downstream of in-river construction when background turbidity is less than or equal to 20 NTUs, and more than a 20% increase in turbidity at 500 feet downstream when background is greater than 20 NTUs). If standards are not met, construction activities would cease temporarily until turbidity is within threshold.

5.5.2.3.4 Bank Stabilization

Bank stabilization prevents a stream channel from migrating and therefore, typically reduces both habitat quantity and habitat quality for salmonids over the long term. The long-term effect of channelizing a stream through bank stabilization is a reduction of the number of fish that the Project activity area can support (NMFS 2020a), which means the continuation of impaired juvenile salmonid abundance over successive generations, relative to what would be expected under natural stream conditions and channel function. However, the bioengineered bank stabilization approach (e.g., riparian planting and instream wood placement that create natural cover elements) proposed would improve habitat conditions relative to what currently exists within the channelized Project activity area (Zika and Peter 2002). These improved habitat conditions do not fully offset the ongoing impact to habitat function and future juvenile population growth caused by extending channelization into the foreseeable future, but adverse effects would be minimized to the extent possible (NMFS 2020a).

5.5.2.3.5 Electrofishing

Electrofishing can cause a suite of effects ranging from disturbance to mortality. The amount of unintentional mortality attributable to electrofishing varies widely depending on the equipment used, the settings on the equipment, and the expertise of the technician. Conservation measures for the Project require that all technicians follow NMFS electrofishing guidelines (Appendix B). In all cases, electrofishing is used only when other relocation methods are not feasible. ESA-listed fish would be handled with extreme care and kept in cold water to the maximum extent possible. During relocation operations, a healthy environment must be provided. Electrofishing is not permitted if water temperatures exceed 64 degrees Fahrenheit (NMFS 2020a).

5.5.2.3.6 Construction Impacts to Riparian Vegetation

During implementation of some activity categories, riparian vegetative cover would be disturbed or removed temporarily, which would result in a temporal reduction of cover and shading, reduced nutrient cycling, and reduced terrestrial invertebrate production on a localized and temporary scale. Temporary displacement of salmonids from

preferred habitat may also result in an increased predation risk or reduced feeding efficiency through the loss of cover (Michney and Hampton 1984; Michney and Deibel 1986). However, in the long-term, no net loss of riparian vegetation would occur, and new plantings would offset the temporal loss of riparian function. The addition of large wood structures would provide cover and shade adjacent to pools and encourage natural sediment build-up next to the wood structures, allowing the bank to fill in and recruit more vegetation for improvement of long-term streambank functions and development of habitat features.

5.5.2.3.7 Activities Taking Place in Dry Conditions

Certain activities, including road maintenance and Stage Zero channel restoration, would take place under dry conditions and are consequently expected to have little adverse impact on fish or habitat. Effects to fish would be limited to a surge of mobilized sediment (first flush) that would potentially occur when seasonal flows and rains return to these areas in the winter or spring following construction, but the increase in turbidity is expected to be short-lived and minimal with the use of erosion and sediment control BMPs.

5.5.2.3.8 Instream Flow Restoration from Diversions

Implementing water conservation measures would benefit salmonids and other fish species by maintaining or increasing instream flow such that rearing and migration conditions would be improved.

5.5.2.3.9 Incidental Chemical Contamination

Negligible effects to individual fish and their habitat as a result of contamination by petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons (PAHs) as a result of heavy equipment use would be anticipated. These instances would be anticipated to be rare but could kill salmonids at high levels of exposure and can cause sub-lethal adverse effects at lower concentrations (Meador et al. 2006). Emergency spill control measures and other BMPs would be employed to prevent spills into waterways (Appendix B).

5.5.2.3.10 Pile Driving

For the Project, timber piles will be used to construct and stabilize some structured log jams and would typically be installed using a vibratory hammer. Therefore, installation of these timber piles would result in minor acoustic effects compared to the installation of metal piles. Metal piles would likely be required for the replacement of bridges as part of the Project, either for temporary construction bridges or for the main bridge structures themselves. Environmental commitments would be incorporated into site-specific designs to ensure that all Project activities with pile driving would stay below injury effect thresholds (Appendix B). With the incorporation of these environmental commitments into site-specific restoration projects, pile driving is anticipated to have minor effects to fish species in the Project activity area.

5.5.2.3.11 Blasting

Blasting is proposed as a technique to remove bedrock as part of the “Restoration and Enhancement of Off-Channel and Side-Channel Habitat” activity category. It is seen as a potential tool for channel restoration in case a bedrock area needs to be removed in order to meet design and grade criteria, and there is no other reasonable alternative. In addition, blasting could be used to removed fish passage barriers as part of the “Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures” activity category.

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Because the hydroacoustic effects of blasting are similar to those of pile driving, the Project would use similar environmental commitments for proposed blasting activities (Appendix B). Hydroacoustic effects as a result of blasting would need to stay below injury effect thresholds. In addition to effects to individual fish, detonation of explosives in or near fish habitat may also result in the physical and/or chemical alteration of fish habitat. However, with the incorporation of the environmental commitments to site-specific project designs, the effects of blasting are anticipated to be minor.

5.5.2.3.12 Beneficial Effects

In addition to effects associated with proposed construction activities, in the long-term, the Project would also enhance or restore the following aquatic habitat functions: stream structure/complexity, stream sinuosity and length, bank stability, floodplain connectivity, and riparian vegetation structure and diversity. These improvements would promote conditions that maintain or decrease stream temperature, reduce turbidity and sediment discharges (via stable streambanks, improved sediment retention through increased channel structure, riparian areas, and floodplains), and improve nutrient input (via improved riparian conditions) and retention (via increased channel structure, sinuosity, and floodplain areas). Removing or repairing in-water structures would restore fish passage for spawning, migrating, and rearing fish, and would increase aquatic habitat area. Restoration of riparian vegetative communities would improve shade along streambanks in the long-term, which would help maintain water temperatures.

Large wood and boulder placement would enhance habitat elements for migrating and rearing fish. A literature review by Roni et al. (2015) reported that the vast majority of studies on wood placement have reported improvements in physical habitat (e.g., increased pool frequency, cover, and habitat diversity) with most evaluations of fish response showing a positive response from salmonids. The resulting effect of large wood on fish habitat is significant. Crispin et al. (1993) also noted increased salmon spawning activity in an area where gravels accumulated behind large wood. Bjornn and Reiser (1991) cited several studies that documented an increase in fish densities with higher levels of large wood, and Fausch and Northcote (1992) documented that coho salmon and cutthroat trout production was greater in large wood-dominated streams.

Restoring side channels would increase adult and juvenile rearing habitat where low flows and cooler water temperatures would provide refugia from mainstem temperatures. Streambank restoration projects would decrease direct sediment inputs into the stream channel, thereby enhancing conditions for rearing juvenile fish.

5.5.2.3.13 Effects on Freshwater Mussels

Mussels are relatively immobile, and an individual mussel may have been present in a certain location for decades. Mussels are present year-round, and in-channel work windows for salmonids do not protect freshwater mussels (Blevins et al. 2017). Any freshwater mussel beds would be identified during the planning process for each site-specific restoration action that is part of the Project. To the extent practicable, construction effects would be minimized through implementation of erosion and sediment control BMPs and/or avoidance of physical disturbance to any freshwater mussel beds using a buffer of 5 meters from any construction activities or any scour as a result of construction activities (Blevins et al. 2019). If avoidance is not possible, freshwater mussel salvage and relocation BMPs described in "Conserving the Gems of Our Waters" (Blevins et al. 2017) would be considered during Project actions. Incorporating these environmental commitments into site-specific designs would entail minor effects to freshwater mussels within the Trinity River watershed. Benefits to freshwater mussels would entail an increase in aquatic habitat complexity that could provide more locations within floodplains where mussel beds could be established in the long term.

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5.6 Wildlife

5.6.1 Affected Environment

The Trinity River Watershed offers a variety of habitats that are important to numerous wildlife species. Whether or not wildlife habitat is suitable for any given species is based on factors including latitude, vegetation communities, topography, proximity to water features including wetlands, streams, lakes, oceans, anthropogenic influences, and natural disturbances, including wildfire and climate change.

To determine what wildlife species needed to be analyzed for the Project, five special status groups were reviewed: Federal ESA-listed, California ESA-listed, USFS Sensitive, BLM Sensitive, and California Fully Protected species. Table 3.1 in Appendix L displays those species with special statuses and with the potential to occur within the Project Activity Area according to the California Natural Diversity Database (CNDDB), BLM sensitive species list provided by RFO, Natural Resource Information System[7] (NRIS), USFS sensitive species list within Trinity County, and consultation with local expertise.

The wildlife of interest that have high potential to occur within the Trinity River Watershed and project activity areas include the northern spotted owl (*Strix occidentalis caurina*), American goshawk (*Accipiter atricapillus*), bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), pallid bat (*Antrozous pallidus*), fringed myotis (*Myotis thysanodes*), Townsend's big-eared bat (*Corynorhinus townsendii*), Pacific/American marten (*Martes caurina; aka M. americana*), Fisher (*Pekania pennanti*), ringtail cat (*Bassariscus astutus*), Northwestern pond turtle (*Actinemys marmorata)*, California mountain kingsnake (*Lampropeltis zonata*), foothill yellow-legged frog (*Rana boylii*), Cascades frog (*Rana cascadae*), coastal giant salamander (*Dicamptodon tenebrosus*), Big Bar [Pressley] hesperian snail (*Vespericola pressleyi*), Trinity bristlesnail (*Monadenia infumata setosa*), Western bumblebee (*Bombus occidentalis*), and monarch butterfly (*Danaus plexippus*).

5.6.2 Environmental Consequences

Key considerations for the analysis of potential Project effects to wildlife species include the presence of a species in or near the Project activity area, the scope and nature of Project activities, and the potential effects associated with those activities. Specific to wildlife species, construction-related effects may result in immediate physical harm or death to individuals, or the disruption of key behaviors that also harm individuals. Long-term effects may include impacts to habitat (e.g., flow, water quality, riparian and aquatic vegetation, etc.) or those that occur later in time (e.g., a decrease in foraging opportunities) that would affect individuals and populations.

5.6.2.1 Wildlife Effects Intensity

For the purposes of the wildlife analysis for this Project, the intensity of effects is described using the following terms:

- Negligible/No effect: Effects would not be measurable, with no perceptible consequences.
- Minor: Effects are detectable but are small and localized.
- Moderate: Effects are detectable, can be measured, and cover a larger area (e.g., a tributary stream).

[7] NRIS is an internal tool that USFS staff has access to.

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- Major: Effects are easily measured, regional, and at the population-scale.

5.6.2.2 No Action

Under the No Action alternative, wildlife populations as well as associated aquatic habitat would be maintained at the current condition. That is, the poor aquatic habitat conditions that currently exist within the Trinity River basin as a result of flow management, logging practices, road construction, mining, and floodplain development would remain unaltered. These conditions would continue to impact the biological productivity of the northwestern pond turtle and other highly aquatic species within the Trinity River basin. Some restoration projects could occur over time and would improve aquatic habitat at a local level; however, this restoration would occur at a slower pace due to a lengthened planning process compared to the Proposed Action.

5.6.2.3 Proposed Action

The Proposed Action includes eleven categories of restoration activities. Each activity entails a certain amount of construction. Table 5-8 in Section 5.5.2.3 above summarizes the potential construction components or construction impacts by restoration activity category that could affect individual fish and their habitat. Similar effects could occur to wildlife species based on the proposed action and are generally discussed below. For species-specific effects, see Appendix L.

During project implementation and post implementation, proposed activities could have effects on wildlife species. Project environmental commitments specific to wildlife would be implemented to reduce effects to species and their habitat. This section discusses general effects that could occur from Project activities. As discussed in Section 4.2 most activities would require the use of heavy equipment and hand tools to complete site-specific designs, which would cause ground disturbance, noise, impaired air and water quality, and temporary loss of native vegetation.

Short-term effects to wildlife species could potentially occur during project implementation. Project implementation is more likely to affect species with relatively small home ranges that are reliant and well adapted to freshwater habitats of the Trinity River and its tributaries including species such as the northwestern pond turtle, foothill yellow-legged frog, and Big Bar hesperian snail. Effects to wildlife as a result of Project activities could include loss of nesting habitat, potential take of ESA-listed species, direct harm (injury or death) of individuals, interference with habitat use, interruption to foraging activities, noise disturbance, and reduced air and water quality.

Short-term effects to wildlife as a result of airborne noise could result from activities such as use of heavy construction equipment, pile driving during bridge replacement, large wood placement via helicopters, bedrock fracturing, and instream structure removal. Airborne noise effects would likely affect nesting birds if migratory birds were using habitat in or in the vicinity of the site-specific project areas for nesting and rearing during implementation. Preconstruction surveys would be performed to identify specific wildlife activity areas and either applicable SRs would be applied or noise-generating activities would be deferred until after the nesting season is complete or until a qualified biologist has determined the young have fledged their nest. Noise effects could have adverse effects to wildlife; however, these effects would be temporary and localized and minimized with the implementation of CMs (see Table 4-5 in Appendix B).

Native and nonnative vegetation removal would occur during site-specific project implementation, inducing temporary habitat alteration associated with construction activities. Heavy equipment would also produce exhaust and dust, affecting air quality and potentially affecting wildlife during implementation. Sedimentation from earth-moving activities and project activities within streams and floodplains could increase turbidity within project waterways temporarily and

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potentially long-term, which could affect aquatic wildlife species. To reduce effects to protected species, Project environmental commitments would be incorporated into site-specific activities including SRs, preconstruction surveys, species salvage and translocation, and biological monitoring. These measures would ensure that effects would not lead to long-term adverse effects on wildlife species.

In terms of beneficial effects, habitat enhancement and revegetation with native species would take place in aquatic areas, meadows, wetlands, riparian areas, and upslope habitats within the watershed where the vegetative community has been disturbed by past land practices, wildfire, introduction of nonnative species, or construction activities and where habitat functions are impaired. ACS objectives would be incorporated into site-specific project designs to maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability (Appendix C). In addition, restoring riparian habitat to support well-distributed populations of native plant, invertebrate, and vertebrate species, site-specific would further address ACS objectives. Coordination with upstream operators to control dam releases or instream flow levels to provide water during plant establishment would occur to ensure revegetation success. Site-specific design, timing, and duration would ensure reduced effects to wildlife species reoccupying habitat following project implementation with the goal of improving habitat long-term.

Long-term benefits to wildlife species include improvements to habitat as a result of proposed activities with increased foraging opportunities (with expected increases to fish populations), improved vegetative community with a higher percentage of native species, and improvements to upslope habitats (wetlands, meadows, floodplain areas, etc.) that may be more resilient and provide refugia during periods of temperature extremes and wildfire. Other improvements include nutrient cycling within project waterways, which would increase instream biodiversity. For more information on positive regional effects on wildlife species, see Section 6.7 in Appendix L.

Habitat use, within the Project activity area, by wildlife species is anticipated to return to pre-project levels post implementation and potentially reduce nonnative wildlife species. Long-term beneficial effects to water quality through native vegetation establishment, bank stabilization, and upslope roadway decommissioning and improvements are expected to occur. Long-term negative effects are not anticipated or likely to occur.

5.7 Climate

5.7.1 Affected Environment

Climate change results from the incremental addition of GHG emissions from millions of individual sources, which collectively have a large impact on a global scale. Reclamation recognizes that all climate change impacts are not attributable to any single action but are exacerbated by a series of actions. Thus, this analysis addresses climate change's impacts with that concept in mind. A detailed analysis of climate change impacts on the affected environment and as a result of the Proposed Action and the No Action Alternative is outlined in Appendix M.

Climate change impacts in the Klamath Basin region and the Trinity River watershed have been observed as increases in temperature; prolonged and at times severe drought; increased stream, reservoir, and Trinity River water temperatures; and effects to the ecological conditions including to forest, wetlands, and riparian communities. Substantial increases to temperatures and water temperatures have been observed in the region and the watershed over the last century, which

are attributed to climate change (Butz R.J. et al. 2022; Asarian et al. 2023). Warmer temperatures associated with climate change reduces the snowpack and alters the seasonality and runoff volumes of the hydrograph; the result of which is larger runoff events occurring earlier in the year due to a shift in precipitation falling as rain rather than snow (CAPCOA 2021). The altered hydrograph patterns strain the ability of reservoir water managers (in this case, Reclamation) to provide cold-water releases for salmonids because of reduced cold water storage. Anadromous salmonids are dependent on cold water to support their life cycle; therefore, the lack of cold water further stresses these vulnerable fish populations. Simultaneously, human demands for water are increasing at a time when streams are at all-time low-flow levels. Water warms more rapidly in shallow streams that have been depleted from water use demands, reducing and sometimes eliminating suitable cold-water aquatic habitat that is critical for fish survival.

In addition to temperature impacts, climate change both exacerbates and is exacerbated by increasingly severe wildfire and ecological conditions in the watershed. Historic management of forests on federal lands has resulted in an ecology prone to insects, disease, and wildfire. Ecosystem damage is inevitable when wildfires occur under these conditions. Over the last 36 years, an average of 0.5% (6,566 acres) of the watershed has burned per year. The most severe and damaging fire events were during the 2015 to 2020 period. Severe and catastrophic wildfire that is not similar to ecological fire regimes contributes to climate change by both releasing sequestered carbon into the atmosphere and by destroying ecological functions that healthy forests and ecosystems provide.

Wetland, aquatic habitats, and riparian areas have and will continue to experience increased use and pressures as many wildlife species are seeking water sources in wetland and aquatic areas that are subject to physical shrinkage and water quality impacts as a result of climate effects, such as air and water temperature increases. Climate change is identified as a major threat to wetlands. Compared to terrestrial ecosystems, wetlands have the highest carbon density, which makes them play an important role in global biogeochemical and carbon cycles and climate change (Kayranli et al. 2010). Warmer air temperature effects will increase evaporation from wetland areas and could promote drying around perimeter of wetland features. More extreme precipitation events (also expected with climate change) along with increased air temperatures are expected to promote photosynthesis that could maintain wetlands as carbon sinks. Decreased precipitation, however, could have the opposite effect and wetlands may become sources of carbon loss.

Riparian areas and the associated microclimate are highly sensitive to environmental changes. Disruptions occur commonly after high flow events or loss due to wildfires that can cause riparian system nutrient accumulations to reach disruptive thresholds that suddenly change the system from a carbon sink to a source. Maintaining and promoting continuity of healthy functioning riparian zones is key to providing refuge for aquatic and terrestrial wildlife species during transitional climatic stress.

5.7.2 Environmental Consequences

5.7.2.1 No Action

Under the No Action alternative, the localized and regional effects of climate change would continue to occur and would likely contribute to worsened watershed conditions. That is, the poor aquatic habitat conditions that currently exist within the Trinity River basin as a result of climate change in combination with flow management, logging practices, road construction, mining, and floodplain development would remain unaltered. These conditions would continue to impact the environmental conditions within the Trinity River basin. Some site-specific restoration projects could occur over time and would improve aquatic habitat at a local level; however, this restoration would occur at a slower pace lengthened planning process compared to the Proposed Action.

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5.7.2.2 Proposed Action

5.7.2.2.1 GHG Emissions

To determine the effect of the Proposed Action, a "carbon footprint" was developed based on the Project activities potential generation of GHGs (primarily carbon dioxide [CO_2]). The Road Construction Emissions Model Version 9.0.0 was used to estimate GHG emissions for combustible fuel using assumptions of how many and what types of vehicles and machinery would be used to complete construction of proposed restoration activities (CAPCOA 2021). Typically, a rehabilitation project would involve the following heavy equipment:

- Water trucks – up to 2
- Crushing and processing equipment – up to 3
- Excavators – up to 3
- Graders and off-highway tractors – up to 3
- Other heavy equipment/machines – up to 5

Project activities that would offset potential impacts were weighed into the equation. For minor site-specific projects, the calculation is based on up to 1 week of construction and one piece of equipment. Medium-sized site-specific projects would require up to a month of construction, and large site-specific projects would be extensive restoration efforts that would take up to a year. The calculation is based on up to 50 projects of varying sizes and complexity being completed in a year. Emissions would be limited to the project construction period and GHG emissions and any effects on climate change would be at least partially offset in the long-term by the benefits from restoration activities that increase the amount of riparian and upland vegetation. Based on the analysis, a maximum 1,837 tons of CO_2 would be released as a direct result of construction activities if 50 site-specific projects of various sizes were completed in a single year, which is roughly equivalent to one transatlantic commercial airline flight between New York and London.

Table 5-9. Assumptions and estimates for GHG emissions by site-specific project size.

Size	Description	Estimated CO_2 per Site (tons)	Potential Number of Projects per year	Estimated Maximum CO_2 (tons)
Small	May take up to a week to complete not including restoration and monitoring; smaller than 1 acre; example: culvert replacement, remote site incubator installation, road maintenance activities	2.7	35	95
Medium	May take up to a month to complete not including restoration and monitoring; smaller than 10 acres; road decommissioning, road rehabilitation, small instream or upslope habitat restoration projects	22.1	10	221
Large	May take up to six months to complete not including restoration and monitoring; larger than 10 acres; large tributary or mainstem in-stream or upslope restoration project	304.2	5	1,521
All			**50**	**1,837**

Environmental commitments outlined in Appendix B would apply to all projects to reduce the temporary effects of GHG emissions from construction activities. Emissions would be limited to the project construction period and GHG emissions and any effects on climate change would be at least partially offset in the long-term by the benefits from restoration activities that increase the amount of riparian and upland vegetation.

5.7.2.2.2 Temperature and Ecological Effects

The proposed action would have a potential beneficial effect on stream and river temperatures that are being adversely impacted by climate change. Restoration of rivers and streams creates complex stream morphology and can lead to increased habitat availability for cold water fish species and amphibians. Lowering floodplains, restoring and creating wetlands and riparian areas, and restoring stream geomorphic processes can help to improve temperature and drought conditions that are exacerbated by climate change by creating conditions that allow for water to be retained in the watershed for longer periods of time, sequestering atmospheric carbon in both soils and vegetation, providing refugia for wildlife species during temperature extremes and wildfire, and providing habitat for rearing and spawning cold water fish species.

These activities would promote resilience within these aquatic ecosystems and help to promote microclimate habitats that support and sustain aquatic species and cold water fish populations. In addition to in-channel and upslope restoration, proposed water conservation activities would augment streamflow during high water temperatures and/or low streamflow can enhance likelihood of survival for a few aquatic T&E individuals of which there are already low in numbers. With the Proposed Action, sixteen HUC 10 watersheds would be targeted for restoration activities focused on riparian reserves. The proposed action would include restorative treatments that would improve health of the riparian and aquatic habitats and the connectivity to neighboring habitats for refuge from inhospitable changes from climate effects. Long-term beneficial effects are expected as a result of restoration within the riparian reserves that enhance floodplains and develop or restore access to diverse aquatic habitats would provide some of the most desirable long-term effects that enhance riparian and aquatic habitat and floodplain connectivity.

5.8 Recreation

5.8.1 Affected Environment

In order to describe the affected environment for recreation resources, information about trails, campgrounds, and river and water access points was obtained from TRRP, USFS, and BLM records as well as local knowledge of other recreational use within the Trinity River watershed. The Trinity River watershed includes federal lands managed by the BLM, USFS, and Reclamation; as well as private lands. Of the approximately 1.6 million acres of land within the watershed, the vast majority are federal lands administered by the USFS.

The Trinity River and its tributaries provide year-round recreational opportunities, including boating, kayaking, canoeing, rafting, inner tubing, fishing, swimming, camping, gold panning, wildlife viewing, picnicking, hiking, and sightseeing. Fishing for Chinook salmon, steelhead, and rainbow and brown trout is a major recreational activity on the Trinity River throughout the year. Fishing intensity varies between years but is prevalent between August and April. The USFS and BLM manage and maintain several campgrounds and picnic facilities within the watershed, and public access to BLM- and USFS-administered lands is present throughout the Project activity area. The USFS and BLM maintain system trails and trailheads in the watershed for both motorized and non-motorized recreational use.

The North and South Forks of the Trinity River include 203 miles of designated Wild and Scenic River (WSR). In addition, the New River within the Project activity area is a designated WSR. The Outstandingly Remarkable Value (ORV) for both the Trinity and New rivers are their anadromous fisheries. Six additional rivers on the STNF have been identified by the USFS as “suitable rivers” under WSRA Section 5(d)(1), meaning they were found suitable for potential future addition to the National WSR System. These include portions of Canyon Creek, Hayfork Creek, Upper North Fork Trinity, Upper

South Fork Trinity, and Virgin Creek. The WSR analysis for the Project is included in Appendix F. The Trinity Alps Wilderness Area, which includes approximately 537,000 acres of USFS lands and 550 miles of maintained system trails, 17 of which are part of the Pacific Crest Trail.

In addition to designated wilderness and WSR, the Lewiston and Trinity lakes, located above each of the Lewiston and Trinity dams along the Mainstem Trinity River, provide recreational opportunities, including camping, fishing, boating, and kayaking. Both public lands and private lands that include resorts and residences are located in the vicinity of the reservoirs. Several small communities that provide tourist and recreational services are located along the lakes, as well as along the Mainstem and North Fork Trinity River. The BLM and the USFS issue up to 100 permits for commercial fishing guides along the Mainstem Trinity River. The USFS also issues 13 rafting permits for the river.

5.8.2 Environmental Consequences

5.8.2.1 No Action

Under the No Action alternative, recreation resources and uses in the watershed are expected to remain similar to existing conditions. Watershed restoration projects would still occur but at a slower pace since there would be no streamlined process for environmental reviews. Therefore, there would be no additional effects to recreation resources or disruption of recreational uses as defined in the CCR, Title 14, Division 6, Chapter 3, Section 15382.

5.8.2.2 Proposed Action

Effects on recreation resources were determined qualitatively by determining the extent that recreational facilities and activities would be effected by proposed activities. Noise effects to recreation are analyzed below in Section 5.9

The proposed Project activities would require construction in active river and stream channels, floodplains, and adjacent upland areas, as described in Section 4. Construction activities could result in temporary disruption at river access points and fishing spots; however, disruptions would be temporary and river access and recreational opportunities would continue to be available at other locations. Very rarely would proposed Project activities interrupt access to upland trails or trailheads. Because disruptions to recreational activities would be temporary, these effects would be minor.

Flows that typically contribute to good fishing tend to have high water clarity (little to no turbidity). Temporary increases in turbidity as a result of the Proposed Action may affect the recreational experience of anglers and the aesthetic values held by other recreationists downstream from site-specific project areas. The amount that turbidity is increase would be a function of the flow regime at the time, the level of instream disturbance at the site-specific project area, and particle size of the substrate/soil disturbed. For example, fine-grained sediments like silts and clays could be carried several thousand feet downstream of the site-specific project area, while larger-sized sediments like sands and gravels tend to drop out of the water column within several feet downstream of the extent of construction. Table 4-1 of Appendix B includes several CMs designed to ensure that turbidity is monitored and minimized to the extent possible. With the implementation of these CMs as well as the localized and temporary nature of these turbidity increases, this effect is expected to be minor.

Construction activities associated with the Proposed Action could pose a temporary physical hazard to recreational users of the river (e.g., boaters) and cause short-term resource damage to lands used for recreational activities in and adjacent to the site-specific project areas. Potential physical hazards to recreationists include the presence of temporary river crossings, operation of construction equipment and vehicles in and around the restoration sites, changes to sediment

deposition patterns, the addition of instream large wood, and an increased potential for chemical contamination (e.g., diesel and hydraulic fluid) from construction equipment and vehicles operating in and adjacent to the river.

Short-term disruptions to recreation resources, turbidity effects that could diminish recreation values, or physical hazards to recreational users within the Project activity area, including, but not limited to, the Trinity Alps Wilderness, private or public recreation facilities in proximity to Lewiston or Trinity lakes, water access points, or other recreation sites are anticipated to be minor as a result of the Proposed Action. Effects to upland trails or limited access to upland trailheads have a low likelihood to occur. Furthermore, adverse effects would be minimized through incorporating recreation resource CMs included in Table 4-6 of Appendix B into site-specific project designs.

In addition, the Proposed Action would have long-term beneficial outcomes for recreation resources across the watershed, through increased recreational fishing opportunities as a result of fisheries habitat recovery; improved long-term water quality conditions; and re-establishment of native vegetation communities.

5.9 Noise

5.9.1 Affected Environment

Sensitive receptors are specific geographic points, such as residences or recreational facilities, where people could be exposed to unacceptable levels of noise. Noise-sensitive areas in the Trinity River watershed include residences, assisted living facilities, motels and hotels, schools, libraries, places of worship, community centers, hospitals, local parks and sensitive wildlife habitats. The main sources of noise in the watershed consist of traffic noise on major roadways and county roadways, industrial and commercial uses such as lumber mills, and aircraft from county airports and local airfields. Noise levels at site-specific project areas could be the result of road noise from local residential traffic, occasional commercial traffic (e.g., logging trucks), and other miscellaneous sources (e.g., chainsaws, lawn mowers, overhead aircraft, barking dogs, children at play, etc.). Site-specific project areas may be in proximity to private property, residences, businesses, wildlife habitat, and recreation facilities/sites. In addition, recreational use of the stream corridors by boaters (i.e., anglers and rafters) occurs throughout the year. Recreational users may be close to site-specific project areas during the construction period as they boat or fish on the Trinity River and its tributaries; however, the duration of their exposure to construction noise would depend on the type of recreational activity undertaken. For instance, a boat floating along a stream may take as long as an hour to get through an area where a restoration activity is taking place.

Baseline noise levels within much if not all of the HUC 10 watersheds are likely below 70 dB Ldn[8], which is typical of small communities and rural areas. Maximum noise levels are generally caused by local automobile traffic and heavy trucks (Brown-Buntin 2002, Trinity County 2024). Background noise levels in the absence of these maximum noise-generating causes are largely attributable to distant traffic, wind, birds, and insects.

[8] dB Ldn = The average equivalent sound level during a 24-hour day, obtained after the addition of 10 A-weighted decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.

5.9.2 Environmental Consequences

5.9.2.1 No Action

Under the No Action alternative, noise effects to sensitive receptors would remain similar to existing conditions. There would continue to be effects to sensitive receptors as a result of on-going restoration efforts within the watershed that are not part of the Proposed Action. These efforts would be fewer in number and would occur over a broader period of time, because of the lack of streamlined environmental reviews.

5.9.2.2 Proposed Action

Noise from site-specific project-related construction activities and transportation of materials to and from site-specific project areas would temporarily dominate the noise environment in and adjacent to project areas for varying periods of time. Construction activities would generate maximum noise levels ranging between 65 to 105 dB L_{max}[9] at a distance of 50 feet (WSDOT 2017), although intervening terrain and vegetation could reduce these noise levels for sensitive receptors such as residents, businesses, and recreationists in the vicinity. Construction noise would be temporary and is expected to primarily occur during daytime while site-specific projects are being implemented.

It is not anticipated that ground vibration created by site-specific projects would be detectable at any sensitive receptor location, nor would the Proposed Action result in structural damage. Noise impacts to fish and wildlife are analyzed in Section 5.5 and Appendix K (fisheries) and Section 5.6 and Appendix L (wildlife). Recreational users in the general vicinity of the site-specific project areas could encounter an increase in ambient noise levels during construction activities. While such an increase in noise could be disruptive, its impact would be temporary and localized and would be minimized with the implementation of noise-related CMs (Table 4-6 in Appendix B). With the incorporation of these CMs into site-specific project designs and the localized nature of construction activities, noise effects to sensitive receptors would be minor.

5.10 Cultural Resources

5.10.1 Affected Environment

There is a deep history of anthropological study in northern California, beginning with an emphasis on ethnography and then continuing forward with both ethnography and archaeology (King et al. 2016). Most of the ethnographic studies were published during the early 1900s and these were largely synthesized in Kroeber's (1925) epic *Handbook of the Indians of California*. Some of these studies extended through the 1930s (e.g., DuBois 1935), 1940s (Gifford 1940), and 1950s (Goldschmidt 1951), with a major flurry of activity between 1934 and 1939 as part of the Culture Element Distributions Survey of Native North America where many of the most knowledgeable Native American consultants were revisited to collect ethnographic information using more systematic, quantitative methods than were used by the original researchers (Kroeber 1935; King et al. 2016). After the 1930s, most of the primary information had been collected, and subsequent publications largely relied on existing data sets in their analyses (e.g., Baumhoff 1958; Kroeber and Barret 1960), culminating with publication of the California volume of the *Handbook of North American Indians* in 1978.

[9] L_{max} is the maximum value of a noise level that occurs during a single event.

5.10.1.1 Cultural Chronology

Summaries of the cultural chronology of the region began with work by Meighan (1955) and elaborated on by Fredrickson (1973, 1974) with local application by Hildebrandt and Hayes (1983, 1984, 1993) based on their field work in sites on South Fork Mountain and Pilot Ridge. The cultural chronology of the area is summarized below.

5.10.1.1.1 Paleoindian Period (13,400–8,850 calibrated years before the present [cal BP])

The Paleoindian Period is the earliest cultural period in the North Coast Range (13,400 to 8,850 cal BP). Although this period is generally illustrated by fluted projectile points and stone crescents, there is no well-defined diagnostic project point type for the Paleoindian period within the project area as evidence from this period is rare (King et al. 2016). Some of the earliest radiocarbon dates are 7,945 cal BP from Pilot Ridge (Fitzgerald and Hildebrandt 2002).

5.10.1.1.2 Borax Lake Pattern (8,850 to 5,700 cal BP)

The Lower Archaic period, commonly defined by the Borax Lake Pattern (8,850 to 5,700 cal BP), is characterized by hunter-gatherer groups, who followed seasonal rounds of hunting large game and gathering local plant foods. The pattern is characterized by wide-stemmed projectile points with indented concave bases (Sundahl 1992) along with serrated bifaces, ovoid flake tools, handstones, millingslabs, and edge-flaked spalls (King et al. 2016). This diversified assemblage is commonly found across a wide range of environmental contexts, such as high elevation ridgetops and river terraces (Hildebrandt and Hayes 1993; Sundahl and Henn 1993).

5.10.1.1.3 Mendocino Pattern (4,500–1,500 cal BP)

The Mendocino Pattern has been identified in a small number of places in northwestern California starting 5,000 years ago but is not common until after about 4,000 cal BP (King et al. 2016). Artifacts common to the pattern include side-notched, corner-notched, and concave-base dart points including the Willits and Mendocino series, handstones and millingslabs, various types of flake tools including McKee unifaces, and cobble tools (ibid.). Some of the earliest manifestations of the Mendocino Pattern in the more northerly areas come from a variety of coastal and interior settings (Gould 1966; Eidsness 1993; Hildebrandt and Levulett 2002; Levulett 1985). The majority of the sites were thought to represent hunting camps; this is a distinct change from the Borax Lake Pattern where uplands mostly consisted of residential sites (King et al. 2016).

5.10.1.1.4 Shasta (also known as Tuluwat Pattern, formerly Gunther) Complex (post-1,500 cal BP)

Following the Mendocino Pattern, significant changes occurred in northwestern California starting around 1,500 cal BP, which is linked to the arrival of the Wintu into northern California (Hildebrandt and Levulett 2002; Hildebrandt and Darcangelo 2008; Tushingham 2009). The frequency of sites greatly increased as large villages were established along various rivers in northern California, with entirely new sets of artifacts (Hildebrandt and Darcangelo 2008; King et al. 2016). Bow and arrow technology appear at this time as well (Hildebrandt and Darcangelo 2008).

5.10.1.1.5 Contact Period (AD 1700s to 1850s)

Unlike the southern and central parts of California, contact between Native and non-native peoples occurred much later in the northwestern part of the state (Tushingham 2013). In 1828, the Jedidiah Smith Party ventured through southern Trinity County near Hyampom and Burnt Ranch (TM 2025). In the 1830s, it is possible that a few Euro-American trappers may have explored the area in search of furs (TM 2025). Major Pierson Reading names the Trinity River while trapping in

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1845 with a company of United States soldiers out of San Francisco camping near Lewiston in 1846 (TM 2025). While there does not appear to be numerous contacts between Euro-Americans during this time period, that does not mean that the Native Americans were not affected. Diseases such as cholera, smallpox, and measles could travel through adjoining tribes through trade even though they never actually met a Euro-American. Projectile points from this time are from bow and arrow technology and consist of Desert side-notched, Rattlesnake, Cottonwood, Tulawat/Gunther barbed, and Clear Lake corner-notched.

5.10.1.2 Ethnographic Context

A number of people groups are connected to the Project activity area through the watersheds and resources, such as salmon and steelhead, contained within it. The ethnography of these groups are summarized broadly below.

5.10.1.2.1 Hoopa

The Hoopa are Athapaskan speakers who occupied the Trinity River watershed from Hoopa Valley south to Grouse Creek at the time of contact. The name is sometimes spelled Hupa in the literature, however the tribe themselves use “Hoopa” on their website (Hoopa Valley Tribe Northern Division [N.D]), and this is therefore the correct spelling. Their ancestral territory centers in the Hoopa Valley, where the main villages were located (Theodoratus 1980), however the language studies indicate that they came from significantly further north approximately 900-1700 years ago (Wallace 1978). The six-mile-long (Wallace 1978) Hoopa valley and the mountains that enclose it became a reservation first in Treaty of 1851, and again in the Treaty of 1864 (Theodoratus 1981).

Permanent Hoopa settlements were traditionally situated along the banks of the Trinity River, with temporary camps set up during the summer hunting and gathering season. Privately owned hunting preserves were scattered throughout the valley and slopes of nearby mountains (Theodoratus 1980). The area is hard to access, with everything but the small valley being heavily vegetated, and as such they had little contact with outsiders. None the less they shared similar lifeways with the nearby Yurok and Karuk, with whom they are known to have intermarried. This seclusion meant that they came into contact with white settlers and miners later than other groups in the area, and this combined with the early treaties that removed such outsiders meant that they faired better than many other groups (Wallace 1978).

5.10.1.2.2 Karuk

The name of this group is often spelled “Karok” in the literature. However, the tribe itself spells their name Karuk on their website (Karuk ND), as does the Quartz Valley Reservation in Siskiyou County California, which has Karuk members (Native Ministries ND). Therefore, the correct spelling is “Karuk.” They are a Hokan-speaking people who inhabit the "middle reaches" of the Klamath River thought to be the earliest inhabitants of the Northwestern California culture area (King et al. 2016). The Karuk are similar in cultural pattern to their Northwestern California neighbors, particularly the Yurok, who inhabit the lower area of the Klamath River and the coast in the vicinity and to the south of the mouth of the Klamath, and the Hoopa, located to the south on the Trinity River (Theodoratus et al 1980).

5.10.1.2.3 Lassik

Lassik were an Athapaskan-speaking group whose territory was drained by the main Eel River between the mouths of Dobbyn and Kekawaka creeks, located immediately south of the Nongatl. The crest of South Fork Mountain marked their eastern boundary and separated them from the Wintu (Elsasser 1978). Boundaries between Athapaskan tribes were usually along the ridges of mountains which separated valleys; however, Lassik boundaries were also marked by the

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location of tributary streams (Kroeber 1925). They enjoyed amicable relations with the Wintu and the two groups often intermarried (Theodoratus 1981).

5.10.1.2.4 Chimariko

James Peabody Harrington's (1928 and 1931, published in 1983) interviews with Chimariko elders point to Chimariko tribal people living in the Project activity area vicinity as well. According to Harrington's studies, conducted in the 1930s, many places claimed as Chimariko camp sites along the Trinity River corridor suggested that earlier Chimariko territory was dozens (if not hundreds) of miles larger than described by Alfred L. Kroeber in his 1925 Handbook of the Indians of California. By 1849, according to Kroeber, there were only about 250 members of the Chimariko tribe living in a "twenty-mile stretch of the canyon of Trinity River from above the mouth of South Fork to (Big) French Creek." The Chimariko people were heavily affected by the Gold Rush, which threatened salmon as well as their camp sites, and faced near extinction. Chase-Dunn and Mann (1998) postulate that a high number of paired place-names, that is the meaning of the words translated from one language to another between Wintu and Chimariko indicate very peaceful relationships between the two groups and that the expansion of the Wintu in to Chimariko territory was a result of intermarriage leading to complete assimilation.

5.10.1.2.5 New River Shasta

Extraordinarily little is known about the New River Shasta, largely because most of the information we have about them is secondary- meaning ethnographers such as Dixon and Merriam got it from other groups who had interacted with them or had heard stories of them dating from before contact with Euro-Americans. Everything else is gleaned from whatever scraps of language the ethnographers could find. As such some ethnographers question of the New River Shasta ever existed at all, and due to the lack of information 4 out of the 6 Shastan Peoples are simply lumped together (Shasta, New River Shasta, Konomihu, and Okwanuchu) (Silver 1978, Theodoratus 1981).

The New River Shasta were first identified by Dixon in 1905, who at the time was describing his "Shasta-Achomawi" linguistic stock (Shasta, Konomihu, New River, Okwanuchu, Achumawi and Atsugewi). Dixon encountered this previously unrecorded dialect spoken by the rumored Shastan occupants of the Upper Salmon, living between the two forks above the Konomihu. They spoke a language markedly divergent from the Shasta proper and Konomihu, and their territory extended over the divide onto the head of the New River (Merriam 1930, Theodoratus 1981).

What happened to the New River Shasta is lost to time, although it can be inferred that many of the same forces which affected the Chimariko (near extinction as a result of the effects of the Gold Rush) must have affected this group and contributed to its disappearance. New River and Canyon Creek were thoroughly explored and exploited for mining resources in the early days of the Gold Rush. Several large claims and operations were established in that area, particularly at the forks of the New River and the mouth of Quinby Creek. No one knows if the New River group fled across the Salmon Mountains (possibly to the area of the Scott Valley Shasta or with the Konomihu) or if they met the same fate as the Chimariko. In either case, the group is not mentioned specifically until Powers (1872) recorded information about the Chimalakwe, a group living on the New River above the Chimariko (Powers 1877). Merriam and others have subsequently speculated that the Chimalakwe may represent the New River Shasta at a point close to the end of their tribal existence (Theodoratus 1981).

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5.10.1.2.6 Nomlaki

The Nomlaki are Penutian-speakers whose territory lies immediately south of the Wintu. Kroeber (1925) referred to this group as the Central Wintun, a name which reflects their geographic location between the Wintu (Northern Wintun) and the Patwin (Southern Wintun). The Nomlaki language is closely related to that spoken by the Wintu and may be a dialect of the same language (Theodoratus 1981). They had friendly relationships with both their northern and southern Wintun neighbors and shared a number of cultural elements with them (Kroeber 1925). The Yana were Nomlaki neighbors to the east and the Yuki were neighbors to the west. Their relationship with the Yuki was uneasy and generally hostile, but the two groups engaged in a limited trade relationship, mostly in the form of trading salt for yewwood, a raw material for making bows (Theodoratus 1981).

The Nomlaki are divided into two groups: the Hill Nomlaki, who lived in the foothills west of the Sacramento River and south of Cottonwood Creek to the upper waters of Stony Creek; and the River Nomlaki of the Sacramento River drainage from its confluence with Cottonwood Creek to a point below Thomes Creek. Daily life was centered around the village, led by a hereditary chief (Goldschmidt 1978).

5.10.1.2.7 Wintu

The Wintu are part of a larger group known as the Wintun, which also includes the Nomlaki and Patwin, both located to the south of the Wintu. These groups fall into the broader Penutian language stock, which includes a number of northern and central California languages including Maidu, Miwok, Costanoan, and Yokuts (King et al. 2016, Kroeber 1925, Theodoratus 1981). The Wintu language has nine known dialects as the McCloud River, Trinity County, Shasta County, Upper Sacramento, Bald Hill, Hayfork, Keswick, Stillwater, and French Gulch dialects (King et al. 2016, Theodoratus 1981). The Wintu were (and remain) a comparatively large and widespread group with their tribal headquarters located in the City of Shasta Lake (Wintu ND).

The Wintu territory borders the traditional territories of several other groups including the Chimariko, Yuki, Nongatl, Nomlaki, Achumawi, Okwanuchu, Shasta, and New River Shasta within the counties of Shasta and Trinity, with some lands in the areas of Tehama and Siskiyou counties (Theodoratus 1981). Many of their direct descendants are still present today (Wintu ND). As such, eventhough the Wintu suffered the same atrocities as other native groups in California with the same levels of mortality, their ethnographic record is more complete due to a larger number of survivors living to tell their tales. Many of the adjacent groups (Chimariko, New River Shasta, Okwanuchu) were completely wiped out or left with so few survivors that they could not function as a society (Theodoratus 1981).

5.10.1.2.8 Yurok

The Yurok are Algonquian speakers who prior to contact occupied the lower Klamath River and a stretch of Pacific Coast near the mouth of the river, to the south of the Tolowa Dee-ni'. As such, Yurok culture is described in the literature as a southerly extension of the cultural patterns of the northwest coast of the United States, British Columbia, and Southern Alaska. Yurok cultural forms are closely related to their neighbors the Hoopa, Tolowa, and Karok who are also a part of this culture group (Kroeber 1925; Pilling 1978). However, not all scholars agree with this assessment: Pilling supports Sapir's contention that Yurok is an Algonquian language, like that of the neighboring Wiyot (Pilling 1978).

The traditional territory of the Yurok is described as the lower portion of the Klamath River from approximately Red Cap and Bluff Creeks to the Pacific Ocean and along the coast between the towns of Crescent City to the north and Trinidad to the south (Kroeber 1925, Theodoratus et al 1980). The Resighini Rancheria, one of two federally-recognized Yurok

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Tribes in the area, describe their traditional territory as “lower Klamath River and tributary watersheds, high country, coast and lagoons along the Pacific Ocean, and the ocean off this coastline west to the horizon (Resighini Rancheria ND, Who We Are)”. The Yurok Tribe (on their website) show and describe a similar area, calling the Klamath “the lifeline of our people” (Yurok Tribe ND, Our History).

5.10.1.3 Historical Overview of Mining in Trinity County

The first gold discovered in Trinity County is attributed to Pierson Barton Reading in 1848. He, along with several others, and sixty Sacramento Valley Indians worked a bar now called Reading’s Bar along Reading Creek, just downriver from the present Douglas City. The Reading discovery opened the flood gates for early gold miners, coming from all over the United States and from many countries around the world, and they spread out from Reading’s Bar to other parts of Trinity County during the latter half of the nineteenth century (Rich 2023).

Mining technology evolved and by 1898, a dredge associated with placer mining had been set up at Poker Bar along the mainstem Trinity River. In the years following, other dredges were installed in several places throughout Trinity County, including at Carrville, Trinity Center, Lewiston, and Weaverville. These dredges were “built locally and were a steady source of employment for residents of Lewiston, Douglas City” and other communities. By 1898, there were 327 hydraulic mines “working or claimed” in Trinity County (Adkins 2007).

Archaeological surveys in the vicinity of Trinity County have recorded associated resources ranging from scattered prospect pits and small tailings piles to huge complexes of mine workings, support facilities (blacksmith shops, powder houses, etc.), workers’ housing, hydraulic cuts, waste rock, and extensive ditch/reservoir systems. French Gulch in Shasta and Trinity counties has been considered a “Principal Gold District” (Clark 1970). Within the French Gulch district, Clark identified several other major mining areas including Weaverville. The largest and best-known of the hydraulic mines in the Weaverville area was the LaGrange Mine, which is one of the largest in California and is located in Oregon Gulch just west of Weaverville. It was said to have produced $3,500,000 in gold between 1893 and 1918 (King et al. 2016, Wee and Costello 2001).

Mining continued to be an important part of the economy of this region through the early 20th century and until around World War II, with the enormous placer dredges wreaking havoc on the fragile ecosystems in and surrounding the Trinity River. The outbreak of World War II pulled people and resources away from this effort, and gold mining at an industrial scale was not attempted thereafter in the Trinity River. Mining of gold and other metals is still practiced by residents and visitors on a smaller scale, although modern environmental regulations have put a stop to dredging and most other intensive gold extraction techniques (Rich 2023).

5.10.1.4 Known Cultural Resources

Cultural resources that are present within the Trinity River basin include archeological sites; isolated finds; buildings/structures/objects (e.g., buildings, bridges, etc.); National Register districts; and traditional cultural properties (TCPs) or sites of religious and cultural significance. Generally, these resources are classified by their age: precontact or historic-era.

Precontact cultural resources include or may include the following:

- Lithic scatters: These sites contain only flaked stone debitage and/or tools and are typically small and shallow, representing only short-term activities during which lithic tools were manufactured or repaired.

- Milling stations: These sites contain bedrock milling features and/or portable milling tools typically associated with food processing, with little if any other associated precontact materials.
- Simple habitations: These sites, in addition to flaked stone, also contain bedrock or portable milling equipment; and/or a midden deposit; and/or accumulations of dietary remains such as shell or animal bone.
- Complex habitations: These sites contain the constituents of simple habitations but also have unambiguous evidence of residential structures (e.g., house pits or large rock rings).
- Rock art: The rock art in the planning area mostly consists of cupules and petroglyphs (and at least one or two pictograph locations), either isolated or in association with other archaeological remains.
- Rock features: This site type includes cairns, walls, and small rock rings, some interpreted as hunting blinds or storage features, others lacking an obvious function.
- Quarries/prospects: Quarries are sites where raw material was obtained for making stone tools.
- Sacred Sites: These sites may include prayer locations, places of religious/spiritual importance, traditional gathering areas, or burials.

Historic-era resources are more difficult to classify into a few categories, as they cover a much wider range of themes and configurations than do precontact resources (King et. al 2016). In the vicinity of the Project activity area historic-era resources largely correspond to: infrastructure (i.e., transportation, water development, and communication); government-related sites and facilities; extraction economy (i.e., mining and logging); oversees Chinese; settlement/agriculture; Native resistance/Indian wars; the new century (i.e., wartime and hydroelectric development).

Unlike other cultural resource types, TCPs, landscapes, burial locations, and use areas are generally not discoverable by cultural resources professionals other than via consultation with local traditional communities. Furthermore, there is a possibility of buried cultural deposits, such as terrace deposits, in certain geomorphic areas.

5.10.2 Environmental Consequences

5.10.2.1 No Action

If the No Action alternative was selected, it is likely that restoration projects that are similar to what is part of the Proposed Action would be implemented over time within the basin. However, these projects would take longer to plan and permit compared to the streamlined approaches of the Proposed Action alternative. Therefore, effects to cultural resources as a result of the No Action alternative would be realized more slowly within the Project activity area as compared to the Proposed Action. Regardless of whichever alternative is chosen, federal actions would be subject to compliance with the requirements of Section 106 of the NHPA and other relevant laws and regulations.

5.10.2.2 Proposed Action

The Proposed Action includes eleven categories of restoration activities which could affect cultural resources. Each activity entails a certain amount of construction or ground disturbance. The table below summarizes the potential construction components or construction impacts by restoration activity category that could adversely affect cultural resources. Effects of particular concern are described in more detail below in Table 5-10.

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Table 5-10. Potential construction effects on cultural resources per activity category.

Restoration Activity Category	Potential Construction Effects with CMs Implemented
1. Restoration and Enhancement of In-Channel Habitat	Ground disturbance related to the development of temporary access roads, staging areas, and the use of heavy equipment; and alteration of streambanks related to large wood placement and excavation. Potential damage or destruction of historic mining-related features.
2. Floodplain Restoration	Ground disturbance related to the development of temporary access roads, staging areas, and the use of heavy equipment; modification or excavation of levees, berms, and dikes; and modification to streambanks related to installation of LTPBR. Potential damage or destruction of historic mining-related features.
3. Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings, and Other In-water Structures	Ground disturbance related to the development of temporary access roads, staging areas, and the use of heavy equipment; streambank modification with the removal of in-water structures; and removal/repair of culverts. Potential damage or destruction of historic mining-related features and stream-side heritage resources.
4. Water Conservation Projects	Ground disturbance related primarily to installation of water conservation structures and infrastructure and modification of streambanks through installation/repair of fish screens.
5. Salmon Carcass Placement	No adverse effects anticipated
6. Remote Site Incubators	Ground disturbance related to minor streambank disturbance during install of system and demobilization.
7. Bioengineered Bank Stabilization	Ground disturbance related to the development of temporary access roads, staging areas, and the use of heavy equipment; and alteration of streambanks related to grading, excavation, and installation of natural materials. Potential damage or destruction of historic mining-related features and stream-side heritage resources.
8. Aquatic, Wetland, Meadow, Riparian, and Upslope Habitat Enhancement	Ground disturbance related to the development of temporary access roads, staging areas, and the use of heavy equipment; manual and mechanical removal of invasive plants; removal of trees where necessary for watershed restoration; fence installation; and planting efforts.
9. Road Maintenance	Ground disturbance related to the use of heavy equipment and minor maintenance activities along roads. May need to assess integrity of historic roads and their values.
10. Road Rehabilitation	Ground disturbance related to the development of temporary access roads, staging areas, and the use of heavy equipment; streambank modification with the removal/replacement/repair of bridges and culverts; and installation of drainage features along roads.
11. Road Decommissioning	Ground disturbance related to the use of heavy equipment; removal of roadway infrastructure and stream-crossing structures; and excavation of roadways.

Site-specific restoration projects associated with the Proposed Action would require their own NHPA Section 106 reviews and adherence to other heritage-related laws and regulations by the federal agencies in order to avoid and minimize adverse effects to cultural resources or complete necessary mitigative measures. Based on restoration activities proposed by implementors during the design phase for each site-specific project, an Area of Potential Effects (APE) would be determined. The APE would include, but will not be limited to, areas where the site-specific project would cause construction-related effects, particularly as a result of ground-disturbing activities, to cultural resources (i.e., disturbance areas, staging areas, material storage, temporary roads, etc.). A cultural resource field inventory along with tribal review would be performed at an agency-approved professional level within the APE and would be utilized in support of the Section 106 (and other legal or regulatory) review to determine if there would be adverse effects to cultural resources. The lead federal agency would determine any applicable CMs necessary to avoid adverse effects to cultural resources to the extent possible. Recommended CMs specific to cultural resources are included in Appendix B. If

any adverse effect to a cultural resource is identified with the potential to occur as a result of a site-specific project, the lead federal agency would determine cultural mitigation (on a project-by-project basis) that is appropriate to offset the adverse effect. In extreme cases, that site-specific project could be determined to be unfeasible.

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6 Regional Effects

In addition to effects that result only from the Proposed Action, effects that result from other activities at a regional level were also analyzed to determine if the effects could amount to a level of significance. This analysis looked at other regional activities that have affected or could affect the same resources as the Proposed Action alternative; in this case watershed resources, which include water quality and hydrology; geology and soils; vegetation and wetlands; fisheries; wildlife; climate, recreation, noise, and cultural resources. The effects of past actions are reflected in the descriptions of current existing conditions. Lands in the vicinity of the Project activity area include USFS-, BLM-, and privately-owned land.

6.1 Flow Management

As previously mentioned, flows are highly managed on the Trinity River mainstem. ROD flows are released from the Lewiston Dam to mimic natural Trinity River flows and interact with downstream areas to enhance conditions for all life stages of fish and wildlife. However, about 50% of Trinity River flows are still diverted to the Sacramento River basin. Lower flows cause degradation of aquatic habitat within the Trinity River due to loss of deep-water habitats and a limited ability to maintain water temperatures required for cold-water fish survival. Over time, much of the mainstem between Lewiston and the North Fork Trinity River confluence has been confined to a narrow channel bordered by dense riparian berms. TRRP, upon the recommendations of the TMC, continues to strive toward managing flows in the river to support aquatic habitat downstream of the dams.

6.2 Hatchery Influence

Hatchery influences are substantial in the Trinity River watershed. Each year, TRH releases approximately 300,000 coho smolts, 448,000 steelhead, and 4.3 million Chinook, and currently, returns are dominated by hatchery fish (USFWS and HVT 1999). In recent years, hatcheries in California have stopped all inter-basin stock transfers, limited out-planting (e.g., all TRH coho smolts are released volitionally at the hatchery), marked outplants, and placed limits on production levels. Therefore, the current level of impact of hatchery fish on natural fish may be significantly less than in the past (CDFG 2002). No hatcheries or artificial propagation occur in the Lower Klamath River coho population area, but there are two hatcheries in the Klamath River Basin that influence fisheries: TRH and the Fall Creek Hatchery (which replaced the Iron Gate Hatchery).

6.3 Cannabis Farming

In 2018, the State of California legalized the recreational use of cannabis, as well as the cultivation and manufacture of cannabis plants and products. In Trinity and Humboldt counties, there are many cannabis farms which cumulatively reduce flow volume and increase discharge of waste and pollutants in streams, which adversely affects water quantity and quality in the Project activity area. Presently, there is no watershed-scale evaluation of the effects of cannabis farming on aquatic habitat in the Trinity River or particular streams (NMFS 2020a).

6.4 Residential Development

Residential development as a result of human population growth in the Project activity area is expected to remain relatively stable over the next 10 years. Once development and associated infrastructure (e.g., roads/trails, drainages,

powerlines, and water development) are established, the effects to the landscape are typically permanent. Anticipated effects on watershed resources include loss of riparian vegetation, changes to channel morphology and dynamics, altered hydrologic regimes (e.g., increased storm runoff), increased sediment loading, and elevated water temperatures where shade-providing canopy is removed (NMFS 2020a).

6.5 Resource Extraction

Resource-based industries are likely to continue to have an influence on environmental conditions within the Project activity area for the indefinite future. Logging continues to be conducted on both public and private lands throughout the tributaries of the Trinity River, except in Canyon Creek (Reclamation 2019). STNF's vegetation management projects include those for forest health/thinning and fuels reduction. Some mining for gravel, aggregate, and minor precious metals occurs on the Trinity River floodplain and a few tributary watersheds. Mining operations can affect coarse sediment supplies and impair water quality via contaminated and sediment-laden runoff from operations. The lack of protective measures in existing regulatory mechanisms, including land management plans (e.g., State Forest Practice Rules), contributes in varying degrees to the decline of salmonids. Sedimentation and loss of spawning gravels associated with poor forestry practices and roadbuilding are particularly chronic problems that can reduce the productivity of fisheries. However, resource extraction industries have adopted management practices that reduce many of their most harmful impacts, which were unknown or not commonly used until recently (NMFS 2020a). The STNF regularly implements forestry projects using resource protection measures and BMPs to reduce sedimentation into streams and otherwise reduce effects to environmental resources.

6.6 Wildland Fire Control

Control of wildland fires may include the removal or modification of vegetation due to the construction of firebreaks or setting of backfires to control the spread of fire. This removal of vegetation can trigger post-fire landslides as well as create chronic sediment erosion that can negatively affect aquatic habitat. In addition, the use of fire retardants may adversely affect aquatic habitat if used in a manner that does not sufficiently protect streams, with the potential for aquatic organisms to be exposed to lethal amounts of the retardant (NMFS 2020a).

6.7 Aquatic Habitat Restoration

Since 2009, TRRP has implemented Trinity River mainstem channel rehabilitation projects at all the Phase 1 channel rehabilitation sites named in the 2000 Master EIR and at nine of the Phase 2 sites. The Deep Gulch and Sheridan sites were constructed in 2017. The Bucktail site, constructed in 2008, was expanded in 2016 to include additional areas. The Dutch Creek project was constructed in 2020. The Chapman Ranch Phase A site was constructed in 2019 and the Phase B site was completed in 2021. The Oregon Gulch project was completed in 2023. These mainstem projects have improved anadromous fish spawning and rearing habitat throughout the extent of the Trinity River.

TRRP continues to add sediment within the 40-mile reach downstream of the Lewiston Dam. In addition, TRRP-managed flows have been implemented yearly since 2004. Ongoing monitoring efforts by TRRP partners continue to document improvements in aquatic habitat use, alluvial processes, and riparian vegetative communities along the mainstem. Continued sediment and wood augmentation projects are intended to improve anadromous fish spawning and rearing habitat in the Trinity River mainstem.

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Beyond TRRP's mainstem channel rehabilitation and sediment augmentation projects, there have been several restoration and road sediment reduction projects implemented by various agencies and organizations throughout the Trinity River watershed. While some of these were considered in the 2009 Master EIR, the USFS, Five Counties Salmonid Conservation Program, Northwest Resource Conservation and Development Council, Watershed Research and Training Center, Trinity County Resource Conservation District, Yurok Tribe, Hoopa Valley Tribe, Nor Rel Muk Wintu Nation, and other local nonprofits and governments have been funded for and/or completed additional projects intended to improve watershed conditions, restore aquatic habitat, improve aquatic connectivity, and reduce road-related sediment delivery to streams and rivers. These watershed restoration projects are intended to improve water quantity and quality as well as rearing and spawning habitat in the Trinity River watershed.

6.8 Proposed Action

The Proposed Action is a continuation and expansion of the watershed restoration efforts that have already been accomplished to date. The Project is an effort to streamline design and planning processes, including environmental compliance, for proposed restoration actions across the watershed, thereby increasing the number of restoration actions that can be implemented over time. Ultimately, as previously discussed, the Proposed Action intends to improve instream and riparian habitat to accelerate the recovery of north coast salmonid populations (coho salmon, steelhead, and Chinook salmon) and other special status aquatic species through site-specific restoration actions implemented to address the following objectives:

- Restore and improve instream conditions sufficient to support all life stages of salmonids and other aquatic species;
- Restore upstream and downstream fish passage for all life stages of salmonids;
- Restore continuous paths for wood dispersal, nutrient cycling, sediment transport, and movement of other vegetative material essential for productive aquatic habitat;
- Maintain or restore native plant communities and vegetative structure impacted by invasive plants and pathogens, while rehabilitating eroding streambanks to improve water quality, shade conditions, and large wood recruitment;
- Repair, replace, or remove ineffective instream structures;
- Restore and improve riparian and meadow habitat in order to promote healthy conditions for aquatic and terrestrial wildlife populations;
- Improve late summer/fall base flow conditions through process-based restoration, water conservation improvements, and meadow restoration;
- Increase nutrient inputs through salmon carcass placement in the watershed; and
- Stabilize upslope areas around road infrastructure to minimize erosion and sediment discharges within the watershed to bring the sediment impaired watersheds into compliance with sediment reduction TMDLs for the South Fork Trinity and Trinity Mainstem rivers (EPA 1998 & EPA 2001).

Each of the regional activities mentioned are discussed in the context of effects relative to the Proposed Action below.

6.8.1 Flow Management

Flow management in the Trinity River, including flow diversion into the Sacramento River basin, limits aquatic habitat-forming hydraulic processes and alters water temperature regimes. The Proposed Action would have minor long-term

benefits to instream flows in the Trinity River tributaries as a result of water conservation activities. Because the effects of flow management are primarily realized in the mainstem Trinity River, the Proposed Action is not anticipated to affect the hydrology of the mainstem Trinity River at a watershed level.

6.8.2 Hatchery Influence

Salmonid populations are highly managed in the Trinity River basin, which is anticipated to continue. The Proposed Action is anticipated to affect salmonid populations by improving available aquatic habitat, nutrient cycling through salmonid carcass placement, and survival of juvenile salmonids through the use of RSIs in the basin. Both the existing hatchery production and the Proposed Action are anticipated to increase salmonid populations within the Trinity River basin.

6.8.3 Cannabis Farming

Cannabis farming in the Trinity River basin is known to have minor adverse effects to water quality and hydrology. The Proposed Action through water conservation activities would have beneficial effects to hydrology within tributaries that may improve hydrologic conditions along tributaries where cannabis farming diversions are an issue. The site-specific projects that are part of the Proposed Action would have short-term water quality sedimentation effects; however, in the long-term, the Proposed Action would provide increased sediment storage and decrease of sedimentation as a result of roadway runoff that may help address some of the sediment inputs from cannabis farming.

6.8.4 Residential Development

Residential development results in riparian vegetation removal, changes to channel morphology and dynamics, altered hydrologic regimes because of increases of stormwater runoff, and increased sediment loading due to ground disturbance. The Proposed Action would restore riparian vegetation, but it is unlikely that this would occur in areas developed for residences. The Proposed Action would improve habitat within the floodplain, including instream areas, which could address some of the adverse impacts that residential development has had to channel morphology and hydrologic regimes. The site-specific projects that are part of the Proposed Action would have short-term water quality sedimentation effects; however, in the long-term, the Proposed Action would provide increased sediment storage and decreased sedimentation as a result of roadway runoff that may help address some of the sediment inputs from residential development.

6.8.5 Resource Extraction

The primary concerns with resource extraction in the Trinity River basin is sedimentation and consequent loss of spawning gravels associated with poor forestry practices and roadbuilding. The site-specific projects that are part of the Proposed Action would have short-term water quality sedimentation effects; however, in the long-term, the Proposed Action would provide increased sediment storage and decrease of sedimentation as a result of roadway runoff that may help address some of the sediment inputs from resource extraction.

6.8.6 Wildland Fire Control

The primary concerns with wildland fire control include sediment discharges (as a result of erosion) and chemical contamination (by fire retardants) to waterways within the Trinity River basin. The site-specific projects that are part of the Proposed Action would have short-term water quality sedimentation effects; however, in the long-term, the

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Proposed Action would provide increased sediment storage and decrease of sedimentation as a result of roadway runoff that may help address some of the sediment inputs from wildland fire control. The Proposed Action would not increase chemical contamination within the basin, nor would it address the chemical contamination added by wildland fire control efforts.

6.8.7 Aquatic Habitat Restoration

The Proposed Action would increase the number of site-specific restoration projects at a watershed-scale, which would increase beneficial effects associated with aquatic habitat restoration. These benefits include, but are not limited to, improvements to aquatic habitat, geomorphic processes, riparian vegetative communities, and water quality.

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Appendix A: Implementation Plan

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1 Introduction

The Trinity River Restoration Program (TRRP) of the Bureau of Reclamation (Reclamation) has developed the Trinity River Watershed Restoration Project (Project) in cooperation with the Bureau of Land Management (BLM) and the U.S. Forest Service (USFS). The Proposed Action alternative is described thoroughly in Section 4 of the Project's Environmental Assessment (EA) and consists of a suite of instream and riparian restoration activities. Proposed activities are grouped into three general categories: instream habitat restoration; upslope habitat restoration; and road maintenance, rehabilitation, and decommissioning activities. In total, there are 11 restoration activity categories included in the Project as shown below. User-friendly activity cards summarizing each activity category are included in Appendix H of the PEA.

Instream Habitat Restoration:

1. Restoration and Enhancement of In-Channel Habitat
2. Floodplain Restoration
3. Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures
4. Water Conservation Projects
5. Salmon Carcass Placement
6. Remote Site Incubators

Upslope Habitat Restoration:

7. Bioengineered Bank Stabilization
8. Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement

Road Maintenance, Rehabilitation, and Decommissioning Activities:

9. Road Maintenance
10. Road Rehabilitation
11. Road Decommissioning

This implementation plan is intended to be a tool for site-specific project proponents to use for watershed restoration projects within the Trinity River watershed (within the Project activity area). This document provides guidance about the environmental compliance process, sideboards site-specific restoration projects must adhere to and other helpful information.

1.1 Purpose and Need

TRRP was established to restore the fisheries of the Trinity River, which had precipitously declined. To that end, the purpose of the Project is to improve instream and riparian habitat to accelerate the recovery of north coast salmonid populations (coho salmon, steelhead, and Chinook salmon) and other special status aquatic species.

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1.2 Project Activity Area

The proposed Project activities would take place within the Trinity River watershed along the mainstem and tributaries both below and above the Lewiston and Trinity dams as shown in Figure 1-1 of the EA. Trinity River watershed areas located within the Six Rivers National Forest and the Hoopa Valley Reservation are excluded from the Project activity area.

1.3 Activities not Included in the EA

The following site-specific project activity types are not covered by the EA:

- Road-related activities that are not primarily for the purpose of watershed restoration (e.g., instream sediment reduction, restoring floodplain processes, etc.)
- Non-native invasive plant species control via herbicide application
- Fuels reduction projects including understory burning
- Silvicultural activities (e.g., timber harvest/management)
- Grazing management activities with the exception of: prescribed grazing for non-native invasive plant control; and installation of livestock exclusion fencing intended to prevent impacts to stream channels and/or floodplains

2 Site-Specific Project Implementation

Each site-specific restoration project undertaken by a project proponent would be required to go through its own review process (led by TRRP, BLM, or USFS) to ensure these site-specific projects: meet the purpose of the Project; the proposed activities align with the Proposed Action; are implemented according to the Project environmental commitments; comply with the applicable environmental regulations; and do not exceed the effects determined in the EA (Figure 2-1). If a site specific project's effects are beyond those determined in the EA, further NEPA analysis and documentation would be required (e.g., Supplemental EA, Supplemental Analysis).

Generally, site-specific projects that are funded federally (e.g., TRRP, USFS, or BLM), are on federal land (e.g., USFS- or BLM-managed land), or require federal approval (e.g., a U.S. Army Corps of Engineers 404 permit) have what is called a "federal nexus" and therefore, must comply with federal regulatory requirements including, but not limited to, those of the National Environmental Policy Act (NEPA), Endangered Species Act (ESA), National Historic Preservation Act (NHPA), Wild and Scenic Rivers Act (WSRA), and Wilderness Act. The process for complying with NEPA, ESA, NHPA, WSRA, and the Wilderness Act related to the Project are outlined in detail below. See Appendix D of the Project EA for further details on these and additional laws and regulations. Some site-specific projects may involve multiple federal agencies. To comply with these federal regulations, a lead federal agency may be determined for NEPA and/or NHPA compliance through coordination between these agencies. For example, the Section 106 NHPA review process can be led by one federal agency for a site-specific project that involves more than one federal agency.

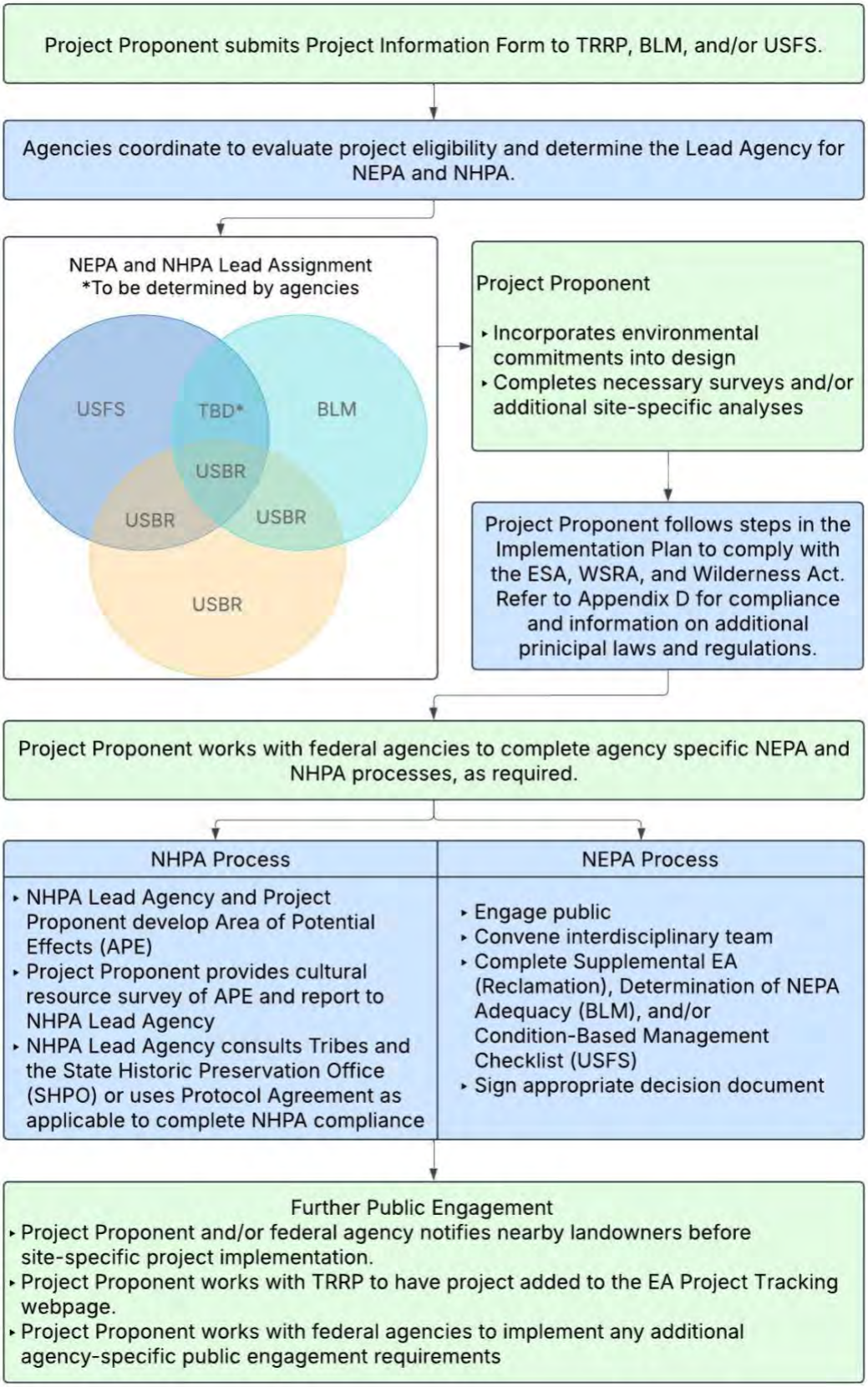

Figure 2-1. Implementation Flowchart

2.1 National Environmental Policy Act

Each site-specific project proponent will need to coordinate with the federal agencies to determine which agency will facilitate the NEPA process. A Venn Diagram developed to assist with this determination is included in Figure 2-1. Generally, site-specific projects involving TRRP/Reclamation will require a Supplemental EA; site-specific projects with BLM as the only federal agency will require a Determination of NEPA Adequacy (DNA); and site-specific projects with the USFS as the only federal agency will require a Condition-Based Management (CBM) checklist.

2.1.1 TRRP (Reclamation)

For each site-specific restoration project completed under the Project EA with TRRP or Reclamation as the lead federal agency the following steps need to be taken:

1. Submit the Project Information Form (link provided in Section 3) to TRRP staff for review.
2. The project proponent would work with TRRP staff to prepare a Supplemental EA, which would consist of a brief site-specific environmental effects analysis. Additional site-specific environmental effects analyses may be required if effects are beyond those disclosed in the Project EA. A link to the Supplemental EA template can be found in Section 3.
3. Based on the Supplemental EA, a Finding of No Significant Impact (FONSI) may be prepared if the Supplemental EA has demonstrated that there are no significant impacts resulting from the site-specific project; if not, an Environmental Impact Statement (EIS) will be initiated.
4. If the BLM or USFS are a cooperating agency on a Supplemental EA, a NEPA Decision would be issued, and the project may be subject to a 30-day appeal and/or objection period.
5. The final Supplemental EA will be posted to the TRRP website and the Bureau of Reclamation NEPA website.

2.1.2 BLM

For each site-specific restoration project completed under the Project EA with BLM as the lead federal agency the following steps need to be taken:

1. The project proponent will submit the Project Information Form (link provided in Section 3) to the BLM Interdisciplinary Team for review.
2. BLM staff and/or the project proponent will complete a DNA to ensure the associated effects of each site-specific project will not exceed those described in the Project EA and ensure conformance with the BLM's Northwest California Integrated Resources Management Plan (NCIP).
3. If a DNA determines that the effects will exceed the effects disclosed in the Project EA, additional analysis under a separate NEPA document will be required.
4. The DNAs will describe the basic site-specific project location and either the proposed finding of effect to cultural resources or the proposed use of an exemption under the California BLM State Protocol Agreement (PA), if that is the case.
5. If the PA is utilized for determining site-specific project compliance with the NHPA, the BLM will post a draft DNA on the BLM's ePlanning NEPA register for at least seven days, consistent with the terms of the

PA. If multiple federal agencies are involved in a site-specific project, the PA cannot be used due to stipulations within the PA. In this case, the BLM or designated NHPA Lead will comply with 36 CFR 800. More information on NHPA compliance can be found in Section 2.3.

6. BLM staff will post the DNA on BLM's ePlanning website for public comment.
7. BLM will issue a Decision Record approving the site-specific restoration project, as analyzed in the DNA. Decision Records are subject to a 30-day appeal period for each site-specific project and subject to Administrative Remedies in accordance with regulations.

2.1.3 USFS

Site-specific restoration projects for which USFS is the lead federal agency would be implemented using a CBM approach to streamline restoration activities that enhance and restore salmonid habitat at the watershed-scale. The CBM approach can be applied where climate change, wildfire risk, and historic and ongoing anthropomorphic impacts create dynamic conditions that may change during the site-specific project implementation. As Project activities would be accomplished at the watershed-scale, the Project EA analyzed the effects of the activities using a conservative approach, analyzing all areas where Project activities would be feasible and appropriate. Project effects are summarized in Chapter 5 of the EA and additional details of the analyses are provided in the specialist reports in Appendices I, J, K, L, M of the EA. USFS Special Use Permittees may use the coverage of the Project EA through the CBM approach.

In general, USFS's CBM approach would entail the following sequence of implementation steps:

1. The project proponent will submit the Project Information Form (link provided in Section 3) to Shasta-Trinity National Forest (STNF) staff for review.
2. Interdisciplinary Review and Project Consistency
    a. Environmental Assessment Consistency
        i. Does the site-specific project meet the purpose of the Project?
        ii. Do the site-specific proposed activities align with the Proposed Action?
        iii. Will the site-specific project be implemented according to the Project environmental commitments?
        iv. Does the site-specific project comply with the applicable environmental regulations?
        v. Would the effects of implementation remain within what was analyzed and disclosed in the environmental assessment?
        vi. Have conditions changed or has new information become available that would alter outcomes? If it is determined during review that effects of treatments would likely be outside what is analyzed in the environmental assessment, those adjustments would be modified to be within predicted effects, eliminated, or further appropriate NEPA process and decision for those adjustments would occur per Forest Service Handbook 1909.15.10, section 18.
    b. Complete CBM Checklist
        i. STNF resource specialists complete CBM Checklist (link provided in Section 3). The checklist brings together the results of the above steps in the review process and documents the results of interdisciplinary development and review of the site-specific project to be implemented.

3. Notifications and Consultation Verification
    a. Notification to public (interested parties, neighbors, permittees, permit-holders, etc.)
    b. Notification to permittees (range, utilities, etc.)
    c. Consultation requirements: Verify the following questions –
        i. Is consultation under Section 106 of the National Historic Preservation Act complete with Tribes, SHPO and other stakeholders?
        ii. Is USFWS and NMFS consultation for relevant terrestrial, aquatic, and botanical species complete?
        iii. Have consultation results been shared with unit-level biologists and line officers?
    d. Are there any Regional Water Quality Control Board clearances required? See Appendix D of the EA for more information on the Clean Water Act.
    e. Special area considerations: if any special areas where action requires approval from line officer authority above the level of the Forest (e.g., Regional Forest, Deputy Chief) are involved, has that permission been obtained to proceed? For example, vegetation manipulation in designated wilderness areas would need to have a minimum requirements analysis completed and approved prior to implementation.
4. For work to be completed on National Forest System Lands, USFS will need to have an agreement or contract in place with the proponent. Agreement types may include, but are not limited to, a non-funded agreement (non-FSM 1580), partnership agreement, interagency agreement, tribal agreement, or a special uses agreement.

Using this approach satisfies NEPA because there is validation of data and assumptions relied upon in the NEPA analysis prior to implementation. USFS would follow the direction in their agency's NEPA guidance regarding evaluation of updated information, circumstances, and requirements that could trigger supplementation to the effects analysis included in the EA.

2.2 Endangered Species Act

ESA compliance for aquatic and terrestrial species is required for implementing site-specific watershed restoration projects. There may be multiple existing consultations for the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS, collectively called "the Services") that site-specific projects may rely on for ESA compliance. Project proponents may also request individual site-specific project consultations with the Services as necessary. ESA coverage for the Project's site-specific restoration activities may also be provided by the following biological opinions (BiOps):

- NMFS' 2020 BiOp for the Trinity River Restoration Program's Mechanical Channel Rehabilitation, Sediment Management, Watershed Restoration, and Monitoring Actions in Trinity County, California (2020 TRRP BiOp, WCRO-2019-03827); and
- USFWS' 2025 Programmatic BiOp for the California Statewide Programmatic Restoration Effort (USFWS Statewide Restoration BiOp, FWS Reference: 2022-0005149-S7).

The fish and wildlife species as well as any associated designated critical habitat covered by these BiOps are discussed in detail in the Fisheries Technical Report (Appendix K of the EA) and the Wildlife Technical Report (Appendix L of the EA). ESA-listed plants are discussed in Appendix J of the EA.

The 2020 TRRP BiOp and the 2025 USFWS Statewide Restoration BiOp were used to develop the environmental commitments included in Appendix B of the EA to avoid and minimize Project effects to threatened and endangered species in compliance with ESA requirements. Both of these ESA Section 7 consultations may be subject to reinitiation due to species status updates and proposed action updates. At the time of the development of the EA, the 2020 TRRP BiOp is anticipated to be reinitiated to better align with the restoration activity categories that are part of the Proposed Action and to reduce project limitations. The USFWS Statewide Restoration BiOp had just been re-issued in February 2025 to include additional species such as northwestern pond turtle. Ultimately, guidance (including process and environmental commitments) included in the updated BiOps would supersede ESA compliance guidance included in the Project EA.

The ESA compliance process for each site-specific project according to these BiOps is described below.

2.2.1 2020 TRRP BiOp

The project proponent would send Project Notification Form information to the TRRP Natural Resources Specialist including the following:

1. Site-specific project name: use the same project name from notification to completion (i.e., Jones Creek 2015 Culvert Replacement)
2. Site-specific project location: watershed/stream name; and latitude and longitude (in decimal degrees); or map
3. Agency (project proponent) contact information: agency and project lead name
4. Timing: site-specific project start and end dates; and potential need to work outside of the in-water work window
5. Activity type
6. Project description: brief narrative of the site-specific project and objectives
7. Extent: stream length (feet/miles) and area (square feet/acres) to be treated (restored); and linear feet/miles of aquatic/riparian habitat benefited
8. Fish information
    a. Species affected
    b. Distance to occupied habitat
    c. Fish handling required (seining/block nets/electrofishing/dewatering/etc.)
9. Verification that all appropriate Conservation Measures, Project Design Criteria, and BMPs listed in the TRRP BA (these have been incorporated into the environmental commitments included in Appendix B of the Project EA) have been thoroughly reviewed and will be incorporated into site-specific project design, implementation, and monitoring as appropriate based on project details. The interagency coordination team (lead federal agency and NMFS) may request additional verification dependent on the scope and scale of the site-specific project.
10. Effects determination of site-specific project for Southern Oregon Northern California Coast (SONCC) coho (no effect, NLAA, LAA)
11. Project lead fish biologist's signature (staff member of either the lead federal agency or the project proponent)

Following site-specific project completion, the project proponent will provide applicable monitoring and reporting information to the TRRP Natural Resources Specialist including, but not limited to, the following: any

capture and mortality of juvenile coho salmon; any problems that may have arisen during implementation of the activities; and any unforeseen ESA-listed fish effects as a result of site-specific project activities.

2.2.2 2025 USFWS Statewide Restoration BiOp[1]

The Bureau of Reclamation California-Great Basin Region is an Action Agency on the USFWS Statewide Restoration BiOp (PBO). It is up to the Action Agencies (e.g. Reclamation, USFWS) to evaluate project eligibility. Project proponents will work with TRRP/Reclamation for coverage under the PBO.

- Step one: The project proponent contacts Action Agency (Reclamation).
- Step two: Action Agencies coordinate to evaluate project eligibility under the PBO.
- Step three: Obtain an Official Species List from the USFWS Information for Planning and Consultation (IPaC) online tool[2] to identify the listed or proposed species and evaluate their potential to occur in the Action Area
    - Determine General Protection Measures and Species Protection Measures (Appendix B of the Project EA) that are applicable based on project type, site-specific constraints, project location, and Covered Species potentially occurring in the Action Area.
    - In coordination with the Lead Action Agency, the project proponent can seek Technical Assistance with the appropriate USFWS Field Office to discuss project-specific needs and/or identify applicable protection measures.
    - Prepare and submit ESA Section 7(a)(2) Review Form (Appendix A of the PBO) to Lead Agency[3]
- Step four: Within 30 calendar days (and no longer than 60 calendar days) of receiving the ESA Section 7(a)(2) Review Form, the Lead Action Agency will review the ESA Section 7(a)(2) Review Form for completeness and notify the project proponent if their form is complete or incomplete.
    - If the ESA Section 7(a)(2) Review Form is complete, the Lead Action Agency will submit the form to their respective USFWS Field Office for Section 7(a)(2) compliance under the PBO.
    - If the ESA Section 7(a)(2) Review Form is incomplete, the Lead Action Agency will notify the project proponent where additional information is needed. Return to Step 3 above until the form is complete.
    - The project proponent may not implement their project until all applicable Federal, State, and local permits are obtained.
- Step five: Project proponent implements the project as described on the approved ESA Section 7(a)(2) Review Form. Report all injury or mortality of Covered Species to USFWS ES (Ecological Services Program) within 48 hours.
    - Submit a Post-Construction Report Form (Appendix B of the PBO) to USFWS ES (with the Action Agency copied) by December 1st. If there is ongoing revegetation or species monitoring beyond the report due date, provide a report annually on December 1st until success criteria have been met, or monitoring has ceased.

[1] From "Figure 2: Flow Chart on Administration for ESA Section 7(a)(2) Compliance with the USFWS" in the 2025 USFWS Statewide Restoration BiOp.

[2] https://ipac.ecosphere.fws.gov/

[3] Ideally, the Project Proponent will submit the completed ESA Section 7(a) (2) Review Form and the Clean Water Act permit application concurrently. USFWS Programs have delegated Section 7(a)(2) authority and will serve the role of USF\NS ES for their respective projects.

    - All revegetated areas will be maintained and monitored for a minimum of 2 years after replanting is complete, or until success criteria are met, to ensure the revegetation effort is successful. The standard for success is 60% cover compared to an intact local reference site. If an appropriate reference site or pre-project conditions cannot be identified, success criteria will be developed for review and approval on a project-by-project basis, based on the specific habitat impacted and known recovery times for that habitat and geography.
- Step six: Action Agencies using the PBO will meet annually in January to discuss implementation, program-wide impacts and identify any needs to the program or process.

2.2.3 Limits on Proposed Activities Frequency and Location

Project types and quantities may be limited depending on which BiOp(s) a site-specific project is relying on. The most common BiOps anticipated to be used for site-specific projects completed under the Project EA are the 2020 TRRP BiOp and the 2025 USFWS Statewide Restoration BiOp. Current annual watershed restoration project limitations based on the 2020 TRRP BiOp are listed below.

- 2 fish passage/dam removal projects
- 8 channel/floodplain rehabilitation projects (4 mainstem and 4 tributary)
- 2 in-stream habitat enhancement projects
- 3 streambank stabilization projects
- 4 road-related projects with in-water activities (i.e., road decommissioning with culvert removal)

TRRP is in the process of reinitiating consultation with NMFS to include all project activities described in the Proposed Action (of the Project EA) that were not previously analyzed in the 2020 TRRP BiOp. Project limitations will also be reviewed during the consultation reinitiation to reduce limitations and increase the number of projects that may be implemented in the watershed per year. Refer to the most recent TRRP BiOp when implementing site-specific projects.

2.2.4 Environmental Commitments

Environmental commitments intended to reduce environmental impacts are included in Appendix B of the EA and cover planning, implementation, post implementation, and monitoring. These would be incorporated into site-specific restoration project designs during the planning process. The environmental commitments have been sorted into three different categories: general protection measures (GPMs); design guidelines by activity type; and conservation measures (CMs) by environmental resource.

These environmental commitments were primarily developed based on measures required by the 2020 TRRP BiOp and the 2025 USFWS Statewide Restoration BiOp. Appendix B of the EA provides recommendations to guide project proponents as they develop a list of appropriate environmental commitments. Project proponents should work with the Action Agency and Services to develop an appropriate list of environmental commitments for their site-specific projects.

2.3 National Historic Preservation Act

Federal agencies are required to consider the effects of their actions on historic properties (i.e., cultural resources that rise to a certain level of significance) in compliance with Title 54 USC Section 306108, commonly referred to as Section 106 of the NHPA, and its implementing regulations located at 36 CFR § 800. Section 106 responsibilities include consultation on historic properties with interested parties (e.g., Indian tribes) and affording the Advisory Council on Historic Preservation a reasonable opportunity to comment on findings. Which federal agency, involved in a site-specific project, would serve as the lead federal agency for the Section 106 review would depend on a number of factors including, but not limited to, the following: if any historic infrastructure managed by a particular federal agency is being modified by a project (e.g., the removal of certain in-water structures); if the project will take place on federally-managed land; or if the project is funded by a particular agency. Ultimately, as previously discussed, the federal agencies involved in the site-specific project would determine which agency would lead the Section 106 review.

To complete the Section 106 review for each site-specific project, the following process would be followed:

1. The project proponent would provide a project description detailing all project activities particularly related to any areas of ground disturbance, staging, and/or access routes.
2. The project proponent would work with the lead federal agency for NHPA to develop an area of potential effects (APE).
3. The archaeologists at the lead federal agency would initiate the Section 106 review process and any other cultural resources related regulations relevant to the lead agency, including Tribal Consultation.
4. The project proponent would conduct a cultural resource survey of the APE and provide a report to the lead federal agency or work directly with the lead federal agency to conduct a cultural resource survey and develop a report. In addition to ground surveys, a records review would be performed to determine past archaeological studies within the APE.
5. The lead federal agency would analyze the site-specific project effects to cultural resources and prepare documentation of the findings to complete the Section 106 review. This may include consulting the SHPO. Avoidance, minimization, and mitigation measures to limit project effects would be identified during this process as well.
6. If cultural mitigation is required as part of consultation, the project proponent would work with the lead federal agency to identify potential options. Possible mitigation measures may include modification of site-specific project design or avoidance of cultural areas.

This is the general process for site-specific projects to meet Section 106 requirements. It should be noted that this process can take time (~6-12 months) and project proponents should plan adequate time into project schedules for this process.

It should be noted that for site-specific projects with BLM as the lead federal agency, the California BLM State Protocol Agreement may potentially be utilized for compliance with the NHPA.

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2.4 Wild and Scenic Rivers Act

The BLM and USFS manage segments of the Trinity WSR on federal lands they manage and, along with the National Park Service (NPS) for non-federal lands, are responsible for implementing Section 7 of the WSRA for the entire Trinity WSR including federal and non-federal lands, which they cooperate to carry out.

When a site-specific project occurs within the proximity of a Wild and Scenic River, Section 7 of the WSRA requires review and evaluation of federally assisted water resources projects and determination of effects by the federal river managing agency to ensure that (1) for projects proposed on a WSR, the project would not have an adverse effect on river values (free-flowing condition, water quality, outstandingly remarkable values (ORVs) or (2) for projects proposed above, below, or on a tributary to a WSR, the project would not invade the WSR or unreasonably diminish the WSR's scenic, recreational, and fish and wildlife values.

In addition to designated Trinity WSR, there have been rivers identified by the USFS and BLM as "suitable rivers" under WSRA Section 5(d)(1), meaning they were found suitable for potential future addition to the National Wild and Scenic Rivers System. While WSRA Section 7 does not apply to these rivers, agency interim measures say that any water resources projects proposed on suitable rivers "shall be analyzed as to their effect on a river's free-flow, water quality, and outstandingly remarkable values, with adverse effects to be prevented to the extent of existing agency authorities (such as special-use authority" (FSH 1909.12, 84.3, item 1). More information on the WSRA can be found in Appendix D of the Project EA.

2.4.1 For Projects on WSRs Managed Only by BLM and Within the Scope of the Project EA's Proposed Action

The BLM has performed a Section 7 analysis and made a determination for the WSR they manage within the Project activity area (Appendix F of the EA). BLM determined the implementation of the Project would have an overall beneficial effect to the river's free-flowing condition, water quality, and anadromous fishery ORV. Site-specific projects that are within the scope of the Proposed Action and effects analysis of the EA and are on WSRs managed by BLM do not require further WSRA coordination. If a site-specific project does not meet the previously listed criteria, a separate WSRA Section 7 review is required as described below. The Authorized Officer will confirm in writing that the WSRA Section 7 analysis is adequate and that no adverse effects are expected.

2.4.2 For All Other Projects

To complete WSRA review for each site-specific project (regardless of location, even if outside designated Trinity WSR and on federal or non-federal lands) the following process would be followed:

1. The project proponent and/or the federal assisting agency would provide the BLM and the USFS with a project description detailing all project activities and their locations, including a map or description to identify which activities would occur below the ordinary high-water mark. Based on the location, the BLM and the USFS would confer with the National Park Service (NPS) as needed to identify which agency will serve as the federal river managing agency for review.
2. The WSR specialist(s) at the federal river managing agency would review the site-specific project proposal for consistency with agency policies for WSR management and wild and scenic river

management direction from the relevant land management plan(s) and, if applicable, the *South Fork of the Trinity Wild and Scenic Rivers Management Plan*.

   a. For the USFS, WSR management direction is in Forest Service Manual (FSM) 2350. Additionally, for site-specific projects proposed on eligible or suitable rivers, interim measures for protective management are in Forest Service Handbook (FSH) 1909.12, Chapter 80, 84.3; contact the regional wild and scenic rivers program manager to discuss documentation for evaluating water resources projects on eligible or suitable rivers.
   b. For the BLM, wild and scenic river management direction is provided within Section 2.5.3 Wild and Scenic Rivers of the 2024 NCIP and BLM Manual 6400, Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management. Similarly, contact the local Field Office wild and scenic rivers specialist to discuss documentation for evaluating water resources projects on suitable rivers.

3. If the site-specific project is a water resources project subject to Section 7 of the WSRA, the WSR specialist(s) at the federal river managing agency would prepare a Section 7 analysis and determination, using the appropriate evaluation procedure from the WSRA. The Interagency Wild and Scenic Rivers Coordinating Council technical paper *The Wild and Scenic Rivers Act: Section 7* provides additional information.
   a. For the USFS, standards and procedures for evaluating water resources projects are established in Regulation at 36 CFR Part 297 and agency policy in FSM 2354.7. Contact the regional wild and scenic rivers program manager as early as possible to coordinate the regional review and signature process.
   b. For the BLM, standards and procedures for evaluating water resources projects are also established in Regulation at 36 CFR Part 297 and BLM Manual 6400.
4. The federal river managing agency official would review the Section 7 analysis and determination and sign the determination, then send the signed determination to the project proponent and/or the federal assisting agency. The Section 7 determination from the federal river managing agency is required before federal assistance can be provided.
   a. For the USFS, the appropriate official is identified in FSM 2354.7. In almost all cases, it is the Regional Forester. Contact the regional WSR program manager with questions.
   b. For the BLM, the appropriate official is the BLM Redding Field Office Manager.
5. The signed Section 7 analysis and determination would be posted on a publicly available website (such as where other project planning documents are posted).
6. The project proponent, federal assisting agency, and river managing agency should cooperate to ensure that all personnel who will be working on the project understand and will follow any WSR-specific rules and commitments. Review and follow any monitoring and reporting requirements.
   a. For the USFS, the STNF is responsible for reporting water resources projects on the Trinity WSR as part of NRM-Wild and Scenic Rivers annual reporting.
   b. For the BLM, the BLM Redding Field Office would serve as the lead data steward for projects on BLM lands.

2.5 Wilderness Act

Section 4(c) of the Wilderness Act prohibits certain uses in wilderness and wilderness study areas (WSAs) outright (permanent roads and commercial enterprise) but allows others (temporary roads, use of motor vehicles, motorized equipment or motorboats, landing of aircraft, other forms of mechanical transport, structures, or installations) only if they are necessary to meet minimum requirements for the administration of the area for the purposes of the Wilderness Act.

Wilderness managers prepare a Minimum Requirements Analysis (MRA) to evaluate whether a use otherwise prohibited by Section 4(c) needs to occur in wilderness (however, not required for WSAs), and if so, how to accomplish it with the least impact to the wilderness resource. The Minimum Requirements Analysis Framework (MRAF)—the interagency tool that wilderness managers typically use to conduct the MRA—helps to meet the substantive requirement of Section 4(c). The MRAF consists of two steps: Step 1 evaluates whether administrative action may be necessary in wilderness; if so, Step 2 provides guidance for determining the minimum technique, timing, or amount of a prohibited use necessary to address the wilderness stewardship issue at hand. The MRAF's selected alternative is a determination that represents the minimum requirement necessary to administer the area as wilderness.

To complete Wilderness Act review for each site-specific project, the following process will be followed (*steps 3-6 are only applicable to Wildernesses not WSAs*):

1. The project proponent will provide the BLM and the USFS with a project description detailing all project activities proposed in wilderness or WSAs including any Section 4(c) uses being considered.
2. The wilderness specialist(s) at the land management agency will review the project proposal for consistency with agency policies for wilderness and WSA management and wilderness management direction from the relevant land management plan(s) and, if applicable, wilderness plan.

    a. For the USFS, wilderness management direction is in Forest Service Manual (FSM) 2320. Identify if the proposed project would require Chief's approval (FSM 2323.04b); if so, notify the regional wilderness program manager as early as possible to discuss the Chief's approval process (see Step 5).

    b. For the BLM, wilderness management direction is provided in BLM Manual 6340 – Management of BLM Wilderness. Management of WSAs is provided in *BLM Manual 6330-Management of BLM Wilderness Study Areas*. Specific management actions for BLM-managed wilderness and WSAs are identified in Section 2.5.4 *Wilderness, Wilderness Study Areas, and Lands with Wilderness Characteristics* of the 2024 NCIP.
3. The wilderness specialist(s) at the land management agency would use the MRAF to conduct the MRA. The purpose of the MRA is to satisfy the requirements of the Wilderness Act to ensure that if there are any Section 4(c) uses in wilderness it is the minimum necessary to administer the area as wilderness and that wilderness character is preserved. The wilderness specialist may need to work with the project proponent and other resource specialists to develop the alternatives and analysis in the MRAF.
4. The appropriate land management agency official would review and sign the MRAF to select the minimum requirement for Section 4(c) uses, if any, and document any associated monitoring and reporting requirements.

a. The appropriate official is identified in FSM 2323.04 and 2326.04, depending on the type of activity and Section 4(c) uses involved. In some cases, responsibility may be delegated through regional direction such as the annual letter "Delegation of Authority for Motorized Equipment and Mechanical Transport in Designated Wilderness." Contact the regional wilderness program manager with questions.

5. For projects in USFS wilderness areas, if Chief's approval is needed (see FSM 2323.04b and 2326.04a), the forest-level wilderness specialist(s) would work with the regional wilderness program manager to develop the products needed for this process and obtain Chief's approval before moving forward.
6. The signed MRAF should be posted for public viewing on a publicly available website (such as where other project planning documents are posted).
7. The project proponent and land managing agency should cooperate to ensure that all personnel who will be working in wilderness and WSAs understand and will follow wilderness-specific rules and commitments. Review and follow any monitoring and reporting requirements.

    a. For the USFS, the forest that serves as the lead data steward for the wilderness area is responsible for reporting on use of motorized equipment and mechanical transport as part of NRM-Wilderness annual reporting. This includes the types, dates, and amounts of use authorized and actual use.

    b. For the BLM, the BLM Redding Field Office that serves as the lead data steward for wilderness and WSAs is responsible for reporting on use of motorized equipment and mechanical transport as part of NRM-Wilderness annual reporting. This includes the types, dates, and amounts of use authorized and actual use. However, there are no designated wilderness areas on BLM lands for this effort, only one designated WSA (Trinity Alps WSA).

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3 Forms and Templates

Project Information Form[4]

Supplemental EA Template (Reclamation)[5]

Determination of NEPA Adequacy Template (BLM)[6]

Decision Record Template (BLM)[7]

Condition-Based Management Checklist (USFS)[8]

Decision Notification Template (USFS)[9]

4 Frequently Asked Questions

Several clarifying questions for the Project are discussed below:

1. **How does the California Environmental Quality Act (CEQA) fit in with the Trinity River Watershed Restoration EA?**

The EA was prepared to meet the requirements of NEPA only. However, the CEQA Program EIR for the State Water Resources Control Board Statewide Restoration General Order (SRGO PEIR) is available for site-specific project CEQA compliance. The activities covered by the SRGO PEIR were based on the 2022 USFWS Statewide Restoration BiOp and though there are minor differences in what activities are covered by the Project (e.g., road-related site-specific restoration activities), most site-specific projects will be covered by the SRGO PEIR.

2. **How long will the approval process take in order to be cleared to do a project?**

The approval process is meant to be streamlined. It would depend on the type of site-specific project being proposed and the lead federal agency process for various environmental compliance components. Much of the environmental compliance approval timeline would be determined by specific processes such as the Section 106 review process and the state and federal permitting process. Early and efficient communication and collaboration combined with a detailed project description and design should lead to a quicker environmental compliance process.

[4] https://www.trrp.net/library/document/?id=2681

[5] https://www.trrp.net/library/document/?id=2680

[6] https://www.trrp.net/library/document/?id=2676

[7] https://www.trrp.net/library/document/?id=2677

[8] https://www.trrp.net/library/document/?id=2678

[9] https://www.trrp.net/library/document/?id=2679

3. Does each site-specific project have to have 100% designs to be proposed?

The site-specific project needs to be designed enough to know if it meets the Project purpose and need, aligns with the covered activities, and will be able to incorporate all applicable environmental commitments into project designs. In addition, the design will have to be far enough along to know if it can meet the requirements of the various regulatory consultations (e.g., 2020 TRRP BiOp, 2025 USFWS Statewide Restoration BiOp, WSRA Section 7, and NHPA Section 106).

4. Will the public have the opportunity to provide input on site-specific projects as they are being proposed to be implemented?

These site-specific projects generally include multi-party collaboration for planning and implementation and public notice will be handled by the lead federal agency processes on a case-by-case basis.

5. Are private lands covered in the PEA?

Private lands are included in the analysis provided in the PEA. It should be noted that, just as for federally managed lands, site-specific surveys and analysis is required for individual projects with federal funding.

6. Where can I find more information about past restoration work conducted within the Trinity River basin?

The TRRP website[10] has many resources that provide detailed information about restoration activities that have occurred within the Trinity River basin in the past.

7. Are project activities permitted in designated Wilderness areas?

Project activities may be permitted in designated wilderness areas associated with identifying fish-bearing streams if they are consistent with the Wilderness Act of 1964, USFS policies for wilderness management, and management direction for wilderness management in the land management plan for the STNF. The process to review project activities proposed in wilderness is described in Section 2.5 of this Implementation Plan. Section 4(c) of the Wilderness Act prohibits certain uses in wilderness "except as necessary to meet minimum requirements for the administration of the area for the purpose of [the Wilderness] Act," including motorized equipment, mechanical transport, landing of aircraft, structures and installations. If the proposal would involve any Section 4(c) uses, the USFS would conduct a Minimum Requirements Analysis (MRA) using the interagency Minimum Requirements Analysis Framework (MRAF) tool. Additionally, certain types of activities can only be approved by the Chief of the Forest Service, including fish and wildlife habitat manipulation and watershed condition improvement.

8. Why do the BLM and USFS have different processes for determining whether site-specific project proposals and effects are within the scope of the EA?

The USFS is using a new approach called Conditions Based Management (CBM). CBM has not yet been adopted by the BLM, therefore BLM will continue to use their Determination of NEPA Adequacy process.

[10] https://www.trrp.net/

Appendix B: Environmental Commitments

Public Draft

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1 Introduction

The Proposed Action is described in Chapter 4 of the Trinity River Watershed Restoration Project (Project) Environmental Assessment (EA). This appendix provides the environmental commitments for the suite of restoration activities included in the Project sorted into three different categories: general protection measures (GPMs); design guidelines by activity type; and conservation measures (CMs) by environmental resource. The environmental commitments were developed for the Project to avoid significant environmental effects. These environmental commitment categories are described below:

1. The GPMs address general construction best management practices (BMPs) that would be recommended for most site-specific restoration activities undertaken by project proponents.
2. The design guidelines were developed by information provided primarily by the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) to ensure site-specific project designs minimize adverse effects and maximize beneficial effects to ESA-listed fish and wildlife species and their associated habitats.
3. CMs were developed to avoid and minimize adverse effects to geology and soils, water quality and hydrology, vegetation resources, non-native invasive species, fishery resources, wildlife, cultural resources, land use, visual resources, recreation, and noise.

These environmental commitments were primarily developed based on measures required by the NMFS' 2020 Biological Opinion (BiOp) for the Trinity River Restoration Program's Mechanical Channel Rehabilitation, Sediment Management, Watershed Restoration, and Monitoring Actions in Trinity County, California (2020 TRRP BiOp, WCRO-2019-03827) and USFWS' 2025 Programmatic BiOp for the California Statewide Programmatic Restoration Effort (USFWS Statewide Restoration BiOp, FWS Reference: 2022-0005149-S7). In addition to the measures required by these BiOps, the environmental commitments were also developed based on recommendations from Project resource specialists and guidance/regulations, including, but not limited to, the following:

BLM's Integrated Vegetation Management Handbook (H1740-2)
Clean Water Act of 1972
California's Porter-Cologne Act
CEQA Program EIR for the State Water Resources Control Board Statewide Restoration General Order (SRGO PEIR)
Executive Order 14072
Executive Order 13112
Forest Service Manual (FSM)
NOAA Restoration Center's (RC's) 2021 Biological Assessment (BA) for Restoration Projects in Northern California
Noxious Weed Control and Eradication Act of 2004
Plant Protection Act of 2000
TRRP's 2019 Biological Assessment and Essential Fish Habitat Assessment
TRRP's 2009 Master Environmental Impact Review (Master EIR)
2018 Water Quality Control Plan for the North Coast Region (aka Basin Plan)
36 Code of Federal Regulations Subpart A, Section 222.8
Native American Graves Protection and Repatriation Act
Cultural resource regulations: National Historic Preservation Act (NHPA) of 1966;Archaeological Resources Protection Act; Historic Sites Act of 1935; Antiquities Act; American Indian Religious Freedom Act; EO 13007; EO 13175; EO 13287

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1 General Protection Measures (GPMs)

GPM-1, Receipt and Copies of All Permits and Authorizations. Work will not begin until all necessary permits and authorizations have been issued (e.g., USACE, USFWS, NMFS, State and/or Regional Boards, or CDFW). The site-specific project proponent will ensure that a readily available copy of the applicable agency permits and authorizations (e.g., USFWS PBO, NMFS PBO, or Section 404 permit) is maintained by the construction foreperson/manager on the project site for the duration of project activities.

GPM-2, Construction Work Windows. Construction work windows may be required, depending on whether the project involves in-water construction and/or whether ESA-listed species have the potential to occur in the project area. Wildlife species-specific seasonal restrictions are provided in Table 3-5. Restoration, construction, fish relocation, and dewatering activities proposed within any wetted or flowing channel of tributaries to the Trinity River shall be restricted to the dry season (June 15 to October 15 for tributaries and July 15 to October 15 for the mainstem), before listed coho salmon begin spawning in tributaries. Work in intermittent streams may continue beyond November 1, as long as weather conditions permit, the stream channel remains dry, and with permitting agency approval. Construction and restoration work within intermittent stream channels must be completed in the dry.

GPM-3, Construction Hours. Construction activities will generally be limited to daylight hours, to the extent practicable. If nighttime construction is necessary, all project lighting (e.g., staging areas, equipment storage sites, roadway, and construction footprint) will be selectively placed and directed onto the roadway or construction site and away from sensitive habitats. Light glare shields will be used to reduce the extent of illumination into sensitive habitats. If the work area is near surface waters, the lighting will be shielded so that it does not shine directly into the water.

GPM-4, Environmental Awareness Training. For projects occurring where ESA-listed species are likely to be present, prior to engaging existing or new personnel in construction activities, new construction personnel will participate in environmental awareness training conducted by a Qualified Biologist. Construction personnel will be informed regarding the identification, potential presence, habitat requirements, legal protections, avoidance and minimization measures, and applicable protection measures for ESA-listed species with the potential to occur in or immediately adjacent to the project site. Construction personnel will be informed of the procedures to follow should a ESA-listed species be encountered during construction activities. For projects where the Qualified Biologist is not regularly on the project site, training may be provided in an online/virtual meeting. For projects that may continue over an extended duration and require excessive training events, a training video developed under the supervision of the Qualified Biologist may be used to train new personnel, as long as a Qualified Biologist is available by phone to answer questions about the training or to answer questions that may arise during construction.

GPM-5, Erosion and Sediment Control. In areas expected or forecasted to get rainfall during the construction season, effective erosion control measures shall be in place at all times during construction activities. Construction within the 5-year floodplain may not begin until all temporary erosion controls (e.g., straw bales, silt fences that are effectively keyed in) are in place, downslope of project activities within the riparian area. Erosion control structures shall be maintained throughout, and possibly after, construction activities. Sediment

shall be removed from sediment controls once it has reached one-third of the exposed height of the control. Whenever straw bales are used, they shall be staked and dug into the ground 12 centimeters (cm). Catch basins shall be maintained so that no more than 15 cm of sediment depth accumulates within traps or sumps.

GPM-6, Erosion and Sediment Control Monitoring. The contractor/applicant to the Program shall inspect, maintain and repair all erosion control materials and devices prior to and after any storm event, at 24-hour intervals during extended storm events, and a minimum of every two weeks until all erosion control measures are no longer needed or as required by the SWPPP.

GPM-7, Wet Weather Work Limitations. No work would be conducted during wet weather or where saturated ground conditions exist; if a 60% chance of a one half inch of rain or more within a 24-hour period is forecasted, then the site shall be treated with erosion control measures and construction operations will cease until 24 hours after rain has ceased. Petroleum products, chemicals, fresh cement, or water contaminated by the aforementioned shall not be allowed to enter flowing waters.

GPM-8, Sediment Laden Water. Water containing mud or silt from construction activities shall be treated by filtration or retention in a settling pond to avoid draining sediment-laden water back to the stream channel. Alternatively, an infiltration area may be created and used within the regular project footprint or in upland areas, if the soil composition of the area adequately supports infiltration back into the system.

GPM-9, Pump Screens. Screens shall be installed on all water pump intakes and other water diversions in compliance with the latest NMFS salmonid screening specifications.

GPM-10, Limitations on Sediment-Inducing Activities. To minimize the potential for additive sediment impacts in downstream habitat, projects constructed during the same field season must be separated longitudinally (i.e., upstream and downstream) by at least 350 meters.

GPM-11, Environmental Monitoring. Where appropriate and based on project-specific requirements, a Qualified Biologist(s) will perform site clearance at the beginning of each day and will monitor construction activities throughout the day in, or immediately adjacent to, sensitive resources and/or ESA-listed species habitat (including critical habitat as applicable), as necessary. The Qualified Biologist will confirm that all applicable protection measures are implemented during project construction. The Qualified Biologist will have the authority to stop any work if they determine that any permit requirement is not fully implemented or if it is necessary to protect ESA-listed species, consistent with the information provided in a signed ESA Section 7(a)(2) Review Form by the USFWS Field Office to cover the proposed project by the USFWS Programmatic BiOp. The Qualified Biologist will prepare and maintain a biological monitoring log of construction site conditions and observations, which will be kept on file.

GPM-12, Work Area and Speed Limits. Construction work and materials staging will be restricted to the smallest area practicable in designated work areas, routes, staging areas, temporary interior roads, or the limits of existing roadways. Prior to initiating construction or grading activities, brightly colored fencing or flagging or other practical means will be erected to demarcate the limits of the project activities, including the boundaries of designated staging areas; ingress and egress corridors; stockpile areas for spoils disposal, soil, and materials; and equipment exclusion zones. Flagging or fencing will be maintained in good repair for the duration of project activities. Posted speed limits on public roadways will be adhered to and speeds will be limited to 20 miles per hour (mph) in the project area on unpaved surfaces and unpaved roads (to reduce dust and soil erosion), or in

areas where ESA-listed species have the potential to occur. Speeds greater than 20 mph may be permitted in the project area where ESA-listed species are not expected to occur (e.g., in areas where ESA-listed species have been excluded) and there is no risk of generating excessive dust (e.g., surfaces are paved, saturated, or have been treated with other measures to prevent dust).

GPM-12, Access Route Development. Limit number of new access routes requiring tree removal and grading to no more than two. Access routes should not be along the top of the stream bank but relatively perpendicular (45 to 90 degrees is acceptable) to bank.

GPM-13, Instream Work Access. Where available, use existing ingress or egress points, or perform work from the top of the streambanks.

GPM-14, Environmentally Sensitive Areas and/or Wildlife Exclusion. Where appropriate, fencing, flagging, or biological monitoring will be used to minimize disturbance to environmentally sensitive areas and ESA-listed species habitat. If the project site is suitable for fencing, prior to the start of construction, environmentally sensitive area fencing (ESAF) and/or Wildlife Exclusion Fencing (WEF) will be installed between the active work area(s) and any suitable terrestrial habitat where ESA-listed species could enter the site. When fencing is not practicable due to project size, topography, soils, or other factors, monitoring by a Qualified Biologist during construction activities can be used to minimize impacts (see GPM-11, Environmental Monitoring).

- The Qualified Biologist will determine the location of the ESAF and/or WEF prior to the start of construction.
- WEF specifications (e.g., height, installation requirement, or materials) will be determined based on the species the fencing is intended to exclude. ESAF does not require such specifications and may include flagging or monitoring (see GPM-5, Environmental Monitoring).
- The ESAF and/or WEF will remain in place throughout the duration of the construction activities and will be inspected and maintained regularly by the Qualified Biologist until completion of the project. Repairs to the ESAF and/or WEF will be made within 24 hours of discovery. The fencing will be removed only when all construction equipment is removed from the site, the area is cleared of debris and trash, and the area is returned to natural conditions.

GPM-15, Prevent Spread of Invasive Species. The spread or introduction of nonnative, invasive plant and animal species will be avoided. When practicable, nonnative invasive plants in the project areas will be removed and properly disposed of in a manner that will not promote their spread. Equipment will be cleaned of any sediment or vegetation at designated wash stations before entering or leaving the project area, to avoid spreading pathogens or nonnative invasive species. Activities that create new habitat for nonnative invasive species will be avoided to the extent possible. Isolated infestations of nonnative invasive species identified in the project area will be treated with weed management methods at an appropriate time, to prevent further formation of seed and destroy viable plant parts and seed. Wash sites must be in confined areas that limit runoff to any surrounding habitat, and on a flat grade. Upland areas will use invasive species-free local wood straw or slash/mulch for erosion control; the remainder of the project area will use certified, weed free erosion control materials. Mulch must be certified weed-free. The Project Proponent will follow the guidelines in the CDFW's California Aquatic Invasive Species Management Plan (CDFW 2008) and Aquatic Invasive Species Disinfection/Decontamination Protocols (CDFW 2016). Construction supervisors and managers will be educated on weed identification and the importance of controlling and preventing the spread of invasive weeds.

GPM-16, Practices to Prevent Pathogen Contamination. The site-specific project proponent will review and implement restoration design considerations and best management practices (BMPs) to help prevent pathogen contamination, as published by the "Working Group for Phytophthoras in Native Habitats" (www.calphytos.org), when there is a risk of introduction and spread of plant pathogens in site plantings. The Project Proponent will review and implement decontamination protocols to prevent the spread of pathogens among amphibians or other aquatic animals when working in aquatic habitats that may support native amphibians. Gear and equipment that may contact water will be cleaned and decontaminated to prevent the spread of chytrid fungus, following protocols in Aquatic Invasive Species Disinfection/Decontamination Protocols (CDFW 2016, or latest version). For additional guidance related to amphibians and chytrid fungus, see AMP-4 and AMP-10 in "Wildlife Resources" below.

GPM-17, Equipment Maintenance and Materials Storage. Vehicle traffic will be confined to existing roads and the proposed access route(s). All machinery must be in good working condition, showing no signs of fuel or oil leaks. Oil, grease, or other fluids will be washed off at designated wash stations prior to entering the construction site. Inspection and evaluation for the potential for fluid leakage will be performed daily during construction. All fuel and chemical storage, servicing, and refueling will be done in an upland staging area or other suitable location (e.g., barges) with secondary containment to prevent spills from traveling to surface water or drains. Site-specific project proponents will establish staging areas for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants in previously disturbed upland areas whenever possible, away from areas suitable for ESA-listed species, and in coordination with resource agencies. Staging areas will have a stabilized entrance and exit and will be at least 100 feet from waterbodies, unless site-specific circumstances do not provide such a setback; in such cases, the maximum setback possible will be used. Fluids will be stored in appropriate containers with covers and will be properly recycled or disposed of off-site. Machinery stored on site will have pans or absorbent mats placed underneath potential leak areas. Adequate erosion control supplies (gravel, straw bales, shovels, etc.) shall be stored on site.

GPM-18, Instream Materials. All materials placed in or over streams, rivers or other waters shall be nontoxic. Any combination of wood, plastic, cured concrete, steel pilings, or other materials used for in-channel structures shall not contain coatings or treatments or consist of substances toxic (e.g., copper, other metals, or pesticides, petroleum-based products, etc.) to aquatic organisms that may leach into the surrounding environment in amounts harmful to aquatic organisms.

GPM-19, Concrete Containment. Where possible, poured concrete should be excluded from contact with surface or groundwater during initial curing, ideally for a period of 30 days after it is poured. During that time, runoff from the concrete will not be allowed to enter the surface or groundwater. If this is not feasible due to expected flows and site conditions, commercial sealants that are appropriate for use near water may be applied to the poured concrete surface to prevent exposure of uncured concrete to streamflow and subsequent risk to water quality and aquatic life before the sealant comes into contact with flowing water. If sealant is used, water will be excluded from the site until the sealant is dry and fully cured according to the manufacturer's specifications. Concrete is considered to be cured when water poured over the surface of concrete consistently has a pH of less than 8.5.

GPM-20, Material Disposal. All refuse, debris, unused materials, and supplies that cannot reasonably be secured will be removed daily from the site-specific project work area and deposited at an appropriate disposal or storage site. All construction debris will be removed from the work area immediately on project completion.

GPM-21, Fugitive Dust Reduction. To reduce dust, construction vehicles will be speedrestricted as described in GPM-12, Work Area and Speed Limits, when traveling on nonpaved surfaces. Stockpiled materials susceptible to wind-blown dispersal will be covered with plastic sheeting or other suitable material to prevent movement of the material. During construction, water (e.g., trucks, and portable pumps with hoses) or other approved methods will be used to control fugitive dust. Dust suppression activities must not result in a discharge to waterbodies.

GPM-22, Trash Removed Daily. During project activities all trash, especially food-related refuse that may attract potential predators or scavengers, will be properly contained in sealed containers, removed from the site-specific work area, and disposed of daily.

GPM-23, Project Cleanup and Site Stabilization. Work pads, temporary falsework, and other construction items will be removed from the 100-year floodplain by the end of the construction window. Removal of materials must not result in discharge to waterbodies. Within seven days of project completion and before the close of the seasonal work window, all exposed soil shall be stabilized with erosion control measures such as mulch, seeding, planting, and/or placement of erosion control blankets. Where straw, mulch, or slash is used on bare mineral soil, the minimum coverage shall be 95 percent with two-inch minimum depth. Operations will use all feasible techniques to prevent any sediment from entering a drainage system.

GPM-24, Streambank Recontouring. Based on a field geomorphic assessment, the channel bed and banks shall be re-contoured after construction to achieve the anticipated natural self-sustaining pool-riffle morphology to the extent feasible.

GPM-25, Revegetate Disturbed Areas. All temporarily disturbed areas will be decompacted and seeded/planted with an assemblage of native riparian, wetland, and/or upland plant species suitable for the area. The site-specific project proponent will develop a revegetation plan. Plants for revegetation will come primarily from active seeding and planting, or from natural recruitment where applicable. Plants imported to the restoration areas will come from local stock. Only native plants (genera) will be used for restoration efforts. Certified weed-free native mixes and mulch will be used for any restoration planting or seeding. Revegetation activities in and adjacent to waterbodies and other aquatic habitat suitable for ESA-listed species will commence after construction activities at a site are complete.

GPM-26, Tree Removal. No large wood (LW) or trees will be removed in active (wetted) channels. Trees outside the wetted channel may be removed for access routes for construction equipment or in the context of watershed restoration (e.g., conifer encroachment on meadows). If trees need to be removed from other portions of the project site, do not remove native riparian trees or shrubs over 3 inches in diameter at breast height or reduce canopy cover provided by hardwoods or conifers. Replant any trees removed to achieve 1:1 successful revegetation by one of the following methods: a) trees removed can be replanted at 3:1, or b) site can be monitored for 2 years and replanted until 1:1 successful revegetation is achieved.

GPM-27, Wildfire Prevention. With the exception of vegetation-clearing equipment, no vehicles or construction equipment will be operated in areas of tall, dry vegetation. A fire prevention and suppression plan will be developed and implemented for all maintenance and repair activities that require welding or otherwise have a risk of starting a wildfire.

2 Design Guidelines

Instream Habitat Restoration Activities

- Only one floodplain reconnection project over 100 acres and one small dam removal project may occur in each HUC-12 watershed per year.
- Channel rehabilitation activities along the Trinity River Mainstem will be completed to coincide with scheduled flow releases from Lewiston Dam. Some restoration activities may require temporary low flow channel crossings, which will consist of unimproved fords, improved fords, vented fords, culverts, low water bridges, or variations of these, tailored to individual site requirements and locally available materials. The crossings will be constructed to maintain adequate water depths (≥ 1 foot deep) and water velocities (≤ 2 feet per second) over as much of the length of the crossing as possible to provide suitable conditions for adult and juvenile salmonid upstream and downstream passage (Bell 1990). A clean cobble/gravel mixture, with a high ratio of cobbles, will be used to create any in-channel crossing surface. Larger particle size will prevent attraction of spawning salmon to the crossing area. Upon completion of work these crossings will be dismantled and materials contoured to the original or restoration-design river bottom during in-water work period (June 15 to October 15 for Trinity River tributaries and July 15 to October 15 for the Trinity River mainstem).
- For low-tech processed based restoration techniques, the Low-Tech Process-Based Restoration of Riverscapes Design Manual[1] should be consulted during the planning and design process.
- For large wood and SLJ placement:
    - For the purposes of large wood placement, trees may be felled or pulled/pushed over, if tree felling does not significantly degrade the habitat of certain wildlife species (i.e., an active nest site), create excessive stream bank erosion or temperature increases in waterbodies, destabilize stream banks, or concentrate surface runoff.
    - Trees should be retained if they are killed through fire, insects, disease, blow-down, and other means rather than felling live trees for the project. Snags and trees should be retained if they have broad, deep crowns (“wolf” trees), damaged tops, or other abnormalities that may provide a valuable wildlife habitat component.
    - Stabilizing or key pieces of large wood should be intact, hard, with little decay; and, if possible, have root wads (untrimmed) to provide functional refugia habitat for fish.
    - Key pieces should be oriented so that the hydraulic forces on the large wood increase stability. Wood members that are oriented parallel to flow are typically more stable than members oriented at 45 or 90 degrees to the flow. Large wood and boulders should be placed in areas where they would naturally occur and in a manner that closely mimics natural accumulations for that stream type. For example, boulder placement may not be appropriate in low-gradient meadow streams. SLJs should be patterned (to the greatest degree practicable) after stable natural log jams in the project area, either present or historical.
    - Project design should simulate log jams, debris flows, wind throw, tree breakage, and other disturbance events.

[1] Wheaton J.M., Bennett S.N., Bouwes, N., Maestas J.D. and Shahverdian S.M. (Editors). 2019. Low-Tech Process-Based Restoration of Riverscapes: Design Manual. Version 1.0. Utah State University Restoration Consortium. Logan, UT. Available at: http://lowtechpbr.restoration.usu.edu/manual

  - For SLJs that occupy greater than 25% of the cross-sectional bankfull area, fish passage should be maintained consistent with NMFS and CDFW guidelines.
  - Operating tractors, vehicles, or equipment on soils with a high or extreme erosion hazard rating, known slides, or unstable areas (including slopes greater than 50% grade) should be avoided. On these high-erosion soils with grades greater than 60%, aerial or cable operations may be necessary to retain bank stability.
  - If large wood anchoring is required, a variety of methods could be used. These include buttressing the wood between riparian trees or using manila, sisal, or other biodegradable ropes for lashing connections. If hydraulic conditions warrant the use of structural connections, rebar pinning or bolted connections could be used. Clean rock could be used for ballast but is limited to that needed to anchor the large wood.
- Design guidelines for small wood placement:
  - Small wood placements shall be conducted by hand or small machinery typically.
  - Small wood placements shall be constructed for floodplain reconnection in stream systems less than 4% stream gradient.
  - Structures must be porous with water surface differential of no more than one-foot at low flows, or otherwise provide a clear path for fish passage over, through, or around the structure during low flows.
  - Structures shall have crest elevations that extend no more than 3 feet above the streambed. Vertical posts (if utilized) shall be cut flush and not extend above the proposed crest elevation.
  - Vertical posts (if utilized) must be driven to a depth at least 1.5 times the expected scour depth of the waterway or a ratio of 2:1 for exposed – embedded length, whichever is more conservative. A minimum 1.5-foot clear space is recommended between posts.
  - All primary materials used in small wood placements must consist of non- treated wood (e.g., fence posts) and must be constructed from a materials source collected outside the riparian area.
  - Placement of inorganic material is limited to the minimum quantity necessary to prevent under-scour of structure and manage pore flow sufficient to ensure adequate over-topping flow and side flow to facilitate fish passage.
  - No cabling, wire, mortar or other materials that serve to affix the structure to the bed, banks, or upland is allowed.
  - Structures cannot unreasonably interfere with use of the waterway for navigation, fishing, or recreation.
- Design guidelines for porous boulder structures and vanes:
  - Boulder step structures should be designed and constructed to facilitate upstream and downstream passage of fish species and all life stages that occur in the stream.
  - Rocks for boulder step structures should be sized and selected to ensure they are durable and of suitable quality for long-term stability in the climate where they are to be used. Rock sizing depends on the size of the stream, maximum depth of flow, planform, entrenchment, and ice and debris loading.
  - Full-spanning boulder step structure placement should be coupled with measures to improve habitat complexity and protection of riparian areas, to provide long-term inputs of large wood. Full-channel-spanning boulder structures should be installed only where appropriate, such as:
    - in highly uniform, incised, bedrock-dominated channels to enhance or provide fish habitat

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        - in stream reaches where log placement is not practicable due to channel conditions (e.g., inadequate space to place logs of sufficient length, bedrock dominated channels, deeply incised channels, or artificially constrained reaches)
        - where damage to infrastructure on public or private lands is of concern
        - where private landowners will not allow log placement due to concerns about damage to their streambanks or property
        - in parts of the state where boulders rather than large wood may typically be the predominant instream habitat feature
    - The use of gabions, cables, or other means of artificial structure should be avoided to prevent the movement of individual boulders in a boulder step structure.
    - Boulder step structures should be placed diagonally across the channel or in more traditional upstream-pointing "V" or "U" configurations, with the apex oriented upstream.
    - Boulder structures should be installed low relative to channel dimensions, so that they would be completely overtopped during a channel-forming flow event (approximately a 1.5-year flow event).
- Design guidelines for the restoration and enhancement of in-channel habitat would include:
    - In-channel habitat restoration site selection and design should be based, in part, on the review of evidence of historical channel location, such as land use surveys, historical photographs, topographic maps, remote sensing information, or personal observation.
    - Excavated material removed from off- or side-channels should be hauled to an upland site or spread across the adjacent floodplain, as long as the soil is considered suitable for application (e.g., free of contaminants and/or pathogens) in a manner that does not restrict floodplain capacity or otherwise degrade floodplain function.
    - Where ESA-listed and sensitive aquatic species that require access to stream habitat are present, off-channel features should be designed to slope toward and drain to the primary stream habitat as streamflow subsides. Isolated pools or ponds that do not incorporate return channels to the stream should be situated at an appropriate distance from the edge of the active channel to avoid temporary connectivity and subsequent fish stranding following flood events. Proposed restoration projects should identify any risk of stranding of fish in isolated waterbodies as a result of implementation.
    - To avoid pile driving impacts, wooden piles only will be used for SLJ placement below the OHWM. Wooden piles may be driven by an excavator, or when needed, a vibratory pile driver would be used in preference over an impact pile driver.
    - For site-specific projects that include blasting, the following avoidance and minimization measures would be incorporated into project designs:
        - TRRP personnel and implementors would coordinate with NMFS/USFWS when blasting is determined to be unavoidable.
        - Blasting would be performed during recommended in-water work windows.
        - Accomplish blasting in dry conditions utilizing dewatering techniques as necessary and without impeding fish passage to the extent possible.
        - Incorporate attenuation methods into blasting activities as directed by NMFS (e.g., bubble curtain, isolation casing, and dewatered cofferdam).

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- Design guidelines for floodplain restoration projects would include:
    - As applicable, fish passage or screening needs should be addressed with the installation of new structures.
    - Actions should be designed to restore floodplain characteristics—elevation, soil stratigraphy, width, sinuosity gradient, length, and roughness—in a manner that closely mimics or resets those that would naturally occur at that stream and valley type.
    - Nonnative fill material should be removed from the channel and floodplain to an approved upland offsite disposal location, potentially including a landfill (for anthropogenic debris).
    - Where practicable, geomorphically appropriate stream channels and floodplains (e.g., enable natural transport processes, including the creation of depositional and scour features) should be constructed in a watershed and reach context, to connect channels to floodplains at baseflow.
    - When necessary, soils should be decompacted once overburden material is removed. Overburden or fill, consisting of pathogen-free and native materials that originated in the project area, may be used in the floodplain to support the project goals and objectives.
    - Structural elements should reflect the geomorphic context of the stream system and valley type. For example, constructed riffles may be preferentially used in pool-riffle stream types, and roughened channels and boulder step structures in step-pool and cascade stream types. However, it is important to recognize that the fundamental physics-based stream classification methods/types may not recognize advancements in alternative models that characterize streams in terms of patterns and trends of adjustment.
    - Weed-free and—if possible—locally occurring material (large wood, rock, sand, or gravel) should be selected and mimic natural stream system materials.
    - Existing native materials (e.g., rock, gravel, large wood, sod, willows, topsoil) should be salvaged and used.
- Design guidelines for projects that involve removal or retrofitting of fish passage barriers, small dams, flood gates, pilings and other in-water structures would include:
    - Actions should be designed to restore floodplain characteristics—elevation, width, gradient, length, and roughness—in a manner that closely mimics those that would naturally occur in that area.
    - Drain pipes, fences, concrete, and other structural improvements should be removed.
    - Nonnative fill, including unnaturally-deposited material, should be removed from the floodplain and, if pathogen-free, reused or disposed of it at an upland site. Trash and debris should be disposed of at an appropriate offsite location, potentially including a landfill (for anthropogenic debris).
    - Where it is not possible to remove or set back all portions of dikes and berms, or in areas where existing berms, dikes, and levees support abundant riparian vegetation and their removal or setback is not part of the project design, openings may be created with carefully planned and approved breaches. Timing and spacing of breaches should be planned for maximum positive environmental outcomes.
    - When necessary for plant establishment, compacted soils should be loosened once overburden material is removed. Overburden or fill consisting of native materials that originated from the project area may be used in the floodplain (if pathogen-free) to create setback dikes and fill anthropogenic holes, provided that floodplain function is not impeded.
    - In some cases bank stabilization would be necessary following removal of instream structures. See "Bioengineered Bank Stabilization" for applicable design criteria.

- During dewatering activities and when reconnecting the work area back to the stream, invasive fish would be removed and euthanized to the extent possible.
- If the structure being removed contains material (e.g., large wood, boulders, concrete) not typically found in the stream or floodplain at that site, consider disposing of removed material at an approved landfill or disposal site.
- If the structure being removed contains material that is typically found in the stream or floodplain at that site (e.g., large wood or boulders), the material could be reused to implement habitat improvements described under other proposed activity categories.
- If the structure being removed is keyed into the bank, consider filling in the holes with native materials to restore contours of stream bank and floodplain. Fill material should be adequately compacted to prevent washing out of the soil during over-bank flooding. Material from the stream channel should not be mined to fill in the holes.
- When removal of buried logs associated with existing structures may result in significant disruption to riparian vegetation or the floodplain, consider using a chainsaw to extract the portion of log in the channel and leaving the buried sections in the streambank.
- If the legacy structures (log, rock, or gabion weirs) were placed to provide grade control, the site should be evaluated for potential headcutting and incision due to structure removal. If headcutting and channel incision are likely to occur due to structure removal and are not desired to achieve proper functioning habitat conditions, additional measures should be taken to minimize these impacts.
- For site-specific projects that include blasting, the following avoidance and minimization measures would be incorporated into project designs:
    - TRRP personnel and implementors would coordinate with NMFS/USFWS when blasting is determined to be unavoidable.
    - Blasting would be performed during recommended in-water work windows.
    - Accomplish blasting in dry conditions utilizing dewatering techniques as necessary and without impeding fish passage to the extent possible.
    - Incorporate attenuation methods into blasting activities as directed by NMFS (e.g., bubble curtain, isolation casing, and dewatered cofferdam).

- Design guidelines for water conservation projects would include:
    - Tanks should include water diverters with sufficient storage capacity to cover any domestic, irrigation, or livestock needs during the no-pump time periods, (e.g., dry season). The no-pump time period should be based on the season, local conditions, forbearance agreement, and existing studies, if available.
    - Water conservation projects that include water storage tanks and a forbearance agreement for the purpose of storing winter and early spring water for summer and fall use should be registered. Registration should be done pursuant to California Water Code Section 1228.3 and with the State Water Board, as applicable.
    - Where anadromous fish are present, fish screens (including screens installed on temporary and permanent pump intakes) and fish bypass systems will be designed, constructed, installed, operated, and maintained according to NMFS fish screen criteria, detailed in Anadromous Salmonid Passage Design Manual (NMFS 2023 or most recent version).
    - Projects will obtain required federal, state, and local permits such as: 1600 Lake and Streambed Alteration (LSA) authorization with CDFW; 1707 water transactions with CDFW; and Small Domestic Use (SDU) storage permitting with local Water Boards.

- Design guidelines for salmon carcass placement projects would include:
    - Carcasses would only include salmonid species native to the watershed (coho, Chinook, and steelhead).
    - Each waterway will be individually assessed for available light, water quality, stream gradient, and life history of the fish present. Adaptive management will be used to derive the maximum benefits of nutrient enhancement.
    - Refer to guidance documents such as WDFW's technical guidance document "Protocols and Guidelines for Distributing Salmonid Carcasses, Salmon Carcass Analogs, and Delayed Release Fertilizers to Enhance Stream Productivity in Washington State" (Saldi-Caromile et al. 2004).
    - Follow any guidance or regulations provided by CDFW or NMFS in regard to avoiding adverse effects as a result of fish pathogens.
- Design guidelines for RSI system supplementation projects would include:
    - Supplementation would only include salmonid species native to the watershed (coho, Chinook, and steelhead).
    - The RSI systems would be installed at least two weeks prior to the delivery of eggs from TRH to ensure the system is in proper working condition (i.e., establish gravity flow of water to the system and monitor flow for consistency).
    - TRH coho salmon eggs would not be transported until they enter the eyed-egg stage and are therefore, less affected by handling.
    - The following is the procedure for transporting TRH salmonid eggs:
        - Prior to arrival at TRH, ensure all equipment is in proper working order;
        - Upon arrival at TRH, prepare shipping container system;
        - Place eggs in cheesecloth/burlap, tie shut, put in container and shut lid;
        - Record number of eggs and time received;
        - Secure container system in transport vehicle;
        - Upon arrival at release site, record time and temperature within RSI system;
        - Disinfect eggs with a ten minute bath treatment using 100 parts per million of iodine;
        - Ensure RSI system is in proper working order; and
        - Place eggs in incubation chamber of RSI system at appropriate density.
    - No eggs would be transported from TRH facilities unless determined to be pathogen-free by the CDFW fish health team's pathogen analysis.
    - Eggs would be wrapped in non-chlorinated water-soaked cheesecloth or burlap to keep moist and placed in a perforated plastic shipping container inserted into a five gallon plastic bucket with lid. Non-chlorinated water would be placed in the bottom of the bucket, beneath the plastic container to keep eggs cooled and the lid would provide the eggs a dark environment during transport.
    - Once the eggs are delivered to the RSI system, daily checks would occur during the hatching window and weekly checks (at a minimum) would occur outside of the hatching window. During these checks, all RSI system components would be examined for any damaged parts, flow through the system would be measured in each compartment, and dead eggs would be removed and enumerated. Post-release reporting would include the percentage of eyed eggs to hatch, with a minimum goal of having a similar hatch rates to that of TRH.
    - Within two weeks following the end of the volitional release period, a report would be provided to NMFS (as applicable) and the Trinity River Hatchery Technical Team that summarizes the

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performance of transport, incubation, and release. Specific details regarding hatching and mortality rates would be provided, as well as any other observations made during the effort.
    - Flows within streams where RSI systems are placed would not be obstructed by supplementation activities.
    - Following supplementation activities, any areas disturbed would be restored as necessary.

Upslope Habitat Restoration

- Design guidelines for bioengineered bank stabilization projects would include:
    - Damaged streambanks should be restored to a natural slope and profile suitable for establishment of riparian vegetation in accordance with applicable land management plans (e.g., The South Fork Trinity River Wild and Scenic Management Plan).
    - When necessary, the use of soil layers or lifts strengthened with biodegradable fabrics that are penetrable by plant roots should be considered.
    - To the extent it would naturally occur, large wood should be included. Wood should have untrimmed root wads to provide functional refugia habitat for fish. Wood that is already in the stream or suspended over the stream may be repositioned to enable greater interaction with the stream.
    - A diverse assemblage of vegetation species that is appropriate for the project area, including trees, shrubs, and herbaceous species, should be used. Vegetation, such as willow, sedge, cottonwoods, and rush mats, may be gathered in approved areas where the soil is not contaminated with pathogens.
    - Fencing and signage should be installed as necessary to prevent access to revegetated sites by livestock or unauthorized people. Coordination with local public agencies (e.g., police and social work groups) should be considered for site protection.
    - The extent and quantity of rocks or boulders should be limited to the minimum necessary to prevent scour from expected moderate to high stream flows and velocities. Boulder structures must be part of a larger restoration design and must include a riparian revegetation element. Bridge abutments and other infrastructure improvements to the restoration design of fish passage projects may require additional boulder and rock bank stabilization.
    - All project designs must be consistent with industry-accepted bioengineering design guidance, such as that found in the CDFW Salmonid Stream Habitat Restoration Manual (fourth edition) (CDFG 2010) or Washington State Aquatic Habitat Guidelines Program: Integrated Streambank Protection Guidelines (Cramer et al. 2003).
    - The maximum linear length of streambank stabilized per individual project shall not exceed three-times the active channel width at the project site. To the extent feasible, use site design to retain natural vegetation, large wood, and permeable soils, limit compaction, and otherwise minimize the extent and duration of earthwork (e.g., compacting, dredging, drilling, excavation).

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- Design guidelines for aquatic, wetland, meadow, riparian, and upslope habitat enhancement projects would include:
    - The species palette for revegetation should be designed based on the species that naturally or historically occur in the project area, have the best chance of survival considering current site conditions, and can provide required habitat elements.
    - Nearby vegetation that will compete with plantings, especially weed species listed as invasive in the Cal-IPC Inventory will be controlled. This could include clearing and maintaining a 24" diameter buffer around plantings.
    - The soil should be tested and prepared prior to planting. The soil in planting and seeding areas should be finish-graded, pathogen-free, weed-free, not compacted to the extent possible, roughened (i.e., track-walked), and amended as appropriate, given the habitat and site conditions. All seeds used will not be treated with neonicotinoids.
    - Revegetation that is not dependent on irrigation systems is generally preferred; however, there can be instances where irrigation is desirable. If using an irrigation system is necessary for plant establishment, the system should be installed and operational prior to installation of planting, or prior to any periods where the weather forecast may jeopardize successful establishment of plants.
    - Native seed or plant sources should be acquired as close to the project site as possible. Seeds should be kept in a cool, dry place during delivery and when temporarily stored onsite. Seeds should be protected from moisture, wind, heat, vandalism, rodents, insects, weather, and other conditions that would damage or impair their viability.
    - Prefabricated vegetated mats (i.e., sedge and rush mats) should be appropriately sized in the riparian zone, channels, floodplains, and areas with high runoff, to prevent their movement during high-flow events.
    - For installation of pole cuttings, cuttings should be sourced from healthy plants, limiting collection to no more than 30% of individual plants or populations. Pole cuttings should be taken from live wood at least 1 year old or older. Cuttings should be kept moist until planted and should be installed at a depth sufficient to allow root growth into the groundwater table, or as necessary to provide long-term survival of the planting.
    - Cuttings should be planted when dormant and within 48 hours of collection. Cuttings should not be dried and the end to be planted should be continuously soaked between cutting and planting.
    - Plantings should be enclosed with fencing, cages, tubex, or other protection measures, as appropriate, in areas where plantings are subject to forage by animals (e.g., deer, elk, beavers, livestock, gophers, or moles). Any nonbiodegradable fencing material should be removed after plantings are adequately established.
    - Work above OHWM can occur at any time of the year but would adhere to conservation measures such as the use of erosion and sediment control BMPs.
    - Post-project revegetation will take place during wet conditions (fall/winter) and will generally occur in riparian areas to maximize use by wildlife species.
    - Tree removal, clearing, and grubbing during the bird nesting season (January 1 through August 31 for raptors; March 15 through August 15 for non-raptors) would be avoided to the extent possible. When tree removal, clearing, and grubbing activities cannot avoid the bird nesting

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season, nest clearance surveys per the California Fish and Game Code guidance would be required.

- Specific to livestock fencing to protect, restore, or establish aquatic or riparian habitat:
  - Fence placement should be designed to allow for lateral movement of a stream, migration or dispersal of wildlife through the area, and establishment of riparian plant species. Fences should be placed outside the channel migration zone. Cross-stream fencing should be installed at fords, with breakaway wire, swinging floodgates, hanging electrified chain, or other devices to allow the passage of floodwater and large woody material during high flows.
  - Fence posts or bracing (e.g., dead men) should not be set with wet concrete in waters of the United States or any other aquatic habitat suitable for Covered Species.
  - Fences should be constructed at water gaps in a manner that allows passage of large wood and other debris.
  - Use of riparian fencing to create livestock containment or handling facilities should be avoided.
  - To protect the habitat from livestock damage, wildlife-friendly fences should be constructed around springs.
  - If pressure-treated lumber is used for fence posts, all cutting and drilling should be completed outside the area of expected inundation so that treated wood chips and debris do not enter the channel.
  - Vegetation removal should be avoided and minimized when constructing fence lines. Large, established vegetation should not be removed.

Road Decommissioning, Maintenance, and Rehabilitation Activities

- Road-related work would occur in dry conditions or in isolated waters.
- Effective erosion control measures shall be in place at all times during construction. These devices shall be in place during and after construction activities to minimize fine sediment input to flowing water and to detain sediment-laden water on site. If continued delivery of sediment to the waterway is likely to occur after construction is complete, appropriate erosion prevention measures shall be implemented and maintained until risk of erosion has subsided.
- Existing roads would be used to access the activity areas, where available. New access roads and haul routes would be constructed, when necessary, and restored to a stable condition in accordance with appropriate landowner/manager requirements at the completion of the project.
- Ground-disturbance areas associated with these activities will be seeded and mulched after final grading. Encourage vegetative growth to improve long-term stability of cuts, fills, and ditches. Consider planting shrubs and trees, use of erosion-control mats and straw wattles, in addition to seeding.
- When adjacent to or upstream of known or potential salmonid spawning and rearing areas, implement erosion and sediment control BMPs and avoid conducting sediment-producing activities from June 15 to October 15 for tributaries and July 15 to October 15 for the mainstem.
- Place large wood or rock, which must be removed from the road prism, into a nearby stream channel only under the direction of a fish biologist.
- Culvert or bridge cleaning may occur anytime, when delaying maintenance would result in impacts to salmonid habitat or fish passage.

- When removing culverts, stabilize side slopes by landscaping them to mimic terraces upstream and downstream of the site.
- Design guidelines for culvert or bridge replacement projects included in road rehabilitation activities:
    - All new or replacements for stream crossings would provide fish passage unless a biological rationale dictates that the barrier remains (for example, too steep for fish migration). Implementors would work with local fish biologists to determine fish passage needs at a specific project site.
    - Existing bridge abutments would be removed if adversely affecting the channel, floodplain function, or instream fish habitat. Abutments may be left in place if the hydrologic function and instream fish habitat is not adversely affected.
    - Any new or replacement crossing, culvert, or bridge that intersects potential habitat for listed salmonid species would meet CDFW and/or NMFS fish passage criteria.
    - All stream crossing projects should consider storm-proofing guidelines presented in Weaver et al. (2015). Culverts would also conform to design guidelines for conveyance of the 100-year peak flow and associated sediment and wood loads, as specified in Cafferata et al. (2017).
    - Projects in channels that provide potential spawning and/or rearing habitat for anadromous salmonids should follow NOAA Fisheries Guidelines for Salmonid Passage at Stream Crossings in California (NMFS 2023).
    - Bridges and culverts should be designed to adequately convey flow and materials (e.g., the 100-year flood) in addition to allowing fish passage. If a bridge or culvert is designed to convey less than the 100-year design flow, the Project Proponent should demonstrate how the smaller culvert avoids excessive erosion/sedimentation, headcutting, or habitat impacts.
    - Stream simulation design (NMFS 2023) should be used to inform project design.
    - Structures should be designed to provide passage for all life stages of native fish species.
    - Bridges (including concrete box culverts, which are constructed as bridges in accordance with current NMFS and CDFW guidelines) should be designed with vertical abutments. Treated wood should not be used for bridge construction or replacement.
    - Placement of rock slope protection (RSP) within the bankfull width of the stream should be avoided except for the minimum necessary for protection of bridge abutments and pilings, culverts, and other stream-crossing infrastructure. The amount and placement of any RSP should not constrict the bankfull flow. RSP should not create barriers to fish or wildlife, and therefore should typically be buried with natural stream material or planted organic material. The toe of RSP used for streambank stabilization should be placed sufficiently below the streambed scour depth to ensure stability. Where RSP is deemed necessary, the use of bioengineered techniques provided in Chapter 3 of the PEA under “Bioengineered Bank Stabilization,” should be incorporated.
    - Drivable low water crossings (i.e., ford) should be appropriately armored on the downstream side to reduce the potential for scouring.
    - For bridge replacement projects requiring impact pile driving, hydroacoustic effects would need to stay below the 207 dB L_{PEAK} and 203 dB $SEL_{CUMULATIVE}$ thresholds (or the most current thresholds accepted by NMFS). The following avoidance and minimization measures would be prioritized as shown below:

1. Design channel spanning bridge structures so that in-channel pile driving would not be required.
2. Avoid installing 24-inch and larger piles when possible
3. Pile driving would be performed during recommended in-water work window.
4. Accomplish pile driving in the dry utilizing dewatering techniques as necessary without impeding fish passage to the extent possible.
5. Utilize vibratory hammers when considered an appropriate installation method according to site conditions.
6. Incorporate attenuation methods into pile driving activities (e.g., bubble curtain, isolation casing, and dewatered cofferdam).

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3 Conservation Measures by Resource

Table 3-1. Geology, Water Quality, and Hydrology

Geology, Water Quality, and Hydrology (GWH) Conservation Measures	Procedures	Applicable regulation/guidance
GWH-1 Measures will be taken to limit the disturbance area for each site-specific project.	These measures include: • Areas that will be disturbed will be identified prior to construction activities, will be the minimum area necessary, and will be limited to those areas already approved. • All project vehicles will be confined to the designated activity areas, access routes, and staging areas. • All work zones will be clearly delineated. • All supervisory personnel will be informed of environmental concerns, permit conditions, and final project specifications. • When possible, pre-project contours will be restored. Areas of disturbance will be clearly marked on plans or staked in the field. Access routes will be clearly communicated, and work zones will be marked on plans or staked in the field. Supervisory personnel will have the authority to stop construction if activities are being conducted outside of the specified work zones and disturbance areas.	PEA
GWH-2 A site-specific stormwater pollution prevention plan (SWPPP) will be prepared for all projects that are required to obtain coverage under the NPDES General Order for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Order).	The SWPPP will describe BMPs for the project, including silt fences, sediment filters, and routine monitoring to verify effectiveness. Proper implementation of erosion and sediment controls will be adequate to minimize sediment inputs into the tributaries until vegetation regrowth occurs. All required controls and BMPs, including sediment and erosion control devices, will be inspected daily during the project period to ensure that the devices are properly functioning. Excavated and stored materials will be kept in upland activity areas with erosion control properly installed and maintained. Excavated and stored materials will be staged in stable upland activity areas. All applicable erosion control standards will be required during stockpiling of materials.	Clean Water Act California's Porter-Cologne Act USFWS Statewide Restoration BiOp

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Geology, Water Quality, and Hydrology (GWH) Conservation Measures	Procedures	Applicable regulation/guidance
GWH-3 An Erosion Control Plan will be prepared and implemented for projects that do not require coverage under an NPDES permit per **GWH-2**, the site-specific project proponent will include appropriate BMPs, and a rain event action plan if seasonal rain during the construction period might occur, to reduce the potential release of water quality pollutants to receiving waters.	BMPs may include the following measures: • Install erosion control measures, such as invasives-free straw bales, silt fences, fiber rolls, or equally effective measures, at riparian areas adjacent to stream channels, drainage canals, and wetlands, as needed. Erosion control measures will be monitored during and after each storm event for effectiveness. Modifications, repairs, and improvements to erosion control measures will be made as needed to protect water quality. • Erosion control measures may also include grading, seeding, mulching, and soil bioengineering (brush layers, stakes, etc.). • Erosion control products that include synthetic or plastic monofilament or cross-joints in the netting that are bound/stitched (e.g., straw wattles, fiber rolls, or erosion control blankets) and could trap snakes, amphibians, and other wildlife will not be used. Over time, erosion control materials associated with temporary disturbance would either decompose or be manually removed.	USFWS Statewide Restoration BiOp
GWH-4 As part of the SWPPP or Erosion Control Plan (see **GWH-2** and **GWH-3**), the Project Proponent will prepare and implement a hazardous materials management and spill response plan.	The site-specific project proponent will ensure that any hazardous materials are stored at the staging area(s) with an impermeable membrane between the ground and hazardous material, and that the staging area is designed to prevent the discharge of pollutants to groundwater and runoff water. The Project Proponent will use and store hazardous materials, such as vehicle fuels and lubricants, in designated staging areas away from stream channels and wetlands, unless otherwise approved in the ESA Section 7(a)(2) Review Form, according to local, state, and federal regulations. The site-specific project proponent will notify regulatory agencies within 24 hours of any leaks or spills and will properly contain and dispose of any unused or leftover hazardous products off site. Also see GPM-17 for more detail on spill prevention.	USFWS Statewide Restoration BiOp
GWH-5 Turbidity and suspended sediments entering waterbodies as a result of access routes will be minimized.	• Bare soil will be kept to the minimum required by designs. Erosion control devices/measures will be applied to areas where vegetation has been removed as needed to reduce short-term erosion prior to the start of the rainy season. • Runoff from bare soil areas will be kept well dispersed. Dispersing runoff keeps sediment onsite and prevents sediment delivery to streams. • Any concentrated runoff from bare soil areas will be directed into natural buffers of vegetation or areas with more gentle slopes where sediment can settle out. • Flow paths, including roadside ditches that might otherwise deliver fine sediment to stream channels or other water bodies, will be disconnected and dispersed. • Floodplain areas will be decompacted (i.e., deep ripping-up to 18”) so that surfaces are permeable, and no surface water runoff occurs. • To reduce sedimentation entering waterbodies, temporary access routes will be stabilized or decommissioned and revegetated upon completion of work in those areas. Decommissioning is defined as removing those elements of a road that reroute hillslope drainage and present slope stability hazards.	Clean Water Act California’s Porter-Cologne Act TRRP BMPs Water Quality Control Plan for the North Coast Region (aka Basin Plan)

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Geology, Water Quality, and Hydrology (GWH) Conservation Measures	Procedures	Applicable regulation/guidance
GWH-6 Turbidity monitoring is required for all in-water work.	Turbidity monitoring will be conducted to ensure projects meet turbidity thresholds during project construction (i.e., ≤20 Nephelometric Turbidity Units (NTUs) at 500 feet downstream of in-river construction when background turbidity is ≤20 NTU; and ≤20 percent increase in turbidity above background at 500 feet downstream when background is >20 NTU). If standards are not met, construction activities will cease until operations or alternatives can be completed within compliance standards.	CWA Section 401 TRRP BiOp Water Quality Control Plan for the North Coast Region (aka Basin Plan)
GWH-7 Potential impacts associated with accidental spills of pollutants (fuel, oil, grease, etc.) on vegetation and aquatic habitat resources within the project boundary will be minimized and avoided.	• Equipment and materials will be stored away from wetland and surface water features. No hazardous materials, including fuels, oils, and solvents, will be stored or transferred within 100 feet of an active channel, or within 0.25 mi of the centerline of a Wild and Scenic River or within riparian reserves. Areas for fuel storage, refueling, and servicing of equipment must be located in an upland location at least 100 feet from the active river channel or within an adequate secondary fueling containment area. • Vegetable oil or other biodegradable hydraulic oil for heavy equipment hydraulics should be used whenever practicable when operating in or near water. • All equipment operated in or adjacent to the waterbody should be clean of aquatic invasive species as well as oil and grease and should be well maintained. • Equipment that will come in contact with the Trinity River or tributaries will be inspected daily. Vehicles will receive proper and timely maintenance to reduce the potential for mechanical breakdowns leading to a spill of materials. • External oil, grease, and mud will be removed from equipment using steam cleaning. Wash sites must be located in upland locations so that dirty wash water does not flow into stream channels or wetlands. Untreated wash and rinse water will be adequately treated prior to discharge if that is the desired disposal option. • Gasoline engines and pumps operated on the floodplain will be isolated from the ground by an impermeable barrier so that any leaking petroleum products are isolated from the ground. • Spill containment booms will be maintained onsite at all times during project activities and/or staging of equipment or fueling supplies. Fueling trucks will maintain a spill containment boom at all times. • The contractor will develop and implement site-specific BMPs, a water pollution control plan, and spill prevention and containment plan in accordance with applicable federal and state requirements. The contractor will be responsible for immediate containment and removal of any toxins released.	TRRP BMP -Fac 7 and BMP AqEco-2 Clean Water Act California's Porter-Cologne Act

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Geology, Water Quality, and Hydrology (GWH) Conservation Measures	Procedures	Applicable regulation/guidance
GWH-8 If a construction phase extends into the following year's construction season, the site will be secured and "winterized" before the start of the flood season (typically November 15) to avoid sediment entering the stream.	Erosion and sediment control BMPs will be implemented to winterize the site.	Clean Water Act California's Porter-Cologne Act
GWH-9 Stockpiling of materials will be done is such a way to prevent discharges to Project waterbodies.	During the wet season, no stockpiled soils will remain exposed, unless properly installed and maintained erosion controls are in place on and around the stockpile. Temporary stockpiling of material onsite will be minimized. Stockpiled material will be placed in upland areas far enough away from ESA-listed species habitat that these materials cannot discharge to waters of the United States	USFWS Statewide Restoration BiOp
GWH-10 Disturbed streambanks should be restored to a natural slope and profile suitable for establishment of riparian vegetation.	Site-specific project design will mimic the natural slope and profile of the bank to support riparian vegetation. The funding and/or land management agency will review all restoration plans to ensure that site-specific designs follow this guidance.	2020 TRRP BiOp
GWH-11 Nonnative fill material, if pathogen free, should be removed from the channel and floodplain to an upland site or appropriate offsite disposal location, potentially including a landfill. Trash and debris should be disposed of at an appropriate offsite location, potentially including a landfill (for anthropogenic debris). If a removed structure contains material (e.g., large wood, boulders, concrete) not typically found in the stream or floodplain at that site, the removed material should be disposed of at an approved landfill or upland disposal site.	Site-specific project design will include plans for disposal of nonnative materials from any project excavation activity that are not appropriate for site-specific reuse. Materials will be hauled to an upland site or off-site and disposed of at a landfill or disposal site. Excavated material removed from off- or side-channels should be hauled to an upland site or spread across the adjacent floodplain, as long as the soil is considered suitable for application (e.g., free of contaminants and/or pathogens) in a manner that does not restrict floodplain capacity or otherwise degrade floodplain function.	Clean Water Act California's Porter-Cologne Act 2020 TRRP BiOp
GWH-12 Effective erosion control measures shall be in place at all times during construction.	These devices shall be in place during and after construction activities to minimize fine sediment input to flowing water and to detain sediment-laden water on site. If continued delivery of sediment to the waterway is likely to occur after construction is complete, appropriate erosion and sediment control measures shall be implemented and maintained until risk of erosion/sedimentation has subsided.	2020 TRRP BiOp

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Geology, Water Quality, and Hydrology (GWH) Conservation Measures	Procedures	Applicable regulation/guidance
GWH-13 Sediment-laden water created by construction activity in upslope areas, floodplain terraces, and dewatered work areas shall be directed to temporary storage and treatment sites (e.g., settling pond or Baker tank) or into upland areas to allow water to filter through vegetation prior to reentering stream network or other aquatic areas.	The funding and/or land management agency will review all restoration plans to ensure that site-specific conditions and designs to ensure that all sediment laden water is directed to temporary storage and treatment sites or upland areas.	2020 TRRP BiOp Clean Water Act California's Porter-Cologne Act
GWH-14 Where slope protection is needed along rocky banks, streambank stabilization measures, such as toe-of-rock slope protections, shall be placed below the bed scour depth to ensure stability	The funding and/or land management agency will review all restoration plans to ensure that site-specific conditions and designs to ensure that all slope protection activities are below bed scour depth.	2020 TRRP BiOp
GWH-15 Heavy equipment would be operated in a manner that minimizes adverse effects to the environment.	The following would be implemented during construction: minimally sized, low-pressure tires, minimal sharp turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils.	PEA, resource specialist recommendations
GWH-16 During site preparation, native soil and materials would be preserved to the extent possible.	The following would be implemented during construction: • Native topsoil (typically 2-4 inches) would be protected and/or salvaged (in disturbance areas). • Native plants and materials would be preserved (e.g., large wood, duff, willow clumps, etc.). • Areas with soil hydrology such as wetlands and wet meadows would be flagged and protected during construction activities.	PEA, resource specialist recommendations
GWH-17 When construction activities are complete, any material stripped from the soil surface during site preparation would be placed on any temporarily disturbed areas where topsoil was removed.	Temporarily disturbed areas and temporary roads (as appropriate, particularly Aquolls and Copsey soils susceptible to compaction) would be decompacted and then stabilized through revegetation with native seed and plantings, as appropriate to the site and restoration goals.	PEA, resource specialist recommendations

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Table 3-2. Vegetation Resources

Vegetation Resources Conservation Measures	Procedures	Applicable regulation/guidance
V-1 Botanical surveys for special status species (BLM Redding Field Office (RFO), USFS Region 5 Sensitive and Forest Watch, California and federally listed plant species) in areas of known occurrence or suitable habitats will be conducted.	A qualified botanist will conduct a minimum of two pre-project surveys to determine if special-status plant species occur within the project site. The agencies will develop a tracking system to document the status of surveys, known occurrences and suitable habitats in activity areas. Botanical surveys will be conducted during time periods most appropriate for detection and identification of target BLM Redding Field Office (RFO), Region 5 Sensitive and Forest Watch, California and federally listed plant species. The project botanist will communicate whether surveys were conducted in a sufficient manner and whether known occurrences or suitable habitats are present. BLM Redding Field Office (RFO), Region 5 Sensitive and Forest Watch, California and federally listed plant species are found during botanical surveys, proceed with developing mitigation/conservation measures. If Region 5 Sensitive and Forest Watch plant species are not observed during appropriately timed botanical surveys, the project botanist will communicate botanical clearance results to the implementation team. Preliminary desktop preparation will scope CNDDB, CalFlora, IPaC, and any other relevant sources to identify special status populations occurring at or near the project area. Surveys shall be conducted during the blooming periods of the plants potentially occurring at the site to determine (1) if the species occur and (2) the quality, location, and extent of any populations.	National Forest Management Act 16 U.S. Code 1604 (g)(3)(B) Endangered Species Act 16 U.S. Code 1531 Sec. 5 (a) Departmental Regulation 9500.4 Forest Service Manual (FSM) 2670.22 FSM 2670.32 (3, 4) FSM 2672.1 BLM Integrated Vegetation Management Handbook TRRP BMP AqEco-2

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Vegetation Resources Conservation Measures	Procedures	Applicable regulation/guidance
V-2 Known special status species plant populations will be protected during project implementation. Known Forest Watch plant populations will be conserved to the extent practicable during project implementation. Biologically sensitive areas (e.g., wetlands and other jurisdictional waters, special-status plant species habitat, riparian vegetation) should be clearly identified and marked to be protected.	The agencies will maintain a tracking system to document the status of surveys, known occurrences and suitable habitats in activity areas. The implementation team and project botanist will develop site- and activity-specific mitigation measures for Region 5 Sensitive plants to be included in contract specifications or as standard operating procedures for agency personnel. The implementation team and project botanist will develop site-specific conservation measures when practicable for Forest Watch plant species to be included in contract specifications or as standard operating procedures for agency personnel. If a special-status plants species is found within 250 feet of any proposed disturbance, the following measures will be implemented: • Prior to the start of disturbance, exclusionary fencing will be erected around the known occurrences and any other appropriate avoidance measures will be taken. A qualified botanist shall be present to assist with locating these special-status plant populations. The exclusionary fencing will be periodically inspected throughout each period of project and be repaired as necessary. • If a population cannot be fully avoided, Reclamation will retain a qualified botanist to (1) determine appropriate salvage and relocation measures and (2) implement appropriate measures in coordination with the landowner and CDFW staff. Populations on BLM-managed lands will be fully avoided. • Project botanist or other staff will inspect and maintain marked areas regularly throughout construction periods.	National Forest Management Act 16 U.S. Code 1604 (g)(3)(B) Endangered Species Act 16 U.S. Code 1531 Sec. 5 (a) Departmental Regulation 9500.4 FSM 2670.22 FSM 2670.32 (3, 4) FSM 2672.1 BLM Integrated Vegetation Management Handbook TRRP BMP AqEco-2 2020 TRRP BIOp

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Vegetation Resources Conservation Measures	Procedures	Applicable regulation/guidance
V-3 Whitebark pine will be protected	Pre-implementation field surveys will be conducted where a high potential for occupied whitebark pine habitat is identified. The project botanist will maintain a tracking system to document the status of surveys, known occurrences and suitable habitats in activity areas. Site-specific protection measures will be developed by the project botanist in coordination with implementation personnel for documented occurrences of whitebark pine. Protection measures may include avoidance zones, relocation of project activities, seasonal restrictions, or other measures. To the maximum extent practicable, damage to live whitebark pine trees during implementation will be avoided. Ground disturbing activities within 33-feet of known whitebark pine individuals (seeds, seedlings, saplings, trees) and stands will be avoided. If damage to whitebark pine cannot be entirely avoided, the project proponent and lead federal agency would need to consult with USFWS. Dead whitebark greater than 5" dbh or any live whitebark pine trees will not be cut or damaged unless they pose an imminent hazard to safety.	National Forest Management Act 16 U.S. Code 1604 (g)(3)(B) Endangered Species Act 16 U.S. Code 1531 Sec. 5 (a) Departmental Regulation 9500.4 FSM 2670.22 FSM 2670.31 FSM 2670.32 (3, 4) FSM 2672.1
V-4 A species palette for revegetation will be based on species that naturally or historically occur in the project area, have the best chance of survival considering current site conditions, and can provide required habitat elements.	The project botanist will develop site-specific seed mixes and planting plans. Project botanists will develop a seed collection protocol. Native seed or plant sources should be acquired as close to the project site as possible. Seeds should be protected from moisture, wind, heat, vandalism, rodents, insects, weather, and other conditions that would damage or impair their viability.	BLM Integrated Vegetation Management Handbook FSM 2070.2 (3, 4, and 5)
V-5 Pole cuttings will be installed in riparian areas that require an increase in woody riparian vegetation.	Pole cuttings will be sourced from healthy plants, limiting collection to no more than 30 % of individual plants or populations. Pole cuttings should be taken from live wood at least 1 year old or older. Cuttings should be kept moist until planted and should be installed at a depth sufficient to allow root growth into the groundwater table, or as necessary to provide long-term survival of the planting. Cuttings should be planted when dormant and within 48 hours of collection.	BLM Integrated Vegetation Management Handbook FSM 2070.3
V-6 Nearby vegetation that could compete with plantings, especially weed species listed as invasive in the Cal-IPC Inventory will be controlled.	The project botanist will determine a weed management protocol. This could include clearing and maintaining a 24" diameter buffer around plantings.	The Plant Protection Act of 2000 (7 U.S.C. 7701 et seq) FSM 2902
V-7 The soil will be prepared prior to planting or seeding.	Prior to planting or seeding, the site will be finish-graded, free of weeds, decompacted and amended as appropriate based on habitat and site conditions. Project botanist will review site to insure it is ready for seed or plantings. Soils will be decompacted to a minimum depth of 6 inches.	BLM Integrated Vegetation Management Handbook FSM 2070.2

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Vegetation Resources Conservation Measures	Procedures	Applicable regulation/guidance
V-8 If determined necessary for plant establishment, irrigation systems will be installed prior to planting or seeding, or prior to any periods where the weather forecast may jeopardize successful establishment of plants.	Project botanist will determine areas that require irrigation and the duration that irrigation is needed.	BLM Integrated Vegetation Management Handbook FSM 2070.2
V-9 Prefabricated vegetated mats (sedges and rushes) for wetland restoration will be used as appropriate.	Prefabricated vegetated mats (i.e., sedge and rush mats) should be appropriately sized and staked in place in the riparian zone, channels, floodplains, and areas with high runoff to prevent their movement during high-flow events. Project botanist will select the species pallet for the vegetated mats.	BLM Integrated Vegetation Management Handbook FSM 2070.2
V-10 Plantings should be enclosed with fencing, cages, tubex, or other protection measures, as appropriate, in areas where plantings are subject to forage by animals (e.g., deer, elk, beavers, livestock, gophers, or moles).	Appropriate material will be used to protect each planting. Any nonbiodegradable fencing material will be removed after plantings are adequately established.	BLM Integrated Vegetation Management Handbook FSM 2070.3
V-11 Native riparian vegetation that must be removed to achieve aquatic and riparian restoration objectives should be salvaged and used. Living trees that must be removed should be replanted if possible or used for large wood placement.	Project botanist will determine what vegetation should be salvaged and where it will be relocated. For living trees, the project botanists will determine the new location for planting or where it should be used for large wood placement.	2020 TRRP BiOp
V-12 Success of revegetation should be monitored.	Monitoring will include periodic assessments of riparian vegetation establishment and mortality, riparian vegetation mapping, avian studies and assessing the performance of planted vegetation. All revegetated areas will be maintained and monitored for a minimum of 2 years after replanting is complete and until success criteria are met, to ensure the revegetation effort is successful. The standard for success is at least 60% absolute cover compared to pre-project conditions at the project site or at least 60% cover compared to an intact, local reference site. If an appropriate reference site or pre-project conditions cannot be identified, success criteria will be developed for review and approval by the appropriate Water Board on a project-by-project basis based on the specific habitat impacted and known recovery times for that habitat and geography. The project proponent will prepare a summary report of the monitoring results and recommendations at the conclusion of each monitoring year.	2020 TRRP BiOp
V-13 Access routes and staging areas that minimize disturbance to riparian and wetland areas should be identified and used.	Prior to construction, equipment access routes that minimize riparian disturbance and avoid unstable areas shall be clearly marked. Vegetation will not be removed from unstable areas that would increase the risk of channel instability.	2020 TRRP BiOp

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Vegetation Resources Conservation Measures	Procedures	Applicable regulation/guidance
V-14 Hazard trees that pose a safety risk in riparian areas should be specified for removal.	When possible, trees should be felled toward the stream channel. Felled trees, with root-wads maintained as possible, will be kept on site when needed to meet large wood placement objectives.	2020 TRRP BiOp
V-15 Equipment with the greatest practicable reach to minimize disturbing riparian vegetation and to minimize adverse impacts on soils should be used	Use hand tools, minimally sized, low-pressure tires, minimal hard turn paths for tracked vehicles, and/or temporary mats or plates within wet or sensitive soils	2020 TRRP BiOp
V-16 Vegetation required to be removed should be used for wood structures, to the extent possible, or disposed of by using as mulch, chipping, hauling offsite, burning, ripping into soil surfaces, burying within spoils areas, or other appropriate methods.	Vegetation that needs to be removed will be marked. The team will determine the use of each removed individual or groups of individuals.	2020 TRRP BiOp
V-17 Old growth tree and forest stand protection.	Avoid and minimize adverse effects to old growth trees and forest stands. Old growth trees may not be removed from federal land without further coordination with land-managing agencies (USFS and BLM). Clearing associated with site-specific restoration activities shall not make old growth more susceptible to hazards such as fire or wind.	Executive Order 14072
V-18 Vegetation disturbance avoidance	The project proponent will minimize, to the greatest extent feasible, the amount of soil, terrestrial vegetation, emergent native vegetation, and submerged vegetation (e.g., submerged aquatic vegetation in freshwater areas) disturbed during project construction and completion and using methods creating the least disturbance to vegetation. Disturbance to existing grades and native vegetation, the number of access routes, the size of staging areas, and the total area disturbed by the project will be limited to the extent of all temporary and permanent impacts as defined by the final project design. All roads, staging areas, and other facilities will be placed to avoid and limit disturbance to waters of the state and other aquatic habitats (e.g., streambank or stream channel, riparian habitat) as much as possible. When possible, existing ingress or egress points will be used and/or work will be performed from the top of the creek banks or from barges on the waterside of the stream or levee bank, or dry gravel beds. Existing native vegetation will be retained as practicable, emphasizing the retention of shade-producing and bank stabilizing trees and brush with greater than 6-inch diameter branches or trunks. Where possible, vegetation disturbance and soil compaction will be minimized by using low ground-pressure (typically less than 13 to 20 pounds psi) equipment that exerts less pressure per square inch on the ground than other equipment. To minimize impacts to vegetation, select equipment with a greater reach.	

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Table 3-3. Non-Native Invasive Plant Species

Non-Native Invasive Species (NNIS) Conservation Measures	Procedures	Applicable regulation/guidance
NNIS-1 Weed Management Specialist will provide information to the implementation team about documented noxious weed infestations and how to identify and report undocumented noxious weeds.	The implementation team and contract administrators will coordinate with the assigned Weed Management Specialist for documented noxious weed locations to avoid and information needed to identify undocumented noxious weeds. Technical guidance may include, but not be limited to, guidelines documented in the USDA Forest Service Guide to Noxious Weed Prevention Practices (2001).	Plant Protection Act (PL 106-224) Noxious Weed Control and Eradication Act of 2004 36 Code of Federal Regulations Subpart A, Section 222.8 Executive Order 13112, amended by EO 13751 FSM 2900
NNIS-2 Weed infestations will be inventoried and prioritized for treatment within the project site and along access routes before ground disturbing activities begin.	Prior to project implementation, weeds will be identified and mapped. Assigned Weed Management Specialist will prioritize areas for treatment and determine an appropriate treatment plan. Both the project site and access routes will be inventoried and treated as necessary.	Plant Protection Act (PL 106-224) Noxious Weed Control and Eradication Act of 2004 36 Code of Federal Regulations Subpart A, Section 222.8 Executive Order 13112, amended by EO 13751 FSM 2900

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Non-Native Invasive Species (NNIS) Conservation Measures	Procedures	Applicable regulation/guidance
NNIS-3 Known and newly reported noxious weed infestations will be pre-treated prior to the onset of ground disturbing activities, when deemed appropriate.	The implementation team and contract administrators will coordinate with the assigned Weed Management Specialist on anticipated locations of ground disturbing activities for pre-treatment needs. Continue monitoring and treating infestations throughout the life of the activity.	Plant Protection Act (PL 106-224) Noxious Weed Control and Eradication Act of 2004 36 Code of Federal Regulations Subpart A, Section 222.8 Executive Order 13112, amended by EO 13751 FSM 2900
NNIS-4 All off-road and earth-disturbing equipment will be cleaned to remove all plant parts, dirt, and material that may carry noxious weed seeds prior to entry onto the STNF, or movement from one national forest project area to another.	The implementation team and contract administrators will coordinate with the assigned Weed Management Specialist for technical guidance, contract specifications, and appropriateness of wash site locations. Technical guidance may include, but not be limited to, guidelines documented in the USDA Forest Service Guide to Noxious Weed Prevention Practices (2001). In areas of extensive noxious weed infestations, designated wash sites may be established as part of project implementation.	Plant Protection Act (PL 106-224) Noxious Weed Control and Eradication Act of 2004 36 Code of Federal Regulations Subpart A, Section 222.8 Executive Order 13112, amended by EO 13751 FSM 2900

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Non-Native Invasive Species (NNIS) Conservation Measures	Procedures	Applicable regulation/guidance
NNIS-5 Equipment loading and unloading, materials storage, parking areas, and helispots would be located outside of known noxious weed infestation sites to the extent practicable.	The implementation team and contract administrators will coordinate with the assigned Weed Management Specialist for documented noxious weed locations to avoid, information needed to identify undocumented noxious weeds, and to select lower-risk sites for staging, equipment loading and unloading, materials storage, and parking areas.	Plant Protection Act (PL 106-224) Noxious Weed Control and Eradication Act of 2004 36 Code of Federal Regulations Subpart A, Section 222.8 Executive Order 13112, amended by EO 13751 FSM 2900
NNIS-6 Areas where the soil has been exposed by ground-disturbing activities will be revegetated to prevent the invasion or expansion of noxious weed infestations.	The implementation team and contract administrators will coordinate with the assigned Weed Management Specialist for technical guidance and contract specifications prior to contract award or submittal of purchase order. Complete inspections to ensure all markings meet the State and County standards for certification as weed free. All seed used on National Forest System lands will be certified to be free of seeds from noxious weeds listed on the current All States Noxious Weeds test and will consist of native or desirable non-native seed mixes and/or native cultivars.	Plant Protection Act (PL 106-224) Noxious Weed Control and Eradication Act of 2004 36 Code of Federal Regulations Subpart A, Section 222.8 Executive Order 13112, amended by EO 13751 FSM 2900

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Non-Native Invasive Species (NNIS) Conservation Measures	Procedures	Applicable regulation/guidance
NNIS-7 Plant-based erosion- and sediment-control materials, including but not limited to hay, straw or mulch, will be free of noxious weed seed.	The implementation team and contract administrators will coordinate with the assigned Weed Management Specialist for technical guidance on plant-based materials prior to awarding of contract or submittal of purchase order. Materials for which weed-seed-free certification is unavailable will be inspected and determined to be free of weed seed prior to purchase and use.	Plant Protection Act (PL 106-224) Noxious Weed Control and Eradication Act of 2004 36 Code of Federal Regulations Subpart A, Section 222.8 Executive Order 13112, amended by EO 13751 FSM 2900
NNIS-8 Source sites for gravel, aggregate and borrow materials will be inspected for noxious weeds before materials are processed, used, or transported from the source site into the project area or onto the STNF.	The implementation team and contract administrators will coordinate with the assigned Weed Management Specialist or Project botanist for technical guidance on inspecting for and mitigating noxious weed infestations at source sites. Clean borrow and gravel sources on Forest would be maintained as noxious weed free through an inspection and treatment program. Off-forest inspections and treatments would be coordinated with county weed agents. Gravel or borrow material source sites with noxious weed infestations will not be used, unless effective treatment or other mitigation measures are implemented.	Plant Protection Act (PL 106-224) Noxious Weed Control and Eradication Act of 2004 36 Code of Federal Regulations Subpart A, Section 222.8 Executive Order 13112, amended by EO 13751 FSM 2900

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Non-Native Invasive Species (NNIS) Conservation Measures	Procedures	Applicable regulation/guidance
NNIS-9 Native plant materials will be free of seeds and propagules of noxious weeds listed on the current All States Noxious Weeds Test.	The implementation team and contract administrators will coordinate with the assigned Weed Management Specialist or Project botanist for technical guidance on weed free plant materials prior to awarding of contract or submittal of purchase order.	Plant Protection Act (PL 106-224) Noxious Weed Control and Eradication Act of 2004 36 Code of Federal Regulations Subpart A, Section 222.8 Executive Order 13112, amended by EO 13751 FSM 2900
NNIS-10 Possessing, storing or transporting non-pelletized hay, straw or mulch will meet the State and/or County standards for certification as weed free.	The implementation team and contract administrators will coordinate with the assigned Weed Management Specialist for technical guidance and contract specifications. Complete inspections to ensure all markings meet the State and/or County standards for certification as weed free.	Plant Protection Act (PL 106-224) Noxious Weed Control and Eradication Act of 2004 36 Code of Federal Regulations Subpart A, Section 222.8 Executive Order 13112, amended by EO 13751 FSM 2900
NNIS-11 Measures will be taken to reduce and prevent the spread of Didymo (*Didymosphenia geminata*).	To prevent the spread of Didymo (*Didymosphenia geminata*) all contractors will check for clumps of algae and sediment to ensure they will not leave the site. All gear will be soaked and scrubbed for at least one minute in a 2% (by volume) solution of household bleach, or a 5% (by volume solution of salt or dishwashing detergent. All surfaces must be contacted by the cleaning solution. Water-absorbent equipment (lifejackets, waders) should be soaked to insure they do not remain a risk. If cleaning is not practical, allow all equipment to dry for at least 48 hours before using in another freshwater system.	Noxious Weed Control and Eradication Act of 2004 36 Code of Federal Regulations Subpart A, Section 222.8 Executive Order 13112, amended by EO 13751 FSM 2900

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Table 3-4. Fishery Resources

Fishery *Resources* (FR) Conservation Measures	Procedures	Applicable regulation/guidance
FR-1 In-stream activities within any wetted or flowing channel should be restricted to the dry season (June 15th to October 15th for tributaries and July 15 to October 15 for the mainstem) before coho salmon begin spawning. Work in intermittent streams may continue beyond November 1 as long as weather conditions permit, the stream channel remains dry, and with approval from the permitting agencies.	The funding and/or land management agency will review all restoration plans to ensure that site-specific conditions and designs that involve in-stream work comply with dry season work windows for stream type.	2020 TRRP BiOp
FR-2 Passage will be provided for any adult and juvenile fish likely to be present in the project area during construction, unless passage did not exist before construction or where the stream reach is naturally impassable at the time of construction. After construction, and where appropriate, adult and juvenile fish passage that meets NMFS's fish passage criteria[2] shall be provided at the site-specific project location.	A fish biologist will be consulted and the funding and/or land management agency will review all restoration plans to ensure that site-specific conditions and designs provide adequate fish passage during and after construction.	2020 TRRP BiOp
FR-4 In those specific cases where it is deemed necessary to work in flowing water, the work area shall be isolated and all flowing water shall be temporarily diverted around the work site to maintain downstream flows during construction.	The contiguous length of the dewatered stream channel, and the duration of any single dewatering event, shall be minimized to the greatest extent practicable. Before beginning project work, a dewatering and fish capture and relocation plan will be submitted to NMFS, so that any activities involving the handling of protected fishes may be reviewed and modified if necessary.	PEA, NOAA RC BiOp

[2] NMFS (National Marine Fisheries Service). 2022. NOAA Fisheries West Coast Region, Anadromous Salmonid Passage Design Manual, NMFS, WCR, Portland, Oregon. Available at: https://www.fisheries.noaa.gov/s3//2023-02/anadromous-salmonid-passage-design.pdf. Accessed November 2024.

Fishery *Resources* (FR) Conservation Measures	Procedures	Applicable regulation/guidance
FR-5 When diverting flow around a work site is necessary (e.g., via pump, bypass culvert, or waterproof lined ditch) pumps shall be screened to prevent fish entrainment, and culvert outfalls shall be fitted with energy dissipation devices to prevent damage to riparian areas and streambeds.	Suction pump intakes shall be fitted with fish screens that meet NMFS criteria[2] to prevent entrainment or impingement of small fish. If diversion allows for upstream and downstream fish passage, place diversion entrances in locations to promote safe entry and reentry of fish to stream channels, preferably in pool habitat with cover. When necessary, pump turbid seepage water from dewatered work sites for disposal into upland locations, where it will not drain directly into any stream channel or where suspended materials will be filtered before flowing back into the stream.	2020 TRRP BiOp
FR-6 Bypass pipes will be sized to accommodate, at a minimum, twice the expected baseflow. The work area may need to be periodically pumped dry of seepage.	Pumps will be placed in flat areas, well away from the stream channel, and secured by tying off to a tree or stake in place to prevent movement by vibration. Pumps shall be refueled in an area well away from the stream channel and fuel absorbent mats will be placed under the pumps while refueling. Pump intakes shall be covered with mesh per the requirements of NMFS Fish Screening Criteria to prevent potential entrainment of fish or amphibians that could not be removed from the area to be dewatered. The pump intake shall be checked periodically for impingement of fish or amphibians. If pumping is necessary to dewater the work site, procedures for pumped water shall include requiring a temporary siltation basin for treatment of all water prior to entering any waterway and not allowing oil or other greasy substances originating from operations to enter or be placed where they could enter a wetted channel. Screen openings shall not exceed 1/4 inch (6.35 mm) in the diagonal direction and approach velocities should not exceed 1ft/second. Velocities should be minimized by placing screens in slow water conditions either in a pool or in a constructed backwater area.	PEA, NOAA RC BiOp
FR-7 Prior to dewatering, the best means to bypass flow through the work area shall be determined to minimize disturbance to the channel and avoid direct mortality of fish and other aquatic vertebrates.	Project site dewatering shall be coordinated with a qualified biologist, who will perform fish and amphibian relocation activities. The qualified biologist(s) must be familiar with the life history and identification of listed salmonids and listed amphibians within the action area. The qualified biologist shall submit a CV to NMFS for approval prior to fish relocation activities. Prior to dewatering a construction site, the qualified biologist shall capture and relocate fish and amphibians to avoid direct mortality and minimize adverse effects. Plastic/rubber material shall be placed over sandbags used for construction of cofferdams to minimize water seepage into the work area. Cofferdams and stream diversion systems shall remain in place and fully functional throughout the construction period. When coffer dams with bypass pipes are installed, debris racks will be placed at the bypass pipe inlet. Bypass pipes will be monitored a minimum of two times per day, seven days a week. All accumulated debris shall be removed.	PEA, NOAA RC BiOp
FR-8 When construction is complete, construction will be removed as quickly as possible to avoid impeding natural processes.	The flow diversion structure shall be removed as soon as possible in a manner that will allow flow to resume with the least disturbance to the substrate. Cofferdams will be removed so surface elevations of water impounded above the cofferdam will be reduced at a rate that will minimize the probability of fish stranding as the area upstream becomes dewatered.	PEA, NOAA RC BiOp

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Fishery *Resources* (FR) Conservation Measures	Procedures	Applicable regulation/guidance
FR-9 Fish shall be excluded from the work area by blocking the stream channel above and below the work area with fine-meshed block nets or screens.	Mesh openings will be no greater than 1/8 inch. The bottom of a seine must be completely secured to the channel bed. Screens must be checked twice daily, or more frequently as needed, and cleaned of debris to permit free flow of water. Block nets shall be placed and maintained throughout the dewatering period at the upper and lower extent of the areas where fish will be removed. Block net mesh shall be sized to ensure salmonids upstream or downstream do not enter the areas proposed for dewatering. Net placement is temporary and will be removed once dewatering has been accomplished or construction work is complete for the day.	PEA, NOAA RC BiOp
FR-10 All seining, electrofishing, and relocation activities shall be performed by a qualified biologist.	• All qualified biologists need to be experienced in fish identification, have experience with fish removals and relocations and have an understanding of the water quality needs of fish. The qualified biologist will need to submit a CV to NMFS for approval prior to fish relocation activities. The qualified biologist shall capture and relocate listed species prior to construction of the water diversion structures (e.g., cofferdams). The qualified biologist shall note the number of listed species observed in the affected area, the number and species of fish relocated, where they were relocated to, and the date and time of collection and relocation. • The qualified biologist will determine the most efficient means for capturing fish (e.g., seining, dip netting, trapping, and electrofishing). 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 dip-netting fish. • At some sites with low habitat complexity, herding fish with a single seine pass before the block net is installed can help reduce the number of fish that must be handled. • NMFS shall be notified one week prior to capture and relocation of listed fish to provide NMFS an opportunity to monitor the operation. • In streams with high water temperature, perform relocation activities during morning periods, when water is coolest. • Prior to capturing fish, determine the most appropriate release location(s). Consider the following when selecting release site(s): Similar water temperature as capture location, ample habitat for captured fish, low likelihood of fish reentering work site or becoming impinged on exclusion net or screen. • Water temperature, dissolved oxygen, and conductivity shall be recorded in an electrofishing log book, along with electrofishing settings. • The following methods shall be used if fish are removed with seines: A minimum of three passes with the seine shall be utilized to ensure maximum capture probability of salmonids within the area. All captured fish shall be processed and released prior to each subsequent pass with the seine. The seine mesh shall be adequately sized to ensure fish are not gilled during capture and relocation activities.	2020 TRRP BiOp & PEA

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Fishery *Resources* (FR) Conservation Measures	Procedures	Applicable regulation/guidance
FR-11 If seining, dip-netting, or trapping of fish is infeasible or otherwise ineffective, electrofishing may be used to capture fish from isolated work areas. Electrofishing will primarily be used to ensure fish removal (salvage) from areas where construction will otherwise result in the death of fish that are not removed.	• NMFS's (2000) electrofishing guidelines[3] shall be followed. • If possible, electrofishing shall not occur when water temperatures are greater than 64°F (18°C) or are expected to rise above this temperature prior to concluding fish capture. • No electrofishing shall be conducted in the vicinity of spawning fish or active redds. • If fish mortality occurs, capture shall be immediately discontinued (unless this would result in additional fish mortality) until current procedures are re-evaluated and any necessary adjustments are made to prevent or reduce further injury and mortality. • Electrofishing is not permitted if listed adult salmon or steelhead are present. Any listed adult salmon or steelhead encountered while electrofishing must be reported to NMFS.	2020 TRRP BiOp & PEA
FR-12 During relocation activities associated with either method of capture (electrofishing or seining) for salmonids, measures will be taken to protect fish.	• Salmonids shall not be overcrowded into buckets; allowing no more than 150 0+ fish (approximately six cubic inches per young-of-the-year [0+] individuals approximately) per five-gallon bucket and fewer individuals per bucket for larger fish. • Every effort shall be made not to mix (0+) salmonids with larger salmonids, or other potential predators. Have at least two containers and segregate (0+) fish from larger age classes. Larger amphibians shall be placed in the container with larger fish. • Native salmonid predators collected and relocated during electrofishing or seining activities shall be relocated in a dispersive manner so as to not concentrate them in one area. Particular emphasis shall be placed on avoiding relocation of predators into steelhead and salmon relocation pools. To minimize predation on salmonids, these species shall be distributed throughout the wetted portion of the stream so as not to concentrate them in one area. • All captured listed fish shall be relocated outside of the proposed construction site and placed in suitable habitat. Captured fish shall be placed into a pool, preferably with a depth of greater than two feet with available instream cover. • All native captured fish will be allowed to recover from electrofishing and anesthesia before being returned to the stream. • 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. • Place a thermometer in holding containers and, if necessary, periodically conduct partial water changes to maintain a stable water temperature.	PEA, NOAA RC BiOp

[3] NMFS (National Marine Fisheries Service). 2000. Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act. June 2000. Available at: https://media.fisheries.noaa.gov/dam-migration/electro2000.pdf. Accessed November 2024.

Fishery *Resources* (FR) Conservation Measures	Procedures	Applicable regulation/guidance
FR-13 Where ESA-listed and sensitive aquatic species that require access to stream habitat are present, off-channel features should be designed to slope toward and drain to the primary stream habitat as streamflow subsides. Isolated pools or ponds that do not incorporate return channels to the stream should be situated at an appropriate distance from the edge of the active channel to avoid temporary connectivity and subsequent fish stranding following flood events. Proposed restoration projects should not result in stranding of fish in isolated waterbodies.	The funding and/or land management agency will review all restoration plans to ensure that site-specific conditions and designs meet the criteria for off-channel features and do not pose risk of stranding ESA-listed species individuals in isolated waterbodies.	PEA, NOAA RC BiOp
FR-14 For small dam removal, the sediment upstream of the dam would be physically removed and the channel through the excavated reach would be designed using natural channel evolution or stream simulation. Designs would be developed in accordance with known stream restoration and fish passage guidance documents[4].	The project proponent will prepare small dam removal designs that will be reviewed by the funding and/or land management agency to ensure that anticipated outcomes are compliant with stream restoration and fish passage guidance documents.	PEA, NOAA RC BiOp

[4] NMFS (National Marine Fisheries Service). 2001. Guidelines for Salmonid Passage at Stream Crossings: For Applications in California at Engineered Stream Crossings to Facilitate Passage of Anadromous Salmonids. September 2001. Available at: https://www.fisheries.noaa.gov/s3//2023-02/stream-crossing-guidelines-ca.pdf. Accessed November 2024.

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Fishery *Resources* (FR) Conservation Measures	Procedures	Applicable regulation/guidance
FR-15 The funding and/or land management agency with jurisdiction will develop and implement a plan to minimize impacts to freshwater mussels (e.g., western pearlshell mussel) and lamprey ammocetes that occupy habitat within the project area will be developed.	Any freshwater mussel beds would be identified during the planning process for each site-specific restoration action that is part of the Project. Construction-related effects would be minimized through implementation of erosion and sediment control BMPs and avoidance of physical disturbance to any freshwater mussel beds using a buffer of 5 meters from any construction activities or any scour as a result of construction activities[5]. If avoidance is not possible, freshwater mussel salvage and relocation BMPs described in "Conserving the Gems of Our Waters"[6] would be implemented during Project actions. This plan will include measures to collect, transport and relocate lamprey ammocetes within the site-specific project area. Relocation of ammocetes would occur using techniques to extract them from substrate habitat and move into the water column; thereby being transported to alluvial habitat downstream.	PEA, NOAA RC BiOp
FR-16 Blasting hydroacoustic effects would need to stay below the 207 dB $L_{PEA}K$ and 203 dB $SEL_{CUMULATIVE}$ thresholds (or the most current thresholds accepted by NMFS).	The following avoidance and minimization measures would be incorporated: 1. TRRP personnel and implementors would coordinate with NMFS when blasting is determined to be unavoidable. 2. Blasting would be performed during recommended in-water work windows. 3. Accomplish blasting in dry conditions utilizing dewatering techniques as necessary and without impeding fish passage to the extent possible. 4. Incorporate attenuation methods into blasting activities as directed by NMFS (e.g., bubble curtain, isolation casing, and dewatered cofferdam). 5. If blasting is implemented in, or adjacent to, a wetted stream, monitoring of fish shall occur during pile-driving activity to ensure no fish stranding or mortality occurs.	PEA, resource specialist recommendation based on Caltrans guidance

[5] Blevins, E., L. McMullen, S. Jepsen, M. Blackburn, A. Code, and S. H. Black. 2019. Mussel-Friendly Restoration: A Guide to the Essential Steps for Protecting Freshwater Mussels in Aquatic and Riparian Restoration, Construction, and Land Management Projects and Activities. 32 pp. Portland, OR: The Xerces Society for Invertebrate Conservation. Available online at www.xerces.org.

[6] Blevins, E., S. Jepsen, J. B. Box, D. Nez, J. Howard, A. Maine, and C. O'Brien. 2017. "Extinction Risk of Western North American Freshwater Mussels: Anodonta Nuttalliana, the Anodonta Oregonensis/Kennerlyi Clade, Gonidea Angulata, and Margaritifera Falcata." Freshwater Mollusk Biology and Conservation 20: 71-88. https://bioone.org/journals/freshwater-mollusk-biology-and-conservation/volume-20/issue-2/fmbc.v20i2.2017.71-88/Extinction-Risk-of-Western-North-American-Freshwater-Mussels--Anodonta/10.31931/fmbc.v20i2.2017.71-88.full

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Fishery *Resources* (FR) Conservation Measures	Procedures	Applicable regulation/guidance
FR-17 Implementors proposing impact pile driving or blasting would provide information similar to that required by the Caltrans Hydroacoustic Project Information Checklist[7] during site-specific project design to evaluate potential hydroacoustic effects.	Information provided would be adapted to include details about blasting (e.g., types and numbers of explosions, locations of explosions, etc.). This information would then be used in concert with the NMFS Multi-Species Pile Driving Calculator Tool[8] to ensure that project effects do not exceed hydroacoustic effects thresholds.	PEA
FR-18 To minimize pile driving impacts, only wooden piles will be used for SLJ placement below the OHWM.	Wooden piles may be driven by an excavator, or when needed, a vibratory pile driver will be used in preference over an impact driver.	2020 TRRP BiOp
FR-19 For bridge replacement projects requiring impact pile driving, hydroacoustic effects would need to stay below the 207 dB L_{PEAK} and 203 dB $SEL_{CUMULATIVE}$ thresholds (or the most current thresholds accepted by NMFS).	The following avoidance and minimization measures would be prioritized as shown below: 1. Design channel spanning bridge structures so that in-channel pile driving would not be required. 2. Avoid installing 24-inch and larger piles when possible 3. Pile driving would be performed during recommended in-water work window. 4. Accomplish pile driving in the dry utilizing dewatering techniques as necessary without impeding fish passage to the extent possible. 5. Utilize vibratory hammers when considered an appropriate installation method according to site conditions. 6. If impact pile driving is implemented in, or adjacent to, a wetted stream, monitoring of fish shall occur during pile-driving activity to ensure no fish stranding or mortality occurs. If sound level thresholds are met, pile driving shall cease for a minimum of 12 hours. 7. Incorporate attenuation methods into pile driving activities (e.g., bubble curtain, isolation casing, and dewatered cofferdam).	PEA
FR-20 Pile driving shall occur during the established/approved in-water and general work windows.	See **FR-1**.	PEA
FR-21 Sheet piling shall be driven by vibratory or nonimpact methods (i.e., hydraulic) that result in sound pressures below threshold levels to the extent feasible.	See **FR-19**.	PEA

[7] https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/hydroacoustic-project-information-checklist-ally.pdf

[8] https://www.fisheries.noaa.gov/resource/data/multi-species-pile-driving-calculator-tool

Fishery *Resources* (FR) Conservation Measures	Procedures	Applicable regulation/guidance
FR-22 Pile driving activities shall occur during periods of reduced currents.	Pile-driving activities shall be monitored to ensure that the effects of pile driving on protected fish species are minimized. If any stranding, injury, or mortality to fish is observed, NMFS shall be immediately notified and in-water pile driving shall cease. Vibratory hammers, rather than impact hammers, shall be used whenever possible.	PEA

Table 3-5. Wildlife Resources

Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
General Wildlife (WL)		
WL-1 Known active nesting, denning, and roosting sites for special status species (threatened, endangered, proposed, candidate, and BLM/USFS sensitive wildlife species) will be protected during implementation to prevent disruption of reproductive success.	Coordinate with Wildlife Biologist. Protective measures may include timing restrictions, no-activity buffers, or modifications to planned activities. Site-specific protective measures shall be determined by the Wildlife Biologist and will depend on species and occupancy status.	Federal Endangered Species Act California Endangered Species Act Statewide Restoration General Order (SRGO) Program Environmental Impact Report (PEIR) (SPM-01)
WL-2 Special status species nesting, denning and roosting sites discovered during the implementation period will be protected to prevent disruption of reproductive success. Comparable provisions shall be included in all contracts to provide protection for special status species discovered during implementation.	Contact the Wildlife Biologist if special status species nest, den, or roost sites are discovered during implementation for guidance. Protective measures may include timing restrictions, no-activity buffers, or modifications to planned activities.	Federal Endangered Species Act California Endangered Species Act SRGO PEIR (MAM-02; BIRD-01 – BIRD-05)

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
WL-3 A qualified biologist will conduct surveys of project sites to determine whether there is suitable nesting habitat for migratory birds.	If suitable habitat is present, the following measures will be implemented. Project activities will be scheduled to avoid the nesting season to the extent possible. The nesting season in Trinity County typically extends from March 15 through July 31. If project activities occur outside the breeding season, no further mitigation is necessary. If project activities during the breeding season cannot be completely avoided, the following measures will be implemented. A qualified biologist will conduct a minimum of one pre-project survey for nesting birds within the project sites and a 250-foot buffer around the sites. The survey will be conducted no more than 15 days prior to the initiation of project in any given area. The pre-project surveys will be used to ensure that no nests within or immediately adjacent to the project sites will be disturbed during project implementation. If an active nest is found, a qualified biologist will determine the extent of a project-free buffer zone to be established around the nest. Where impacts are unavoidable, a qualified biologist should prioritize the Partner's in Flight's (https://partnersinflight.org/) species of conservation concern (e.g. Vaux's swift, Willow flycatcher, Tree swallow, Spotted sandpiper). Other species of conservation concern for Trinity River's Bird Conservation Region (BCR5: Northern Pacific Rainforest) can be found in the Avian Conservation Assessment Database (https://pif.birdconservancy.org/avian-conservation-assessment-database-scores/).	Migratory Bird Treaty Act
WL-4 Nesting bird protection	If vegetation is to be removed by the project and all necessary approvals have been obtained, potential nesting habitat (e.g., shrubs and trees) that will be removed by the projects will be removed before the onset of the nesting bird season (typically March 1 for migratory songbirds). This will help preclude nesting and substantially decrease the likelihood of construction-related impacts.	Migratory Bird Treaty Act
WL-5 Live trees with evidence of large stick nests should be retained.	Site-specific protective measures shall be determined by the Wildlife Biologist and will depend on species and occupancy status. Protective measures may not be necessary or may include timing restrictions, no-treatment buffers, or modifications to planned prescriptions. Development of protective measures will be coordinated with the appropriate resource staff. Species that this may apply to include osprey, red-tailed hawks, Cooper's hawk, sharp shinned hawk, great horned owl, long-eared owl or other raptors.	California Endangered Species Act SRGO PERI (BIRD-01 – BIRD-05)

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
WL-6 Qualifications of the Qualified Biologist and USFWS-Approved Biologist	Biological monitoring and construction oversight will be provided by biologists at two different experience levels, depending on the activity. These two levels are described in this measure, below. In general, the Qualified Biologist will complete many tasks across species for a Proposed Restoration Project, and the USFWS-Approved Biologist will only be required for specific tasks that require additional species expertise. In some cases, the Qualified Biologist(s) may work under the guidance, direction, or supervision of the USFWS-Approved Biologist. Unless otherwise indicated, Guild- and Species-Specific Protection Measures, general site surveys and biological monitoring can be conducted by a Qualified Biologist. Because the qualifications for the USFWS-Approved Biologist exceed those for the Qualified Biologist, any activity indicated as appropriate for the Qualified Biologist may also be completed by a USFWS Approved Biologist. • Qualified Biologist: The Qualified Biologist is required to meet certain qualifications, as confirmed by the Project Proponent. Résumé review by the USFWS is not required for the Qualified Biologist. Minimum qualifications for the Qualified Biologist include a bachelor's degree in biological or environmental science, natural resources management, or related discipline; field experience in the habitat types that may occur at the project site; familiarity with the Covered Species (or closely related species) that may occur at the project site; and prior preconstruction survey, construction monitoring, or construction oversight experience (if and as relevant to the activity to be conducted). • USFWS-Approved Biologist: For some Covered Species, additional qualifications may be required for biologists who would be responsible for species handling or relocation, or other activities. These activities would be completed by the USFWS-Approved Biologist when required by the protection measures. Résumé(s) for the USFWS-Approved Biologist(s) with experience in the identification of all life stages and ecology of the applicable Covered Species (or closely related species) and their critical habitat will be submitted to the USFWS Field Office for review and approval at least 30 days prior to any activity for which the protection measures indicate that a USFWS-Approved Biologist is required. Because species handling and relocation of some species for proposed restoration projects would be authorized by USFWS through issuance of the PBO and associated ITS, it may not be a requirement for the USFWS-Approved Biologist to hold a federal Section 10(a)(1)(A) Recovery Permit to implement this role on an approved project under this program. However, it is noted that some presence/absence surveys that may be performed by a USFWS-Approved Biologist may require that the person conducting those surveys hold a Section 10(a)(1)(A) Recovery Permit. For any surveys, securing/confirming necessary 10(a)(1)(A) permits and other authorizations should be coordinated with the respective USFWS Field Office or S7 Delegated Authority Program (DAP).	2025 Reinitiated USFWS Statewide Restoration BiOp (ASP-1)

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
WL-7 Preconstruction Surveys	If Covered Species and/or their habitat is present, where appropriate and based on project-specific requirements, a Qualified Biologist will conduct visual preconstruction surveys and implement additional protection measures within 5 days prior to beginning work to protect the species and habitat from avoidable construction-related disturbance. The intent of the survey is to assess current species habitat and species use locations in the project area immediately prior to construction. The preconstruction survey is not intended to be a presence/absence or protocol-level survey; the potential for species presence would have already been evaluated prior to project approval. Pre-construction surveys may be phased across a construction site if construction in different areas will occur at different times; only areas where disturbance is imminent need be surveyed. If construction activities at a given location cease for more than 5 consecutive days, and there is potential for Covered Species to reoccupy habitat at that site, the Qualified Biologist will resurvey the project area prior to resuming construction and implement applicable protection measures. Additional Guild- and Species-Specific Protection Measures may supersede this more GPM, as applicable.	2025 Reinitiated USFWS Statewide Restoration BiOp (ASP-2) SRGO PEIR (SPM-01)
WL-8 Species Capture, Handling, and Translocation	Covered Species capture, handling, and translocation will only be conducted by a USFWS-Approved Biologist(s). The Project Proponent will prepare a Covered Species translocation plan to be reviewed and approved by the USFWS Field Office as part of the ESA Section 7(a)(2) Review Form. The plan will include capture and translocation methods, translocation site, and post translocation monitoring, if applicable. If capture, handling, and translocation are necessary due to dewatering activities, follow the USFWS-Approved translocation plan. Additional Guild- and Species-Specific Protection Measures may supersede this more GPM, as applicable.	2025 Reinitiated USFWS Statewide Restoration BiOp (ASP-3) SRGO PEIR (SPM-04)
WL-9 Covered Species Entrapment Prevention	To prevent the accidental entrapment of Covered Species during construction, all excavated, steep-walled holes or trenches will be covered with appropriate covers (e.g., plywood, thick metal sheets, or similar materials) at the end of each workday. Covers will be placed so that trench edges are fully sealed with rock bags, sand, or other appropriate material. Alternatively, one or more escape ramps (e.g., fill dirt or wood planking) will be installed at an angle no greater than 30 degrees, to allow wildlife to escape. Before holes or trenches are filled, sealed, or collapsed, the holes or trenches will be thoroughly inspected for trapped animals. If pipes are stored on site or in associated staging areas, they will be capped when not in use or stored above ground level at an appropriate height to minimize species entrapment and will be inspected before being moved. Any animals discovered will be allowed to escape voluntarily or will be relocated by a USFWS-Approved Biologist. Additional Guild- and Species-Specific Protection Measures may supersede this more GPM, as applicable.	2025 Reinitiated USFWS Statewide Restoration BiOp (ASP-4) SRGO PEIR (SPM-05)

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
WL-10 Airborne Noise Reduction	Equipment (including the noise abatement systems) will be maintained in good working order. If construction noise has the potential to adversely affect Covered Species, the Project Proponent will include site-specific protection measures for construction activities in the Project ESA Section 7(a)(2) Review Form to minimize impacts. Muffler (or spark arrester) damage must be promptly remedied. Potential adverse effects from project-related noise should be avoided or minimized to the maximum extent practicable by implementing sufficient disturbance buffers between noise generating project activities and covered amphibian, bird, and mammal species habitat. When applicable, species-specific noise buffer distances will be followed from Guild and Species-Specific Protection Measures. Noise buffer distances are distinct from other indicated buffer distances, which may relate to an area involving dispersal, visual disturbance, or other considerations; however, incorporating the larger of two buffer distances will provide buffer for both purposes. Noise buffer distances may be modified in coordination with the USFWS Field Office based on project specific characteristics or a Project Proponent/Action Agency may choose to submit their own analysis and buffer recommendations for the USFWS's consideration. If sufficient buffers cannot be implemented, the proposed activities may lead to adverse effects, including possible incidental take.	2025 Reinitiated USFWS Statewide Restoration BiOp (ASP-5) SRGO PEIR (SPM-06)
WL-11 Environmentally Sensitive Areas and/or Wildlife Exclusion	Monitoring, flagging, and/or fencing will be used to minimize disturbance to environmentally sensitive areas (e.g., waters and wetlands). If fencing is used: • The agency-approved biologist or resource specialist will determine the location of the fencing prior to the start of construction (e.g., between active work area(s) and sensitive resources). • Fencing will remain in place throughout the duration of the construction activities, and will be inspected and maintained regularly by the agency-approved biologist or resource specialist until completion of the project. • Repairs to the fencing will be made within 24 hours of discovery. • Fencing will be removed when all construction equipment is removed from the site, and the area cleared of debris and trash, and returned to natural conditions.	SRGO PEIR (SPM-02)
WL-12 Species Protection Construction Work Windows	Construction work windows may be required, depending on whether or not the project involves in-water construction and/or whether special-status species have potential to occur onsite.	SRGO PEIR (SPM-03)

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
WL-13 Reporting Requirements	Agencies will be notified within 24 hours if any individual special-status species is captured. The date; time of capture; specific location (GPS coordinates); and approximate size, age, and health of the individual will be recorded and provided in both hard copy and digital format to the agency(ies) within 2 weeks of the conclusion of the protective trap-and-release operation. The agency(ies) will be notified within 24 hours if any special-status mammal species is found injured or dead. A written notification will also be prepared by the project proponent after verbal notification to the agency(ies). The report will include the date, time, and location of the discovered animal/carcass; cause of injury or death; and any other pertinent information. All dead and preserved specimens will be submitted to the appropriate agency(ies) upon request. Salvaged animals will be kept cooled or frozen until delivered.	SRGO PEIR (MAM-05)
WL-14 Use of Handheld Tools	If exclusion fencing will be installed, vegetation in active work areas outside of the exclusion areas will be trimmed and cleared to the ground using handheld tools (which can include handheld motorized equipment, such as weed whackers or mowers) to the maximum extent practicable, under the supervision of an agency-approved biologist, to discourage presence of species in the construction area.	SRGO PEIR (MAM-03)
WL-15 Clearing and Grubbing Vegetation	An agency-approved biologist will be present during all vegetation clearing and grubbing activities in areas where the special status reptiles are confirmed to occur, or where measures are being implemented based on presence of suitable habitat. Prior to vegetation removal, the agency-approved biologist will thoroughly survey the area for these species. Vegetation in sensitive areas will be cleared by handheld motorized tools (e.g., weed eaters, chainsaws) or hand pulling unless alternate methods are proposed by the project proponent and approved by agency(ies). Tree stumps and roots will be left in place where possible to avoid any ground disturbance and preserve refugia habitat, with the exception of non-native invasive plants that could propagate from remaining vegetative material. Native branches, leaf litter, mulch, woody debris, and other vegetative trimmings may be retained and spread on site to enhance habitat as appropriate.	SRGO PEIR (REP-03)
WL-16 Species Trapping and Relocating	If the minimum avoidance zone cannot be maintained and the agency-approved biologist believes activities will disturb or destroy habitat (e.g., collapse burrows) or may otherwise adversely affect these special-status mammal species, then an agency-approved biologist may be required to implement a trap and release program at the agency's discretion. Project-specific guidance on trapping, temporary holding, release location, and release method will be required by the agency prior to the start of trapping.	SRGO PEIR (MAM-04)
WL-17 Prohibited Us of Rodenticides	No rodenticides will be used at the project site during construction in areas that support suitable habitat for special-status species.	SRGO PEIR (REP-04)
Northern Spotted Owl (NSO)		

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
NSO-1 Inquire with USFWS on Northern Spotted Owl Data Records.	If the proposed project is in suitable nesting, roosting, or foraging (NRF) habitat for the northern spotted owl and may affect the northern spotted owl or its habitat, the Project Proponent will contact USFWS to obtain contact information for local USFS, County, or other biologists who can provide a northern spotted owl survey, Activity Center, and habitat suitability data for the project area. An Activity Center represents the "best of detections" such as a nest tree, an area used by roosting pairs or territorial singles, or an area of concentrated nighttime detections. This step will provide baseline information for the project area and will help determine if and where surveys will be done, or if recent surveys have been completed.	2025 Reinitiated USFWS Statewide Restoration BiOp
NSO-2 Protocol Level Surveys**.**	If northern spotted owl surveys have not been done or are not current in accordance with the 2012 Northern Spotted Owl Survey Protocol guidance (depending on activity), and surveys are planned, conduct surveys according to the 2012 Northern Spotted Owl Survey Protocol and 2019 guidelines revision and follow the seasonal restrictions described 119 below for "Surveyed Landscape"[9]. If surveys are not planned, assume occupancy by nesting owls based on the presence of suitable NRF habitat; adhere to the guidance and seasonal restrictions described below for operating in an "Unsurveyed Landscape." 1. As an alternative to the full six-visit protocol surveys described in the 2012 Northern Spotted Owl Survey Protocol[10] three surveys can be conducted in the year of action implementation if there have been two consecutive years of surveys with six visits per year in the immediately previous years. If no northern spotted owls are detected within 0.25-mile of the proposed activities, activities may proceed that year without seasonal restrictions.	2025 Reinitiated USFWS Statewide Restoration BiOp
NSO-3 Habitat Avoidance. In all suitable NRF habitat:	1. Removal or damage of known nest trees and associated screen trees will be avoided, unless they must be removed to implement the proposed project or are a confirmed safety hazard according to the guidance documents from the implementing agency or another agency with jurisdiction in the project area. 2. Removal or damage of trees or snags with potential nesting platforms and associated screen trees will be avoided. These include trees with large, flattened tops; large, broken-topped trees; trees with decadence, such as large cavities; mistletoe broom structures, catfaces, or large limbs; or large snags with these similar characteristics. 3. Removal of large (20 inches in diameter at breast height or larger) snags will be avoided, unless they must be removed to implement the proposed project or are a confirmed safety hazard according to the implementing agency's guidance documents.	2025 Reinitiated USFWS Statewide Restoration BiOp

[9] USFWS (U. S. Fish and Wildlife Service). 2012. Protocol for Surveying Proposed Management Activities that May Impact Northern Spotted Owls. Revised January 9, 2012. Available online at: https://www.fws.gov/media/protocol-surveying-proposed-management-activities-mayimpact-northern-spotted-owls-0 and USFWS. 2019. Revision to Take Avoidance and Analysis and Guidance for Northern spotted owl. Letter from M.J. Senn, USFWS to H. Eng, California Department of Forestry and Fire Protection with two attachments. November 1.

[10] USFWS (U. S. Fish and Wildlife Service). 2012. Protocol for Surveying Proposed Management Activities that May Impact Northern Spotted Owls. Revised January 9, 2012. Available online at: https://www.fws.gov/media/protocol-surveying-proposed-management-activities-mayimpact-northern-spotted-owls-0.

Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
NSO-4 Avoid Reducing Habitat Quality.	Project activities will not result in net loss of habitat or downgrade or remove the function of suitable NRF habitat to the degree that the habitat does not function in the capacity that existed prior to treatment: 1. Although habitat elements such as individual large trees or snags may be removed from NRF habitat, the treatment must not be so extensive as to downgrade or remove the overall function of the habitat.	2025 Reinitiated USFWS Statewide Restoration BiOp
NSO-5 Avoid Foraging Habitat.	In suitable foraging habitat in northern spotted owl core areas (a 0.5-mile radius or 500-acre area around an Activity Center) and in suitable foraging habitat in northern spotted owl home ranges (a 1.3-mile radius, including core, or a 3,398-acre area around an Activity Center): 1. Downgrading or removal of suitable foraging habitat function will be avoided. 2. Although habitat elements—such as individual trees, shrubs, down logs, and snags—may be removed from foraging habitat, the treatment must not be so extensive as to downgrade or remove the overall function of the habitat in a northern spotted owl core or home range below the recommended habitat levels for supporting survival, reproduction, and occupancy[11]. In the interior California Klamath and California Cascades Provinces, this level is a combination of 400 acres of suitable NRF habitat in the core. For the home range, the level is 40% suitable NRF (approximately 1,336 acres). In the Redwood zone, the recommended level is 100 acres of suitable NRF habitat in the core and 500 acres of suitable NRF habitat in the home range[12].	2025 Reinitiated USFWS Statewide Restoration BiOp

[11] USFWS (U.S Fish and Wildlife Service). 2011. Revised Recovery Plan for the Northern Spotted Owl (*Strix occidentalis caurina*). Region 1: Portland, Oregon. June 28.

[12] USFWS (U.S Fish and Wildlife Service). 2019. Revision to Take Avoidance and Analysis and Guidance for Northern spotted owl. Letter from M.J. Senn, USFWS to H. Eng, California Department of Forestry and Fire Protection with two attachments. November 1.

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
NSO-6 Work Restrictions in Previously Surveyed Landscape.	If surveys are completed or are current for the project area (based on surveys conducted by the Project Proponent, or other data provided from other agencies): 1. Do not conduct activities that result in loud or continuous noise above ambient levels within 0.25 mile (or 1,320 feet) of a nest site between February 1 and July 9. This includes activities that generate sound levels 20 or more decibels above ambient sound levels, or activities that generate maximum sound levels above 90 decibels, excluding vehicle back-up alarms. Maximum sound levels are the combined ambient and activity-generated sound levels. 2. Do not conduct any suitable habitat modification or smoke-generating activities within 0.25 mile (or 1,320 feet) of a nest site between February 1 and September 15. Suitable habitat includes northern spotted owl NRF habitat. Modification includes cutting and removal of large trees, down logs, or snags. Tree or limb trimming or pruning, brush trimming or removal, and hazard tree felling may occur as long as the noise levels described above are not exceeded during the critical breeding period of February 1 through July 9.	2025 Reinitiated USFWS Statewide Restoration BiOp
NSO-7 Work Restrictions in Unsurveyed Landscape.	If surveys have not been completed and cannot be done, assume occupancy by nesting owls in the project area/portion of it based on the presence of suitable NRF habitat: 1. Do not conduct activities that result in loud and continuous noise above ambient levels within 0.25-mile (or 1,320 feet) of unsurveyed suitable NRF habitat between February 1 and July 9. This includes activities that generate sound levels 20 or more decibels above ambient sound levels or activities that generate maximum sound levels above 90 decibels, excluding vehicle back-up alarms. Maximum sound levels are the combined ambient and activity-generated sound levels. 2. Do not conduct any suitable habitat modification or smoke-generating activities within 0.25 mile (or 1,320 feet) of unsurveyed suitable NRF habitat between February 1 and September 15. Suitable habitat includes northern spotted owl NRF habitat. Modification includes cutting and removal of large trees, down logs or snags. Tree or limb trimming or pruning, brush trimming or removal, and hazard tree felling may occur as long as the noise levels described above are not exceeded during the critical breeding period of February 1 through July 9.	2025 Reinitiated USFWS Statewide Restoration BiOp

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
NSO-8 Work Restrictions in Designated Critical Habitat.	When working in designated critical habitat, adhere to all measures described in NSO-5, NSO-6, and NSO-7 for reducing impacts in suitable NRF habitat. This will ensure that effects to physical and biological features related to NRF[13] are minimized.	2025 Reinitiated USFWS Statewide Restoration BiOp
American Goshawk & Nesting Bald Eagles (AGBE)		
AGBE-1	Seasonal restrictions would be imposed from January 1 through August 15 within 0.25 mile of any known goshawk and eagle nest sites in the project area to all activities causing above-ambient loud and continuous noise (for >=2 hours per day) to avoid potential disturbance during the goshawk and eagle breeding season. 1. For smoke producing activities within 0.25 miles of active nests, employ firing techniques that provide good smoke dispersion and ventilation aloft and/or away from active nests. 2. If effects of smoke cannot be avoided or minimized within 0.25 miles of an active nest site, prescribed burning will be conducted outside the seasonal restriction period. 3. Seasonal restrictions may be lifted if surveys determine no nesting activity within 0.25 miles of proposed activities.	STNF LRMP 1995
AGBE-2	Prior to the start of construction, a qualified biologist will conduct a survey of the project site(s) to determine whether suitable nesting habitat for the species is present. If suitable habitat is present, construction will be scheduled to avoid the nesting season for eagles and American goshawks to the extent feasible. The nesting season for most raptors in Trinity County extends from January 1 through July 31. Thus, if construction can be scheduled to occur between August 1 and December 31, the nesting season will be avoided and no impacts to nesting bald eagles and northern goshawks would be expected. If it is not possible to schedule construction during this time, Mitigation Measures 4.7-8c and 4.7-8d of the TRRP Master EIR will be implemented.	TRRP Master EIR (4.7-8a) SRGO PEIR (BIRD-01)
AGBE-3	Construction will be scheduled to avoid the nesting season for eagles and American goshawks to the extent feasible. The nesting season for most raptors in Trinity County extends from January 1 through July 31. Thus, if construction can be scheduled to occur between August 1 and December 31, the nesting season will be avoided and no impacts to nesting eagles and American goshawks would be expected. If it is not possible to schedule construction during this Mitigation Measures 4.7-8c and 4.7-8d of the TRRP Master EIR will be implemented.	TRRP Master EIR (4.7-8b) SRGO PEIR (BIRD-02)
AGBE-4	Pre-construction surveys for nesting northern goshawks will be conducted by a qualified biologist to ensure that no nests will be disturbed during project implementation. These surveys will be conducted no more than 14 days prior to the initiation of construction activities. During this survey, the biologist will inspect all trees immediately adjacent to the impact areas for eagle and northern goshawk nests. If an active nest is found close enough (i.e., within 500 feet) to the construction area to be disturbed by these activities, the biologist, in consultation with the CDFW, will determine the extent of a construction-free buffer zone to be established around the nest.	TRRP Master EIR (4.7-8c) SRGO PEIR (SPM-01; BIRD-05)

[13] USFWS (U.S Fish and Wildlife Service). 2012. Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for the Northern Spotted Owl Final Rule (77 FR 71876). Available online at: https://www.fws.gov/federal-register-document/revised-designation-critical-habitatnorthern-spotted-owl-1.

Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
AGBE-5	If vegetation is to be removed by the project and all necessary approvals have been obtained, potential nesting habitat (i.e., trees) within 0.25 miles of a known eagle nest that will be removed by the project, will be removed before the onset of the nesting season, if feasible. This will help preclude nesting and substantially decrease the likelihood of construction-related impacts.	TRRP Master EIR (4.7-8d) SRGO PEIR (BIRD-02)
Bats		
BAT-1	Surveys would be conducted of crevices in caves, mines, and abandoned wooden bridges and buildings for the presence of roosting bats.	STNF LRMP (1995) SRGO PEIR (MAM-01)
BAT-2	No noise-generating or habitat-modification activities (including timber harvest) will take place within 250 feet from caves, mines and mine adits to protect known or potential sensitive bat species (Townsend's big-eared bat, pallid bat, and fringed myotis) roost sites. Activities necessary to address safety threats (e.g. hazard trees to the road or operations) will prevail over this measure.	STNF LRMP (1995) SRGO PEIR (SPM-06)
BAT-3	Options for conducting burning around caves/mines could include the following: • Limit burning to outside the breeding season (do not burn March 1 through August 31); or • Burn under prevailing wind conditions that disperse smoke away from cave/mine entrances.	STNF LRMP (1995)
BAT-4	A pre-construction survey for roosting bats will be conducted prior to the start of construction activities. The survey will be conducted by a qualified biologist. No activities that would result in disturbance to active roosts of special-status bats will proceed prior to completion of the surveys. If no active roosts are found, no further action is needed. Because bats are known to abandon young when disturbed, if a maternity roost is located, a qualified bat biologist will determine the extent of a construction-free zone to be implemented around the roost. If a bat maternity roost or hibernaculum is present, Mitigation Measures 4.7-9b and/or 4.7-9c of the TRRP Master EIR will be implemented. CDFW will also be notified of any active bat nurseries within the disturbance zones.	TRRP Master EIR (4.7-9a) SRGO PEIR (MAM-01)
BAT-5	If an active maternity roost or hibernaculum is found, the project will be redesigned to avoid the loss of the tree or structure occupied by the roost, if feasible. If the project cannot be redesigned to avoid removal of the structure, demolition of that structure will commence before bat maternity colonies form (i.e., prior to March 1) or after young are volant (flying) (i.e., after July 31). The disturbance-free buffer zones described above will be observed during the bat maternity roost season (March 1–July 31). If a non-breeding bat hibernaculum is found in a tree or structure to be razed, the individuals will be safely evicted, under the direction of a qualified bat biologist (as determined by a Memorandum of Understanding with CDFW), by opening the roosting area to allow air to flow through the cavity. Demolition will then follow no sooner than the following day (i.e., there will be no less than one night between initial disturbance for air flow and the demolition). This action will allow bats to leave during dark hours, thus increasing their chance of finding new roosts with a minimum of potential predation during daylight. Trees with roosts that need to. be removed will first be disturbed at dusk, just prior to removal that same evening, to allow bats to escape during the darker hours.	TRRP Master EIR (4.7-9b) SRGO PEIR (MAM-02)
Pacific/American Marten, Ringtail, and Fisher (MRF)		

Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
MRF-1	A pre-construction survey for ring-tailed cats will be conducted prior to the start of construction activities. The survey will be conducted by a qualified biologist. No activities that would result in disturbance to active dens of ring-tailed cats will proceed prior to completion of the surveys. If no active dens are found, no further action is needed. If a ring-tailed den is present, Mitigation Measures 4.7-9b and/or 4.7-9c of the TRRP Master EIR will be implemented. CDFW will also be notified of any active bat nurseries within the disturbance zones.	TRRP Master EIR (4.7-9a) SRGO PEIR (MAM-01)
MRF-2	If an active ringtail nest is found, the project will be redesigned to avoid the loss of the tree occupied by the nest if feasible. If the project cannot be redesigned to avoid removal of the occupied tree, demolition of that tree will commence outside of the breeding season (February 1 to August 30). If a non-breeding den is found in a tree scheduled to be removed, the individuals will be safely evicted under the direction of a qualified biologist. Trees with dens that need to be removed will first be disturbed at dusk, just prior to removal that same evening, to allow ringtails to escape during the darker hours.	TRRP Master EIR (4.7-9c) SRGO PEIR (MAM-02)
Northwestern Pond Turtle (WPT)		
WPT-1 Habitat Avoidance	A Qualified Biologist will survey and flag the work area for suitable overwintering habitat (e.g. leaf litter layer under trees and shrubs) or nesting habitat to avoid. Any flagging used must be removed after work is completed. Project personnel will be advised to avoid disturbance in these areas unless site-specific conservation measures allow work to be conducted in these areas to minimize or avoid disturbance. To the extent feasible, logs or rocks will not be moved or otherwise disturbed to avoid impacts to turtles utilizing these objects as cover. If such features must be moved, the biologist will visually inspect these features prior to and during moving to ensure turtles are not present. The biologist will also ensure any work materials do not create dispersal barriers to pond turtle. If a pond turtle is found in the work area during construction, work will stop until the individual(s) leave the area on their own volition. Workers should be vigilant to avoid turtles on roadways and be made aware of the potential for hatchling dispersal. Workers must also visually check for turtles (particularly hatchlings) under vehicles and equipment prior to moving them and allow the turtles to leave the area on their own volition before moving vehicles or equipment. Vehicles should stay on designated roads where feasible and if overland travel is needed in suitable habitat where there is a possibility of dispersing hatchlings, a monitor may be required.	2025 Reinitiated USFWS Statewide Restoration BiOp

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
WPT-2 Visual Encounter Surveys	Before construction activities occur, a Qualified Biologist will search all suitable aquatic habitat in the project area a minimum of three times during appropriate weather conditions (e.g. sunny periods between 8am to 12pm, and from 3pm until an hour before dusk; air temperatures 55.0-90.0 degrees Fahrenheit; wind speeds less than 12.0 mph). Surveys will occur when western pond turtles are most likely to be detected in aquatic habitat: • For the northwestern pond turtle, the highest probability of detection is from April 1 to September 30 (May 1 to August 31 at elevations above 3,500 feet). If work will occur outside of this window, a Qualified Biologist will also search upland habitat between October 1 and March 31 (September 1 to April 30 at elevations above 3,500 feet). In areas where western pond turtles are known to occur or could be present, follow current guidance for visual encounter surveys in the Visual Encounter Survey Protocol for Western Pond Turtles developed by the Oregon Native Turtle Working Group (ODFW 2020). If surveys are not conducted or do not follow USFWS-approved methods, assume western pond turtles are present in suitable aquatic and upland habitat. Inquire with local USFWS Field Office on western pond turtle data records and if surveys have been completed in the project area.	2025 Reinitiated USFWS Statewide Restoration BiOp

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
WPT-3 Work Windows	For project areas where the northwestern pond turtle are known or assumed to occur, avoid work during the following windows: • For project activities that involve in-water/dewatering work, work will be avoided from October 1 to March 31. • For project activities within 500 meters (1604.4 feet) of suitable nesting habitat (i.e. sunny, open grasslands and ruderal habitat or bare soil), avoid disturbing nesting adult females from May 15 to July 31 for the northwestern pond turtle (except May 1 to July 31 in the San Joaquin Valley) unless wildlife exclusion fencing has been installed around all suitable nesting habitat within the proposed project footprint prior to the start of the nesting season (i.e., prior to May 15 for the northwestern pond turtle (except prior to May 1 in the San Joaquin Valley)). • For project activities in overwintering habitat (e.g. muddy pond bottoms), work will be avoided from October 1 to March 31 (September 1 to April 30 above 3,500 feet elevation) unless wildlife exclusion fencing has been installed around all suitable overwintering habitat within the proposed project footprint prior to the start of the overwintering season (i.e., prior to October 1 at elevations < 3,500 feet and prior to September 1 at elevations >3,500 feet). Alternatively, if installation of wildlife exclusion fencing around all overwintering habitat is not feasible, then all suitable overwintering cover (e.g. leaf litter layer, woody debris) will be removed from the project footprint before overwintering begins (i.e., prior to October 1 at elevations < 3,500 feet and prior to September 1 at elevations >3,500 feet), and will be maintained daily free of suitable overwintering cover. A qualified biologist will also search all mammal burrows for overwintering western pond turtles and move them out of harm's way. The qualified biologist then may collapse the burrows to prevent their usage by overwintering western pond turtles. • For project activities in aestivation habitat (e.g., upland habitat (e.g. leaf litter) within 500 meters (1,640.4 feet) of suitable aquatic habitat), work will be avoided when nearby seasonal aquatic habitat is dry unless wildlife exclusion fencing has been installed around all suitable aestivation habitat within the proposed project footprint before nearby seasonal aquatic habitats dry up. Work windows may be modified via completion of the ESA Section 7(a)(2) Review Form and local Field Office approval.	2025 Reinitiated USFWS Statewide Restoration BiOp

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
WPT-4 Environmentally Sensitive Areas and Wildlife Exclusion	Fencing and/or monitoring will be used to protect western pond turtles and will be implemented in coordination with a Qualified Biologist. If the project site is suitable for fencing, the USFWS requires an Exclusion Fencing Plan, and a Qualified Biologist will determine where environmentally sensitive area fencing (ESAF) will be installed to protect western pond turtle habitat adjacent to the proposed project footprint. If complete exclusion of the project disturbance footprint with Wildlife Exclusion Fencing (WEF) is not feasible in the project area, projects may consider directional fencing (fencing that is meant to guide the movement of western pond turtles safely around a work area) to discourage western pond turtles from entering the project area from suitable habitat, or fencing off only portions of the larger project area as they are being actively worked on. The local USFWS Field Office may be contacted for technical assistance on excluding western pond turtles from a project area where complete exclusion fencing is not feasible. WEF must be opaque, non-climbable material, at least 2.0 feet (0.6 meters) high, have one-way exit funnels away from the work area, and contoured such that western pond turtles are unable to climb over the fence. WEF will include coverboards spaced every 50 to 100 feet on either side to provide cover to western pond turtles that encounter the fence. If WEF is found to be compromised, a Qualified Biologist will conduct a survey immediately preceding construction activity that occurs in western pond turtle habitat, or in advance of any activity that may affect other species. The Qualified Biologist will search along WEF and in pipes, culverts, and beneath equipment (e.g., vehicles or heavy equipment) before they are moved. Monitoring can be conducted in lieu of WEF at sites where installation is not practicable.	2025 Reinitiated USFWS Statewide Restoration BiOp

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
WPT-5 Capture and Relocation	Western pond turtles will only be captured and relocated when it is the only option to prevent injury or mortality, and after all attempts to avoid interaction with the species have been used. If necessary to avoid injury or mortality, relocation of western pond turtles will be conducted by a Qualified Biologist in accordance with the requirements of *REP-6, Species Handling and Relocation* in the 2022 Statewide BiOp. Western pond turtle relocation will be conducted as described in a USFWS-approved reptile relocation plan submitted by the Project Proponent to the local USFWS Field Office concurrently with the ESA Section 7(a)(2) Review Form or at least 60 days before construction. Early submission facilitates timely USFWS review and approval and helps avoid project delays. • Avoid and minimize transfer of diseases (e.g. turtle-shell disease, respiratory disease). The Qualified Biologist will wear disposable nonlatex or rubber gloves when handling individual turtles to inhibit transmission of disease. Any suspected observations of disease such as respiratory or turtle-shell disease in western pond turtles or any other species of turtle at the project site will be reported to the USFWS within 24 hours and before relocating any western pond turtle. If any western pond turtle or other turtle species in the project site test positive or are suspected of turtle-shell disease, then all turtles at the project site will be considered to be potentially infected. All equipment and clothing will be decontaminated and dried completely prior to and after use at an aquatic project site to prevent disease transmission between water bodies. • Western pond turtles will be released within a few hours of capture. Individuals will be kept in containers with high sides, such as 5-gallon (18.9 liter) plastic buckets or 10-gallon (37.9 liter) storage tubs. Place a lid or piece of cloth over the top to darken the container. Keep captured western pond turtles out of direct sunlight because overheating is possible in a short time. • The Qualified Biologist will capture and relocate the western pond turtle the shortest distance possible to a location that contains similar suitable habitat and that will not be affected by activities associated with the project. No western pond turtles will be relocated more than 500 meters or to a different watershed to prevent disorientation and the spread of diseases. • If a western pond turtle found in upland habitat is suspected of traveling to an overwintering/aestivation or nesting site and voids its bladder upon handling, then the western pond turtle will be returned to aquatic habitat. • Nesting or gravid female western pond turtles will be avoided to the greatest extent practicable. If an adult female western pond turtle is gravid or post-nesting, the Qualified Biologist will determine if she will be relocated to suitable undisturbed nesting habitat or suitable aquatic habitat outside of the work area. All possible precautions will be taken to allow her to continue to nest and to avoid nest failure. Refer to the 2024 Northwestern Pond Turtle Avoidance and Minimization Measures in Appendix A of the Wildlife Technical Report (Appendix L) for more details on relocation of western pond turtles.	2025 Reinitiated USFWS Statewide Restoration BiOp
WPT-6 No Net Loss of Basking Habitat	Maintain existing basking structures (e.g. logs, rocks, shorelines, emergent vegetation, algal mats, and substrate adjacent to aquatic habitat whenever possible. Avoid planting trees and shrubs that would shade suitable basking habitat and maintain an open riparian canopy to allow sufficient solar exposure for basking. Install basking structures as necessary for any basking habitat that is removed.	2025 Reinitiated USFWS Statewide Restoration BiOp

Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
WPT-7 Avoid Excessively Shading Nesting Habitat	Avoid planting trees and shrubs that would shade suitable nesting habitat if nesting habitat is limited near the project area.	2025 Reinitiated USFWS Statewide Restoration BiOp
Foothill Yellow-Legged Frog (FYLF) & Amphibians (AMP)		
FYLF-1 Work Windows[14]	For projects where the Sierra Nevada yellow-legged frog, mountain yellow-legged frog, and foothill yellow-legged frog are known or assumed to occur, project activities in uplands areas will be confined to August 1 through October 31. For project activities in occupied aquatic breeding habitat that typically dries before the end of autumn, grading and other disturbance will be confined to May 1 through November 15, and to when the breeding habitat feature (or portion of the feature where work would occur) has been dry for a minimum of 30 days before initiating work. These frogs have a multi-year larval development stage and are present in aquatic breeding habitat year-round. Therefore, project activities in occupied aquatic breeding habitat that does not dry before the end of autumn will be confined to May 1 through November 15 and will require a USFWS-Approved capture and relocation plan (see AMP-11, Species Observations and Handling Protocol) prior to initiating grading and other disturbance in the aquatic breeding habitat. Dewatering sites will be located and timed to avoid and minimize adverse effects to instream flows and depletion of pool habitat.	2025 USFWS Statewide Restoration BiOp
FYLF-2 Water Temperature[14]	Project activities will not result in long-term deleterious changes to water temperatures in occupied or potential habitat.	2025 USFWS Statewide Restoration BiOp
FYLF-3 Borrow Site Sediment Control[14]	Any borrow sites used will be developed so that the topsoil is removed and piled at the base of the slope to act as a berm catching any sediment that may be transported down slope. For most of the period during borrow, the slope will have a low basin at the base of the borrow area that can be substituted as a sediment pond (if needed) during a storm event. If applicable, all remaining spoils not used during construction will be hauled off-site and deposited in stable areas once construction is complete.	2025 USFWS Statewide Restoration BiOp
FYLF-4	If any construction in the Trinity River channel will occur prior to August 1 of any construction season, a pre-construction survey for yellow-legged frog larvae and/or eggs will be conducted by a qualified biologist. This survey would need to be conducted within the construction boundary no more than 2 weeks prior to the start of in-stream construction activities. If larvae or eggs are detected, the biologist will relocate them to a suitable location outside of the construction boundary.	TRRP Master EIR (4.7-5a)
FYLF-5	In the event that a yellow-legged frog individuals, larvae, or nests are observed within the construction boundary, the contractor will temporarily halt in-stream construction activities until the species has been moved to a safe location with suitable habitat outside of the construction limits.	TRRP Master EIR (4.7-5b)

[14] CM would only apply to site-specific projects if FYLF were to become an ESA-listed species, triggering the need for coverage under the 2025 USFWS Statewide Restoration BiOp.

Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
FYLF-6	Mitigation measures presented in Section 4.5 of the TRRP Master EIR (Water Quality) for addressing erosion and sedimentation and accidental spills will be fully implemented to mitigate for potential long-term impacts to dispersal habitat for the yellow-legged frog due to sedimentation and accidental spills.	TRRP Master EIR (4.7-5c)
FLYF-7	The mitigation measure associated with the disturbance to riparian habitat (Mitigation Measures 4.7-1a-c of the TRRP Master EIR) will be fully implemented.	TRRP Master EIR (4.7-5d)
AMP-1 Rain Event Limitations	To the maximum extent practicable, construction activities will be restricted to periods of low rainfall (less than 0.5 inch per 24-hour period) and periods of dry weather (with less than a 50% chance of rain). During these restricted periods, no construction activities will occur between 30 minutes prior to sunset and 30 minutes after sunrise (no night work during rain events). If rain exceeds 0.5 inch during a 24-hour period, work will cease until no further rain is forecast. Construction activities halted due to precipitation may resume when precipitation ceases and the National Weather Service 72-hour weather forecast indicates less than a 50% chance of 0.5 inch of rain or less during a 24--hour period. Before construction activities resume, a Qualified Biologist will inspect the project area and all equipment/materials for the presence of Covered Species of amphibians.	2025 Reinitiated USFWS Statewide Restoration BiOp (AMP-2) SRGO PEIR (AMP-2)
AMP-2 Preconstruction Survey	If covered amphibians are present or assumed present, no more than 24 hours prior to the date of initial ground disturbance and vegetation clearing, a USFWS-Approved Biologist will walk in the project site to investigate all potential areas that could be used by the Covered Species of amphibians for feeding, breeding, sheltering, movement, and other essential behaviors. If a covered amphibian species is encountered during the survey, the Project Proponent will refer to and follow procedures described below in AMP-9, Encounters with Species; and AMP-10, Species Observations and Handling Protocol, for passively allowing the species to move out of the work area or actively relocating the species out of harm's way. Proposed restoration projects that may need to actively relocate amphibians out of harm's way will require the Project Proponent to submit a project specific species relocation plan for USFWS review and approval, as described in AMP-10.	2025 Reinitiated USFWS Statewide Restoration BiOp (AMP-3) SRGO PEIR (AMP-3)
AMP-3 Disease Prevention and Decontamination	To prevent disease conveyance among work sites during project implementation, the USFWS-Approved Biologist will ensure that the decontamination protocols described in CDFW, Aquatic Invasive Species Disinfection/Decontamination Protocols[15] (or latest version) will be implemented prior to gear and equipment arriving at or moving between work sites and will be followed at all times. A copy of the code of practice must be available at the project site.	2025 Reinitiated USFWS Statewide Restoration BiOp (AMP-4) SRGO PEIR (AMP-4)

[15] CDFW (California Department of Fish and Wildlife). 2016. California Department of Fish and Wildlife, Aquatic Invasive Species Disinfection/Decontamination Protocols. February. Available online at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=92821&inline. Accessed August 2019.

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
AMP-4 Clearing and Grubbing Vegetation	A USFWS-Approved Biologist will be present during all vegetation clearing and grubbing activities in areas within the currently occupied range of Covered Species of amphibians where suitable habitat is present. Before vegetation removal, the USFWS-Approved Biologist will thoroughly survey the area for these species (see AMP-3, Preconstruction Survey). Either vegetation in sensitive areas will be cleared with handheld motorized tools (e.g., weed eaters or chainsaws) or by hand pulling; or a USFWS-Approved Biologist will walk in front of vegetation-clearing equipment. Where dense brush occurs (e.g., blackberry or periwinkle), the USFWS-Approved Biologist may direct an equipment operator to lift and shake dense vegetation with an excavator or backhoe so that the USFWS Approved Biologist can look underneath and search for amphibians. Tree stumps and roots will be left in place to avoid any ground disturbance and preserve refugia habitat, with the exception of nonnative invasive plants that could propagate from remaining vegetative material. Native branches, leaf litter, mulch, woody debris, and other vegetative trimmings may be retained and spread on site to enhance habitat, as appropriate.	2025 Reinitiated USFWS Statewide Restoration BiOp (AMP-6) SRGO PEIR (AMP-6)
AMP-5 Pump Screens	If a waterbody is to be temporarily dewatered by pumping, intakes will be completely screened, consistent with NMFS and CDFW screening guidelines[16] or latest updates to those guidelines (currently, where fry-sized salmonids are present, wire mesh openings no larger than 3/32 inch [2.38 mm] for woven wire or perforated plate screens, or 0.0689 inch [1.75 mm] for profile wire screens, and other relevant criteria such as limited approach velocities), to avoid entrainment or impingement of larval amphibians. The intake will be placed in a perforated bucket or another method to attenuate suction, to prevent Covered Species of amphibians from entering the pump system. Water will be returned to the water body when diversions or cofferdams are removed and flow is restored. If no diversion or cofferdams are used during dewatering, the waterbody will be allowed to refill naturally from precipitation, runoff, or hydrological processes.	2025 Reinitiated USFWS Statewide Restoration BiOp (AMP-7) SRGO PEIR (AMP-7)

[16] NMFS (National Marine Fisheries Service). 1997. Fish Screening Criteria for Anadromous Salmonids. National Marine Fisheries Service. Southwest Region. January 1997. 12 pp. and CDFW (California Department of Fish and Wildlife). 2001. Fish Screening Criteria. Available online at: http://www.fgc.ca.gov/regulations/2008/749_3EXHIBIT%20A.pdf.

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
AMP-6 Removal of Nonnative Invasive Species	Removal of any individuals of nonnative invasive species (e.g., bullfrogs, nonnative crayfish, or nonnative fishes) is encouraged as practicable to facilitate conditions for project success. The Project Proponent is responsible for ensuring that these activities comply with the California Fish and Wildlife Code. Suspected hybrid California tiger salamander will not be removed without specific authorization from USFWS (and CDFW, in accordance with their requirements). More details on nonnative animal removal are provided below. 1. In federally-listed aquatic species occupied habitat, a USFWS-Approved Biologist will be present during removal activities. Less experienced personnel assisting with removal efforts will get confirmation of species identification of all vertebrates prior to collection and removal. 2. All individuals participating in removal activities will have training in identification of Covered Species that might be present and nonnative species proposed for removal and proper techniques for all planned removal methods prior to the initiation of removal activities. 3. Crew size, along with the amount of time spent in any given habitat area, will be kept to the minimum necessary. Repeated disturbance of any given area within a single year will be avoided unless necessary for eradication purposes. 4. To the extent feasible, both native and nonnative fauna will be examined for signs of diseases or parasites soon after capture, and any abnormalities will be photographed and documented. 5. Prior to initiation of electrofishing activities in Covered Species habitat, the names and credentials of all electrofishing crew leaders will be submitted for review and approval by USFWS. 6. The USFWS-approved electrofishing crew leader will provide training to the crew regarding potential risks associated with electrofishing and injury to Covered Species. The crew will also be trained to identify signs of injury and appropriate response. 7. Electrofishing will be conducted using the minimum pulse rate and width that is effective. Only direct or pulsed direct current will be used. In shallow waters, undercut banks, near algal mats or other areas where Covered Species can be concentrated or are more likely to come into close contact with electrofishing equipment, the amount of time spent electrofishing will be minimized. 8. If any Covered Species are immobilized by electrofishing activities, they will be carefully removed from the water body by a USFWS-Approved Biologist until activities are completed. These individuals will be held for the minimum amount of time necessary and monitored until they are completely mobile and then returned to the point of capture. 9. Handling of individuals (e.g., arroyo toad, California red-legged frog) may occur if they are inadvertently collected by net or trap, in accordance with procedures for handling in AMP-11 and FISH-3 of the Statewide BiOp. These individuals will be released at the place of capture or will be relocated to the nearest available suitable habitat. 10. Gill nets will be used upstream and downstream of occupied stream stretches, but not in stream stretches where Covered Species might occur. Where gill nets are used, they will not be left unattended overnight 11. If traps are used, they will be carefully monitored to minimize the potential for injury and mortality of nontarget species. Fish traps will be used under the following conditions: (a) fish traps will be checked a minimum of once a day; (b) fish traps will be set so that air will be available at the top of the trap; and (c) if predator tracks adjacent to or signs of predator tampering with fish traps occur, these traps will be closed for a period of time until predator activity is no longer detected.	2025 Reinitiated USFWS Statewide Restoration BiOp (AMP-8) SRGO PEIR (AMP-8)

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
AMP-7 Placement of Suitable Erosion Control Material	To prevent amphibians from becoming entangled, trapped, or injured, erosion control materials that use plastic or synthetic monofilament netting will not be used. Silt fencing can be used because it is not considered a netting and does not entangle species. This includes products that use photodegradable or biodegradable synthetic netting, which can take several months to decompose. Acceptable materials include natural fibers such as jute, coconut, twine, or other similar fibers. Following site restoration, erosion control materials such as straw wattles will not block the movement of Covered Species of amphibians.	2025 Reinitiated USFWS Statewide Restoration BiOp (AMP-9) SRGO PEIR (AMP-9)
AMP-8 Encounters with Species	Each encounter with a covered amphibian will be treated on a case-by-case basis. If any life stage of the Covered Species of amphibian is found and these individuals may potentially be killed or injured by work activities, the following will apply: a. If a Covered Species of amphibian is detected in the project area, work activities within 50 feet of the individual that may potentially be harmed, injured, or killed will cease immediately, and the USFWS-Approved Biologist will be notified. Based on the professional judgment of the USFWS-Approved Biologist, if project activities can be conducted without harming or injuring the species, it may be left at the location of discovery and monitored by the USFWS-Approved Biologist. All project personnel will be notified of the finding, and at no time will work occur within 50 feet of a species without a USFWS-Approved Biologist present. b. Contact with the Covered Species of amphibian will be avoided, and the amphibian will be allowed to move out of the potentially hazardous situation of its own volition. Allowing a Covered Species of amphibian to move out of the potentially hazardous situation of its own volition may not be appropriate for multi-day projects because covered amphibians could stay or move back into the project site. If there is an immediate hazard or if there is no suitable, accessible habitat nearby to which the amphibian may relocate, the amphibian will be moved following approved handling protocol (see AMP-11, Species Observations and Handling Protocol). c. Not to exceed the self-imposed take limits provided in Table 4 of the Statewide BiOp.	2025 Reinitiated USFWS Statewide Restoration BiOp (AMP-10) SRGO PEIR (AMP-10)

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Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
AMP-9 Species Observations and Handling Protocol	The potential need to handle and relocate covered amphibian species should be evaluated during the technical assistance step. If a Covered Species of amphibian does not or cannot leave the work area and handling covered amphibians is required, capture and relocation will only be allowed in accordance with a plan developed in accordance with the guidance below and submitted to USFWS for review and approval. Although it could be submitted after the ESA Section 7(a)(2) Review Form, to avoid project delays and facilitate timely USFWS review and approval, a draft of the capture and relocation plan may be submitted with the ESA Section 7(a)(2) Review Form. The capture and relocation will be conducted by a USFWS-Approved Biologist. In addition to measures described in GPM-9 of the Statewide BiOp, Practices to Prevent Pathogen Contamination; and AMP-5, Clearing and Grubbing Vegetation[17], to prevent the spread of pathogens among sites, special care should be taken to prevent transferring potential pathogens among individual animals, as described below. a. Prior to handling and relocation, the USFWS-Approved Biologist will take precautions to prevent the introduction of amphibian diseases, in accordance with the Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander[18]. i. All dirt and debris, including mud, snails, plant material (including fruits and seeds), and algae, should be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with water. Cleaned items should be rinsed with clean water before leaving the work area. ii. Boots, nets, traps, etc., should then be scrubbed with either a 70% ethanol solution, a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water), QUAT 128 (quaternary ammonium, use 1:60 dilution), or a 6% sodium hypochlorite 3 solution and rinsed clean with water between study sites. Cleaning equipment in the immediate vicinity of a pond or wetland should be avoided. Care should be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat. iii. When working at sites with known or suspected disease problems, disposable gloves should be worn and changed between handling each animal. iv. Used cleaning materials (liquids, etc.) should be disposed of safely, and if necessary, taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags. b. Disinfecting equipment and clothing is especially important when biologists are coming to the project area to handle amphibians after working in other aquatic habitats. Covered amphibians will also be handled and assessed according to the Restraint and Handling of Live Amphibians[19]. Covered amphibians will be captured by hand, dip net, seine net, or other USFWS-Approved methodology, transported and relocated to nearby suitable habitat outside of the work area, and released as soon as practicable the same day of capture. Soaps, oils, creams, lotions, repellents, or solvents of any sort cannot be used on hands within two hours before and during periods when the biologist is capturing and relocating individuals. Individuals will be relocated to areas containing suitable habitat, as identified in the relocation plan. If the animal will be held in captivity for any length of time, they shall be kept in a cool, dark, moist environment with proper airflow, such as a clean and disinfected bucket or plastic container with a damp sponge. Holding/transporting containers will not contain any standing water, objects (except sponges), or chemicals. Holding/transporting containers and dip nets will be thoroughly cleaned, disinfected, and rinsed with fresh water prior to use in the project area[20]. USFWS will be notified (e.g., via phone, email, or text message) as soon as practicable and no longer than 1 week after all capture, handling, and relocation efforts.	2025 Reinitiated USFWS Statewide Restoration BiOp (AMP-11) SRGO PEIR (AMP-11)

Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
AMP-9 Species Observations and Handling Protocol (Continued)	If an injured covered amphibian is encountered, and the USFWS-Approved Biologist determines that the injury is minor or healing and the individual is likely to survive, the individual will be released immediately, consistent with measures above. The individual(s) will be monitored until it is not imperiled by predators or other dangers. If the USFWS-Approved Biologist determines that a covered amphibian has major or serious injuries as a result of project-related activities, the USFWS-Approved Biologist will take it to a USFWS-Approved facility as soon as practicable, if such a facility is within a reasonable distance from the project site. If taken into captivity, the individual will remain in captivity and not be released into the wild unless it has been kept in quarantine and the release is authorized by USFWS. The circumstances of the injury, the procedure followed, and the final disposition of the injured animal will be documented in a written incident report to USFWS, as described below. Notification to USFWS of an injured or dead covered amphibian in the project area will be made and reported, whether or not its condition resulted from project-related activities. In addition, the USFWS-Approved Biologist or Project Proponent will follow up with USFWS in writing (e.g., email) within 2 calendar days of the finding. Written notification to USFWS will include the following information: the species; number of animals taken or injured; sex (if known); date, time, and location of the incident or of the finding of a dead or injured animal; how the individual was taken; photographs of the specific animal; the names of the persons who observe the take and/or found the animal; and any other pertinent information. Dead specimens will be preserved, as appropriate, and will be bagged and labeled (i.e., species type; who found or reported the incident; when the report was made; when and where the incident occurred; and, if possible, the cause of death). Specimens will be held in a secure location until instructions are received from USFWS regarding the disposition of the specimen.	2025 Reinitiated USFWS Statewide Restoration BiOp (AMP-11) SRGO PEIR (AMP-11)
Invertebrates (INV)		
INV-1	Fell trees in Riparian Reserves when they pose a safety risk. Keep felled trees on-site when needed to meet coarse woody debris objectives.	TRRP Master EIR (RA-2)

[17] CDFW (California Department of Fish and Wildlife). 2016. California Department of Fish and Wildlife, Aquatic Invasive Species Disinfection/Decontamination Protocols. February. Available online at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=92821&inline. Accessed August 2019.

[18] USFWS (U.S. Fish and Wildlife Service). 2003. Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander. Available online at: https://www.fws.gov/media/interim-guidance-site-assessment-and-field-surveysdetermining-presence-or-negative-finding.

[19] USGS (United States Geological Survey). 2001. Guidelines for Use of Live Amphibians and Reptiles in Field and Laboratory Research. Second Edition, Revised by the Herpetological Animal Care and Use Committee (HACC) of the American Society of Ichthyologists and Herpetologists, 2004. (Committee Chair: Steven J., Beaupre, Members: Elliott R. Jacobson, Harvey B. Lillywhite, and Kelly Zamudio).

[20] CDFW (California Department of Fish and Wildlife). 2016. California Department of Fish and Wildlife, Aquatic Invasive Species Disinfection/Decontamination Protocols. February. Available online at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=92821&inline. Accessed August 2019.

Wildlife Conservation Measures	Procedures	Applicable regulation/guidance
INV-2	Prior to the start of construction activities, project proponents will retain a qualified biologist to identify potential construction access routes to ensure that these features avoid and/or minimize to the fullest extent impacts to jurisdictional waters. In addition, the project proponent will clearly identify, and flag in the field, biologically sensitive areas (e.g., jurisdictional waters and riparian habitat) to be protected, and will provide the contractor with specific instructions to avoid any construction activity within these features. They will inspect and maintain marked areas on a regular basis throughout the construction phase.	TRRP Master EIR (4.7-1a)
INV-3 Implement Butterfly and Bumble Bee Protection Measures	The following general butterfly and bumble bee protection measures apply to all special-status butterfly and bumble bee species and their habitat, as applicable. • Site Restrictions: Access routes, staging areas, and total project footprint within butterfly or bumble bee habitat will be limited to the minimum necessary to achieve the project goal. • Biological Monitor: Biological monitoring will be overseen by an agency-approved biologist. During the adult flight season of special-status butterfly and/or bumble bee species, an agency-approved biologist will be present when construction activities occur in or within 150 feet of suitable habitat (dispersal habitat as well as areas containing the larval host plant and adult food plants). • Environmentally Sensitive Areas: Any larval food or host plants found within 300 feet of the project footprint will be clearly marked and will be avoided to the maximum extent practicable. Prior to any ground-disturbing or vegetation removal activities, the edge of the work area near any larval food or host plants will be clearly marked to prevent workers and vehicles from entering this area. • Dust Control: The agency-approved biologist will ensure that dust is controlled by construction personnel by periodically watering down areas within 100 feet of special-status butterfly and/or bumble bee habitat, as necessary. Watering down the construction area will prevent dirt from becoming airborne and accumulating on larval host plants and adult food source plants for special-status butterflies and/or bumble bees.	SRGO PEIR (INVERT-04)

Table 3-6. Cultural, Land Use, Noise, and Recreation Resources

Cultural, Land Use, Visual, Recreation, and Noise Conservation Measures	Procedures	Applicable regulation, guidance, & BMPs
Cultural (CR)		
CR-1 Compliance with Section 106 of the National Historic Preservation Act (NHPA) must be completed for all site-specific projects under the EA. Compliance will also occur in consideration of other federal laws and regulations such as the Archaeological Resources Protection Act (ARPA).	The extent of cultural resource field inventory, tribal consultation, cultural resource evaluation, and CMs undertaken related to this compliance will be determined by the lead federal agency archeologist.	NHPA, ARPA, Native American Graves Protection and Repatriation Act, EO11593, American Indian Religious Freedom Act, etc.
CR-2 CMs will be designed to avoid or minimize adverse effects to cultural resources listed on or eligible (or potentially eligible) for listing on the	The CMs will be based on results of the cultural resource compliance study and will be approved the lead federal agency manager after	NHPA and others as listed above

Cultural, Land Use, Visual, Recreation, and Noise Conservation Measures	Procedures	Applicable regulation, guidance, & BMPs
National Register of Historic Places (NRHP) including districts, sites, objects, structures, and buildings, as well as cultural resources that are traditional cultural significance to Native American Indian Tribes (i.e., traditional cultural places).	consultation with his or her archeologist(s) and incorporated into Section 106 and NEPA compliance documentation.	
CR-3 The lead federal agency archeologist will define the site-specific project's Area of Potential Effects (APE) in consultation with the implementor and in accordance with agency policy and covering laws and regulations.	The APE will include, but will not be limited to, areas where the site-specific project could cause construction-related effects, particularly as a result of ground-disturbing activities, to cultural resources (i.e., disturbance areas, staging areas, material storage, temporary roads, etc.).	NHPA and others as listed above
CR-4 Determine through interdisciplinary review if the timing of the project at a specific location may impact Tribal cultural practices, recreational uses or other resource areas.	Adjust project timing to avoid impacts.	NHPA and others as listed above as well as laws and regulations pertaining to other resource areas
CR-5 At the request of the lead federal agency archeologist, cultural resources within the APE will be monitored by an archaeologist and/or Tribal monitor (where Tribal-related resources are present) approved by the affected agency or agencies during and after project implementation.	Not applicable.	NHPA and others as listed above
CR-6 Cultural resource flagging and fencing will be used to avoid and mitigate effects to site specific cultural resources. Other measures may be determined by the cultural resource specialist(s) in consultation with various parties such as Tribes, operators, SHPO, etc.	Procedures include: flagging, fencing, capping, avoidance (including modifications to the site-specific project design), monitoring, type of equipment employed (e.g., rubber tires), season of work, pre-work conferencing, etc.	NHPA and others as listed above (Federal Land Policy and Management Act specific to BLM)
CR-7 Prior to ground-disturbing activities, all workers will be alerted to the possibility of discovering undocumented cultural resources. This includes prehistoric and/or historic resources.	Personnel will be instructed that upon discovery of buried or undocumented cultural resources, work within 50 feet of the find will be halted and the designated archaeologists for Reclamation and the respective land management agency will be consulted. Once the find has been identified, Reclamation, in coordination with the respective land management agency, will be responsible for developing and authorizing a treatment plan for the cultural resource including an assessment of its historic properties and methods for avoiding any adverse effects, pursuant to the PA and in compliance with the NHPA and other pertinent laws and regulations	NHPA and others as listed above

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Cultural, Land Use, Visual, Recreation, and Noise Conservation Measures	Procedures	Applicable regulation, guidance, & BMPs
CR-8 Federal law and regulations as well as California state law require that all human remains discovered are to be treated with respect and dignity.	**Federal and Tribal Lands:** In the event that suspected human remains are discovered during proposed project activity on Federal land, all activities in a 50-foot radius of the discovery will cease, and appropriate precautions will be taken to protect the remains and any associated cultural items from further disturbance. Under the Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3001) and implementing regulations 43 CFR Part 10, the Federal agency is responsible for the protection of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that are discovered on Federally owned lands. All human remains and potential human remains must be treated with respect and dignity at all times. The Federal agency with jurisdictional authority (Reclamation, US Forest Service, or the Bureau of Land Management) will follow the procedures outlined in 43 CFR § 10.4 Inadvertent Discoveries. The Federal agency with jurisdictional authority will be immediately notified by telephone and will take responsibly for the discovery by contacting the appropriate law enforcement and agency officials. Within three (3) working days of confirmation of the discovery [see 43 CFR Part 10.4(d)(1)(iii)], the jurisdictional agency will ensure that Indian tribes likely to be affiliated with the discovered human remains (e.g., lineal descendant, culturally affiliated Indian tribe, Indian tribe with other cultural relationship, and Indian tribe that aboriginally occupied area) are notified by telephone or in person, with written confirmation. Treatment and handling of the remains will be determined through consultation between the jurisdictional agency and consulting tribes. Upon discovery of human remains on Federal land, please contact the appropriate agency contact below (Federal Agency Contacts). **Non-Federal Lands:** In the event that suspected human remains are discovered during proposed project activity on non-Federal land, all activities in a 50-foot radius of the discovery will cease, and appropriate precautions will be taken to protect the remains and any associated cultural items from further disturbance. There are numerous California State laws and codes that direct the preservation of prehistoric and historic cultural resources, establish the procedures for protecting inadvertently discovered Native American human remains, and impose penalties and punishments for persons acting in violation of the legal code.	Archaeological Resources Protection Act (ARPA) 16 USC 470 & 43 CFR 7; Native American Graves Protection & Repatriation Act (NAGPRA) 25 USC 3001 & 43 CFR 10; Public Lands, Interior 43 CFR 8365.1-7; California Health & Safety Code 7050.5, Dead Bodies; and California Public Resources Code 5097.98, Notification of Discovery of Native American Human Remains

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Cultural, Land Use, Visual, Recreation, and Noise Conservation Measures	Procedures	Applicable regulation, guidance, & BMPs
	Specifically, Section 7050.5 of the California Health and Safety Code deals with the discovery of human remains in any location other than a dedicated cemetery, and directs that in such cases the coroner of the county in which the remains are discovered be contacted and further excavation or disturbance in the location of discovery be discontinued until the coroner has examined the remains and made recommendations concerning their treatment and disposition. If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American or has reason to believe that they are those of a Native American, the coroner is required to contact the California Native American Heritage Commission (NAHC), by telephone, within 24 hours. Stipulations encouraging private landowners to work with the NAHC and the most likely descendant identified by the NAHC to establish and carry out appropriate treatment of the remains are established in Section 5097.98 of the California Public Resources Code. Upon discovery of human remains on non-Federal land, please contact the appropriate lead Federal agency contact below (Federal Agency Contacts). **Federal Agency Contacts:** **Reclamation:** Mr. Scott Williams, Regional Cultural Resources Officer, will be notified immediately at (916) 978-5042 and Dr. Melanie Ryan, Reclamation Native American Graves Protection and Repatriation Act (NAGPRA) Specialist, will be notified immediately at (916) 978-5526 (office) or (916) 281 7743 (cell) **USFS:** Matthew Padilla, Heritage Program Manager, (530) 226-2339 (office), (530) 921-3335 (cell), matthew.j.padilla@usda.gov **BLM:** BLM Redding Field Office Archaeologist, (530) 224-2100	
Land Use (LU)		
LU-1 Ensure proposed project does not impact existing rights-of-way or other land uses with prior existing rights.	During project design, federal agencies will confirm if there are existing rights-of-way or other land uses in the project area that could be affected by the project and notify holders of the project as needed. Impacts to existing rights-of-way or land uses will be designed or modified to avoid impacts.	43 CFR 2800 (BLM)

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Cultural, Land Use, Visual, Recreation, and Noise Conservation Measures	Procedures	Applicable regulation, guidance, & BMPs
LU-2 Issue rights-of-way or other land use rights to restoration projects where needed.	Federal agencies could consider issuing rights-of-way or other land use rights to restoration project proponents. The federal agencies will determine if a right-of-way or other land use right is appropriate and needed in order to protect restoration investments and facilitate orderly management of public lands in the future. Exact procedures for the right-of-way or other land use rights would be subject to agency specific guidance.	
LU-3 Wilderness and Wilderness Study Areas	Site-specific projects in wilderness and wilderness study areas would be limited in scope to avoid impacting the wilderness character. Each project in wilderness or wilderness study areas would coordinate with the lead federal agency for specifics about how to avoid impacts and this information would be incorporated into project designs and implemented during site-specific project construction.	BLM NCIP and MS 6330 - Management of Wilderness Study Areas
Visual (VIS)		
VIS-1 Ensure proposed project meets visual resource management objectives for the project area.	During project design, consider the visual resource management objectives for the project area and design or modify the project to accommodate those objectives. Considerations could include short term vs. long-term impacts, using screening vegetation, shifting project location, and modifying the color or form of human-made structures.	BLM Visual Resource Management Manual 8400
Recreation (REC)		
REC-1 Notification and signage will be used to provide information to the public about interruptions to access to recreation facilities, sites, and opportunities associated with site-specific restoration activities.	Where interruptions to recreation may occur as a result of a project, project implementers would be required prepare and post precautionary signage and public notifications warning of in-river construction in order to reduce the hazards to recreational users that would be associated with in-river construction activities. This approach has worked well for previous channel rehabilitation projects and has been particularly effective in reducing impacts on in-water recreational activities such as boating and fishing.	California Code of Regulations, Wild and Scenic River compliance
REC-2 Site-specific projects will be reviewed for potential interruptions and hazards to recreation access, opportunities or activities and develop site-specific prescriptions to minimize and reduce hazards or interruptions.	After construction is completed, the activity areas would be evaluated by the permit-issuing agency land managers and owners to identify specific prescriptions required to minimize any further potential safety risks to recreational users and to ensure the avoidance of any further project effects to resources occurring on recreational lands in the project boundaries.	
REC-3 Recreation access and facilities affected by the implementation of restoration projects will be repaired to pre-construction conditions.	Implementers will repair and/or replace any facilities associated with the project that are impacted by project activities. This feature includes installation of interpretive signage consistent with the	

Cultural, Land Use, Visual, Recreation, and Noise Conservation Measures	Procedures	Applicable regulation, guidance, & BMPs
	requirements of the BLM, USFS, or other property owner or manager. Pre-construction meetings between implementers and landowners/land managers will identify the amount of vegetative screening to be retained at each recreation site within the project area.	
Noise (NOISE)		
NOISE-1 Construction activities will be limited to occur during time windows when noise disturbance is least likely to affect nearby sensitive receptors.	Construction activities near residential areas will be scheduled between 7:00 a.m. and 7:00 p.m., Monday through Saturday. No construction activities will be scheduled for Sundays or other hours and days established by the local jurisdiction (i.e., Trinity County). The contractor may submit a request for variances in construction activity hours from Reclamation, as needed.	
NOISE-2 Noise from construction equipment will be minimized.	All construction equipment will be equipped with the manufacturer's specified noise muffling devices. Placement of all stationary noise-generating equipment will be as far away as feasibly possible from sensitive noise receptors or in an orientation minimizing noise impacts (e.g., behind existing barriers, storage piles, unused equipment).	
NOISE-3 Sensitive receptors will be provided project construction information.	Landowners, business owners, and stakeholders within 0.5 miles of the proposed project will be notified by letter prior to project construction about restoration project noise disturbances that may occur.	

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Appendix C: Aquatic Conservation Strategy Consistency Evaluation

Public Draft

1 Introduction

The Bureau of Reclamation (Reclamation), under the auspices of the Trinity River Restoration Program (TRRP), is the proponent and lead agency for the proposed Trinity River Watershed Restoration Project (Project). This evaluation is for restoration activities along the mainstem Trinity River and its tributaries within the Project activity area, as described in Chapter 4 of the Project Environmental Assessment (EA).

This document evaluates and determines the consistency of the TRRP activities with the Aquatic Conservation Strategy (ACS) in the 1994 Record of Decision (1994 ROD) for the Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Related Species within the Range of the Northern Spotted Owl. It also assess alignment with the ACS objectives from the 2024 Northwest California Integrated Resource Management Plan (NCIP; BLM 2024) completed by the BLM"s Reding and Arcata Field Offices. The ACS was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The 1994 ROD is incorporated into the 1995 Shasta-Trinity National Forest (STNF) Land and Resource Management Plan (LRMP).

The intent of this evaluation is to ensure that decision makers have the information necessary to determine whether the TRRP watershed restoration activities are consistent with the ACS objectives. This evaluation incorporates information provided in the Mainstem Trinity River Watershed Analysis (BLM 1995), incorporates by reference the 2009 Master Environmental Impact Report prepared by Reclamation in cooperation with BLM, and other information in the administrative record to assist the decision maker. In order to make the finding that a project or management activity “meets” or “does not prevent attainment” of the ACS objectives, the decision maker must ensure that management actions that do not maintain the existing condition or lead to improved conditions in the long term would not be implemented.

The ACS states that species-specific strategies aimed at defining explicit standards for habitat elements would be insufficient for protecting even the targeted species. The intent of the ACS is to maintain and restore ecosystem health at watershed and landscape scales to protect habitat for fish and other riparian-dependent species and resources and to restore currently degraded habitats. This approach seeks to prevent further habitat degradation and restore habitat over broad landscapes as opposed to implementing individual projects or focusing on small watersheds. Because the ACS is based on natural disturbance processes, the 1994 ROD recognized that it is a long-term strategy that may take decades, and possibly more than a century, to accomplish all of its objectives.

The ACS contains four components: riparian reserves, key watersheds, watershed analysis, and watershed restoration. Each component is integral to improving the health of the aquatic ecosystems encompassed by the 1994 ROD. A detailed discussion of these components is provided in the ROD.

Attachment A of the 1994 ROD includes Standards and Guidelines (S&Gs) that were incorporated as management direction into the STNF LRMP to ensure compliance with the ROD. This hierarchy of land allocations is described below.

At some locations on NFS- and BLM-managed lands, land allocations overlap. Standards and Guidelines for Congressionally Reserved Areas must be met first. Second, Riparian Reserve S&Gs apply and are added to S&Gs of other designated areas (e.g., Late Successional Reserves [LSR], matrix). For example, where Riparian Reserves occur within LSRs, both sets of S&Gs apply. In all land allocations, S&Gs in current plans apply where they are more restrictive or provide greater benefits to late-successional forest related species. For this project, two land allocations are applicable to BLM and NFS lands. These are:

- **Riparian Reserves** – Mainstem Trinity River and Trinity River tributaries and related areas associated with their respective floodplains, including fish-bearing streams, permanently flowing nonfish-bearing streams, intermittent streams, constructed ponds, lands and natural ponds and wetlands; and
- **Matrix (USFS)** – The matrix consists of those federal lands not subject to another land allocation.

The activities proposed by Reclamation under the auspices of the TRRP would occur along the mainstem of the Trinity River and tributaries of the Trinity River, which are located both below and above the Lewiston and Trinity dams. The Trinity River, South Fork Trinity River, North Fork Trinity River, and New River are federally designated as wild and scenic rivers. The Trinity River is also a state designated wild and scenic river. This evaluation focuses on Riparian Reserves as defined in the Redding RMP and STNF LRMP.

The following sections of this evaluation address the consistency of the TRRP's Proposed Action with the four components of the ACS and the nine ACS objectives described in Attachment B to the 1994 ROD and the 2024 NCIP.U.S. Bureau of Land Management (BLM) 2024

2 Components of the Aquatic Conservation Strategy

2.1 Riparian Reserves (USFS) and Riparian Management Areas (BLM)

This evaluation focuses on Riparian Reserves as defined in the STNF LRMP and Riparian Management Areas in the NCIP. Watershed analyses have been completed by BLM (1995) and the STNF (FA and Shasta-Trinity National Forest 2005) for federal lands within the Trinity River corridor; these analyses did not modify the designated widths of the Riparian Reserves established in the 1994 ROD established by the S&Gs. The width of the riparian reserves essentially correlates with the floodplain of the Trinity River and its tributaries within the Project Activity Area and can extend beyond the floodplain to include riparian vegetation and functions that occur in upland areas. Table C-1 at the end of this appendix shows the S&Gs that were integrated into the project.

2.2 Key Watersheds

USFS manages four primary tier key watersheds in the upper Trinity River watershed. Three of these watersheds, the North Fork Trinity River, Canyon Creek, and the New River, are primarily associated with the Salmon-Trinity Alps Wilderness Area; the fourth watershed is the South Fork Trinity River. While key watershed are included in the proposed project, restoration actions may occur within the watershed without respect to key watershed designation.

2.3 Watershed Analysis

The BLM conducted watershed analyses for the lands within the mainstem Trinity River corridor (BLM 1995) and STNF have conducted watershed analyses for several watersheds (Appendix I of the EA). Any activities proposed within these riparian reserves will conform to the site-specific conditions established in the S&Gs to ensure consistency with the ACS.

2.4 Watershed Restoration

The Proposed Action is a comprehensive ecosystem restoration project intended to restore the physical processes and biological resources of the mainstem Trinity River and its tributaries. While some short-term impacts may occur to riparian-dependent species, the scale of the activities proposed by the TRRP, including project activities, ensures that restoration of ecological processes and functions will be consistent with the ACS.

2.5 Aquatic Conservation Strategy Objectives

The extensive geographical project area allows for planning and analysis of restoration actions on a large scale. Considering the effects this way allows us to forecast potential regional effects and find ways for actions to be complementary to one another or achieve more meaningful goals in focused areas. The following section evaluates the consistency of the Proposed Action with the nine ACS objectives listed in Attachment B of the ROD and Section 2.3.5.1 of the NCIP.

The lands managed by the Forest Service and BLM within the range of the northern spotted owl will be managed to:

1. *Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.*

The Proposed Action is intended to restore the watershed and landscape processes, specifically the alluvial and riparian functions, that have been impaired by construction of the Trinity River Division of the Central Valley Project and other human and natural disturbances throughout the watershed. The activities that are proposed on federal lands subject to the ACS are an integral part of the larger project and are intended to assist BLM and Forest Service in attaining this ACS objective. TRRP focuses on developing the diversity, complexity, and distribution of landscape-scale aquatic features in the Trinity River watershed. TRRP's partnership with the STNF and the Redding Office of BLM is expected to accelerate the pace and expand the scale of activities that would enable each agency and its partners to engage in implementing important restoration activities throughout the entire watershed. By controlling non-native invasive species and restoring important floodplain habitat along the Trinity River and its tributaries, species diversity and structural complexity would be maintained and restored on a landscape scale. The combined landscape-scale projects would improve the overall Trinity River watershed.

2. *Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically*

unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

The objective of the Proposed Action is to implement restoration projects throughout the watershed. Project activities, such as stream and floodplain restoration, removal of fish barriers, and riparian corridor enhancement and revegetation, would help to maintain and restore spatial and temporal connectivity within and between the HUC10 watersheds within the Project activity area. The extensive geographical project area defined in Figure 1-1 of the EA would allow project activities on a large scale that would maintain and restore the functional values of the Trinity River and its tributaries within the Project activity area. The TRRP, BLM, and the Forest Service have worked cooperatively through the years to identify and prioritize channel and stream rehabilitation projects. Projects to improve lateral connectivity and improve instream habitat complexity have been conducted on several reaches of the Trinity River. Continuing similar types of restoration activities would continue to improve and enhance watershed, floodplain, and aquatic habitat connectivity within and between the HUC 10 watersheds. Modifications of floodplains, removal of grade control structures and other fish barriers, construction of functional side-channel and off-channel habitat, and sediment augmentation are examples of restoring connectivity for a variety of aquatic and riparian-dependent species. The intent of the Proposed Action is to assist the BLM and the Forest Service in attaining this ACS objective.

3. *Maintain and restore the physical integrity of the aquatic system, including shorelines, banks and bottom configurations.*

A fundamental component of project activities would be to restore the bed, banks, and floodplain of the mainstem Trinity River and its tributaries. The modification of grade control, expansion of functional floodplain habitat, construction of side channels, efforts to enhance the coarse sediment supply, and placement of large wood and boulders that provide refugia habitat are examples of the activities intended to restore the physical integrity of the aquatic system. Disturbed and eroded stream banks would be restored and planted with riparian and wetland vegetation. Collectively, these efforts are designed to restore the alluvial habitat and associated riparian character of streams within the watershed. That along with continuity from one project to the next, cooperation among restoration partners can leverage to achieve more meaningful results. The Proposed Action would promote continuity from one project to the next with the implementation of several restoration activities each year. The intent of the Proposed Action is to assist the BLM and the Forest Service in attaining this ACS objective.

4. *Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Where the responsible agency has the ability to influence water quality, it must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*

The Proposed Action includes a suite of instream and riparian corridor restoration activities that are designed to maintain, enhance, and restore instream processes to benefit aquatic species, riparian habitats, and water quality. Removal or retrofitting of small dams, diversions, flood gates, pilings, and legacy structures and realigning and/or rerouting channels around or through artificial waterbodies would improve freshwater circulation, flow, and water quality primarily by removing outdated in-stream structures. A component of the Proposed Action would be to rehabilitate eroding streambanks to improve water quality, shade conditions, and

large wood recruitment. Engineered streambanks would reduce input of fine sediment, enhance aquatic and riparian habitat, and improve water quality by integrating vegetation into bank protection measures.

Road maintenance, road rehabilitation, and road decommissioning would be conducted on private and public lands for the reduction of sediment into the mainstem and tributaries of the Trinity River. The road maintenance, road rehabilitation, and road decommissioning activity category would address locations along roadways with undersized, deteriorated, misaligned, or otherwise dysfunctional culverts or bridges that warrant replacement. By improving how these roads function, fine sediment supply to the Trinity River basin would decrease over time, improving water quality, fish passage, and instream habitat for salmonids and increasing the production potential of the watershed, which would ultimately benefit a range of ecological functions within the Trinity River basin. Challenges associated with climate change and a history of significant water diversions (including many illegal diversions still occurring on tributary streams) are limiting flow availability and contribute to warmer waters. By using water conservation measures, the Proposed Action would help increase water flows during the summer low flow period and throughout the hottest and driest part of the season.

TRRP, BLM and the Forest Service have worked cooperatively to ensure that Environmental Commitments are incorporated into the project activity descriptions as general protection measures and conservation measures to minimize effects on water quality (Appendix B of the Project EA). The Proposed Action would be consistent with the requirements of the BLM's Redding RMP and the STNF LRMP; it would therefore not prevent attainment of this ACS objective. Sections 401 and 404 of the Clean Water Act apply to all projects that area completed under the EA, and site-specific analysis for projects would be completed.

5. *Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*

A fundamental element of the TRRP is restoration of the sediment regime in a manner that enhances the alluvial character of the 40-mile reach of the Trinity River downstream of Lewiston Dam. One objective of the Proposed Action would be to restore continuous paths for wood dispersal, nutrient cycling, sediment transport, and movement of other vegetative material essential for productive aquatic habitat. The inclusion of large wood and boulder clusters would also increase the functional benefits of sediment augmentation. TRRP conducts site-specific sediment augmentation below Lewiston Dam regularly to infuse the stream with materials that would be present if not for the dams. This activity would continue along with the many other habitat restoration projects in the Trinity River. While there may be a change in the timing or volume of sediment input, site-specific sediment augmentation that would be proposed would assist BLM and the Forest Service in attainment of this ACS objective.

6. *Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*

The Proposed Action would result in improved stream flows where restoration and water conservation projects are completed; and in some cases may not influence in-stream flows. No modifications to the flow regime of the Trinity River or its tributaries are proposed; therefore, this ACS objective would be met.

7. *Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.*

Proposed activities that would modify the bed, banks, and floodplains of the Trinity River and its tributaries within the project activity area are designed to maintain and/or restore the hydrologic connection between the river and adjacent wetland/riparian habitat. By reducing the floodplain elevations, stabilizing and recontouring banks, and removing instream barriers, the existing flow regime would establish functional, connected wetland habitat adjacent to the Trinity River and its tributaries. Peak flow timing, variability, magnitude and duration of Trinity River flows are determined by the Trinity Management Council and advised by TRRP flow work group. The flow workgroup stays abreast of the needs associated with various restoration projects along the Trinity River and recommends flow attributes that enhance or compliment restoration project objectives. The Proposed Action could influence those decisions in the future based on the status of the multitude of instream restoration projects. The Trinity River's flows are managed to replicate natural conditions.

8. *Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.*

A fundamental objective of the TRRP is to restore the species composition and structural diversity of native plant communities along the mainstem Trinity River. The Proposed Action expands the geographic scope to include tributaries to the mainstem Trinity River. Instream habitat and floodplain restoration, large and small wood placement, bioengineered bank stabilization, aquatic, wetland, meadow, riparian, and upslope habitat enhancement would increase and improve species and structural diversity in the wetland and riparian plant communities, increase woody debris inputs, stabilize banks and decrease bank erosion and sediment being washed in the streams. Some project activities would reintroduce a diverse assemblage of native riparian vegetation and reduce the potential for non-native, invasive, and noxious plant species. Placement of large wood within and/or adjacent to stream banks would enhance channel complexity and edge habitat. The increase in woody riparian species would provide thermal regulation and maintain cooler water at the end of the summer and into the fall. The removal of instream barriers would promote a more functional fluvial system that would deliver natural bedload and woody debris supplies to augment development of instream habitats.

Many of the proposed activities would create or improve ecological functions and create or restore the functions of wetlands, meadows, streams, and riparian areas, including upslope watershed sites that could contribute sediment to streams or disrupt floodplain and riparian functions. Overall, natural recruitment of riparian communities supplemented by riparian planting efforts following restoration and bank stabilization increases the species and structural diversity of riparian habitat and helps regulate stream temperatures. Adding small and large wood to the floodplain and increasing floodplain connectivity will ensure that the Proposed Action meets this ACS objective.

9. *Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.*

A fundamental objective of the TRRP is to restore the aquatic, riparian, and upland habitat along the mainstem Trinity River. The Proposed Action expands the restoration activities to include tributaries to the mainstem

Trinity River. The project activities would create, rehabilitate, and improve aquatic and riparian habitat for riparian-dependent species. The proposed activities are designed to restore natural processes in the watershed. Collectively, project activities would generate geomorphic responses downstream that would improve the overall habitat enhancement objectives by reestablishing alluvial processes that were impaired by the construction and operation of the Trinity River Division or other anthropomorphic actions throughout the watershed. Proposed activities on federal lands subject to the ACS are an integral part of the overall objective of the TRRP and are intended to assist BLM and STNF in attaining this ACS objective. The changes and pressures of climate change and wildfires necessitate protecting and enhancing riparian and aquatic habitats and communities to become more resilient to future changes.

3 Conclusion

Based on this evaluation, BLM and the Forest Service find that the projects described in the NEPA decision document have been designed and would be constructed in a manner that does not prevent future attainment of and would help to achieve ACS objectives. The management actions incorporated into the Proposed Action would maintain, restore, or improve the existing condition in the short- and long-term, consistent with the intent of the ACS. Table 3-1 outlines the Standards and Guidelines for management within the riparian reserves, and Table 3-2 outlines BLM's management objectives for management.

Table 3-1. Riparian Reserves Applicable Standards and Guidelines.

S&G #	Standard and Guideline
All Land Allocations – Survey and Manage	
2	Survey prior to ground disturbing activities. (Surveys not required as discussed in Appendix E)
Riparian Reserves Timber Management	
TM 1-c	Apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquired desired vegetation characteristics needed to attain ACS objectives.
Riparian Reserves Roads Management	
RF-1	Federal, state, and county agencies should cooperate to achieve consistency in road design, operation, and maintenance necessary to attain ACS objectives.7
RF-2	For each existing or planned road, meet ACS objectives by applying RF-2a through RF-2f below
RF-2a	Minimizing road and landing locations in Riparian Reserves.
RF-2b	Completing watershed analyses (including appropriate geotechnical analyses) prior to construction of new roads or landings in Riparian Reserves.
RF-2c	Preparing road design criteria, elements, and standards that govern construction and reconstruction.
RF-2d	Preparing operation and maintenance criteria that govern road operation, maintenance, and management.

S&G #	Standard and Guideline
RF-2e	Minimizing disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow.
RF-2f	Restricting sidecasting as necessary to prevent the introduction of sediment to streams.
RF-3	Determine the influence of each road on the ACS objectives through watershed analysis. Meet ACS objectives by applying RF-3a through RF-3c
RF-3a	Reconstructing roads and associated drainage features that pose a substantial risk.
RF-3b	Prioritizing reconstruction based on current and potential impact to riparian resources and the ecological value of the riparian resources affected.
RF-3c	Closing and stabilizing or obliterating and stabilizing roads based on the ongoing and potential effects to ACS objectives and considering short-term and long-term transportation needs.
RF-4	New culverts, bridges and other stream crossings shall be constructed, and existing culverts, bridges and other stream crossings determined to pose a substantial risk to riparian conditions will be improved, to accommodate at least the 100-year flood, including associated bedload and debris. Priority for upgrading will be based on the potential impact and the ecological value of the riparian resources affected. Crossings will be constructed and maintained to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.
RF-5	Minimize sediment delivery to streams from roads. Out sloping of the roadway surface is preferred, except in cases where out sloping would increase sediment delivery to streams or where out sloping is unfeasible or unsafe. Route road drainage away from potentially unstable channels, fills, and hillslopes.
RF-7	Develop and implement a Road Management Plan or a Transportation Management Plan that will meet the ACS objectives. As a minimum, this plan shall include provisions for the following activities:
RF-7a	Inspections and maintenance during storm events.
RF-7b	Inspections and maintenance after storm events.
RF-7c	Road operation and maintenance, giving high priority to identifying and correcting road drainage problems that contribute to degrading riparian resources.
RF-7d	Traffic regulation during wet periods to prevent damage to riparian resources.
RF-7e	Establish the purpose of each road by developing the Road Management Objective.
Riparian Reserves Recreation Management	
RM-1	New recreational facilities within Riparian Reserves, including trails and dispersed sites, should be designed to not prevent meeting ACS objectives. Construction of these facilities should not prevent future attainment of these objectives. For existing recreation facilities within Riparian Reserves, evaluate and mitigate impact to ensure that these do not prevent, and to the extent practicable contribute to, attainment of ACS objectives.

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S&G #	Standard and Guideline
LH-3	Locate new support facilities outside Riparian Reserves. For existing support facilities inside Riparian Reserves that are essential to proper management, provide recommendations to FERC that ensure ACS objectives are met. Where these objectives cannot be met, provide recommendations to FERC that such support facilities should be relocated. Existing support facilities that must be located in the Riparian Reserves will be located, operated, and maintained with an emphasis to eliminate adverse effects that retard or prevent attainment of ACS objectives.
LH-4	For activities other than surface water developments, issue leases, permits, rights-of-way, and easements to avoid adverse effects that retard or prevent attainment of ACS objectives. Adjust existing leases, permits, rights-of-way, and easements to eliminate adverse effects that retard or prevent the attainment of ACS objectives. If adjustments are not effective, eliminate the activity. Priority for modifying existing leases, permits, rights-of-way and easements will be based on the actual or potential impact and the ecological value of the riparian resources affected.
Riparian Reserves General Riparian Area Management	
RA-2	Fell trees in Riparian Reserves when they pose a safety risk. Keep felled trees onsite when needed to meet coarse woody debris objectives.

Table 3-2. BLM NCIP Management Objectives for Riparian Reserves and Aquatic Resources (BLM 2024).

Objective #	Description
Riparian Management Areas	
RIP-FIS-MA-01	Riparian management areas consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest.
RIP-FIS-MA-02	Fish-bearing streams are distinguished from non-fish bearing streams by the presence of any species of fish for any duration. Many intermittent streams may be used as spawning and rearing streams, refuge areas during flood events in larger rivers and streams or travel routes for fish emigrating from lakes. In these instances, the riparian management area boundaries for fish-bearing streams will apply to those sections of the intermittent stream used by the fish.
Fish-bearing Streams	
RIP-FIS-MA-01	Riparian management areas consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest.
RIP-FIS-MA-02	Fish-bearing streams are distinguished from non-fish bearing streams by the presence of any species of fish for any duration. Many intermittent streams may be used as spawning and rearing streams, refuge areas during flood events in larger rivers and streams or travel routes for fish emigrating from lakes. In these instances, the riparian management area boundaries for fish-bearing streams will apply to those sections of the intermittent stream used by the fish.
Permanently Flowing (Perennial) Non-Fish-bearing Streams	

Objective #	Description
RIP-PFN-MA-01	Riparian management areas consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet total, including both sides of the stream channel), whichever is greatest.
Wetlands Greater than 1 Acre, Constructed Ponds, Lakes, and Reservoirs	
RIP-WPR-MA-01	Riparian management areas consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or the extent of unstable and potentially unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the wetland greater than 1 acre or the maximum pool elevation of constructed ponds and reservoirs, whichever is greatest.
Lakes and Natural Ponds	
RIP-LPN-MA-01	Riparian management areas consist of the body of water and the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or to the extent of unstable and potentially unstable areas, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance, whichever is greatest.
Seasonally Flowing or Intermittent (ephemeral) Streams, Wetlands Less than 1 Acre, and Unstable and Potentially Unstable Areas	
RIP-SFI-MA-01:	This category applies to features with high variability in size and site-specific characteristics. At a minimum, the riparian management area must include: • The extent of unstable and potentially unstable areas (including earthflows) • The stream channel and extend to the top of the inner gorge • The stream channel or wetland and the area from the edges of the stream channel or wetland to the outer edges of the riparian vegetation • Extension from the edges of the stream channel to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest. Intermittent streams are defined as any nonpermanent flowing drainage feature having a definable channel and evidence of annual scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two physical criteria.

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ACRONYMS AND ABBREVIATIONS

ACS	Aquatic Conservation Strategy
BiOp	biological opinion
BLM	Bureau of Land Management
CC	California Coastal
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
FGC	California Fish and Game Commission
CRHR	California Register of Historical Resources
CCH	coho salmon critical habitat
CM	conservation measure
ESA	Endangered Species Act
EFH	essential fish habitat
ESU	evolutionarily significant unit
EO	Executive Order
FWCA	Fish and Wildlife Coordination Act
FYL	foothill yellow-legged frog
GPMs	general protection measures
LRMP	Land Resource Management Plan
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFS	National Forest Service
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NWFP	Northwest Forest Plan
ORV	Outstandingly Remarkable Values
ROD	Record of Decision
MAMU	Recovery Plan for the marbled murrelet
Recovery Strategy	Recovery Strategy for California Coho Salmon
NSO	Revised Recovery Plan for Northern Spotted Owl
STNF	Shasta-Trinity National Forest
SHPO	State Historic Preservation Officer
SWAP	State Wildlife Action Plan
SM	Survey and Manage
SONCC	The Southern Oregon/Northern California Coast (coho)
TMDL	total maximum daily load
TRRP	Trinity River Restoration Program
ITARA	Indian Trust Asset Reform Act
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
DOI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

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WCRF	Watershed Condition Restoration Framework
WSR	Wild and Scenic River
WSRA	Wild and Scenic Rivers Act

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1 USDA Forest Service Regulatory Framework

1.1 National Forest Management Act

The National Forest Management Act (NFMA), the primary statute governing the administration of National Forest Service (NFS) lands, requires the maintenance of productivity of the land and the protection and, where appropriate, improvement of the quality of the soil and water resources. The act specifies that substantial and permanent impairment of productivity (not defined) shall be avoided. Furthermore, activities shall be monitored to ensure that productivity is protected. This law led to subsequent regulation and policy to execute the law at various levels of management.

1.2 Shasta-Trinity National Forest (STNF) Land Resource Management Plan (LRMP)

The STNF manages NFS lands in the Trinity River Basin in accordance with its LRMP. The LRMP discusses the general current and desired condition of natural resources in the plan area and prescribes appropriate land use management and protections to achieve them. As part of the USFS decision-making process, the agency must evaluate the consistency of the Proposed Action with the LRMP, as amended. This project supports specific LRMP resource goals to "provide for the protection, maintenance, and improvement of wild trout and salmon habitat"; to "coordinate rehabilitation and enhancement projects with cooperating agencies involved in the Model Steelhead Stream Demonstration Project Plan and the Trinity River Basin Fish and Wildlife Management Program"; and to "identify and treat riparian areas that are in a degraded condition" (USDA Forest Service 1995, p. 4-4, 4-18). In so doing, the project also meets NWFP guidelines to "design and implement fish and wildlife habitat restoration and enhancement activities in a manner that contributes to the attainment of Aquatic Conservation Strategy objectives" (USDA Forest Service 1995, p. 4-58), as well as the riparian management prescription objective that "fish habitats will be maintained and enhanced" (USDA Forest Service 1995, p. 4-58 ,4-59).

1.3 Watershed Condition Restoration Framework Assessment

The Watershed Condition Restoration Framework (WCRF) is a comprehensive approach for proactively implementing integrated restoration on priority watersheds on national forests and grasslands. It is a means and strategy to identify restoration priorities and monitor program accomplishments per the FY 2015-2020 USDA Forest Service Strategic Plan (Forest Service Strategic Plan; USDA 2015).

The WCRF also established a nationally consistent approach for classifying watershed condition using a comprehensive set of 12 indicators that are surrogate variables representing the underlying ecological functions that affect watershed condition and watershed health. The primary emphasis is on aquatic and terrestrial processes and conditions that can be influenced by USFS management activities.

The STNF would follow the WCRF's nationally consistent approach in designing the Watershed Restoration Project's proposed activities to improve aquatic conditions (Forest Service Strategic Plan).

2 DOI Regulatory Framework

2.1 BLM Redding Field Office Northwestern California Integrated Resource Management Plan (NCIP)

BLM's Redding Field Office manages federal lands in the Trinity River Basin in accordance with its 2024 Northwest California Integrated Resource Management Plan (NCIP) and Record of Decision (ROD, BLM 2024). The NCIP discusses the general condition of natural and cultural resources in the plan area and prescribes appropriate land use management for BLM-administered lands. The NCIP includes the ACS' Riparian Reserves but renamed them riparian management areas and identifies watershed restoration as an important priority (Section 2.3.5 of the NCIP). The Trinity River from Lewiston Dam to Weitchpec is federally designated as a Wild and Scenic River (WSR; recreational designation) for its fisheries and recreational values. BLM is the federal river manager from the Lewiston Dam to the North Fork Trinity River (Section 2.5.3.3 of the NCIP). The ACS for the project is provided in Appendix C, and a WSR determination for the project is included in Appendix F. As part of its decision-making process, BLM must evaluate the consistency of the Proposed Action with the 2024 NCIP.

3 ACS Compliance

Project NEPA decisions must be consistent with the ACS, including consistency with the nine ACS objectives described in the 1994 NWFP ROD (p. B-10) and in the May 22, 2007 Memorandum (USDA 1994). The NEPA decisions must assess alignment with the nearly identical ACS objectives from the 2024 NCIP completed by the BLM's Redding and Arcata Field Offices. These objectives and analysis of the Project's consistency with the ACS is in Appendix C.

The proposed instream and riparian restoration activities included in the Project were designed to implement the ACS reflected in the NWFP ROD (USDA 1994), as incorporated into the STNF's LRMP and the ACS objectives of the BLM's NCIP.

4 Survey and Manage Standards and Guidelines

The NWFP includes guidance for managing species associated with late-successional forests (USDA and DOI 2001; USDA 1994), termed Survey and Manage (SM) species, as incorporated into the STNF's LRMP. The Project's compliance with the Survey and Manage Standards and Guidelines is outlined in Appendix E.

5 Wild and Scenic Rivers Act (WSRA)

The Trinity River was designated by the Secretary of the Interior as a federal Wild and Scenic River in 1981 under the 1968 Federal WSRA at the request of the State of California under Section 2(a)(ii) of the Wild and Scenic Rivers Act (WSRA). In the Trinity River watershed, 203 miles of river including the North and South Forks of the Trinity River and the New River, are part of the National Wild and Scenic Rivers System. As a "2(a)(ii) river" the Trinity WSR is primarily administered by the state. The Bureau of Land Management (BLM) and Forest Service manage segments of the Trinity WSR on federal lands they manage and, along with the National Park Service (NPS), are

responsible for implementing Section 7 of the WSRA for the entire Trinity WSR including federal and non-federal lands, which they cooperate to carry out. A Wild and Scenic River Act compliance analysis of the Project activities is in Appendix F.

The National Wild and Scenic Rivers System preserves certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The WSRA is notable for safeguarding the special character of these rivers, while also recognizing the potential for their appropriate use and development. The WSRA is a non-degradation and enhancement policy. Each river in the National Wild and Scenic Rivers System is administered with the goal of protecting and enhancing the values that caused it to be designated. These river values are free-flowing condition, water quality, and, specific to each river segment, its outstandingly remarkable values (ORVs). The ORV for all segments of the Trinity WSR is anadromous fish. Each segment was given a classification as a wild, scenic, or recreational river based on the level of development along the river at the time of designation. For the Trinity WSR, 44 miles are classified as wild, 39 miles are classified as scenic, and 120 miles are classified as recreational. Some agency management direction may be specific to wild rivers, scenic rivers, or recreational rivers to ensure activities are consistent with maintaining the classification.

In addition to the designated Trinity WSR, six rivers on the Shasta-Trinity National Forest have been identified by the Forest Service as "suitable rivers" under WSRA Section 5(d)(1), meaning they were found suitable for potential future addition to the National Wild and Scenic Rivers System (National System). These include portions of Canyon Creek, Hayfork Creek, Upper North Fork Trinity, Upper South Fork Trinity, and Virgin Creek. Five rivers on BLM-administered lands were found suitable for addition to the National System as part of the 2024 Northwest California Integrated Resource Management Plan (NCIP) that considered river and stream segments for eligibility and suitability for inclusion in the National System. The BLM segments identified as suitable, include Indian Creek 1 (Trinity River Tributary) Segment A, B, and C, West Weaver Creek, West Weaver Creek Tributary, Grub Gulch, and Canyon Creek. Suitable rivers are protected through management direction in the USFS and BLM land use management plans as well as interim measures for protected management in the WSRA, Forest Service Handbook (FSH) 1909.12, Chapter 80 and in BLM Manual 6400, Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management. While WSRA Section 7 does not apply to these rivers, agency interim measures say that any water resources projects proposed on suitable rivers "shall be analyzed as to their effect on a river's free-flow, water quality, and outstandingly remarkable values, with adverse effects to be prevented to the extent of existing agency authorities (such as special-use authority" (FSH 1909.12, 84.3, item 1).

Section 7 is a key provision of the WSRA that directs federal agencies to protect a WSR's free-flowing condition, water quality, and ORVs. When a project occurs within the proximity of a Wild and Scenic River, Section 7 requires review and evaluation of federally assisted water resources projects and determination of effects by the federal river managing agency to ensure that (1) for projects proposed on a WSR, the project would not have a "direct and adverse effect" on river values (free-flowing condition, water quality, ORVs) or (2) for projects proposed above, below, or on a tributary to a WSR, the project would not invade the WSR or unreasonably diminish the WSR's scenic, recreational, and fish and wildlife values. The "Section 7 determination" from the federal river managing agency is required before federal assistance can be provided, including permits or funding. In the rare case of an adverse Section 7 determination, federal assistance is prohibited. Early communication and coordination between project proponents, federal assisting agencies, and the federal river managing agency will minimize likelihood of project redesign, adverse Section 7 determinations, and permitting or funding delays.

- **Water resources projects** are defined in 36 CFR part 297. Water resources projects are federally assisted actions in the bed and banks. Examples include but are not limited to dams; water diversion projects; fisheries habitat and watershed restoration/enhancement projects; bridges and other roadway construction/reconstruction projects; bank stabilization projects; channelization projects; levee construction; recreation facilities such as boat ramps and fishing piers; and activities that require a 404 permit from the US Army Corps of Engineers.
- **Federal assistance** is assistance by a federal agency such as a license, preliminary permit, permit, authorization, or federal funding including a loan or grant. Common examples include FERC licenses, Section 404 permits granted by the US Army Corps of Engineers, Department of Transportation funding of state highway proposals, or activities undertaken or authorized by a federal agency such as the Forest Service or BLM.
- **Federal assisting agency** is the federal agency or agencies providing assistance (e.g., license, permit, funding, authorization). Commonly, this is the FERC, US Army Corps of Engineers, and/or Department of Transportation. For the Trinity River Watershed Restoration Project, the BOR is a federal assisting agency. Federal land management agencies such as the Forest Service and BLM may be federal assisting agencies if they are providing authorization or funding, including cases where they may be the project proponent.
- **Federal river managing agency** is the federal agency or agencies responsible for implementing WSRA Section 7, including the Section 7 determination. For the Trinity WSR: for projects on federal lands, the BLM or Forest Service is the federal river managing agency for projects on the respective lands they administer; for projects on non-federal lands, the BLM and Forest Service cooperate with the NPS to identity which among the three agencies is best positioned to be responsible for Section 7.
- **Free-flowing** as it applies to WSRs is defined in WSRA Section 16 as "existing or flowing in a natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway."

6 Wilderness Act

In the Wilderness Act of 1964 (16 U.S.C. § 1133), the law's Statement of Policy (Section 2(a)) declares that wilderness areas "shall be administered ... so as to provide for the protection of these areas, the preservation of their wilderness character." Section 4(b) of the Wilderness Act further specifies that the wilderness-managing agencies' primary mandate under the law is to preserve wilderness character. These and other provisions of the Wilderness Act provide the affirmative mandate for stewarding Congressionally designated wilderness areas differently from non-wilderness lands. "Wilderness character" is a holistic concept based on the interaction of: (1) biophysical environments primarily free from modern human manipulation and impact, (2) personal experiences in natural environments relatively free from the encumbrances and signs of modern society, and (3) symbolic meanings of humility, restraint, and interdependence that inspire human connection with nature. Taken together, these tangible and intangible values define wilderness character and distinguish wilderness from all other lands.

Section 4(c) of the Wilderness Act prohibits certain uses in wilderness and wilderness study areas (WSAs) outright (permanent roads and commercial enterprise) but allows others (temporary roads, use of motor

vehicles, motorized equipment or motorboats, landing of aircraft, other forms of mechanical transport, structures, or installations) only if they are necessary to meet minimum requirements for the administration of the area for the purposes of the Wilderness Act. Some common examples of Section 4(c) uses include but are not limited to motorized equipment such as chainsaws, motorized drills and augers, and portable pumps; installations such as monitoring equipment or fencing; mechanical transport such as wheelbarrows, carts, or bicycles; helicopter landings or slingload deliveries; piloting or landing of drones; or heavy equipment such as bulldozers.

Wilderness managers prepare a Minimum Requirements Analysis (MRA) to evaluate whether a use otherwise prohibited by Section 4(c) needs to occur in wilderness (however, not required for WSAs), and if so, how to accomplish it with the least impact to the wilderness resource. The Minimum Requirements Analysis Framework (MRAF)—the interagency tool that wilderness managers typically use to conduct the MRA—helps to meet the substantive requirement of Section 4(c). The MRAF consists of two steps: Step 1 evaluates whether administrative action may be necessary in wilderness; if so, Step 2 provides guidance for determining the minimum technique, timing, or amount of a prohibited use necessary to address the wilderness stewardship issue at hand. The MRAF's selected alternative is a determination that represents the minimum requirement necessary to administer the area as wilderness.

7 Fish and Wildlife Coordination Act

Enacted in 1934 then amended in 1946 and 1958, the Fish and Wildlife Coordination Act (16 U.S.C. 661-666[e]) directs the U.S. Fish and Wildlife Service (USFWS) to investigate and report on proposed Federal actions, such as the Project, that may affect any stream or other body of water, including the Trinity River and its tributaries, and give recommendations that minimize impacts on fish and wildlife resources. Executive Order 11990 and 11988

The purpose of Executive Order (EO) 11990 – Protection of Wetlands (as amended) is to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." To meet these objectives, the EO requires federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided.

EO 11988 – Floodplain Management (as amended) requires federal agencies to avoid the long- and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid the support of floodplain development. If an action must be located in a floodplain, EO 11988 requires that agencies minimize potential harm to people, property, and to natural and beneficial floodplain values.

8 Executive Order 13112 and 13751

EO 13112 – Invasive Species called upon executive departments and agencies to take steps to prevent the introduction and spread of invasive species, and to support efforts to eradicate and control invasive species that are established. The EO also created a coordinating body, the Invasive Species Council, also referred to as the National Invasive Species Council, to oversee implementation of the order, encourage proactive planning and action, develop recommendations for international cooperation, and take other steps to improve the federal

response to invasive species. Past efforts at preventing, eradicating, and controlling invasive species demonstrated that collaboration across federal, state, local, tribal, and territorial government; stakeholders; and the private sector is critical to minimizing the spread of invasive species and that coordinated action is necessary to protect the assets and security of the United States.

EO 13751 - Safeguarding the Nation from the Impacts of Invasive Species amends Executive Order 13112 by directing actions to continue coordinated Federal prevention and control efforts of invasive species. This order maintains the National Invasive Species Council and Invasive Species Advisory Committee (ISAC); expands and clarifies the membership of the Council; incorporates considerations of human and environmental health, climate change, technological innovation, and other emerging priorities into Federal efforts to address invasive species; and strengthens coordinated, cost-efficient Federal actions.

9 Magnuson-Stevens Fishery Conservation and Management Act (MSA)

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) was adopted in 1976 and requires federal agencies to consult with the National Marine Fisheries Service (NMFS) on all actions that may adversely affect essential fish habitat (EFH), including coho and Chinook salmon EFH. The MSA was amended in 2006 under the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA). The MSRA required NMFS to develop a recovery plan for Klamath River coho salmon in 2007 and submit annual reports in regard to both coho and Chinook salmon to Congress beginning in 2009. The *MSRA Klamath River Coho Salmon Recovery Plan* presents long-range guidance for various agencies, organizations, and individuals to use as they consider taking actions or pursuing projects that may affect Klamath River coho salmon. These actions are consistent with and implement the *MSRA Klamath River Coho Salmon Recovery Plan*.

10 Migratory Bird Treaty Act of 1918

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712) was signed to ensure the sustainability of populations of all protected migratory bird species. The act implements four international conservation treaties that the U.S. entered into with Canada 1916, Mexico 1936, Japan 1972, and Russia 1976. The MBTA prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the USFWS. The need for a take permit would be determined during the site-specific project planning and would be obtained directly from the USFWS, prior to any activity that result in take of migratory birds protected under this act.

11 Endangered Species Act (ESA)

It is USDA and DOI policy to implement the Endangered Species Act of 1973 (ESA) as amended “to seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act.” Forest Service manual direction (2670.21) directs that NFS habitats and activities for threatened and endangered species shall be managed to achieve recovery objectives, so that special protection measures under the ESA are no longer necessary. This Proposed Action implements recovery items in the

federal and state recovery plans (described below) for The Southern Oregon/Northern California Coast (SONCC) coho salmon ESU[1], and the federal multispecies recovery plan for the Northern California steelhead DPS[2] and California coastal Chinook salmon ESU.

The Proposed Action also meets the 2011 Revised Recovery Plan for northern spotted owl (NSO) and the Recovery Plan for the marbled murrelet (MAMU) in Washington, Oregon, and California (USFWS 2011; USFWS 1997) by ensuring the Proposed Action implements design features to maintain habitat components for ESA-listed terrestrial species.

11.1 2020 Trinity River Restoration Program Biological Opinion

TRRP has completed formal consultation with NMFS on the effects of floodplain restoration work throughout the Trinity River watershed. The NMFS' August 2020 Trinity River Restoration Program Biological Opinion (BiOp; NMFS 2020), herein referred to as the 2020 TRRP BiOp, describes the implementation strategies and conservation measures that would be employed during watershed restoration projects. Implementation strategies and conservation measures described in the 2020 TRRP BiOp would be employed as part of the design guidelines for all site-specific projects that are part of the Proposed Action.

11.2 2025 California Statewide Restoration Activities Biological Opinion

In 2022, the USFWS issued a programmatic BiOp that covers ESA-listed species (under the jurisdiction of USFWS) for watershed restoration activities in California. In February 2025, the reinitiation of BiOp was completed (USFWS 2025) to include additional species such as the northwestern pond turtle. Watershed restoration activities included in the 2025 USFWS Statewide Restoration BiOp include instream habitat restoration, native riparian and wetland restoration, and fish passage improvements. The Project activities analyzed in the Project EA that fall under these categories and use the 2025 USFWS Statewide Restoration BiOp for ESA coverage would conform to the BiOp. General protection measures (GPMs), design guidelines, and conservation measures (CMs) described in the 2025 USFWS Statewide Restoration BiOp would be employed as part of the environmental commitments for all site-specific projects that are part of the Project's Proposed Action.

11.3 SONCC Coho Salmon Recovery Plan and Designated Critical Habitat

The SONCC Coho Salmon Recovery Plan (NMFS 2014) provides a roadmap guiding implementation of restoration based on the best available science; targeting identified threats and stresses to coho.

Coho salmon critical habitat (CCH) for SONCC coho salmon was designated by NMFS, on May 5, 1999. Coho salmon critical habitat is defined in §3(5)(A) of the ESA as "the specific areas within the geographical area occupied by the species ... on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection." Critical habitat was designated to include the water, substrate, and adjacent riparian zones of estuarine and riverine reaches (including off-channel habitats); not limited to, spawning sites, food resources, water quality

[1] Evolutionarily significant unit

[2] Distinct population segment

and quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and safe passage conditions (64 FR 24049, May 5, 1999).

11.4 Pacific Lamprey Conservation Agreement

The Pacific Lamprey Conservation Agreement (PLCI 2022) is a voluntary commitment by the interested parties, to collaborate on efforts that reduce or eliminate threats to Pacific lamprey to the greatest extent possible. The goal of the agreement is to achieve long-term persistence and support traditional tribal cultural use of Pacific lamprey throughout their range. This agreement provides a mechanism for interested parties to collaborate and pool available resources to expeditiously and effectively implement conservation actions, including restoration actions.

11.5 Foothill Yellow-Legged Frog Conservation Assessment

The Foothill Yellow-Legged Frog Conservation Assessment in California (Hayes et al. 2016) provides a review of foothill yellow-legged (FYL) frog status across federal lands in California and evaluates risk factors likely to impact the FYL frog and its habitat. The assessment informs a future conservation strategy for the species and includes a number of potential actions for future conservation and management of the species, including waterflow management, stream restoration and non-native species management, and watershed management.

12 California Department of Fish and Wildlife Documents

12.1 State ESA-Listed Threatened and Endangered Species

The California Endangered Species Act (CESA) of 1970 created the categories of endangered and rare. Species with a state list date of June 27, 1971, were protected under this statute. The Act was amended in 1984, at which time the rare status was changed to threatened. On January 1, 1985, all animal species previously designated as rare were reclassified as threatened. The official California listing of endangered and threatened animals is contained in CCR Title 14 §670.5. The current legal status for non-plant species is provided online[3] and is updated quarterly. The current legal status for botanical species is available upon request from the CDFW.

12.2 Recovery Strategy for California Coho Salmon

In February 2004, the California Fish and Game Commission (FGC) adopted the Recovery Strategy for California Coho Salmon (Recovery Strategy). The primary objective of the Recovery Strategy is to return coho salmon to a level of sustained viability, while protecting the genetic integrity of both the SONCC and Central California Coast (CCC) ESUs with the goals of delisting, thus making regulations or other protections under the CESA and ESA no longer necessary. A second objective of the Recovery Strategy is to achieve harvestable populations of coho salmon for tribal, recreational, and commercial fisheries (CDFG 2004).

[3] http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109405

In California, prior coastal watershed recovery projects are considered complementary to the objectives of the Aquatic Restoration Project, as they acted to: 1) restore and enhance suitable habitat conditions for juveniles and adults; 2) upgrade permitting and regulatory enforcement to protect coho salmon populations and their habitats; 3) promote continuation and further development of captive rearing programs at Warm Springs and Kingfisher Flat conservation hatcheries to help re-establish coho salmon in depleted streams north and south of San Francisco Bay, respectively; and, 4) implement range-wide and watershed-scale recovery actions.

12.3 State Wildlife Action Plan (SWAP)

In all regions of the state, aquatic, wetland, and riparian habitats support rich biological communities, including many special status species, and restoration of these habitats represents an important step for the state's biological heritage. The CDFW has a fundamental objective with regard to California's native anadromous fish species: to manage and conserve these species and the habitats they occupy for their ecological significance, recreation, commercial, and tribal values and for enjoyment by current and future residents and visitors. The State Wildlife Action Plan (SWAP, CDFW 2015) has six (6) core principles for managing these populations and their habitat. Four (4) of these principles are pertinent to this decision: water conservation, habitat restoration, species recovery and promoting partnerships. The permitting agency (USFS, BLM, or TRRP) would work closely with CDFW to reach these mutual goals. In addition, the SWAP has developed conservation strategies for conservation targets in the North Coast and Klamath Province, including a 5 percent increase in riparian and montane woodland habitat, a 5 percent increase in acres or stream miles with natural floodplain connectivity, and a 5 percent increase in acres or stream miles with natural hydrologic regime.

12.4 Steelhead Restoration and Management Plan for California (1996)

Steelhead are an important and valued resource to California's citizens and are an important component of the vast biodiversity of the state. Like many of the state's anadromous fish resources, steelhead are declining. Decline of steelhead populations is but one aspect of the present statewide decline in biodiversity, caused by California's burgeoning human population and the ever-increasing demand on natural resources. This plan focuses on restoration of native and naturally produced (i.e., wild) stocks because these stocks have the greatest value for maintaining genetic and biological diversity.

Steelhead restoration and management goals 1) increase natural production, as mandated by the Salmon, Steelhead Trout, and Anadromous Fisheries Program Act of 1988, so that steelhead populations are self-sustaining and maintained in good condition, and 2) enhance angling opportunities and non-consumptive uses. The strategies to accomplish these goals are to 1) restore degraded habitat; 2) restore access to historic habitat that is presently blocked; 3) review angling regulations to ensure that steelhead adults and juveniles are not over-harvested; 4) maintain and improve hatchery runs, where appropriate; and 5) develop and facilitate research to address deficiencies in information on fresh water and ocean life history, behavior, habitat requirements, and other aspects of steelhead biology.

12.5 CDFW Section 1600 State Waters

The need for a lake or streambed alteration agreement would be determined during the site-specific project planning and would be obtained from the CDFW, prior to any activity that could substantially modify the bed,

bank, or channel of a stream. Where state funding is involved, incidental take authorization pursuant to the CESA would be obtained before activities that may result in take of state ESA-listed species.

12.6 Clean Water Act Section 401

The Clean Water Act (CWA) Section 401 (33 U.S.C. 1341) requires that applicants obtain a Section 401 water quality certification for activities that result in a discharge into waters of the United States (WOTUS). Such certifications are typically issued by a certifying authority, usually a state or tribe, that can attest that the discharge complies with applicable provisions of the CWA. In California, water quality certifications are issued by one of nine Regional Water Quality Control Boards (Regional Boards) that collectively with the State Water Resources Control Board, have the authority to regulate discharges under CWA Section 401 and the Porter-Cologne Water Quality Control Act (Porter-Cologne). Under California's Porter-Cologne Act discharges to waters of the state require filing a report of waste discharge (WDR). In certain cases, a Regional Board may issue a combined 401 certification/wavier of WDRs application. The applicability of existing 401 certifications and/or WDR Waiver will be evaluated based on project-specific requirements and pursuant to current state and federal regulatory requirements.

12.7 Clean Water Act Section 404

Section 404 of the CWA (33 U.S.C. 1344) regulates the discharge of dredged or fill material into WOTUS, including wetlands. Under the Section 404 program, a permit is required before dredge or fill material is discharged into WOTUS, unless the activity is exempt from Section 404 regulation. Under provisions of the CWA, the United States Army Corp of Engineers (USACE) administers the day-to-day Section 404 program, which includes general and individual permit decisions, jurisdictional determinations, developing policy and guidance, and enforcing the provisions of Section 404. WOTUS are defined in 33 CFR 328.3, which has been clarified following multiple Supreme Court decisions and supplemental guidance documents issued by USACE and the Environmental Protection Agency (EPA), the agency that is responsible for developing and interpreting policy, guidance, and environmental criteria for the Section 404 program. The need for a Section 404 permit would be determined during the site-specific project planning prior to commencing in-stream channel alterations and would be the responsibility of the project proponent. Section 106 of the National Historic Preservation Act (NHPA)

Federal agencies are required to consider the effects of their actions on historic properties in compliance with 36 CFR Part 800, commonly referred to as Section 106 of the National Historic Preservation Act (NHPA) of 1966, found at Title 54 USC § 306108. The Section 106 process is often used to satisfy the requirements for cultural resources under the National Environmental Policy Act (NEPA), and includes identification, consultations, and, if needed, mitigation measures for determining adverse effects. It requires that federal agencies consider the effects of an undertaking on historic properties, which are defined as cultural resources (including prehistoric, historic, archaeological, and tribal cultural resources) listed in or eligible for listing in the National Register of Historic Places (NRHP).

A cultural resource is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. Cultural resources that meet criteria for listing on the California Register of Historical Resources (CRHR) (defined at 14 CCR Section 15064.5[a]) are called "historical resources," and cultural resources that meet

the criteria for listing on the National Register of Historic Places (NRHP) (as defined by 36 CFR Section 60.4) are called "historic properties." While the CRHR and NRHP significance criteria are similar, the NRHP is given precedence in this analysis because many cultural resources eligible for the NRHP are also eligible for inclusion in the CRHR, but the reverse is not necessarily true (California PRC Section 5024.1[c]).

. Cultural resources found not eligible for the NRHP must still be considered in planning and NEPA actions following other laws, regulations and EOs, including: the Archaeological Resources Protection Act, Native American Graves Protection and Repatriation Act, Historic Sites Act of 1935, Antiquities Act, American Indian Religious Freedom Act, EO 13007 (Indian Sacred Sites), EO 13175 (consultation and coordination with Indian tribal governments), and EO 13287 (Preserve America).

12.8 Indian Trust Asset Reform Act and Executive Order 13007

The Indian Asset Reform Act (ITARA) authorizes the Secretary of the Interior to establish and carry out an Indian trust management for tribal forestry and surface leasing programs. Indian Trust Assets (ITAs) are held in trust by the federal government on behalf of a Native American individual or Tribe. Site-specific restoration projects associated with the Proposed Action may affect ITAs and would require site-specific reviews by USFS, BLM, and/or Reclamation.

EO 13007 – Indian Sacred Sites requires federal land managing agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites. Site-specific restoration projects associated with the Proposed Action may affect ceremonial use of Indian sacred sites on federal lands or adversely affect the physical integrity of such sacred sites and would require site-specific reviews by USFS, BLM, and/or Reclamation.

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Appendix E: Compliance with Standards and Guidelines for Survey and Manage Species

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The Trinity River Watershed Restoration Project (Project) is consistent with court orders relating to the Survey and Manage mitigation measure of the Northwest Forest Plan, as incorporated into the 1995 Shasta-Trinity National Forests' (STNF's) Land and Resources Management Plan (LRMP).

On December 17, 2009, the U.S. District Court for the Western District of Washington issued an order in Conservation Northwest, et al. versus Rey, No. 08-1067 (W.D. Wash.) (Coughenour, J.), granting Plaintiffs' motion for partial summary judgment and finding a variety of violations of the National Environmental Policy Act (NEPA) in the U.S. Forest Service (USFS) 2007 Record of Decision (ROD) eliminating the Survey and Manage mitigation measure. Judge Coughenour deferred issuing a remedy in his December 17, 2009, order until further proceedings. Plaintiffs and Defendants entered into settlement negotiations that resulted in the 2011 Survey and Manage Settlement Agreement, adopted by the District Court on July 6, 2011.

The Ninth Circuit Court of Appeals issued an opinion on April 25, 2013, that reversed the District Court for the Western District of Washington's approval of the 2011 Survey and Manage Settlement Agreement. The case is now remanded back to the District Court for further proceedings. This means that the December 17, 2009, District Court order which found National Environmental Policy Act (NEPA) inadequacies in the 2007 analysis and RODs removing the Survey and Manage requirement is still valid.

Previously, in 2006, the District Court (Judge Pechman) had invalidated the agencies' 2004 RODs eliminating Survey and Manage due to NEPA violations. Following the District Court's 2006 ruling, parties to the litigation had entered into a stipulation exempting certain categories of activities from the Survey and Manage standard (referred to as the "Pechman Exemptions"). Judge Pechman's October 11, 2006, order directs as follows:

> *Defendants shall not authorize, allow, or permit to continue any logging or other ground-disturbing activities on projects to which the 2004 ROD applies unless such activities are in compliance with the 2001 ROD (as the 2001 ROD was amended or modified as of March 21, 2004), except that this order will not apply to:*
>
> *a. Thinning projects in stands younger than 80 years old;*
>
> *b. Replacing culverts on roads that are in use and part of the road system, and removing culverts if the road is temporary or to be decommissioned;*
>
> *c. Riparian and stream improvement projects where the riparian work is riparian planting, obtaining material for placing in-stream, and road or trail decommissioning; and where the stream improvement work is the placement large wood, channel and floodplain reconstruction, or removal of channel diversions; and*
>
> *d. The portions of project involving hazardous fuel treatments where prescribed fire is applied.*
>
> *Any portion of a hazardous fuel treatment project involving commercial logging will remain subject to the survey and management requirements except for thinning of stands younger than 80 years old under subparagraph a. of this paragraph.*

Following the District Court's December 17, 2009, ruling, the Pechman exemptions still remained in place. The USFS have reviewed the Project's Environmental Assessment (EA) in consideration of both the December 17, 2009, partial

summary judgment and Judge Pechman's October 11, 2006, order. The Project consists of a suite of restoration activities described in detail in the Project EA document that would fit within Pechman Exemptions B and C (October 11, 2006, order).

The Project's Proposed Action entails the following restoration activities:

Instream Habitat Restoration

1. Restoration and Enhancement of In-Channel Habitat
2. Floodplain Restoration
3. Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures
4. Water Conservation Projects (minimal ground disturbance)
5. Salmon Carcass Placement (no ground disturbance)
6. Remote Site Incubators (RSIs) (minimal ground disturbance)

Upslope Habitat Restoration

7. Bioengineered Bank Stabilization
8. Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement

Road Maintenance, Rehabilitation, and Decommissioning Activities

9. Road Maintenance
10. Road Rehabilitation
11. Road Decommissioning

All of the proposed restoration activities are intended to improve stream and riparian habitat (including culvert replacements) while minimizing ground disturbance to the extent possible. No forest management actions are proposed as part of the Proposed Action. Therefore, the USFS have made the determination that Project meets Exemption B and C of the Pechman Exemptions. Therefore, the Project may still proceed even if the District Court sets aside or otherwise enjoins use of the 2007 Survey and Manage ROD since the Pechman Exemptions would remain valid in such a case.

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Appendix F: Wild and Scenic Rivers Section 7 Analysis and Determination

Public Draft

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ACRONYMS AND ABBREVIATIONS

Acronym	Definition
BiOp	biological opinion
BLM	U.S. Bureau of Land Management
BMP	best management practices
cfs	cubic feet per second
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
DPS	Distinct Population Segment
EA	Environmental Assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	evolutionarily significant unit

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HVT	Hoopa Valley Tribe
LRMP	land and resource management plan
MDB&M	Mount Diablo Base and Meridian
NCIP	Northwest California Integrated Resource Management Plan
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPS	National Park Service
NTU	nephelometric turbidity unit
ORV	outstandingly remarkable value
Project	Trinity River Watershed Restoration Project
Reclamation	Bureau of Reclamation
RFO	Redding Field Office
ROD	Record of Decision
ROW	right-of-way
SONCC	Southern Oregon/Northern California Coast
STNF	Shasta-Trinity National Forest
SR	State Route
TMDL	total maximum daily load
TRD	Trinity River Division
TRH	Trinity River Hatchery
TRRP	Trinity River Restoration Program
UKTR	Upper Klamath/Trinity River
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
WSR	Wild and Scenic River
WSRA	Wild and Scenic Rivers Act

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1 Introduction

The National Wild and Scenic Rivers Act of 1968 (WSRA) establishes the national wild and scenic rivers (WSR) system; Section 7(a) of the WSRA directs the river-administering federal agency to evaluate the effects of a federally-assisted water resources project proposed within a WSR corridor on the river's free-flowing condition, water quality, and outstandingly remarkable values (ORVs). The WRSA prohibits activities that would interfere with the free-flowing condition of a WSR or degrade the values for which the wild and scenic designation was given. Rivers added to the national WSR system are given a classification: wild, scenic, or recreational, which are determined based on the level of development along the river at the time of designation.

The purpose of this analysis is to summarize the impacts of the Trinity River Watershed Restoration Project (Project), in accordance with Section 7(a) of the WSRA, on the mainstem Trinity River, South Fork Trinity River, North Fork Trinity River, and New River (collectively referred to as the Project WSRs in this document). Project activities and potential impacts would typically occur along roads and within areas designated as riparian reserves under the 1994 Northwest Forest Plan (NWFP; USFS and BLM 1994) within the Trinity River basin, including the Project WSRs. The primary objectives of the Project are to enhance aquatic habitat conditions for native anadromous fish species (e.g., salmon, steelhead, and Pacific lamprey) within the Trinity River watershed and to support the objectives of the Aquatic Conservation Strategy (ACS) of the NWFP, adopted by the Bureau of Land Management (BLM) and U.S. Forest Service (USFS).

Because activities would be implemented on BLM-administered and USFS-managed lands, the BLM and USFS serve as the river-administering agency and is required to determine whether the proposed Project would directly and adversely affect the Project WSRs' free-flowing condition, water quality, and/or ORVs. BLM and USFS work reciprocally under an Memorandum of Understanding (MOU) to identify which agency will be responsible for Section 7 analysis based on the project location. This document serves to provide project-level WSRA coverage for site-specific projects that involve BLM-managed WSR resources within the Trinity River Watershed, and additional site-specific WSR determination would not be required. For site-specific projects that involve USFS-managed WSR resources, additional site-specific WSR determinations would be completed for review and approval by the USFS line officer.

The Trinity River was designated as a WSR in 1981 under the WSRA 2(a)(ii) (46 FR 7484 7485, see Table 1). The mainstem Trinity River is designated as recreational from 100 yards below Lewiston Dam downstream to Cedar Flat, just upstream of the Trinity River's Burnt Ranch Gorge and then again below Gray Falls to the Six Rivers National Forest boundary. The Trinity River is designated as scenic from Cedar Flat Creek to Gray Falls. In addition to the mainstem section, three tributaries of the Trinity River were designated: the North Fork from the Trinity River confluence to the southern boundary of the Trinity Alps Wilderness Area (classified as wild); the South Fork Trinity River from the Trinity River confluence to the California State Highway 36 bridge crossing (classified as wild, scenic, and recreational); and the New River from the Trinity River confluence to the Trinity Alps Wilderness Area (classified as wild, scenic, and recreational). The South Fork of the Trinity River Wild and Scenic River Management Plan (USFS 1992) dovetails the Shasta-Trinity River National Forest (STNF) Land and Resources Management Plan (USFS 1995), which provides guidance on allowed uses for the three classifications. Wild river segments provide recreational opportunities that provide solitude with an emphasis on a dispersed

primitive experience. Some opportunities for solitude and isolation as well as opportunities for gregarious activities occur in scenic river segments, and opportunities for highly gregarious activities occur in recreational river segments. Recreation development includes maintenance of existing trails and facilities as well as providing for minimal developments in wild segments. In scenic and recreational river segments, moderate development is allowed. In wild river segments, only use of native materials is allowed in areas proposed for resource improvements and should be installed in such a way to appear natural. In scenic and recreational river segments, use of native and non-native materials is allowed, and both natural- and manmade-appearing improvements are allowed. Bioenhancement and fisheries habitat enhancement activities are allowed in all three river classifications. The USFS- and BLM-managed WSR segments within the Trinity River Watershed are shown in Figure 1.

Table 1. Definition of wild, scenic, and recreational Wild and Scenic Rivers designations and permitted activities (The Wild & Scenic Rivers Act [16 U.S.C. 1271-1287] 1968, STNF Land and Resource Management Plan 1994).

Designation	Definition	Permitted Activities
Wild	Those rivers or sections of rivers that are free of impoundments, with watersheds or shorelines essentially primitive, generally inaccessible except by trail, and with unpolluted waters. These represent the vestiges of primitive America.	No roads or other provisions for land motorized travel would be permitted within one-quarter mile of the riverbank. However, one or more inconspicuous roads leading to the river area, for the purpose of providing access, may be permitted. Also, unobtrusive trail bridges could be allowed. The cutting of trees would not be permitted except when needed for a primitive recreation experience or to protect the environment.
Scenic	Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.	Roads may occasionally bridge the river area. Short stretches of conspicuous or longer stretches of inconspicuous and well screened roads could be allowed. Consideration would be given to the type of use for which roads are constructed and the type of use that would occur in the river area. A wide range of silvicultural practices could be allowed provided that such practices are carried on in a way that there is no substantial adverse effect on the river and its immediate environment.
Recreational	Those rivers or sections of rivers that are readily accessible by road or railroads, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.	Parallelling roads could be constructed on one or both riverbanks. There could be several bridge crossings and numerous river access points. Timber harvesting would be allowed. However, some restrictions could apply to immediate river environments to preserve scenic and fish and wildlife values.

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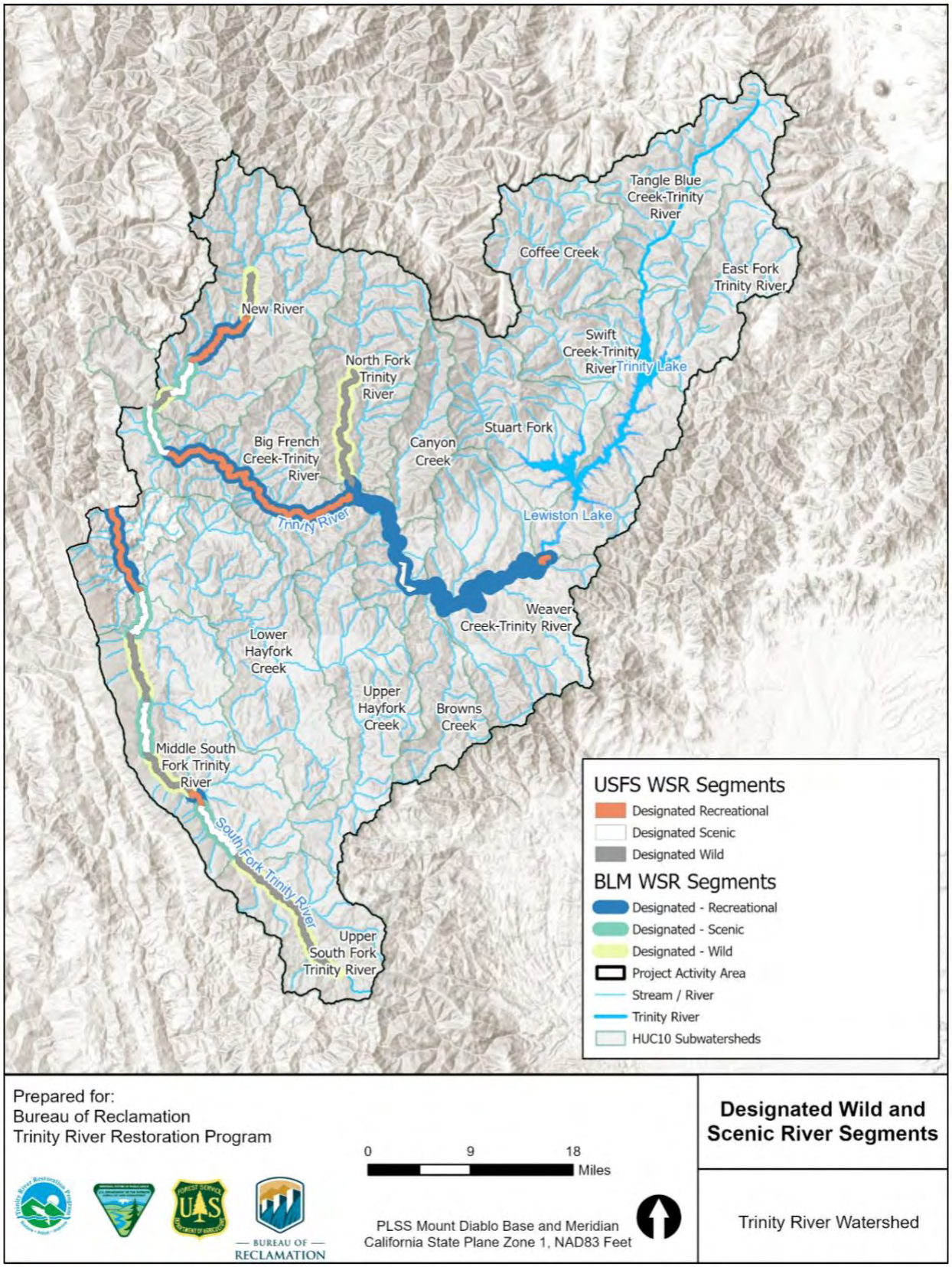

Figure 1. Designated WSR River Segments Managed by BLM and USFS.

The STNF has identified five tributaries that are candidates for WSR which include Canyon Creek, Hayfork Creek, Virgin Creek, and upper watershed segments of the North Fork Trinity River and South Fork Trinity River (see Table 2). Canyon Creek is a candidate for designation for scenic ORV under wild from the outlet of lower Canyon Creek Lake to the Canyon Creek Trailhead and under recreational from Canyon Creek Trailhead to the mainstem of the Trinity River. Hayfork Creek is a candidate for scenic designation for scenic and fisheries ORVs from nine-mile bridge to the confluence with the South Fork Trinity River. Virgin Creek is a candidate for wild designation for scenic and fisheries ORVs from the headwaters to the confluence with the New River. The North Fork Trinity River is a candidate for wild designation for scenic and fisheries ORVS for approximately 11.7 miles into the Trinity Alps Wilderness above its current designated WSR segments. The South Fork Trinity River has five candidate segments (2 wild, 2 scenic, and 1 recreational) identified for scenic and fisheries ORVs that extend from Forest Glen at the current WSR designated segments upstream approximately 24.8 miles to the headwaters as the Yolla Bolly-Middle Eel Wilderness Boundary.

The BLM RFO has similarly identified sections within Canyon Creek as suitable for designation of recreational with ORVs for fish, scenic, and recreation. BLM RFO has identified sections of the headwaters and mainstem of Weaver Creek and Indian Creek as suitable for scenic and one section of wild WSR designation for cultural, fish, and scenic ORVs (Table 2).

Table 2. Designated, candidate (USFS), and suitable (BLM) Wild and Scenic River (WSR) sections in the Trinity River Basin managed by the Shasta-Trinity National Forest (USFS) or the Redding Field Office (BLM).

River	Status	Description	Classification	Length (miles)	Management Agency	ORV
Canyon Creek	Candidate WSR	Headwaters at the outlet of lower Canyon Creek Lake to Canyon Creek Trailhead at Ripstein Campground	Wild	6.5	USFS	Scenic
Canyon Creek	Candidate WSR	Canyon Creek Trailhead to the Confluence with the Mainstem Trinity River	Recreational	11	USFS	Scenic
Canyon Creek	Suitable WSR	Canyon Creek is located in Trinity County in the northern Coast Ranges and contributes to the designated Trinity River WSR.	Recreational	2.9	BLM	Fish, Scenic, Recreation
Grub Gulch	Suitable WSR	The segments within the West Weaver Creek Complex are located in Trinity County and contribute to the designated Trinity River WSR.	Scenic	0.5	BLM	Cultural
Hayfork Creek	Candidate WSR	Nine Mile Bridget to the Confluence with the South Fork Trinity River	Scenic	14	USFS	Fish, Scenic

River	Status	Description	Classification	Length (miles)	Management Agency	ORV
Indian Creek 1 Segment A	Suitable WSR	The segments within the Indian Creek (Trinity River) Complex are located in Trinity County in the northern Coast Range and contribute to the designated Trinity River WSR.	Wild	0.8	BLM	Fish
Indian Creek 1 Segment B	Suitable WSR	The segments within the Indian Creek (Trinity River) Complex are located in Trinity County in the northern Coast Range and contribute to the designated Trinity River WSR.	Scenic	2.9	BLM	Fish, Cultural
Indian Creek 1 Segment C	Suitable WSR	The segments within the Indian Creek (Trinity River) Complex are located in Trinity County in the northern Coast Range and contribute to the designated Trinity River WSR.	Scenic	1.7	BLM	Fish
New River	Designated WSR	1000 feet below the confluence of Virgin and Slide Creek to junction with East fork New River in Section 23, T7N, R7E	Wild	5	USFS	Anadromous fish
New River	Designated WSR	Junction with East Fork New River in Section 23, T7N, R7E, to 100 yards below Panther Creek Campground in Section 18, T6N, R7E	Recreational	12.5	USFS	Anadromous fish
New River	Designated WSR	100 yards below Panther Creek Campground in Section 18, T6N, R7E to Dyer Creek in Section 25, T26N, R6E	Scenic	5	USFS	Anadromous fish
New River	Designated WSR	Dyer Creek in Section 25, T26N, R6E to the confluence with Trinity River Mainstem	Wild	3	USFS	Anadromous fish
North Fork Trinity River	Designated WSR	Trinity Alps Wilderness boundary, in the northwest 1/4 of Section 6, T36N, R11W to Trinity Alps Wilderness boundary, Section 20, T34N, R11W	Wild	14.7	USFS	Anadromous fish
North Fork Trinity River	Designated WSR	Trinity Alps Wilderness boundary, Section 20, T34N, R11W to confluences with the Trinity River mainstem, southeast Section 20, T34N, R11W	Recreational	7	USFS	Anadromous fish

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River	Status	Description	Classification	Length (miles)	Management Agency	ORV
North Fork Trinity River	Candidate WSR	Headwaters in Southwest 1/4 of Section 24, T8N, R12W to existing WSR at Trinity Alps Wilderness Boundary, in the northwest 1/4 of Section 6, T36N, R11W	Wild	11.7	USFS	Fish, Scenic
North Fork Trinity River	Designated WSR	The North Fork of the Trinity from the intersection of the river with the southern boundary of the Salmon-Trinity Primitive Area downstream to the river mouth at Helena	Recreational	0.8	BLM	Fish, Scenic
South Fork Trinity River	Designated WSR	South Fork Trinity River (SFTR) from Forest Glen to Hidden Valley Ranch	Wild	5.9	USFS	Anadromous fish
South Fork Trinity River	Designated WSR	SFTR from Hidden Valley Ranch to Plummer Creek confluence in Section 8, T1N, R7E	Scenic	3.4	USFS	Anadromous fish
South Fork Trinity River	Designated WSR	SFTR from Plummer Creek confluence in Section 8, T1N, R7E to Johnson Creek confluence near the boundary of Sections 13 and 14, T2N, R6E	Wild	6.1	USFS	Anadromous fish
South Fork Trinity River	Designated WSR	SFTR from Johnson Creek confluence near the boundary of Sections 13 and 14, T2N, R6E to the boundary of Sections 25 and 36, T3N, R6E	Scenic	2	USFS	Anadromous fish
South Fork Trinity River	Designated WSR	SFTR from the boundary of Sections 25 and 36, T3N, R6E, to the footbridge near the mouth of Underwood Creek	Recreational	6.1	USFS	Anadromous fish
South Fork Trinity River	Designated WSR	SFTR from the footbridge near the mouth of Underwood Creek to Todd Ranch in Section 18, T5N, R6E	Wild	7.3	USFS	Anadromous fish
South Fork Trinity River	Designated WSR	SFTR from Todd Ranch to the confluence with the Trinity River	Scenic	6.4	USFS	Anadromous fish
South Fork Trinity River	Candidate WSR	Headwaters of the South Fork Trinity River at the Yolla Bolly-Middle Eel Wilderness Boundary at Section 19, R10W, T27N to the west section line of Section 28, T28N, R11W	Wild	8.1	USFS	Fish, Scenic

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River	Status	Description	Classification	Length (miles)	Management Agency	ORV
South Fork Trinity River	Candidate WSR	West section line of Section 28, T28N, R11W to two tenths of a mile west and downstream od the Double Cabins site	Scenic	1	USFS	Fish, Scenic
South Fork Trinity River	Candidate WSR	Two tents of a mile west and downstream of the Double Cabins site to the confluence with Smoky Creek	Wild	8	USFS	Fish, Scenic
South Fork Trinity River	Candidate WSR	Confluence with Smokey Creek to four tents of a mile upstream from confluence with Farley Creek	Scenic	4.8	USFS	Fish, Scenic
South Fork Trinity River	Candidate WSR	Four tents of a mile upstream from confluence with Farley Creek to existing South Fork Trinity River WSR, at Forest Glen	Recreational	2.9	USFS	Fish, Scenic
Trinity River	Designated WSR	100 yards below Lewiston Dam to Shasta-Trinity National Forest Boundary, Section 17, T33N, R8W	Recreational	2	USFS	Anadromous fish
Trinity River	Designated WSR	Shasta-Trinity National Forest boundary in north Section 4, T33N, R10W to Shasta-Trinity National Forest Boundary in north Section 29, T33N, R10W	Recreational	3	USFS	Anadromous fish
Trinity River	Designated WSR	Shasta-Trinity National Forest boundary to the east of Section 29, T34N, R11W near Pigeon Point to Cedar Flat Creek, Section 19, T5N, R6E	Recreational	29.5	USFS	Anadromous fish
Trinity River	Designated WSR	Cedar Flat Creek, Section 19, T5N, R6E to Grays Falls, Section 34, T6N, R6E	Scenic	5.2	USFS	Anadromous fish
Trinity River	Designated WSR	Grays Falls, Section 34, T6N, R6E to Six Rivers National Forest boundary, northwest corner of Section 32, T7N, R5E near Tish Tang	Recreational	17	USFS	Anadromous fish
Trinity River	Designated WSR	The main stem from 100 yards below Lewiston Dam to the river mouth at Weitchpec	Recreational	18.6	BLM	Fish, Scenic
Virgin Creek	Candidate WSR	Headwaters to the confluence with the New River	Wild	11.7	USFS	Fish, Scenic

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River	Status	Description	Classification	Length (miles)	Management Agency	ORV
West Weaver Creek	Suitable WSR	The segments within the West Weaver Creek Complex are located in Trinity County and contribute to the designated Trinity River WSR.	Scenic	1.4	BLM	Fish, Cultural
West Weaver Creek Tributary	Suitable WSR	The segments within the West Weaver Creek Complex are located in Trinity County and contribute to the designated Trinity River WSR.	Scenic	0.1	BLM	Fish, Cultural

These river segments in the Trinity River basin were designated as WSRs to preserve the anadromous and resident fisheries, outstanding geologic resource values, scenic values, recreational values, and cultural and historical values. The ORV that is specific to the Project WSRs is the anadromous fishery. Under an interagency agreement between the BLM, the National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), and USFS, the BLM generally has the responsibility for conducting WSRA Section 7 determinations for WSRs. In addition, Section 7(a) of the WRSA directs the BLM on behalf of the Secretary of Interior to evaluate proposed water resource projects that have potential to effect a WSR for which the BLM is charged with administration (BLM 2012).

The Bureau of Reclamation (through the Trinity River Restoration Program [TRRP] that is part of Reclamation's Northern California Area Office [NCAO]) is the Lead Federal Agency for the National Environmental Policy Act (NEPA) process. The cooperating agencies are USFS and BLM. TRRP, USFS, and BLM have collaborated during the preparation of the Project's Environmental Assessment (EA).

This analysis evaluates the effects of the Project on the Project WSRs' free-flowing condition, water quality, and the anadromous fishery ORV and provides a determination regarding their protection as required under Section 7 of the WSRA. Because of the length and level of detail provided in the EA and associated technical reports, this WSR analysis is presented in summary form and refers the reader to the specific sections of Chapter 5 of the EA for additional information on water quality and hydrology, geology and soil, vegetation and wetlands, fisheries, wildlife, and climate.

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2 Definition of the Activity

2.1 Project Proponent

The Project proponent is TRRP (administered by Reclamation) with cooperators BLM and USFS.

2.2 Purpose and Need for the Project

The purpose of the Project is to improve instream and riparian habitat to accelerate the recovery of north coast salmonid populations (coho salmon, steelhead, and Chinook salmon) and other special status aquatic species, thereby fulfilling tribal trust responsibilities and obligations to local communities as well as recreational and commercial fishing industries (per the STNF LRMP, BLM's Northwest Integrated Resource Management Plan (NCIP), and state and federal recovery plan goals [NMFS 2014, CDFG 2004]). All figures and appendices referenced in this document are included in the EA.

Specifically, the Project would:

- Restore and improve instream conditions sufficient to support all life stages of salmonids and other aquatic species;
- Restore upstream and downstream fish passage for all life stages of salmonids;
- Restore continuous paths for wood dispersal, nutrient cycling, sediment transport, and movement of other vegetative material essential for productive aquatic habitat;
- Maintain or restore native plant communities and vegetative structure impacted by invasive plants and pathogens, while rehabilitating eroding streambanks to improve water quality, shade conditions, and large wood recruitment;
- Repair, replace, or remove ineffective instream structures;
- Restore and improve riparian and meadow habitat in order to promote healthy conditions for aquatic and terrestrial wildlife populations;
- Improve late summer/fall base flow conditions through process-based restoration, water conservation improvements, and meadow restoration;
- Increase nutrient inputs through salmon carcass placement in tributaries; and
- Stabilize upslope areas around road infrastructure to minimize erosion and sediment discharges within the watershed

Implementation of the Project would incorporate general protection measures (GPMs), design guidelines, and conservation measures (CMs) to ensure that it is consistent with the BLM's management goals and objectives for the Trinity River under its NCIP to support management actions intended to enhance the fishery and

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recreational ORVs of the Project WSRs. The Project is consistent with the ACS objectives established by the NWFP[1] and was developed through a cooperative effort by the TRRP, BLM, and USFS.

2.3 Geographic Location of the Project

The Project restoration activities analyzed in the EA, which are described in more detail in Chapter 4 of the EA would occur within the Trinity River watershed. The proposed Project would be implemented primarily within riparian reserves along the mainstem and tributaries of the Trinity River, both below and above the Lewiston and Trinity dams and in upslope areas (Figure 1-1 of the EA).

2.4 Magnitude and Extent of the Project Activities

Project restoration activities are described and evaluated at the watershed-level because site-specific project locations and other details have not been determined. The Project consists of a suite of instream, riparian, and other restoration activities that were selected to meet the objectives described above. Detailed descriptions of each of the proposed activities are included in Chapter 4 of the EA. Proposed activities are grouped into three general categories: instream habitat restoration; upslope habitat restoration; and road maintenance, rehabilitation, and decommissioning activities. The activities proposed under each of these categories are summarized below:

Instream Habitat Restoration

1. Restoration and Enhancement of In-Channel Habitat
2. Floodplain Restoration
3. Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures
4. Water Conservation Projects
5. Salmon Carcass Placement
6. Remote Site Incubators (RSIs)

Upslope Habitat Restoration

7. Bioengineered Bank Stabilization
8. Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement

Road Maintenance, Rehabilitation, and Decommissioning Activities

9. Road Maintenance
10. Road Rehabilitation
11. Road Decommissioning

[1] USDA, USDI. 1994c. Standards and guidelines for management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl: Attachment A to the Record of Decision for Amendments to Forest Service and Bureau of Land Management planning documents within range of the northern spotted owl. p. B-11.

2.5 Duration of the Activities

The time required to implement Project activities at a specific restoration site can be as short as a few days for minor projects, or as long as several years or only during certain months of the year for major projects. Major Project construction activities are typically concentrated during the dry season (generally May through October) with mobilization occurring as early as April. In-channel work windows for salmonids and seasonal restrictions for wildlife species may further constrict construction timelines to avoid and minimize impacts on sensitive species. Construction usually occurs only during daylight hours; however, in rare cases, continuous daytime and nighttime work may be necessary for some activities, expedited projects, and projects where the construction schedule is nearing the flood season. Depending on weather and river flow conditions, construction can extend well into November. If a construction phase extends into the following year's construction season, the site would be secured and "winterized" before the start of the flood season (typically November 15).

Site specific project planning would address the timing of the project as it relates to the following areas:

- Surveys/Progression of Work: Identify and plan to allow for surveys that may need to occur at certain times of year, or that may take multiple years (see vegetation and wildlife conservation measures in Appendix B).
- Sediment: Individual projects with the potential to generate sediment would occur during the dry (typically between June 15 and November 19 in the Trinity River basin) or before first significant rainfall, whichever comes first.
- Flows: Instream projects in ESA-listed species occupied habitat should consider flow levels and life history stage when implementing activities that require heavy equipment. Instream projects would occur during low flows, which typically occurs during summer and early fall months.
- Seasonal Restrictions (SRs): Based on noise generation, SRs may apply to all or part of the project based on location and surveys completed (see wildlife conservation measures in Appendix B of the EA).
- Timing and Project Location: Determine through interagency review if the timing of the project at a specific location may impact cultural practices, recreational uses or other resource areas. Adjust project areas accordingly to avoid sensitive resource impacts (see cultural and wildlife conservation measures in Appendix B of the EA).

2.6 Past and Future Activities

The Trinity River Restoration Program and partners have been completing flow modification, restoration and enhancement of in-channel habitat, floodplain restoration, road maintenance, road rehabilitation, and road decommissioning since the Record of Decisions was signed in 2000 and full implementation of actions started in 2005. The efforts to date for major instream projects have concentrated in WSR segments of the mainstem Trinity River between Lewiston Dam and the confluence with the North Fork Trinity River.

Many other local tribal, watershed and fisheries management, and land management organizations have worked to complete many of the actions proposed in this EA throughout the tributaries to the Trinity River. Minimal project modifications have taken place on the New River, Virgin Creek, North Fork or Canyon Creek over the last 10 years. The Bluebird Mine Restoration was an upland recontouring and revegetation project that took place in the Canyon Creek drainage. The South Fork Trinity River and Hayfork Creek have

benefitted from water conservation and in-stream habitat improvement projects spearheaded by The Watershed Research and Training Center and Yurok Tribal Fisheries Program within WSR sections on the South Fork Trinity River. Along the South Fork Trinity River large wood was placed to improve channel complexity and juvenile rearing habitat in wild and scenic sections upstream of Hyampom, CA.

This EA supports future restoration activities within designated, candidate, and suitable WSR segments throughout the Trinity River basin.

3 Baseline Conditions

3.1 Free Flowing Condition

Existing conditions within the Trinity River watershed are influenced by the legacy of 20th-century dredge mining, which contributed to disturbances to the channel, floodplain, and flow regimes and simplified the available habitat for aquatic, riparian, and upland species. The channelization of the mainstem Trinity River associated with historic dredge activities was exacerbated by modifications to the Trinity River flow regime downstream of Lewiston Dam, beginning in 1964, when the Trinity River Division (TRD) of the Central Valley Project (CVP) became fully operational. In 1981 when the mainstem Trinity River was designated as a WSR, anthropogenic riparian berms had been developing for more than 15 years and were further channelizing the river in several locations. Subsequently, studies have demonstrated that the river's alluvial nature had been modified extensively due to changes in the flow regime and sediment flux.

Although changes to flow management made since 2006 have provided some improvements to the form and function of the Trinity River, the Record of Decision (ROD) for the Trinity River Mainstem Fishery Restoration Environmental Impact Statement/Environmental Impact Report (USFS 2000) also required the establishment of the TRRP and stipulated watershed restoration efforts to address negative impacts that resulted from land use practices in the watershed. The ROD also stipulated that mechanical channel rehabilitation, including management of sediment inputs, would be required to reconfigure sections of the river and provide opportunities for alluvial processes to become reestablished, albeit at a smaller scale than had occurred before the construction and operation of TRD facilities (i.e., the Lewiston and Trinity dams).

The South Fork Trinity River is the largest un-dammed river within the State of California and is considered a keystone watershed within the Klamath River basin. The South Fork Trinity River Basin is 980 square miles before joining the Trinity River near Salyer in Trinity County, CA. The South Fork Trinity River has no major dams or diversions. Historically, the South Fork Trinity River had a stable anadromous fish population, but these populations are still recovering after major flooding, which was exacerbated by erosion as a result of mining, logging, road construction, and ranching during the mid-1900s.

The North Fork Trinity River flows through the Klamath Mountains, draining roughly 151 square miles, and has no major dams or diversions.

The New River drains about 225 square miles of rugged mountains and forests. About 70 percent of the New River watershed is in the Trinity Alps Wilderness, which has little human disturbance. New River is also free flowing and is 25.5 miles from the headwaters to its confluence with the Trinity River.

Canyon Creek drains 124 square miles which was heavily mined and was previously damned until 1940.

3.2 Water Quality

Water quality downstream of Lewiston Dam is notably of high quality, and Trinity River water is used to lower the water temperature and improve water quality conditions of the Klamath River during low water conditions in late summer. Water releases from the TRD influence flow volumes and velocities, water quality, and channel geometry of the Trinity River downstream of Lewiston Dam. These releases are particularly important to water quality parameters such as temperature and suspended sediments. Water in the Trinity Basin supports municipal and domestic water supplies and beneficial uses primarily associated with sustaining high-quality fish habitat (cold-water spawning and rearing habitat) and recreational pursuits (swimming and boating). These benefits are protected by numeric and narrative water quality objectives defined in the Water Quality Control Plan for the North Coast Region (2018 Basin Plan; North Coast Regional Water Quality Control Board (RWQCB) 2018).

Although the South Fork Trinity River and its tributaries support important populations of salmon and steelhead, excessive sediment continues to be a problem and consistently exceeds the existing Water Quality Standards (WQS) necessary to protect the beneficial uses of the basin, particularly the cold-water fishery. Accelerated erosion from land use practices and natural sources impacts the migration, spawning, reproduction, and early development of cold-water fish such as spring- and fall-run chinook salmon and steelhead trout.

Both the mainstem Trinity River and the South Fork Trinity River have been declared as sediment impaired and placed on the Section 303(d) list as impaired waters. The Trinity River was first placed on the Section 303(d) list in 1992 in response to a determination by the State of California that the water quality standards for the river were not being met due to excessive sediment. The North Fork Trinity River, New River, and Canyon Creek are including in the Trinity River TMDL listing. The upper portions of these watersheds have active mast wasting from the glacial geologic formations and high severity fire areas within the watersheds have contributed to soil erosion. Large portions of these watersheds are within the Trinity Alps Wilderness Area and provide residents within the drainages with a stable source of drinking water.

The South Fork Trinity River has been listed as a sediment impaired waterbody in California's 1995 CWA 303(d) list adopted by the State of California North Coast Regional Water Quality Control Board. In 2001, the EPA established a total maximum daily load (TMDL) for sediment in the river. In 1998, the South Fork Trinity River is listed on the Section 303(d) list for impairment or threat of impairment to water quality associated temperature. Diversions and recent drought compounding on the physical morphology have negatively impacted the South Fork Trinity River leading to warm water temperatures and low flows during the dry season. The warm water temperatures are a concern for returning salmonids but have also contributed to an increase in algae growth in the drainage.

The primary adverse impacts of excessive sediment in the Trinity River pertain to the degradation of habitat for salmonids. The restriction of streamflow downstream of the TRD has contributed significantly to the Trinity River's impairment below Lewiston Dam (EPA 2001). Since 2006, TRRP recommended spring flow releases for fisheries that resulted in scoured sediment downstream of the TRD and reduced excess sediment deposition in areas near Lewiston Dam. In general, natural background turbidity levels in the Trinity mainstem range from 0 to 1 NTUs during low-flow conditions (typically 300 to 450 cfs). The Regional Water Board issues Section 401 Water

Quality Certifications for construction activities and in light of the Trinity River TMDL, it typically provides an allowable zone of turbidity dilution (protective of sensitive aquatic life), within which turbidity levels shall not exceed 20 NTUs or 20 percent above naturally occurring background levels whichever is greater.

Water temperature is one of the most important variables affecting salmonids and other aquatic organisms (Carter 2005). It influences feeding rates and growth, metabolism, development, the timing of migration, spawning, rearing, and food availability. Since the construction of the TRD, discharges from Lewiston Dam have played an important role in regulating water temperatures in the Trinity River downstream. Depending on the type of water year (e.g., extremely wet, wet, normal, dry, critically dry) and time of year, this effect diminishes to varying degrees with distance from Lewiston Dam.

A key objective of the TRRP's flow management is to improve thermal regimes for all salmonid life stages in the Trinity River. TRRP has been using flow management practices to meet specific temperature management targets, and temperature monitoring data have been collected as part of the Adaptive Environmental Assessment and Management (AEAM) process since 2002.

Water temperatures in the Trinity River are primarily influenced by flows, topography, riparian condition, and aspect. Since the construction of the TRD, discharges from Lewiston Dam have had a significant effect on water temperatures in the Trinity River downstream. Reservoir releases from Lewiston Dam have altered the natural temperature regime, making the river warmer in the winter and colder in the summer than under pre-dam conditions. Depending on the water year type and time of year, this effect diminishes to varying degrees with distance from Lewiston Dam.

3.3 Outstandingly Remarkable Value: Anadromous Fishery

The ORV identified for the Project WSRs is the anadromous fishery. These rivers support the Southern Oregon/North California Coast (SONCC) coho salmon evolutionarily significant unit (ESU), which was federally listed as threatened under the Endangered Species Act (ESA) in 1997. In addition, the WSRs also support the Klamath Mountain Province (KMP) steelhead DPS, the Upper Klamath/Trinity River (UKTR) fall-run Chinook salmon ESU, a remnant population of UKTR spring-run Chinook salmon, and Pacific lamprey.

Per the ACS, the BLM and USFS are tasked with conserving and restoring native anadromous fish habitat, and TRRP exists to re-establish endangered salmonid populations to the Trinity River, in part through restoration activities within the tributaries. Federal and state special-status fish species of particular concern that occur within the Project activity area include:

- SONCC coho salmon ESU (federal and California state ESA-listed as threatened, with designated CH); and
- UKTR spring-run Chinook salmon ESU (federal candidate species, California state ESA-listed as endangered, USFS sensitive).

The UKTR Chinook salmon ESU, while not a federal ESA-listed species and no critical habitat has been designated, is a stock covered under the Pacific Coast Salmon federal fishery management plan. Therefore, its habitat within the Trinity River watershed is considered essential fish habitat (EFH). SONCC coho habitat is also considered EFH. EFH receives federal protection under the Magnuson Stevens Fishery Conservation and Management Act.

Table 3 below identifies all special-status fish and freshwater mussel species with the potential to occur within the Trinity River watershed according to the California Natural Diversity Database (2024), BLM sensitive species Redding Field Office list, USFS sensitive species list for the Shasta-Trinity National Forest, University of California Davis PISCES Database fish distribution maps (CalFish 2024), and consultation with local expertise, namely TRRP. Table 3 includes the species and status, documented HUC 10 watershed presence, and whether designated critical habitat is present within the Project activity area.

Table 3. Special-status fish and freshwater mussel species with potential to occur within the Project activity area.

Common Name	Scientific Name	Federal Status[1]	Other Status[2]	Documented HUC 10 Presence	Designated critical habitat in the Project activity area?
Fish Species					
Coho salmon, SONCC ESU	*Oncorhynchus kisutch*	FT	ST, S2	Big French Creek, East Fork Trinity River, New River, Stuart Fork, Swift Creek-Trinity River, Weaver Creek, Lower Hayfork Creek, Middle South Fork Trinity River	Yes
Spring Chinook salmon, UKTR ESU	*Oncorhynchus tshawytscha*	FC	SE, SSC, USFS-S, S2	Big French Creek, Browns Creek, Canyon Creek, Coffee Creek, East Fork Trinity River, New River, North Fork Trinity River, Stuart Fork, Swift Creek-Trinity River, Tangle Blue Creek-Trinity River, Weaver Creek, Lower South Fork Trinity River, Lower Hayfork Creek, Upper Hayfork Creek, Middle South Fork Trinity River, Upper South Fork Trinity River	No
Steelhead, Klamath Mountains Province DPS[3]	*Oncorhynchus mykiss irideus*	NL	SSC, USFS-S, S2	Canyon Creek, Coffee Creek, East Fork Trinity River, New River, North Fork Trinity River, Stuart Fork, Swift Creek-Trinity River, Tangle Blue Creek-Trinity River, Weaver Creek, Lower South Fork Trinity River, Lower Hayfork Creek, Middle South Fork Trinity River, Upper South Fork Trinity River	No
Green sturgeon, Northern DPS[3]	*Acipenser medirostris*	NL	SSC, S1	Big French Creek[3]	No
Pacific lamprey	*Entosphenus tridentatus*	NL	SSC, USFS-S, BLM-S, S3	Big French Creek, Browns Creek, Canyon Creek, Coffee Creek, New River, North Fork Trinity River, Tangle Blue Creek-Trinity River, Weaver Creek, Lower South Fork Trinity River, Lower Hayfork Creek, Upper Hayfork Creek, Middle South Fork Trinity River	No

Common Name	Scientific Name	Federal Status[1]	Other Status[2]	Documented HUC 10 Presence	Designated critical habitat in the Project activity area?
Freshwater Mussel Species					
Western pearlshell	*Margaritifera falcata*	NL	S1S2	Common in the Trinity River	No
California floater	*Anodonta californiensis*	NL	USFS-S, S2	Documented in low numbers in the Klamath and Trinity rivers	No

[1] FT = Federally-listed as threatened and species likely to become endangered within the foreseeable future; FC = Federal candidate for listing; NL = Not listed.

[2] SSC = California Species of Special Concern; SE = State-listed as endangered; ST = State-listed as threatened; BLM-S = BLM sensitive species, USFS-S = USFS sensitive species; NatureServe California State Rank S1 = critically imperiled, S2 = imperiled, S3 = vulnerable.

[3] Distinct Population Segment

[4] Green sturgeon is found outside the Project activity area in this HUC 10 watershed.

All anadromous salmonid species begin their life in freshwater, migrate to the ocean to rear and mature and return to spawn in freshwater. Although the three native salmonid species that occur in the Trinity River watershed have generally similar life histories, they differ in the time of year they migrate and spawn and when egg incubation typically occurs.

Adequate flows, water temperatures, water depths, and velocities; appropriate spawning and rearing substrates (e.g., riverbed gravels); and availability of instream cover and food are critical to the life stages of all anadromous salmonids. Spring-run Chinook salmon and summer-run steelhead also need long-term adult holding habitat for which pool size and depth, temperature, cover, and proximity to spawning gravel are essential requirements. Newly emerged fry and juveniles of all species require rearing habitat with low velocities, open cobble substrate, and cool water temperatures. The emigration of smolts to the ocean and the immigration of spawning adults require adequately timed flows with the appropriate temperature, depth, and velocity.

The TRRP prioritizes enhancing Trinity River juvenile salmonid rearing conditions through management and restoration actions. Juvenile salmonid habitat availability and quality were determined to be the limiting factors for salmonid production during early Trinity River habitat evaluations (USFWS and HVT 1999). Extant native river salmonid populations have been dramatically reduced from historical abundance, and the TRRP is charged with restoring populations to pre-dam levels. Fall-run Chinook salmon are the primary target for tribal harvest, commonly taken by sport fishermen, and arguably the species that would benefit most from the implementation of watershed restoration activities. Consequently, Chinook salmon numbers are targeted for juvenile population assessments in the Trinity River.

Since full implementation of the TRRP began in 2005, there has been a positive trend in the number of out-migrating naturally-produced juvenile Chinook salmon, which is attributed to improved rearing habitats a result of increases in Trinity River spring water release volumes, coupled with enhancement of in-channel habitat. In general, out-migrating naturally-produced juvenile Chinook numbers have increased from approximately 1

million in the early 1990s to just under 4 million per year currently measured at the Willow Creek rotary screw traps (September 11, 2019, TMC presentation in Weitchpec, CA).

Baseline numbers of adult salmon returning to the river are more problematic to interpret than juvenile data as many factors outside of river restoration may influence fisheries' escapement to the river. Though habitat restoration in the watershed may be improving conditions, fishery harvest (ocean and in-river) and poor ocean conditions (e.g., high temperatures or low food abundance) may drastically reduce the number of adults that return to natural spawning grounds and the Trinity River Hatchery (TRH). In general, salmon and steelhead population estimates are cyclical over time; however, general trends indicate overall population health. Since watershed restoration efforts began, the proportion of spring- and fall-run spawners returning to natural spawning areas has generally increased but overall numbers have diminished since peak escapement in 1987. Coho numbers have also decreased since the mid-1980s, and the proportion of hatchery spawners has increased. However, steelhead escapement has increased since the mid-1980s, and this is considered the current strongest population of salmonids on the Trinity River. Current Trinity River basin adult escapement goals set by the TRRP for natural-origin adults are: 6,000 spring Chinook; 62,000 fall Chinook; 1,400 coho; and 40,000 steelhead.

The best available data for anadromous fisheries return to the WSR designated and candidate tributaries is the annual summer snorkel surveys hosted by the STNF, CDFW, and The Watershed Research and Training, which are point in time counts of UKTR spring-run Chinook salmon ESU and summer-run KMP steelhead DPS in the major tributaries to the Trinity River. Surveys are completed along sections of Hayfork Creek, South Fork Trinity River, Canyon Creek, North Fork Trinity River, and New River. The tributaries with the strongest returning runs of UKTR spring-run Chinook are the South Fork Trinity River and New River, while the strong returns for summer-run KMP steelhead DPS are found on the North Fork Trinity River and New River.

The following subsections summarize current adult run sizes reported in the *Trinity River Basin Salmon and Steelhead Monitoring Project: Chinook and Coho Salmon and Fall-run Steelhead Run-size Estimates Using Mark-Recapture Methods: 2022-2023 Season* available at: https://www.trrp.net/library/document/?id=2625).

3.3.1 Spring-run Chinook Salmon 2022 Status Summary

According to this data, spawning escapement above the Junction City Weir was an estimated 13,262 fish, including the 3,971 spring-run adult Chinook that entered TRH and 8,531 estimated natural area adult spawners. There was insufficient data to estimate the contribution of hatchery adults to the total run or towards the TRRP goal of 6,000. This year's run size estimate of 13,262 is approximately 87.2% of the 15,212 average since 1978. Estimated spring Chinook run-size had ranged from 2,381 fish in 1991 to 62,692 fish in 1988.

3.3.2 Fall-run Chinook Salmon 2022 Status Summary

An estimated 14,179 fall-run Chinook migrated upstream of the Willow Creek Weir (WCW) in 2022. The run-size of 3,772 jacks (precocious fish) and 10,407 adult fall Chinook adults comprised an estimated 6,368 natural origin adults, 2,556 natural-origin jacks, 3,866 hatchery-origin adults, and 1,072 hatchery-origin jacks. An estimated 317 (144 jack and 173 adults) fall-run Chinook were harvested, yielding an escapement of 13,862, including the 4,938 fall Chinook that entered TRH and the 8,924 estimated natural area spawners. There was insufficient data

to estimate the contribution of hatchery adults to the total run or towards the TRRP goal of 62,000. This year's run-size estimate of 14,179 is approximately 36.4% of the 46-year average of 38,903 since 1977.

3.3.3 Coho Salmon 2022 Status Summary

An estimated run-size of 6,551 Coho comprised of 380 natural origin jacks, 2,664 natural origin adults, 237 hatchery jacks, and 3,240 hatchery adults migrated into the Trinity River basin upstream of the WCW in 2022. The estimated escapement of 550 natural origin Coho Salmon adults is 39.3% of the TRRP goal of 1,400 fish. This year's run size estimate of 6,551 is approximately 44.8% of the 45-year average of 14,615 since 1977. Estimated Coho Salmon run-size has ranged from 655 in 2017 to 59,079 in 1987.

3.3.4 Fall-run Steelhead 2022 Status Summary

An estimated 10,597 adult fall-run steelhead migrated upstream of WCW in 2022. Of those, 322 were estimated to have been harvested by anglers. An estimated 10,274 potential spawners, (7,642 natural-origin and 2,632 hatchery-origin) escaped. The estimated escapement of 7,642 natural origin steelhead adults is 19.1% of the TRRP goal of 40,000. This year's estimated run size is 79.0% of the average of 13,420 since 1980, with a range from 2,972 in 1998 to 53,885 in 2007.

4 WSRA Section 7(A) Evaluation Standard and Evaluation Criteria

4.1 Evaluation Standard

The Project was evaluated to determine if the proposed activities would result in any "direct and adverse" effects on the WSR's values (free flow, water quality, and the anadromous fishery ORV) pursuant to Section 7(a) of the WSRA. The Redding Field Manager will approve the determination for the BLM. The Regional Forester will approve the determinations for the USFS on site specific projects.

4.2 Evaluation Criteria

The following specific criteria were used to evaluate for direct and adverse effects to the free flow, water quality, and ORVs.

4.2.1 Free Flowing Condition

Alteration of within-channel conditions including:

- Active channel location
- Channel geometry
- Channel slope
- Channel form
- Navigation of river

Alteration of riparian and/or floodplain conditions including:

- Vegetation composition, age structure, quantity, or vigor
- Relevant soil properties such as compaction or percent bare ground
- Relevant floodplain properties such as width roughness, bank stability, or susceptibility to erosion

Alteration of upland conditions including:

- Vegetation composition, age structure, quantity, or vigor
- Relevant soil properties such as compaction or percent bare ground
- Relevant floodplain properties such as width roughness, bank stability, or susceptibility to erosion
- Relevant hydrologic properties such as drainage patterns or the character of the surface and subsurface flows

Alteration of hydrological processes including:

- The ability of the channel to change course, reoccupy former segments, or inundate its floodplain
- Streambank erosion potential, sediment routing and depositions, or debris loading
- The amount or timing of flow in the channel
- Existing flow patterns
- Surface and subsurface flow characteristics
- Flood storage (detention storage)
- Aggradation or degradation of the channel

Magnitude and extent of off-site changes including:

- Changes that influence other parts of the river system including:
  - Range of circumstance under which off-site changes might occur
  - The likelihood that predicted changes will be realized
  - Processes involved, such as water and sediment, and the movement of nutrients

4.2.2 Water Quality

- Pollutants (i.e., oil and grease)
- Sedimentation/Turbidity
- Water Temperature (discussed in the context of the anadromous fishery ORV)

4.2.3 Outstandingly Remarkable Value: Anadromous Fishery

To maintain/restore the fishery, the TRRP is charged with restoring ecosystem function and conditions to support salmon and steelhead. Likewise, the Project objectives focus around restoring and enhancing aquatic habitat in support of all salmonid life stages with the Trinity River watershed.

The evaluation criteria for the anadromous fisheries ORV are:

- Water temperature

- Water quality (physical, biological, chemical)
- Aquatic habitat
  - Geomorphic condition
  - Substrate quality
  - Nutrient cycling
  - Condition of aquatic invertebrate, amphibian, and mollusk habitat
  - Species composition and diversity
- Fish species population conditions, specifically:
  - Anadromous salmonid fish species
  - Resident fish species
  - Species traditionally used by and culturally important to Native Americans

This Section 7(a) evaluation addresses the Project's potential to directly and negatively impact the anadromous fishery ORV and other values identified by the WSRA. Chapter 4 of the EA provides additional analysis of the Project effects on the WSRs, water quality, hydrology, fisheries, wildlife, vegetation, recreation, and aesthetic values.

5 Analysis of Effects to Free-Flowing Conditions

5.1 How the Project Would Directly Alter Within-Channel Conditions

5.1.1 Position of the Project Relative to the Streambed and Streambanks

Consistent with the purpose and need described in Section 2.2and as determined by the ROD, the TRRP is directed to reestablish the form and function of the Trinity River in a manner that reestablishes the fishery to pre-dam conditions. The Project activities could occur within and adjacent to the bed and banks of the mainstem Trinity River and other WSRs to improve the aquatic habitat functions of these rivers in support of the anadromous fisheries ORV while ensuring the protection of water quality. The Project activities described in Section 2.4 would change the WSRs' existing form and functions within and, to varying degrees downstream of Project sites by restoring and improving floodplain habitat, increasing channel complexity, reestablishing self-sustaining riparian vegetation, and removing instream structures.

5.1.2 Potential Project-Related Changes to Free-Flowing Conditions

5.1.2.1 Active Channel Location

The active channel of the Trinity River is subject to extreme changes in flow throughout the water year, in part due to the TRRP flow release schedule that is implemented on an annual basis based on water year type. Base flows may be as low as 300 cfs in the fall and often exceed 6,000 cfs in the winter and spring; during wet years, TRRP releases may be as high as 11,000 cfs from Lewiston Dam.

Project activities implemented on the four WSRs that involve restoration and enhancement of in-channel habitat, floodplain restoration, and removal/retrofitting of fish passage barriers, small dams, flood gates, pilings and other in-water structures within the active channel would provide opportunities for both short- and long-term changes in channel morphology (width, depth, and gradient), therefore increasing the amount and quality of habitat for all life stages of anadromous salmonids. The Project activities resulting in physical modifications within the floodplain would improve the free-flowing conditions at individual project sites by allowing the WSRs and tributaries to more frequently inundate and move within their floodplains.

Portions of the North Fork Trinity River and the South Fork Trinity River and the entire reach of the New River are designated as wild. There would be no proposed heavy equipment use within the wild portions of wild and scenic river designations (WSRA§2 (a)(ii)). The scenic classification applies to those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and largely undeveloped but may be accessible in places by roads. Proposed activities would not affect the free-flowing condition of the rivers and would lead to improvement to the ORV.

5.1.2.2 Channel Geometry

As described in Section 2.2 Purpose and Need for the Project, one of the fundamental objectives of the Project is to implement activities intended to change the channel geometry in the short-term and provide opportunities for continuous dynamic processes within the stream channels over time in response to ongoing changes in sediment and flow regimes associated with both natural and anthropogenic processes. The Project would encourage the development of a dynamic channel geometry that would increase the amount and quality of habitat for fisheries and other aquatic species.

5.1.2.3 Channel Gradient

Many project activities would improve channel complexity by increasing sinuosity and the number and length of side channels, which would reduce flow velocity and encourage colonization of riparian vegetation. In channelized portions of the WSRs, site improvements that decrease channel gradient could improve channel stability.

5.1.2.4 Channel Morphology

The various Project activities are expected to alter channel morphology by increasing sinuosity, stabilizing banks, reconnecting the channel to the floodplain, and creating side channel habitat. Through implementation of Project activities, the channel morphology would become more diversified resulting in an increase in back channels and riffle-pool complexes. At some locations, eroded banks would be stabilized and upslope erosion would be controlled so that less sediment enters the channel.

5.1.2.5 Navigation of the River

The Project WSRs provide year-round recreational opportunities, including boating, kayaking, canoeing, rafting, inner tubing, fishing, swimming, camping, gold panning, wildlife viewing, picnicking, hiking, and sightseeing. Fishing for Chinook salmon, steelhead, and rainbow and brown trout is a major recreational activity on the WSRs throughout the year.

The BLM, in agreement with the USFS, issues up to 100 permits for commercial fishing guides along the upper reach of the mainstem Trinity River. The USFS issues 13 raft guide permits for the Trinity River downstream of Pigeon Point River Access. Visitor use of the Project WSRs can vary throughout the year and depending on the season. Temporary construction activities associated with the Project could pose a physical hazard to recreational users and cause short-term disturbance to areas used for recreational activities in and adjacent to project sites. Potential physical hazards to recreationists include the presence of temporary river crossings, operation of construction equipment and vehicles in and adjacent to the river, the addition of wood into the channel, and an increased potential for chemical contamination (e.g., diesel and hydraulic fluid) from construction equipment and vehicles operating in and adjacent to the river.

During site-specific project implementation, public access in the construction areas would be limited. Access to the Project sites would be limited based on individual agreements with landowners; however, river access to float through the Project WSRs would be maintained at all times.

An environmental commitment described in Appendix B of the EA requires implementors to post precautionary signage of instream construction to reduce the hazards to recreational users associated with in-river construction activities. This approach has worked well for previous TRRP projects and has been particularly effective in reducing short-term impacts for in-water recreational activities such as boating and fishing over the past 10 years. In the long-term, natural vegetation and a more sinuous naturally-functioning river would benefit river recreation.

5.2 How the Project Would Directly Alter Riparian and/or Floodplain Conditions

5.2.1 The Position of the Project Relative to Riparian and Floodplain Areas

The Project activities would primarily occur in riparian and floodplain areas and would improve floodplain interaction and allow for river dynamics to shift in response to flow and sediment regimes that persist after the construction of the TRD. Project activities would restore hydraulic connections and inundation across the floodplain to improve the diversity and complexity of aquatic, meadow, and riparian habitat; and ecosystem and geomorphic functions within the watershed. Project activities relating to floodplain restoration include: the setback, breaching, modification, and removal of levees, berms, and dikes; excavation or fill in support of hydraulic reconnection across the floodplain (including restoration to stage zero, which creates streams that are fully connected with their floodplains; typically, with multi-thread channels). Floodplain restoration activities also includes rock placement (specifically as engineered stream material, riffle ramps, or weirs); filling or reshaping of on- and off-channel gravel pits; and other strategies to aggrade the channel and improve connectivity within the floodplain. At site-specific project locations, riparian vegetation conditions would be enhanced and restored and nonnative species would be controlled to the extent possible.

5.2.2 Potential Project-Related Changes to Floodplain Conditions

5.2.2.1 Vegetation Composition, Age Structure, Quantity, or Vigor

In places, the riparian vegetation along the Project WSR corridors lack complexity with respect to species diversity, multiple age classes, and structure. The riparian corridors along the Project WSRs were impacted by placer mining activities, including both hydraulic and dredge operations, which resulted in increased floodplain elevations over time due to excessive deposition of mine tailings with virtually no soil available to support

riparian or upland vegetation other than extensive populations of invasive weeds (e.g., star thistle and Himalayan blackberry).

Certain Project activities would lower floodplain elevations to enable alluvial processes to reestablish under low flows and would provide opportunities for reestablishment of complex assemblages of native riparian and upland vegetation communities, including trees, shrubs, and grasses, at elevations that enable rooting within the hyporheic zone of alluvial features.

Project revegetation activities would be designed through collaboration with BLM and USFS botanists and fish biologists to ensure establishment of complex and regionally appropriate riparian communities. Revegetation efforts implemented in conjunction with floodplain grading, weed management, and extensive planting would improve riparian community reestablishment within 5 to 10 years post project construction. Some Project activities would include removing nonnative terrestrial and aquatic plant species by manual and mechanical methods (i.e., no herbicides); removing trees where necessary for watershed restoration (and salvaging for instream placement when appropriate); and revegetating areas with native herbaceous plants (including sedges, rushes, grasses, and forbs), shrubs, and trees. Revegetation efforts would involve harvesting and installing willow cuttings, stakes, mats, and fences; installing livestock fences around sensitive habitat; providing temporary irrigation; and coordinating with upstream operators to control dam releases or instream flow levels to provide water during early plant establishment.

5.2.2.2 Relevant Soil Properties Such as Compaction or Percent Bare Ground

Historic mining activities along Project WSRs resulted in loss of soil structure and in some areas complete loss of topsoil, limiting the establishment of native vegetation. By removing tailings within the floodplains and preserving remnant soils where found, the Project would create opportunities for riparian vegetation to naturally colonize some newly open areas. Revegetation efforts and natural recruitment are expected to decrease the amount of bare ground over the long term as riparian and upland vegetation becomes reestablished within restored floodplains.

5.2.2.3 Relevant Floodplain Characteristics Such as Width, Roughness, Bank Stability, or Susceptibility to Erosion

As described previously, changes to channel morphology by increasing sinuosity, stabilizing banks, reconnecting the channel to the floodplain, and creating side channel habitat would occur as a result of the Project. Generally, channel complexity within floodplain areas would be improved. At some locations, eroded banks would be stabilized and upslope erosion would be controlled so that less sediment enters the channel.

5.3 How the Activity Would Directly Alter Upland Conditions

5.3.1 The Position of the Activity Relative to the Uplands

Many areas throughout the watershed have been subjected to some degree of disturbance associated with historic mining. Upslope areas within the watershed where vegetative communities have been disturbed by past land disturbances (wildfire, introduction of nonnative species, or construction activities) and where habitat functions (e.g., water quality, biodiversity, etc.) have been degraded would be targeted for restoration or enhancement. Project activities implemented in uplands would include nonnative/invasive plant management

by manual and mechanical methods (i.e., no herbicides); removing trees where necessary for watershed restoration (and salvaging for instream placement when appropriate); and revegetating areas with native herbaceous plants, shrubs, and trees.

5.4 Resident Fish Species

Project activities that improve the Project WSRs for anadromous fish would also offer opportunities to improve aquatic habitat conditions in support of resident fish and other aquatic organisms (e.g., freshwater mussels).

5.4.1 Potential Project-Related Changes to Uplands

5.4.1.1 Vegetation Composition, Age Structure, Quantity, or Vigor

The composition, age structure, and quantity of some upland vegetation has been altered or degraded in areas impacted by boat line dredge piles from the 1930s and 1940s. Some of these upslope areas along Project WSRs would be revegetated with native trees (conifers and hardwoods), shrubs, and grasses. In addition, any areas disturbed by Project activities would be targeted for invasive species removal and would be revegetated with native grasses, forbs, shrubs, and trees, with a goal of reestablishing complex and resilient native plant communities.

5.4.1.2 Relevant Soil Properties Such as Compaction or Percent Bare Ground

Project activities may involve removal of excessive fill material and lowered surface elevations resulting in conversion of uplands to floodplain habitat. Areas with significant soil compaction would be ripped prior to revegetation or seeding. Existing high-quality topsoil would be stockpiled and used in revegetation areas as appropriate. In addition, in upland areas where roads are decommissioned, soils would be decompacted (through soil ripping) as part of the decommissioning.

5.4.1.3 Relevant Hydrologic Properties Such as Drainage Patterns or the Character of Surface and Subsurface Flows

A goal of upland Project activities would be to improve surface and subsurface drainage patterns. Grading plans would be designed to create topographic features that would disperse rather than concentrate overland flows and grading resulting in steep slope angles would be avoided to minimize erosion from the upland areas after site-specific project implementation.

5.4.1.4 Archaeological, Cultural, or Other Identified Significant Resource Values

Surveys for pre-historic and historic resources would occur within and adjacent to the site-specific project areas. Close coordination between Reclamation, USFS, and BLM cultural resource managers would ensure that Project activities would have no adverse effect on historic properties pursuant to Section 106 determination of the National Historic Preservation Act.

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5.5 How Changes in On-Site Conditions Could Alter Existing Hydrologic Processes

5.5.1 Ability of the Channel to Change Course, Reoccupy Former Segments, or Inundate Its Floodplain

Project activities are expected to increase the Project WSRs' ability to evolve into more complex and dynamic channel structures that can access floodplains at a much wider range of flows than under current conditions. Post-project conditions would promote morphological responses to changes in the onsite flow and sediment regime, thus contributing to improved geomorphic function.

5.5.2 Potential Project-Related Changes to Hydrologic Processes

5.5.2.1 Streambank Erosion Potential, Sediment Routing and Deposition, or Debris Loading

A key objective of the TRRP is reestablishing the alluvial processes that existed before the construction of the TRD to the extent possible. Periodic natural fluvial disturbances such as bank erosion, sediment flux, and debris loading, can be essential to a dynamic and high functioning river system. Areas with severe bank erosion/cut banks would be stabilized or reconfigured.

5.5.2.2 The Amount or Timing of Flow in the Channel

The flow regime of the upper reach of the Trinity River is highly influenced by releases from the TRD and Lewiston Dam. Project activities could result in lowered floodplain surfaces, allowing for floodplain inundation to occur on a more frequent basis. Increased surface and subsurface inundation would maintain floodplain habitat important for juvenile fish rearing. Surface flows in the free-flowing Project WSRs would not be negatively affected by Project activities.

5.5.2.3 Existing Flow Patterns, Surface and Subsurface Flow Characteristics

Trinity River flows are highly regulated, particularly under base-flow conditions. Project activities would not change the volume of flow within Project WSRs but would substantially increase floodplain inundation during periods of juvenile fish inhabitation. Where structured log jams (SLJs) and other large wood would be placed on the floodplain, surface flow complexity would increase and immediate refuge habitat would be created for many fish species. Within the vicinity of wood installation, flow variability would increase across all river depths.

5.5.2.4 Floodplain Storage (Detention Storage)

The existing topographic setting of some of the Project WSR floodplains is not conducive to floodplain storage. However, lowering floodplain elevations would increase the hyporheic connection between the river and shallow groundwater and would increase overbank flows and subsurface recharge. This dynamic is expected to improve conditions for opportunistic native riparian plant recruitment and establishment.

5.5.2.5 Aggradation or Degradation of the Channel

Project activities are meant to reestablish geomorphological processes that would enhance opportunities for riverbed aggradation and degradation that emulates natural fluvial processes. Floodplain and in-channel

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restoration activities are intended to jumpstart more natural fluvial processes and provide the Trinity River basin with the means to continue this cycle over time under the TRRP-managed mainstem flow regime.

5.5.3 Estimation of the Magnitude and Spatial Extent of Potential Off-Site Changes

5.5.3.1 Changes That Influence Other Parts of the River System

Project activities are likely to affect areas downstream of the Project WSRs in several ways. The short-term episodic increases in turbidity related to in-channel construction and access activities would be noticeable for periods of time ranging from several hours to several days, though the turbidity levels would be managed as to not exceed water quality permit thresholds. High flows following construction are expected to remobilize floodplain material on depositional features downstream and to increase channel complexity. Over time, large wood structures would degrade and potentially dislodge, becoming a source of large wood to areas downstream. Modification of site-specific hydraulic conditions could affect the channel downstream while the channel adjusts to the new configuration. During this period, alluvial material may mobilize and deposit along downstream reaches.

5.5.3.2 The Range of Circumstances under Which Off-Site Changes Might Occur

During and after site-specific project implementation and after flooding events, increases in turbidity may be visible for several miles downstream of activity areas for short periods of time before dilution and mixing occur. The downstream mobilization of large wood could occur periodically for several years; the distance large wood is mobilized downstream would vary considerably depending on the duration and magnitude of flood events.

5.5.3.3 The Likelihood That Predicted Changes Will Be Realized

The predicted fluvial process changes from implementation of Project activities would likely be realized. Recent TRRP projects intended to restore alluvial processes and benefit anadromous fish habitat in the mainstem Trinity River have achieved the desired restoration objectives that are intended for the Project and therefore, similar outcomes are anticipated for the proposed Project activities.

5.5.3.4 Specify Processes Involved, Such as Water and Sediment, and the Movement of Nutrients

The construction of river meanders and side channels and expansion of inundated floodplain conditions, coupled with placement of large wood and other habitat elements would improve hydraulic conditions, sediment transport (including organic sediment), and nutrient cycling within the Trinity River basin overtime. The Project is expected to have a beneficial effect on the anadromous fishery ORV in both the short- and long-term.

6 Analysis of Effects to Water Quality

6.1 Relevant Water Quality Parameters

Potential chemical contamination effects related to potential fuel and fluid leaks from heavy equipment or contaminated sediment being released with the removal of instream structures. However, the probability of

such an uncontrolled event is low with the implementation of the BMPs provided in Appendix B of the EA under "Avoidance and Minimization Measures."

Project restoration activities involving construction with heavy machinery and earthmoving create the greatest potential for sediment and turbidity concerns. Restoration and Enhancement of In-Channel Habitat; Floodplain Restoration; Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures; Water Conservation Projects; Bioengineered Bank Stabilization; and Road Maintenance, Rehabilitation, and Decommissioning Activities would be those most likely to produce short-term construction-related sedimentation and turbidity impacts. The duration of most turbidity plumes would be limited to hours or days, though large projects may continue to produce turbidity (though gradually declining) for weeks. Actions in other activity categories have minor, if any, construction components. Fish would be exposed to longer-term increases in sediment mobilization caused by Project activities, but several measures would reduce the potential impact of sedimentation. Erosion and sediment control best management practices (BMPs) would be implemented to ensure compliance with the turbidity thresholds specified by the site-specific Section 401 water quality certifications (typically, more than 20 NTUs at 500 feet downstream of in-river construction when background turbidity is less than or equal to 20 NTUs, and more than a 20% increase in turbidity at 500 feet downstream when background is greater than 20 NTUs). If standards are not met, construction activities would cease.

In addition to typical erosion and sediment control BMPs, effective sedimentation/turbidity control measures would be utilized to minimize turbidity impacts during instream construction. These include:

- Structural Containment – Use structures such as earth barriers, K-rail containment dams, and silt curtains to isolate turbid water from the active channel. These structures typically remain in place until the riverine features are fully excavated and graded.
- Pace of Construction – Controlling the pace of in-channel work ensures that sediment input into the water column is consistent with permit requirements. This method requires direct field observations and real-time turbidity construction monitoring.
- Flushing – Within structurally contained areas, turbid water is flushed by allowing flow into the work area and regulating the outflow as a function of measured turbidity levels. Small weirs are used to adjust inflow and outflow rates to ensure that permit requirements are met.
- Channel Bottom Cleaning – This method entails removing silt- and clay-sized sediment from the channel bottom, typically by pumping or hand excavation. Turbid effluent water is pumped upslope to containment ponds or areas that are subsequently incorporated into site-specific restoration efforts.

7 Analysis of Effects to The Outstandingly Remarkable Value: The Anadromous Fishery

The Project WSRs support numerous native and non-native fish and other aquatic organisms. Before installing the TRD, the Trinity River provided habitat for numerous anadromous fish species, including Chinook salmon, coho salmon, steelhead, and Pacific lamprey. Since completion of the TRD, anadromous fish populations have dramatically decreased in abundance, which lead to the establishment of the TRRP for the purpose of restoring

aquatic habitat in an effort to recover anadromous fish populations within the Trinity River. The anadromous fishery is the ORV identified in the Trinity River's 1981 WSR designation.

The Project would enhance or restore stream structure/complexity, stream sinuosity and length, bank stability, floodplain connectivity, and riparian vegetation structure and diversity. These improvements would promote conditions that maintain or decrease stream temperature, reduce turbidity and excessive sediment discharges (via stabilized streambanks, improved sediment retention through floodplain reconnection, and roadway activities), and improve nutrient cycling (via improved riparian, meadow, and wetland conditions as well as salmonid carcass placement). Removing or repairing in-water structures would restore fish passage for spawning, migrating, and rearing fish, and would increase aquatic habitat area. Restoration of riparian vegetative communities would improve or create shade and cover along streambanks in the long-term, which would help maintain water temperatures.

Large wood and boulder placement would enhance habitat elements for migrating and rearing fish. Wood placement tends to result in improvements in physical habitat (e.g., increased pool frequency, cover, and habitat diversity) and positive responses from salmonids. Increased salmon spawning activity in a areas where gravel has accumulated behind large wood has also been observed.

Restoring off-channel habitat, including side channels, would increase adult and juvenile rearing habitat by creating flow refugia. Bioengineered bank stabilization projects would decrease direct sediment inputs into the river and improve riparian conditions would benefit rearing juvenile fish.

In addition, the use of remote site incubation (RSI) systems would supplement tributary streams with anadromous salmonids. The RSI systems also have been shown to improve the survival of these fish compared with more traditional hatchery production.

7.1 Water Temperature

Water temperature is one of the most important variables affecting salmonids and other aquatic organisms (Carter 2005). It influences feeding rates and growth, metabolism, development, the timing of migration, spawning and rearing, and food availability. Since the construction of the TRD, discharges from Lewiston Dam have played an important role in regulating downstream water temperatures in the Trinity River. Depending on the type of water year and time of year, this effect diminishes to varying degrees with distance from Lewiston Dam.

Restoration and enhancement efforts associated with Project activities would improve riparian vegetation communities, particularly through the planting of trees and shrubs, which would increase shade and improve habitat conditions for juvenile salmonids along the margins of the mainstem and tributaries. It is also worth mentioning that invasive plant species management at site-specific project locations is anticipated to be a challenge without herbicide application allowed. Adding channel complexity and restoring flows across the floodplain would increase adult and juvenile salmonid rearing habitat where cooler water temperatures in some off-channel habitats would provide refugia from mainstem temperatures.

7.2 Water Quality

As a result of construction activities, the Project would have short-term sedimentation/turbidity effects as previously discussed. However, in the long-term, the Project would improve suspended sediment conditions in the Trinity River basin as well, which would benefit salmonids. Adding channel roughness, such as boulders, SLJ's, and loose wood placements, would increase the sediment storage capability within Project waterways. One or more of these added instream habitat features could capture tens to hundreds of cubic yards of sediment and wood that would otherwise be lost through annual stream flows in the absence of placed structures. Restoring floodplain connections by decommissioning of roads with removing their associated culverts and cross-drains, paired with floodplain restoration activities, would increase sediment storage within its reconnected floodplain. Studies indicate that road decommissioning would reduce human-caused sediment to streams. One study (Black et al. 2017) noted an 80% reduction in sediment delivery to streams in National Forests in the Pacific Northwest, Northern, and Intermountain Forest Service Regions.

7.3 Aquatic and Riparian Habitat

The purpose of the Project is to improve instream and riparian habitat at a watershed scale and to accelerate the recovery of north coast salmonid populations (coho salmon, steelhead, and Chinook salmon). One of the Project objectives is to restore and improve riparian and meadow habitat associated with the Trinity River in order to promote healthy conditions for aquatic and terrestrial wildlife populations.

Dewatering, heavy equipment use in the channel, removal of riparian vegetation to access sites, grading of floodplain areas, and re-contouring of streambanks would likely result in a temporary reduction of available forage and instream habitat for wildlife. Site-specific Project designs would preserve large riparian trees or reuse them to create instream large wood structures to the extent possible. In some cases, riparian vegetative cover would be reduced or removed, which would result in a temporal reduction of cover and shading, and potentially reduced nutrient cycling and reduced terrestrial invertebrate production on a localized and temporary scale. Displacement of salmonids from preferred habitat may also result in an increased predation risk or reduced feeding efficiency due to the loss of cover (Michney and Hampton 1984; Michney and Deibel 1986). Some of these effects would be short-term and would therefore be negligible for salmonids and other migrating fish. Invertebrates would rapidly recolonize disturbed areas following reintroduction of water (Harvey and White 2008). Riparian plantings and natural recruitment would ensure no net loss of riparian habitat; however, there would be a temporal loss of riparian functions while riparian areas re-establish. The addition of large wood structures would provide immediate cover and shade adjacent to pools and encourage natural sediment build-up next to the wood structures, allowing the bank to fill in and recruit more vegetation for improvement of long-term streambank functions and development of habitat features. Increases in shallow-water habitat at point bars and along floodplains, including side channels and alcoves, would benefit invertebrate production, and increases in point bar surface areas would increase salmon spawning habitat within the boundaries of the rehabilitation sites (Goodman et al. 2012, Beechie et al. 2014). Project activities would ultimately increase floodplain connectivity, facilitate channel migration across floodplains, and improve riparian and aquatic habitat diversity for anadromous salmonids throughout the Project.

The Project would also manage noxious weeds and invasive plant species through control measures, grading, clearing, native revegetation activities, and periodic flooding of newly constructed floodplains. Prevention

measures for invasive plants would include using weed-free erosion control materials and washing equipment, would be implemented at Project sites per erosion and sediment control BMPs.

7.3.1 Geomorphic Condition (Sediment Transport and Substrate Quality)

The geomorphic setting of the Project WSRs is characterized by a subsection of mountains with rounded summits, steep sides, and narrow canyons formed during the Trinity Alps glaciation period, as Quaternary glacial till and outwash occur in many areas. On the western side of the Project activity area, alluvial glacial outwash that impinged on older metavolcanic formations to the east and older ultramafic sea floor deposits to the north (elevations ranging from about 1,500 to 5,000 feet) occurs. Mass wasting and fluvial erosion are the main geomorphic processes that influence conditions in the Project WSRs.

The South Fork Trinity River lies between rugged mountains with deeply incised stream valleys. Logging has historically been part of the economy of this area. A flood in December 1964 caused extensive natural landslides, mostly on the west-side geologic terranes. The resulting sediment input caused widespread channel aggradation, decreased channel complexity, and decreased pool depth and reduced temperature stratification (USFS 2001). As a result, fish populations experienced substantial declines.

Some reaches of the Project WSRs, especially on the mainstem Trinity River, are characterized by a relatively wide alluvial valley bottom, low gradient, low sinuosity, and simple channel geometry. The channel is almost exclusively single thread, with some evidence of riffles, bars, or similar channel bed elements. Dredge tailings piles occupy portions of the floodplain and disrupt surface and subsurface hydrological connections with the river. Hydraulic mining caused significant aggradation, such that depth to bedrock is anticipated to be at least 10 feet or more. Flow velocities increase rapidly with discharge volume and greatly exceed the thresholds deemed to be suitable for rearing salmon (1-2 ft/s) throughout most of the channel.

Massive aggradation during the period dominated by hydraulic mining was followed by large-scale dredge mining of the alluvial valley floor that continued into the 1940s. The channel and associated alluvial features of the Trinity River were dredged extensively and the dredge tailing deposits are evident along the river corridor.

For Project activities that address floodplain connectivity, floodplain soils would be enhanced both by placement of materials during construction and as flows deposit sediment in newly lowered locations. The overall Project effects on river geomorphology would benefit aquatic resources and result in more natural alluvial processes that would increase the size, amount, and complexity of riverine features that support diverse aquatic habitats, as discussed in the EA.

7.3.2 Substrate Quality

Project activities would include amending the floodplain substrate in historically mined areas through sediment and wood augmentation. In addition, enhanced post-project floodplain topography will encourage the deposition of fines from upslope areas and sediment capture in revegetation areas

7.3.3 Nutrient Cycling

At some of the site-specific project sites, large wood and other organic materials would be placed within the channel, along the banks, or on the floodplain. The addition of large wood and other organic materials (chips

and slash) would increase nutrient cycling as aquatic invertebrates, saprotrophic fungi, and detritivores such as bacteria directly consume deadwood. In turn, these organisms will release nutrients by converting them into other forms of organic matter that may then be consumed by other organisms.

7.3.4 Condition of Aquatic Invertebrate, Amphibian, and Mollusk Habitat

Project activities that increase meanders, reconnect channels with the floodplains, and add large wood structures and/or other habitat elements would increase the complexity of habitat available to amphibian and aquatic invertebrate species, including mollusk beds.

7.3.5 Species Composition and Diversity

The Project is expected to increase aquatic species biodiversity and habitat complexity in the watershed. Project activities are intended to benefit fisheries, and these benefits are expected to increase over time. Project activities would:

- Restore and improve instream conditions sufficient to support all life stages of salmonids and other aquatic species.
- Restore upstream and downstream fish passage for all life stages of salmonids.
- Restore continuous paths for wood dispersal, nutrient cycling, sediment transport, and movement of other vegetative material essential for productive aquatic habitat.
- Maintain or restore native plant communities and vegetative structure impacted by invasive plants and pathogens, while rehabilitating eroding streambanks to improve water quality, shade conditions, and large wood recruitment.
- Repair, replace, or remove ineffective instream structures.
- Restore and improve riparian and meadow habitat in order to promote healthy conditions for aquatic and terrestrial wildlife populations.
- Improve late summer/fall base flow conditions through process-based restoration, water conservation improvements, and meadow restoration.

7.4 Fish Species Population Conditions

7.4.1 Anadromous Salmonid Species

The Project is expected to improve anadromous adult fish spawning success in several ways. The Project would enhance or restore stream structure/complexity, stream sinuosity and length, bank stability, floodplain connectivity, and riparian vegetation structure and diversity. These improvements would promote conditions that maintain or decrease stream temperature, reduce turbidity and sediment discharges (via stable streambanks, improved sediment retention through increased channel structure, riparian areas, and floodplains), and improved nutrient input (via improved riparian conditions) and retention (via increased channel structure, sinuosity, and floodplain areas). Removing or repairing in-water structures would restore fish passage for spawning, migrating, and rearing fish and would increase aquatic habitat area. Restoration of riparian vegetative communities would improve shade along streambanks in the long-term, which would help maintain water temperatures. Large wood placement has been shown to improve physical habitat (e.g.,

increased pool frequency, cover, habitat diversity, sediment retention). Restoring off-channel habitat would increase adult and juvenile rearing habitat would provide flow and cold water refugia. Streambank stabilization measures would decrease direct sediment inputs into the stream channel while also using bioengineering techniques, thereby enhancing conditions for rearing juvenile fish (USFS 2019).

7.5 Species Traditionally Used By, and Culturally Important To, Native Americans

The need to restore and maintain the natural production of anadromous fish in the mainstem Trinity River is derived in part from the federal government's trust responsibility to protect the fishery resources of the region's Indian tribes. The Trinity River Basin Fish and Wildlife Restoration Act of 1984 (Public Law 98-541) expressly acknowledges tribal interests in the basin's fishery resources by declaring that the measure of successful restoration of the Trinity River fishery includes the "ability of dependent tribal…fisheries" to participate fully, through enhanced in-river "harvest opportunities, in the benefits of restoration." In addition, the 1992 Central Valley Project Improvement Act (CVPIA) specifically recognizes the federal trust responsibility regarding the Trinity River fishery. The Project would affect anadromous fish, non-anadromous fish, water, wildlife, vegetation, and overall riverine health; these impacts in turn, could affect tribal traditional practices, uses, and economy.

Salmon, steelhead, sturgeon, and lamprey that spawn in the Trinity River and other WSRs pass through the Hoopa Valley and Yurok Reservations and are part of the tribal fishery harvest. The fishing traditions of these tribes stem from practices that pre-date the arrival of non-indigenous people. Accordingly, when the federal government established what are today the Hoopa Valley and Yurok Indian Reservations on the Trinity and lower Klamath Rivers, it reserved tribal fishing rights. The Yurok and Hoopa Valley tribes' federally reserved fishing rights entitle them to take fish for ceremonial, subsistence, and commercial purposes from the rivers that flow through the reservations.

While the focus of the legal history surrounding indigenous rights to resources has concentrated on water and fisheries, other resources, such as wildlife and vegetation, are also extremely important to the tribes, and the tribes have assessed that these resources are no less reserved. In the case of the Hoopa Valley and Yurok tribes, the decline in the health of the region's rivers has limited the availability of grasses and other plants important to traditional knowledge and practices including basketry, art, and medicine. Thus, while anadromous fish are the focus of the Project, other trust assets, such as vegetation, are embodied in the federal government's trust responsibility and, accordingly, need to be considered in the decision-making process. Table 7.17-1 of TRRP's Master EIR/EA (Regional Water Board and Reclamation 2009) lists 10 aquatic resources (fish species) and 12 terrestrial resources (e.g., willows, cottonwoods, wild grape, bulrush) that are considered trust assets protected on behalf of the Tribes of the Klamath/Trinity Region. These species would generally benefit from restoring historic floodplain functions as the Project is intended to do.

Implementation of the Project activities would continue to support tribal trust assets. The short-term impacts described in sections of the EA pertaining to water quality and hydrology, geology and soils, vegetation and wetlands, fisheries, wildlife, and climate would occur where site-specific projects are implemented. These impacts are expected to be short-term and outweighed by the overall benefits to tribal trust assets gained through the implementation of Project.

8 Time Frame Over Which Effects Are Likely to Occur

The proposed Project is expected to begin achieving, to some degree, the site-specific objectives immediately following completion of activities and would continue to provide ecosystem and habitat benefits within the Trinity River basin well into the future. Removing fish barriers and restoring fish passage, incorporating large wood into the channel and riparian areas, and stabilizing upslope areas around road infrastructure would have immediate benefits. During implementation of instream Project activities, insignificant amounts of turbidity are expected to occur due to removal and placement of material, instream structures, and habitat elements. These effects are expected to be temporary and would generally be confined to the area within and adjacent to the site-specific project locations. In areas where invasive plant species would be removed and/or native revegetation is implemented, there would be temporal effects of 1 to 5 years before native vegetation is successfully established. Following bank stabilization projects, sediment discharges as a result of eroding bank would decrease. Restoration of aquatic, riparian, wetland, and meadow habitat would also provide long-term benefits within the watershed that would last for many years into the future.

9 Comparison of Project Analyses To Management Goals

BLM's RFO manages federal lands in the Trinity River Basin in accordance with its 2024 Northwest California Integrated Resource Management Plan (NCIP) and Record of Decision (ROD, BLM 2024). The NCIP discusses the general condition of natural and cultural resources in the plan area and prescribes appropriate land use management for BLM-administered lands. The Trinity River from Lewiston Dam to Weitchpec is federally designated as a WSR (recreational designation) for its fisheries and recreational values. BLM is the federal river manager from the Lewiston Dam to the North Fork Trinity River (Section 2.5.3.3 of the NCIP). As part of its decision-making process, BLM must evaluate the consistency of the Proposed Action with the 2024 NCIP.

In addition to the BLM's NCIP, the Wild and Scenic River Implementation Guide of July 31, 1996, cites the following pertinent (paraphrased) goals, both of which are met by implementation of the Project's activities:

- Protect the river's free-flowing character and protect or enhance its ORVs, and
- Maintain or improve water quality and quantity to meet fish habitat requirements.

The STNF manages federal lands within the Trinity River basin in accordance with the 1994 Land and Resource Management Plan (Forest Plan). The management activities described in the Forest Plan for WSR are directed towards the enhancement of anadromous fisheries and recreational opportunities. The South Fork Trinity River is the only segment to have its' own WSR management plan in the Trinity River Basin. The pertinent (paraphrased) goals of the South Fork Trinity River WSR Management Plan are to maintain and enhance anadromous fisheries habitat, maintain and enhance other values of the river, support recreational opportunities, and adequately monitor and document impacts to the river to protect the ORV.

10 Summary of Effects to WSR Values

Table 4 and Table 5 below outline the indicators and the effects to free-flowing condition, water quality, and the anadromous fisheries ORV that underscores the WSRA designations in the Project activity area.

Table 4. Summary of effects to Wild and Scenic River values for the Proposed Action alternative versus No Action alternative.

Values	Indicator or Measure	Proposed Action	No Action
Free Flowing Conditions	Obstruction or modifications to free-flowing river conditions.	Changes to the WSRs' existing form and functions within and, to varying degrees downstream of project sites would occur by restoring and improving floodplain habitat, increasing channel complexity, reestablish self-sustaining riparian vegetation, and removing instream structures. Direct and indirect effects will vary by project. (A more thorough list of the effects of the Proposed Action to the free-flowing conditions is available in Table 5.)	Natural tree mortality due to drought, disease, or wildfire may occur and introduce large wood and sediment into the systems.
Water Quality	Effects to stream sediment, temperature, and beneficial uses.	Projects utilizing heavy machinery and earthmoving have the potential for chemical contamination and sediment turbidity concerns to varying degrees downstream of project sites. Best management practices for spills and sediment control will be in place and maintain turbidity to the site-specific Section 401 water quality certifications to limit contributions to short term impacts. Stream temperature may increase briefly if riparian vegetation is removed and replanted during a project, but projects would support long-term cooler water temperatures. Project designs may improve and decommission roads contributing sediment into the designated and eligible WSR river segments and/or improve late summer/fall base flow conditions through process-based restoration, water conservation improvements, and meadow restoration. Direct and indirect effects will vary by project. (A more thorough list of the effects of the Proposed Action to the water quality is available in Table 5.)	Natural contributions of sediment will continue, climate change may contribute to increasing stream temperatures, and sediment from access roads and roads alongside river segments may contribute sediment. Stream diversions will continue without application of voluntary conservation strategies.
Outstandingly Remarkable Value: Anadromous Fishery	Effects to the values determined to meet the criteria as an ORV (fisheries).	Short-term contributions to turbidity and potential increase in water temperature. Long-term benefit to aquatic and riparian habitats, improved floodplain connectivity, bank stability, restoration of native plant communities, stream sinuosity and length, and repair, replace or remove ineffective instream structures overall enhancing the structure and quality of fisheries habitat for adults and juveniles. Direct and indirect effects will vary by project. (A more thorough list of the effects of the Proposed Action to the ORV is available in Table 5.)	Natural contributions of sediment will continue, stream segments will continue to be large wood limited, stream channelization will persist promoting warm water temperatures and limiting juvenile rearing habitat.

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Table 5. Summary of effects to WSR values. The magnitude and exact duration of effects to WSR would be based on site-specific project location and design guidelines.

Project Activity	Free-flowing Condition	Water Quality	Outstandingly Remarkable Value (Anadromous Fisheries)
Restoration and Enhancement of In-Channel Habitat	**Short-term Effects:** The activity may result in short-term manipulation and adjustment of the active channel, channel geometry, channel slope, and channel morphology during the short window of site-specific project implementation. **Long-term Effects**: The activity is expected to improve of the function and complexity of active channel, channel geometry, channel slope, and channel morphology after implementation. Navigation of the river would be maintained throughout project implementation and post-implementation maintenance.	**Short-term Effects:** The activity may temporarily degrade water quality during implementation and BMPs will be utilized for sediment and erosion control and potential chemical due to fuel or fluid leaks form heavy equipment use. **Long-term Effects:** The activity is expected to improve channel stability and re-established native vegetation that supports improved water quality during storm events by slowing and filtering sediment from the flow. Restoring a more natural sediment contribution regime.	**Short-term Effects:** The activity may temporarily degrade the opportunity or experience of anadromous recreational fishing and fish may avoid project site during construction. Project-level ESA consultation for anadromous fish, along with the incorporation of BMPs, will minimize potential for take during project construction and support the recovery of salmonid populations. **Long-term Effects:** The activity is expected to improve anadromous fish instream and side channel habitat promoting adult spawning and juvenile rearing habitat, which would increase run sizes and opportunity for recreational and tribal fishing.

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Project Activity	Free-flowing Condition	Water Quality	Outstandingly Remarkable Value (Anadromous Fisheries)
Floodplain Restoration	**Short-term Effects:** The activity may alter the active channel, channel geometry, channel slope, and channel morphology during the short window of project implementation. Vegetation within the riparian corridor may be removed during the project preparation and replanted for reestablishment to take 5-10 years. Navigation of the river will be maintained through project implementation and any post-implementation maintenance. **Long-term Effects**: The activity is expected to improve the function and complexity of active channel, channel geometry, channel slope, and channel morphology after implementation. Beaver dam analogues may be installed to store and redirect water throughout the floodplain to increase inundation. Levee adjustment projects are expected to result in larger area for free flow of the river segments.	**Short-term Effects:** The activity may affect water quality during implementation and BMPS will be utilized for sediment and erosion control during implementation. Potential chemical contamination may occur due to fuel or fluid leaks form heavy equipment use. The activity may cause increases in turbidity during storm events at and below the project site. **Long-term Effects**: The activity is expected to improve channel stability and reestablished vegetation is likely to support improved water quality during storm events by slowing and filtering sediment from the flow. Restoring a more natural sediment aggradation and deposition regime.	**Long-term Effects**: Increased floodplain and side-channel inundation may expand recreational fishing opportunities. The activity is expected to improve anadromous fish instream and side channel habitat promoting adult spawning and juvenile rearing habitat which is likely to increase run sizes and opportunity for recreational and tribal fishing.

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Project Activity	Free-flowing Condition	Water Quality	Outstandingly Remarkable Value (Anadromous Fisheries)
Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gages, Pilings, and Other In-water Structures	**Short-term Effects:** The activity may require limited windows of dewatering to remove barriers. The activity may promote increased sinuosity and habitat complexity above barriers and small dams. **Long-term Effects**: The activity is expected to improve free flow and navigation of the river by removing barriers and in-water structures.	**Short-term Effects:** The activity may degrade water quality during implementation and BMPs will be utilized for sediment, contamination, and turbidity control during implementation. Sediment and loose natural debris trapped behind structures may mobilize in storm events after removal. **Long-term Effects**: The activity is expected to improve freshwater circulation providing cooler water and increased flow volume during dry season therefore providing improved water quality.	**Short-term Effects:** Barrier removal may require limited windows of dewatering to remove barriers. Hydroacoustic blasting may cause project site avoidance decreasing the recreational fishing opportunity during deconstruction. **Long-term Effects**: Fish passage to upper watershed reaches activity is expected to be restored and support access to additional habitat. Non-native predatory fish and other non-native fish may be opportunistically removed during dewatering to promote native fish populations.
Water Conservation Projects	**Short-term Effects:** The activity may change stream bed morphology or geometry to remove existing instream infrastructure and replace with new infrastructure. **Long-term Effects:** The activity is expected to improve existing diversions or utilize forbearance techniques to increase flow in the dry season.	**Long-term Effects**: The activity is expected to improve existing diversions or utilize forbearance techniques to increase flow volume in the dry season.	**Long-term Effects**: The activity is expected to improve dry season flows improving quality of and increasing accessibility to habitat for juvenile and adult salmonids. The activity is expected to expand juvenile and adult habitat in tributary reaches supporting diversification of habited reaches to support increased populations and fishing opportunities.

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Project Activity	Free-flowing Condition	Water Quality	Outstandingly Remarkable Value (Anadromous Fisheries)
Salmon Carcass Placement	**Short-term Effects:** The activity may place salmon carcasses or analogs within the wetted edge of the river. The action is very unlikely to cause any change to the channel morphology nor impede flow or navigation.	**Short-term Effects:** The activity may improve nutrient availability within the water column and promote algae and macroinvertebrate productivity.	**Short-term Effect:** The activity may improve food availability for juvenile salmonids within the tributaries to support larger size during outmigration. **Long-term Effects**: The activity is expected to support increased salmonid run size and increase opportunity for tribal and recreational fishing.
Remote Site Incubators (RSIs)	**Short-term Effects:** The activity may temporarily divert a small volume of water from the tributary through the RSIs to rear the eggs in off channel basins.	**Long-term Effects**: The activity may support the return of adult salmon into underperforming tributaries generating carcasses to support healthier nutrient cycles and improve the water quality.	**Short-term Effects:** The activity may increase juvenile salmonid outmigration in underperforming tributaries. **Long-term Effects**: The activity is expected to increase adult salmonid returns to the Trinity River Basin and increase the opportunity for tribal and recreational fishing.
Bio-engineered Bank Stabilization	**Long-term Effects**: The activity alters the channel morphology and geometry with natural materials. Natural materials may increase roughness and create variability to direction and rate of flow. The activity may improve bank stability and natural recruitment of large wood in the rivers.	**Short-term Effects:** The activity may degrade water quality during construction. BMPs will be utilized to minimize effects. **Long-term Effects**: The activity would introduce biodegradable materials which may increase nutrient availability for algae and macroinvertebrate populations. The activity may reduce site specific sediment contribution.	**Long-term Effects**: The activity may diversify habitat and rate of flow promoting pockets of juvenile habitat and nutrient release for macroinvertebrate and algae productivity improving juvenile salmonid food resources. The activity may create eddies providing slow holding water and potentially create new recreational fishing opportunities.

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Project Activity	Free-flowing Condition	Water Quality	Outstandingly Remarkable Value (Anadromous Fisheries)
Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement	**Long-term Effects**: The activity is expected to increase native vegetation inundated during high and storm flows. This activity may support natural channel migration and change diversifying morphology, geometry, and channel composition.	**Short-term Effects:** The activity may degrade water turbidity and increase sediment contributions in the first few years after implementation during high flows. **Long-term Effects**: Once the native vegetation has been reestablished, during high flow events the inundated vegetation is expected to slow the rate of flow and collect fine sediments on the floodplain and create pockets of shade.	**Long-term Effects**: The removal of nonnative invasive species may increase suitable foraging habitat in the floodplains during high flows. The activity constructs a healthier riparian habitat which can contribute to more natural nutrient cycling to produce food resources and additional foraging habitat for juvenile salmonids. This activity is expected to support creation of side channel habitat for juvenile rearing or adult spawning.
Road Maintenance	**Short-term Effects:** This activity may prevent stream channel erosion and improve free flow of water from headwaters to mainstem river segments.	**Long-term Effects**: This activity is expected to reduce sediment contributions.	**Long-term Effects**: This action may improve accessibility for recreational fishing opportunities. This activity is expected to improve accessibility for instream restoration activities to improve instream adult and juvenile habitat.

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Project Activity	Free-flowing Condition	Water Quality	Outstandingly Remarkable Value (Anadromous Fisheries)
Road Rehabilitation	**Short-term Effects:** This activity may require flow to be redirected during site-specific project construction. **Long-term Effects**: This activity is expected to improve stream crossings by upgrading culverts or installing bridges which may improve the free-flowing nature in those project areas or may install new piles or structures within the stream channel degrading the free-flowing nature of a project site.	**Short-term Effects:** This activity may increase sediment contribution and turbidity during and after construction. Sediment and loose natural debris may mobilize in storm events after construction. BMPs will be utilized for sediment, contamination, and turbidity control during and after construction. **Long-term Effects**: The activity is expected to upgrade water crossings, culverts, and bridges that may reduce the potential for failure and support a more natural sediment contribution regime.	**Short-term Effects:** This action may require limited windows of dewatering. **Long-term Effects:** Fish passage to upper watershed reaches may be improved or restored and support access to additional habitat. Non-native predatory fish and other non-native fish may be opportunistically removed during dewatering to promote native fish populations. This activity is expected to improve accessibility for instream restoration activities to improve instream adult and juvenile habitat.
Road Decom-missioning	**Short-term Effects:** This activity may require flow to be redirected during project construction. **Long-term Effects**: This activity is expected to remove infrastructure that may limit the free flow of water and support natural evolution of channel formation and migration.	**Short-term Effects:** This activity may increase sediment contribution and turbidity during and after construction. Sediment and loose natural debris may mobilize in storm events after construction. BMPs will be utilized for sediment, contamination, and turbidity control during and after construction. **Long-term Effects**: This activity is expected to remove stream crossing infrastructure which may improve groundwater connectivity, floodplain inundation, support cooler water temperatures, and promote a more natural sediment contribution regime.	**Short-term Effects:** This action may require limited windows of dewatering. **Long-term Effects**: Fish passage to upper watershed reaches is expected to be restored and would support access to additional habitat. Non-native predatory fish and other non-native fish may be opportunistically removed during dewatering to promote native fish populations.

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11 WSRA Section 7 Determination

The Project consists of a suite of habitat restoration projects located throughout the Trinity River basin and more specifically, within rivers designated as WSRs. An EA was prepared, led by TRRP with BLM and USFS as cooperators, and includes the above analysis of the Project's consistency with the WSRA.

Based on the findings of this analysis and considering the direction established by the BLM's NCIP, there would be an overall beneficial effect to free-flowing conditions, water quality, and the anadromous fisheries ORV. BMPs, design guidelines, and conservation measures described in both TRRP's 2020 NMFS Biological Opinion (NMFS 2020) and USFWS' 2022 Statewide Restoration Biological Opinion (USFWS 2022) would be employed for all site-specific restoration projects using the EA for NEPA coverage. These are included in Appendix B of the EA.

The overall purpose of the Project is to improve instream and riparian habitat to accelerate the recovery of north coast salmonid populations (coho salmon, steelhead, and Chinook salmon) and other special status aquatic species, thereby fulfilling tribal trust responsibilities and obligations to local communities as well as recreational and commercial fishing industries (per the STNF LRMP, BLM's RMP, and state and federal recovery plan goals.

Implementation of the Project provides a net positive effect of protecting and enhancing river values by restoring the Project WSR's natural characteristics, including free-flowing conditions with improved floodplain accessibility, and improved habitat quality for fish and other aquatic organisms. We have determined that there would be an overall beneficial effect to the river's free-flowing condition, water quality, and anadromous fishery ORV.

Jennifer Mata — Date
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Bureau of Land Management

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Appendix G: Pubic Scoping and Participation Materials

Public Draft

1 Introduction

On November 4, 2022, Bureau of Reclamation's (Reclamation) Trinity River Restoration Program (TRRP or Program), Shasta-Trinity National Forest (Forest), and Bureau of Land Management's (BLM) Redding Field Office released a public scoping announcement to request input from the public on the proposed Watershed Restoration Project. The public scoping period was open from November 4 to December 5, 2022, and the public was invited to provide comments by mail or email to TRRP staff.

At the onset of the public scoping period, notices informing the public of the intent to begin the environmental review process were posted on the TRRP, Reclamation, Forest, and BLM websites and at the TRRP Weaverville office, BLM Redding Field Office, and Forest Field Office. Scoping notices were also mailed and emailed to local landowners and interest groups and published in the Trinity Journal on November 16, 2022.

The TRRP, Forest, and BLM provided the scoping flyer on its websites to outline the proposed watershed restoration project and to receive public input. The Scoping flyer is provided below.

The TRRP, BLM, and Forest hosted a virtual and in-person scoping meeting on November 17, 2022, to outline the Trinity River Watershed Restoration Project (Project), receive public input, and to answer questions. During the meeting, the public asked questions and provided input. Presentation slides and a recording of the November 17, 2022 scoping meeting are available online at https://www.trrp.net/calendar/event/?id=11759. This appendix includes the scoping notice, scoping meeting agenda, and results of the public scoping phase of the Project Environmental Assessment (EA).

The scoping notice and agenda, which are included at the end of this report, were provided to the public either on the agencies' websites or at the November 17, 2022, public meeting.

2 Scoping Results

During public scoping for this project, TRRP received eight comment submissions (three emails and five letters) from eight different individuals or groups, of which three were anonymous. During the public meeting, six members of the public attended either in-person or virtually with some verbal comments provided. The verbal comments and written submissions were read and/or considered for substantive comments about the proposed project. Letters or comments that merely expressed support for the project were appreciated but were not considered substantive. Scoping comments were reviewed and categorized by principal issue of concern (topics).

Thirteen topics were identified across the comments:

1. Concern for the lower Trinity River and the South Fork of the Trinity River
2. Cultural Resources
3. Cumulative effects
4. Fisheries
5. Land Use
6. Public and agency input and outreach
7. Recreation

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8. Requested specific information to be in the EA
9. Requested additional information about the project
10. Special status species
11. Tribal consultation
12. Vegetation (in general, riparian habitat, and wildfire effects)
13. Wildlife

Comment topics and corresponding comments for each individual or group of commenters as well as where the comment topic is addressed in the EA are summarized in Table G-1.

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Table G-1. Summary of scoping comments by individual commenters.

Commenter(s) and/or Organization	Comment Topic	Specific Comment or Question	Response
Anonymous	Livestock grazing	I enthusiastically support all efforts to restore ecological systems and processes and make them more resilient to climate change and drought. Because riparian habitats are especially sensitive to cattle grazing. I hope that cattle will be excluded from these habitats. I also hope that any harmful dredging for gold in the river will be prohibited.	Thank you for your comment. Livestock grazing and mining activities are addressed either in the proposed action and project design features, along with the applicable land management plans. See Table 5-1 of the EA for more information about resources eliminated from analysis.
Anonymous	Climate Change and livestock grazing	Please carefully review the attachments that describe the climate change related and other adverse impacts from public lands livestock grazing.	Climate change is analyzed in Section 5.7 of the EA. Livestock grazing and mining activities are addressed either in the proposed action and project design features, along with the applicable land management plans. See Table 5-1 of the EA for more information about resources eliminated from analysis.
Anonymous	Livestock grazing	I hope that BLM won't work at cross purposes by restoring habitats while simultaneously allowing livestock grazing to harm those same habitats. I commend BLM for this worthwhile proposed project, and I wish BLM much success with it.	Livestock grazing and mining activities are addressed either in the proposed action and project design features, along with the applicable land management plans. See Table 5-1 of the EA for more information about resources eliminated from analysis.
Baker, Kimberly (EPIC - Environmental Protection Information Center) and Glass, Larry (SAFE Alternative for our Forest Environment	Cultural resources	Decision makers must have regular, meaningful and robust consultation with all affected Tribes. Please see this January 26, 2021, Memorandum concerning Tribal Consultation and Strengthening Nation-to-Nation Relationships.	Tribal consultation will occur in accordance with all applicable laws, regulations, and policies.

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Commenter(s) and/or Organization	Comment Topic	Specific Comment or Question	Response
Baker, Kimberly (EPIC - Environmental Protection Information Center) and Glass, Larry (SAFE Alternative for our Forest Environment (continued)	Cumulative effects	How will the cumulative effects from other, past, present and future projects on private, public and Tribally managed lands be considered and analyzed for each individual project carried out under the EA? How will the public and decision makers be made aware of the cumulative effects analysis? Please provide this information in the EA.	Tribal land is not included in the project area. Cumulative effects are analyzed in Section 6 of the EA.
	Land Use	The Northwest Forest Plan and with Shasta-Trinity Land Resource Management Plan (LRMP) standards and guidelines must be followed. There are multiple animal and plant species, management areas and assessments that must be considered, analyzed and incorporated into each individual project proposed under the EA. For instance, Watershed Analyses, Late Successional Reserve (LSR) Assessments include recommendations that must guide project planning within the Shasta-Trinity National Forest. Please describe how each project will address these requirements.	See Appendix D of the EA for a discussion of all applicable laws and regulations that the proposed project is subject.
	Request for specific information in the EA	The programmatic approach apEArs to be all encompassing and without limits, which is problematic in impaired watersheds that are vital to the survival of imperiled species. Please provide specific targets and limits, in acres, miles or number of projects on a yearly basis. We urge the Restoration Program to include prioritized areas and site specific goals in the EA. Please provide some explicit spatial and temporal boundaries to greatly decrease the level of uncertainty and risk overall.	See Section 4 for a full description of the activities including limits and requirements; and Appendix B for all environmental commitments (ECs) to which projects are subject.
	Request for specific information in the EA	Please detail how the timing of treatments would be incorporating into project planning. Each plant and animal species has unique life cycle. To add to the uncertainty of risk, climatic shifts will bring changing weather patterns. Please describe how these factors will be considered and mitigated.	See Section 4 for a full description of the activities including timing of activities; and Appendix B for all environmental commitments (ECs) to which projects are subject.
	Request for specific information in the EA	The EA should describe how these considerations would be documented and shared with the public prior to any decision under the EA. How will Tier 1 key watersheds and the Watershed Condition Framework influence project prioritization? How will each project be documented to attain the Aquatic Conservation Strategy (ACS) objectives? We are concerned that the broad programmatic approach would overlook these necessities.	See Appendix A of the EA for a detailed discussion about implementation of specific projects; and Appendix D for a discussion of all applicable laws and regulations that the proposed project is subject.

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Commenter(s) and/or Organization	Comment Topic	Specific Comment or Question	Response
Alternative for our Forest Environment	Request for specific information in the EA	The forthcoming EA should include real data and examples of past monitoring and reporting efforts. Where can the public access this information? How has the program learned from past studies, projects and monitoring efforts within the watersheds? What worked well? What did not? What were the impacts and effects to fish and water quality? What is the level of work the program has accomplished? Please provide some specific examples. These learned experiences and monitoring studies should inform the EA.	See Section 5 of the EA and Appendices I through M for detailed analysis of resources considered and analyzed in the EA for adverse and beneficial impacts from restoration.
	Request for specific information in the EA	Please also include monitoring, documentation and reporting requirements for project authorized under this EA.	See Appendix A of the EA for a detailed discussion about implementation of specific projects.
	Request for specific information in the EA	Given the widespread level of uncertainty there must be real data to inform the EA and to meet NEPA's "hard look" requirement. Please provide this necessary information in the EA and describe what monitoring, documenting and reporting efforts will be included in each individual project under the EA.	See Appendix A of the EA for a detailed discussion about implementation of specific projects.
	Request for specific information in the EA	In summary, given the level of significant issues, the uncertainty and level of risk, we request that the EA: Provide some explicit spatial and temporal boundaries, Explain how the cumulative effects from other projects will be considered, Detail how the timing of treatments would be incorporating into project planning, Describe how each project will address Northwest Forest Plan and LRMP standards and guidelines, Describe how each project will incorporate Watershed Analyses, LSR Assessments and Recovery Plans, Drop road construction, any commercial logging and the use of heavy equipment in Riparian Reserves for fuels reduction from the project proposal, Provide limitations for road maintenance, Include substantive data and examples of past monitoring, studies and reporting efforts, Include monitoring and reporting requirements for projects under the EA, Provide real data to meet NEPA's "hard look" requirement, Include robust and meaningful consultation with all affected Tribes, Guarantee that invasive species will not be spread and Provide details on the site-specific authorization and public notice and participation process.	See Section 4 for a full description of the activities including limits and requirements; and Appendix B for all environmental commitments (ECs) to which projects are subject. See Appendix A of the EA for a detailed discussion about implementation of specific projects.

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Commenter(s) and/or Organization	Comment Topic	Specific Comment or Question	Response
Alternative for our Forest Environment (continued)	Requests additional information	Please provide a detailed description of when, why and how future decisions will be released and what the timing of the public notice and participation process will be, not just for future decisions but also for any site-specific project authorized under this EA.	See Appendix A of the EA for a detailed discussion about implementation of specific projects.
	Special status species	The scoping notice references the 2020 NMFS biological opinion (BO), which was issued to comply with Section 7 of the Endangered Species Act, for restoration and rehabilitation activities along the mainstem Trinity River and its tributaries primarily for the federally listed SONCC coho salmon. The BO states, "The TRRP will monitor and report on projects implemented under the TRRP Programmatic BO for TRRP-funded projects and for restoration projects in the action area (i.e., Trinity River watershed for restoration projects and Trinity River watershed and the Lower Klamath River watershed for monitoring and research) that the TRRP adopts into the TRRP Programmatic BO. TRRP will be responsible for collating all the monitoring and reporting to NMFS." The BO referenced five different studies to monitor restoration effectiveness. The requirement of tracking and reporting to NMFS was also included in the BO.	TRRP tracks projects that are completed under the 2020 BiOp and reports to NMFS on an annual basis for compliance under Section 7 of the ESA. See Section 4 for a full description of the activities including limits and requirements; and Appendix B for all environmental commitments (ECs) to which projects are subject. See Appendix D for a discussion of all applicable laws and regulations that the proposed project is subject.
	Vegetation	Our members have brought to our attention that past projects on the Trinity River, implemented by/for the TRRP have actually increased the spread of invasive plant species. We are very concerned that soil and ground disturbance provides the optimal opportunity for invasive plant species to flourish. Because the removal and treatment of invasive species is one of the restoration activities proposed, the EA should detail how invasive plants would be removed and what monitoring will be included to ensure that treatments are not causing the spread of this very real threat.	See Section 5.4 and Appendix J for a detailed discussion of the proposed project on the spread of noxious weeds.

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Commenter(s) and/or Organization	Comment Topic	Specific Comment or Question	Response
Alternative for our Forest Environment (continued)	Vegetation (riparian habitat)	While our organizations support the purpose and need of the project we have concerns regarding the scope, scale, significant issues and uncertainty of affects, which should be addressed in the project analysis. Riparian Reserves are some of the most fragile and sensitive ecosystems that serve multiple functions vital to all life in these river environments. While restoration from the decades of abuse is important, it is also important that the project does not cause undue stress and more harm. Additional decisions, public participation, site-specific surveys, monitoring, documentation and reporting as well as consultation with associated agencies and Tribes prior to implementation must occur and should be detailed in the forthcoming project analysis and decision.	See Section 5.4 and Appendix J for a detailed discussion of the proposed project on the Riparian Reserves. See Appendix A of the EA for a detailed discussion about implementation of specific projects and Appendix B for all environmental commitments (ECs) to which projects are subject.
	Water quality and fisheries	What water quality and fisheries efforts are currently happening in these watersheds? What water quality and fisheries efforts will be included for treatments and projects carried out under the EA? How are TMDL targets and restrictions being measured and documented? How will this information be included and incorporated into the EA?	See Section 5.4 and Appendix J for a detailed discussion of the proposed project on wetlands and Section 5.2 and Appendix I for water quality.

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Commenter(s) and/or Organization	Comment Topic	Specific Comment or Question	Response
Alternative for our Forest Environment (continued)	Land use and vegetation (riparian habitat)	The scoping notice references the Six Rivers Aquatic Programmatic EA. We would like to point out that this effort specifically excluded road maintenance and construction and authorized the utilization of existing roads only. The creation of roads, especially within Riparian Reserves is contrary to multiple ACS objectives and could have long-term detrimental effects to soil porosity and riparian ecosystem function. Roads are the largest contributor of sediment to our streams and rivers. Road construction, commercial logging and the use of heavy equipment for "fuels reduction" are both publicly and scientifically controversial. These activities increase the risk and uncertainty of effect and elevate the need for an individualized NEPA process and separate environmental analysis. Please clarify that the EA is not intended for commercial logging. We urge project planners to drop road construction and the use of heavy equipment in Riparian Reserves for fuels reduction from the project proposal. Further, without some scope and scale associated for the EA the level of "road maintenance" is also concerning. The agencies already have Categorical Exclusions for road maintenance; therefore the EA should drop road maintenance or provide a particular amount or level of treating roads.	See Section 4 for a full description of the activities including limits and requirements; and Appendix B for all environmental commitments (ECs) to which projects are subject.
Boggs, Denise (Conservation Congress)	Cumulative effects	We encourage the agencies to be honest and to disclose indirect, direct and cumulative impacts. As the scoping notice stated, climate change may make it impossible to attain some of the goals of this project, and if logging, grazing, and road construction aren't addressed, they will also limit the success of this project.	See Section 5 and 6 of the EA for a discussion of all impacts; and Appendices I through M for detailed analysis of resources considered and analyzed in the EA for adverse and beneficial impacts from restoration.

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Commenter(s) and/or Organization	Comment Topic	Specific Comment or Question	Response
Boggs, Denise (Conservation Congress) (continued)	Land use	While it is admirable for the agencies to want to improve aquatic habitat to support recovery of diminished salmon and steelhead populations, the program will not be successful if the agencies refuse to address what is exacerbating these problems. While the Trinity and Lewiston dams initially caused many problems; timber harvesting, livestock grazing, and road construction compound existing problems. The EA should look at land management activities that are interfering with the potential success of this program, and make recommendations to remedy them. Agencies have the authority to avoid areas for logging, grazing and road construction to aid in the recovery of listed species. We encourage them to do so.	See Section 5 and 6 of the EA for a discussion of all impacts; and Appendices I through M for detailed analysis of resources considered and analyzed in the EA for adverse and beneficial impacts from restoration.
	Land use	We are also concerned about any dewatering of streams that may be occurring due to marijuana plantations on public lands. These areas should be mapped, the authorities notified, and the plantations destroyed.	See Sections 5 and 6; and Appendices I through M for detailed analysis of resources considered and analyzed in the EA for adverse and beneficial impacts from restoration.
	Special status species	In addition, we are concerned about the removal of any late-successional habitat in or near riparian areas that may be used by Northern Spotted Owls or fishers. We recommend surveys be conducted before removal of any of this habitat.	See Sections 5.5, 5.5, and 5.6 and Appendices J, K, and L for discussions of impacts to vegetation and sensitive species.
Burr, Ben (Blue Ribbon Coalition)	Land Use and Vegetation (wildfire effects)	Wilderness and areas with restrictive management without many anthropogenic disturbances are not conducive to wildlife vitality. Wilderness already makes up a large portion of the area. BRC strongly encourages any plan revisions to strongly consider removing any wilderness characteristic areas and pursue forest fire mitigation projects that will ultimately help protect the species.	See Appendix F for a detailed discussion about Wilderness impacts; and See Sections 5.5, 5.5, and 5.6 and Appendices J, K, and L for discussions of impacts to vegetation and wildlife.
	Recreation	We would like to add our support to any comment submitted by any other individuals or organizations that advocate for motorized use and increased recreation access overall. BRC members and supporters have concrete, definite, and immediate plans to continue such activities in the future.	See Table 5-1 of the EA for more information about resources eliminated from analysis.

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Commenter(s) and/or Organization	Comment Topic	Specific Comment or Question	Response
Burr, Ben (Blue Ribbon Coalition) (continued)	Recreation and socioeconomics	Local communities rely on recreation for economic opportunities. There has been a surge of use throughout the nation on public lands as well as in the Trinity River area. Local groups have worked hard to put the area on the map so that they could reap the economic benefits. Closing any roads or areas to recreation even temporarily does hinder economic opportunity and the agencies should be sensitive to this.	See Table 5-1 of the EA for more information about resources eliminated from analysis and Section 4 for description of the proposed activities.
	Vegetation (wildfire effects)	BRC supports the broad project objectives to keep public lands and watersheds healthy and reduce the risk of wildland fires. We recommend using commercial treatment in the maximum amount of land possible. Best available science should be used in making these decisions. Past wildfires that have burned rampant because of the lack of maintenance and vegetation projects should be looked at when making these decisions. The removal of hazardous trees and fuel loading will benefit the overall future of these public lands. Wildfire is a large cause of warming temperatures that are affecting waters in California therefore land agencies must do all they can to prevent these large wildfires.	See Table 5-1 of the EA for more information about resources eliminated from analysis and Section 4 for description of the proposed activities and Section 5 for a discussion of resource impacts including climate change.
	Vegetation (wildfire effects), wildlife, land use	Habitat loss is the largest threat to wildlife and wildfire is the largest threat to habitat loss. One wildfire could cause an entire species to go extinct. We support the agencies in properly managing these lands to prevent wildfires that could cause harm to wildlife. However, many conservation groups actively litigate projects that help mitigate fires. One of the best things that can be done to protect wildlife and habitat is to actively manage vegetation to prevent wildfires. In order to adequately manage these areas, roads are a critical component. Roads not only provide access to carry-out management projects but also act as a natural fire barrier.	See Table 5-1 of the EA for more information about resources eliminated from analysis and Section 4 for description of the proposed activities and Section 5 for a discussion of resource impacts including wildfire.
Magdaleno, Dena (Elder - Tsnugwe Council)	Concerned about the lower Trinity River and the South Fork of the Trinity River and special status species	Finally, we live in western Trinity County; our people live in the Lower Trinity River community and on the South Fork of the Trinity. We have seen no meaningful projects completed in our part of the river system. As you are aware there are spawning Coho in the South Fork and at Old Campbell Creek near the mouth of the South Fork. We would like to understand why are all the projects at or near the headwaters instead of an areas where there has been a healthy Coho population that is now in decline and listed for the Spring run as was stated at your meeting.	The EA would cover projects throughout the Watershed including in the lower Trinity River. See Section 1.

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Commenter(s) and/or Organization	Comment Topic	Specific Comment or Question	Response
Magdaleno, Dena (Elder - Tsnugwe Council) (continued)	Public and agency input and outreach	We, the Tsnungwe Council, have reviewed the "Watershed Restoration Programmatic EA" and one of our Elders, Dena Magdaleno, attended your recent Community meeting, where although there were many in attendance, there were only two members of the public. This is our first concern. Shouldn't there be a wide range of input regarding a comprehensive plan that all agencies involved will be using to make short and long range decisions about our rivers? Simply holding the meeting does not seem adequate. Unless there already has been ample input. But the type and number of comments from the community were not discussed.	There will be additional public notice and opportunities to provide input on a site-specific basis, which will be carried out by the lead federal agency for the project. See Appendix A.
	Tribal consultation	Additionally, the Tsnungwe were not informed or consulted regarding this important document. Information about how to contact us as listed at a tribe in Trinity County is available at the Native American Heritage Commission. As you are aware opportunity for consultation is required with all tribes by the State of California on public lands and waterways.	Tribal Consultation will occur on a project-specific basis by the lead federal agency. See Appendix A.
	Water resources and fisheries	The Tsnungwe Council agrees with the TRRP's statement that returning more flows to the river will restore it. Increased flows must be scheduled to help restore more natural processes to the river. Putting more water in the river will heal the river and bring back the fish. We care about and depend on the rivers and fish in them. They are part of who we are. There need to be more proactive measures taken to protect them both. State and federal agencies installed the dams, have all the funding, and control when it comes to our water and the decline of our fish. We need to do a better job.	Thank you for your support of water conservation measures. See Section 4 for details about proposed project activities, including water conservation projects.
Wheeler, Tom (EPIC)	Vegetation	Will herbicides be used for the proposed project?	The EA would not authorize the use of herbicides as part of the project. See Section 5.4 and Appendix J for a discussion of proposed project effects on vegetation resources.

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3 Stakeholder Engagement

The TRRP and coordinating agencies conducted stakeholder engagement at several junctures during the Project planning and scoping process to solicit and incorporate feedback from restoration implementors. The aim of the engagement was to inform the proposed activities and the process by which the EA and the implementation of site-specific projects would occur.

On May 18, 2023, a stakeholder scoping meeting at the TRRP offices in Weaverville was convened and lead by TRRP, USFS, and the BLM. The meeting was attended by restoration implementors and funding agencies. The information and feedback from the meeting was used by TRRP, USFS, and BLM to revise and refine the proposed activities presented in the scoping notice to help capture the range of potential restoration activities that have and may occur in the watershed.

In December 2023, TRRP sent a follow-up survey to the stakeholders and implementers to request additional feedback on the proposed project and tiered permitting process. The survey was accompanied by a draft version of the Activity Cards that are in Appendix H of the EA. The questions and the responses from the three implementors that provided feedback are in Table G-2.

Table G-2. Implementor Survey and Responses

Survey Question	Responses
What is your restoration "dream project" in the Trinity Watershed, if funding and resources were not an issue?	• Monitoring: baseline, instream aquatic habitat, fish presence, and more. The common theme in funding opportunities is to not fund long term monitoring. However, most of the funders want to see it done. Having good data would help restorationists develop better projects. • To fill all the streams and rivers with LWD [large woody debris] to match preindustrial volumes. • Hayfork Creek Stage 0, fish passage around Trinity Dam, better water management of flows, seeding juvenile salmon through the SFTR watershed (hatchbox)
Would any of your organization's proposed activities (included in the Activity Cards), occur within upland areas that are not directly adjacent to streams?	• Potentially • Yes
Would any of your organization's proposed activities (included in the Activity Cards), occur within upland areas that are not directly adjacent to streams?	• Restoration and Enhancement of Off-Channel and Side-Channel Habitat

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Survey Question	Responses
What types of activities (from the Activity Cards) would your organization be likely to implement? In the text box, what is the maximum number of restoration projects for each activity type that your organization would want to complete in a year, if funds and resources were available?	• Floodplain restoration • Removal of Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-Water Structures • Water Conservation Projects • Salmon Carcass Placement • Bioengineered Bank Stabilization • Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement Including Removal of Nonnative Invasive Species and Revegetation with Native Plants. • Road Decommissioning, Maintenance, and Rehabilitation • Projects often include multiple activity types. It is tough to estimate the maximum over any given year. For activity types, except for Salmon Carcass Placement, it should be no more than 3 per year. For salmon carcass placement, it would be between 6-8 per year. • 10 projects/year • Stabilization: 2 (typically coincides with Restoration and Enhancement of Off-Channel and Side Channel Habitat) Habitat Enhancement: 2 (typically coincides with Restoration and Enhancement of Off-Channel and Side Channel Habitat) Road Work: 1
What is inhibiting more projects from getting on the ground? What could help make project processes (planning/design/implementation) more streamlined, more efficient?	• Timely engagement of regulatory agencies. Some are very easily accessible and easy to engage. However, there are some that are difficult to reach and engage in project environmental compliance discussions in a timely manner. Having early, committed coordination between federal agencies/landowners/regulators would make a notable difference in the efficiency and timeliness of project completion. • NEPA and CEQA • Archeological surveys (on very small scale projects), funding, project partners
Is there a restoration project activity that your organization would like to implement that is not covered in the Activity Cards? If so, please describe.	• Yes, tree tipping and placement of large wood via helicopter loading (heliwood loading) • Tributary mouth manual reconnection, meadow restoration, upgrade/improvement of diversion structures. See Activity Cards for more information.
Do you believe that having the Trinity Watershed Restoration EA available to meet your environmental compliance requirements will help your organization's projects become more cost-effective (particularly for the planning/design phase), hopefully leading to better funded implementation? If this is not the case, please tell us why.	• If it is well crafted to include project work, timing, etc., use of the TR Watershed Restoration EA should help reduce time spent on environmental compliance.
Are you aware of any fire resiliency funds available for watershed restoration activities? (Noting that the proposed activity categories are focused on watershed restoration and do not specifically include fire resiliency activities).	• https://www.nfwf.org/programs/northern-california-forests-and-watersheds/california-forests-large-watershed-planning-grants-2024-request-proposals • Forest Thinning and Road side fuel reduction

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Survey Question	Responses
Please add any other questions, comments or concerns about the watershed restoration projects.	• These monitoring metrics seem to suggest that the volume and flow instream be measured. There are so many factors that affect instream volumes that tying the success or outcomes of some water conservation projects to that metric wouldn't be appropriate. For example, persuading a landowner to install storage for and use water collected during the wet season rather than divert during the dry season is something that is measured/monitored by recording (via water meters) the volume collected during the wet season and to help verify that no diversions occurred during the forbearance season. Strictly speaking, it's not saving much water over the course of any given water year, but rather isolating withdrawals to a wetter period. Suggest expanding this to include alternative metrics to accommodate multiple types of water conservation projects that aren't necessarily tied to other factors outside of the control of the project that might be affecting the volume of instream flow during the dry season. 2) For road rehabilitation work, suggest adding "or features" after "... the addition of new drainage structures" because structures implies culverts but doesn't seem to include rolling and critical dips, which are a very important tool in that type of work. Changing monitoring metrics to Number of culverts, stream crossings, or drainage features replaced would be advisable. 3) Timing of work, which is similar for most activity types: Currently the language in the Activity Cards limit work to end by Oct 15 of each year, except for intermittent streams. The reality, particularly in the more frequent drought conditions that we have been experiencing, is that sometimes rains sufficient to create favorable salmonid migration conditions that come by mid-Oct. The difference between instream conditions at a specific project site on Oct 1st versus Oct 20th in the same year can sometimes be indiscernible. Those extra days can make a huge difference. Further, in the last 15 years or so, there have been many years where extremely dry summer conditions result in critically high fire risk, which creates a reluctance to do certain types of heavy equipment work for fear of starting a fire in forested or grassy restoration project locations. In late fall, cooler temperatures and low water instream conditions often make for ideal construction windows. It would be helpful to revise the language to allow for those scenarios where conditions warrant. Work within a stream zone already has numerous required protocols including fish screening and best management practices (BMPs). Upslope work has several BMPs to protect water quality. Project proponents already coordinate with regulatory agencies closely throughout project implementation. Therefore, any concerns about weather or instream conditions in the latter half of October can be addressed with appropriate oversight. These regulatory agencies have biologists on staff that regularly observe conditions and should be well prepared to discuss and evaluate concerns with pursuing instream work past Oct 15, even in perennial streams. • I'm concerned that the Activity Cards do not encompass all restoration activities and methods. See Activity Cards (Appendix H)

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4 Scoping Materials

The following scoping notice and agenda were provided were provided to the public either on the agencies' websites or at the November 17, 2022, public meeting.

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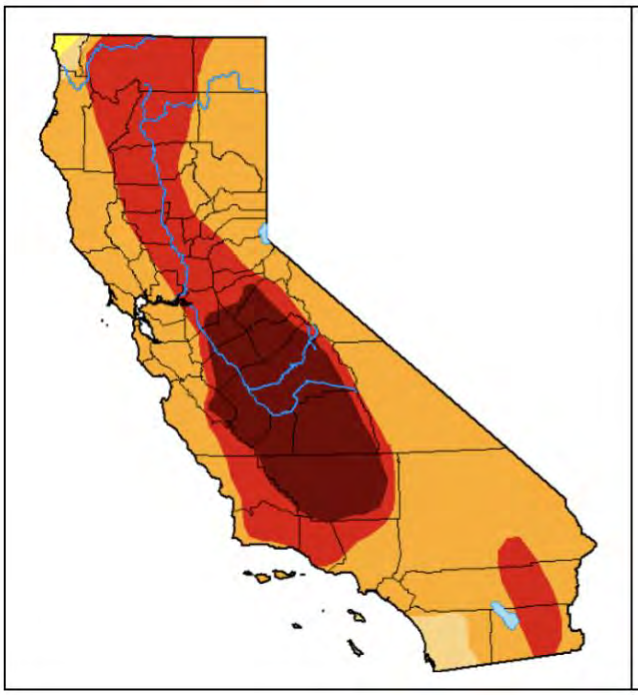
Background

As of August 2022, more than 97% of California is experiencing severe, extreme and exceptional drought, as well as record high temperatures (see Figure 1). The continuation of warming trends and drought will increasingly stress important regional fisheries and hamper efforts to recover vulnerable fish populations (Isaak et al. 2012).



August 23, 2022
(Released Thursday, Aug. 25, 2022)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	99.76	97.53	43.16	16.57
Last Week 08-16-2022	0.00	100.00	99.76	97.53	43.16	16.57
3 Months Ago 05-24-2022	0.00	100.00	99.86	97.56	59.81	11.59
Start of Calendar Year 01-04-2022	0.00	100.00	99.30	67.62	16.60	0.84
Start of Water Year 09-28-2021	0.00	100.00	100.00	93.93	87.88	45.66
One Year Ago 08-24-2021	0.00	100.00	100.00	95.58	88.37	47.40

Figure 1. California Drought Map (USDA California Climate Hub)

Regional temperatures are expected to warm in all seasons, perhaps with greater summer maximum temperatures and an increased heat wave frequency (Dahl K. et al. 2019). By 2100, temperatures may increase by 2.2 to 5.4 degrees Celsius above temperatures recorded between 1951-1980 (Hilberg et al. 2019a; Hilberg et al. 2019b).

Air temperature is the dominant factor explaining long-term stream temperature trends (82% - 94% of trends) and inter-annual variability (48% - 86% of variability), except during the summer, when discharge accounted for approximately half (52%) of the inter-annual variation in stream temperatures (Isaak et al. 2018). These conditions will not provide the cold-water habitat upon which our present cold water aquatic species depend.

Snowpack in Northern California has long served as a natural form of water storage, and snowmelt has historically provided a cold-water source for aquatic ecosystems and enough water to keep forests hydrated into the summer months. Historic long-term drought resulting in lower snowpack levels means an earlier snowmelt period that results in a longer dry season. This leaves surrounding forest ecosystems water-stressed and more vulnerable in late summer and fall.

Human demands for water are increasing at a time when streams are at all-time low flow levels. Water warms more rapidly in shallow streams that have been depleted from water use demands, reducing and sometimes eliminating suitable cold-water aquatic habitat. Furthermore, sediments from runoff after wildfires and from impaired tributaries and poorly maintained roads can fill lakes and streambeds. This leads to obstructed natural stream flows which adversely affect navigation, recreational use, and valuable aquatic habitat. Sediments often smother fish eggs and the aquatic insect larvae upon which fish prey. The mainstem Trinity River below Trinity Dam and the South Fork Trinity River are sediment impaired, and experience some of these effects from sedimentation (EPA 2001).

The desired outcome for the watershed restoration projects under the PEA could counter several climate-related variables that are impairing the Trinity River watershed. Specific desired outcomes include more accessible cold-water aquatic habitats with effective riparian shade and downed wood fostering a cooler microclimate; and a sediment transport regime that retains the key habitat characteristics to promote the survival and sustainability of cold-water aquatic organisms.

Project Purpose and Need

Projects that support habitat conditions of native aquatic species are essential to recover and sustain natural production of salmon and steelhead within the Trinity River watershed. The purpose of the project is to enhance the quality and quantity of accessible cold-water aquatic habitat and water temperature conditions; and to decrease fine sediment loading through watershed restoration activities. The project is needed to improve fish passage and water temperature conditions.

Proposed Watershed Restoration Activity Area

The activities to be analyzed in the PEA, which are described in more detail below, would occur within the Trinity River watershed (Figure 2).

The intent is to include activities described in the TRRP's 2020 biological opinion issued by the National Marine Fisheries Service (NMFS) for the benefit of federally listed Southern Oregon/Northern California Coast (SONCC) evolutionarily significant unit coho salmon.[1, 2]

[1] The 2020 NMFS biological opinion was issued to comply with Section 7 of the Endangered Species Act, for restoration and rehabilitation activities along the mainstem Trinity River and its tributaries primarily for the federally listed SONCC coho salmon. The biological opinion is available at https://www.trrp.net/library/document/?id=2472.

[2] In terms of USFS lands included within the Proposed Activity Area, the Six Rivers National Forest has been excluded because a similar PEA for aquatic restoration has been completed and can be found at https://www.fs.usda.gov/project/?project=42051.

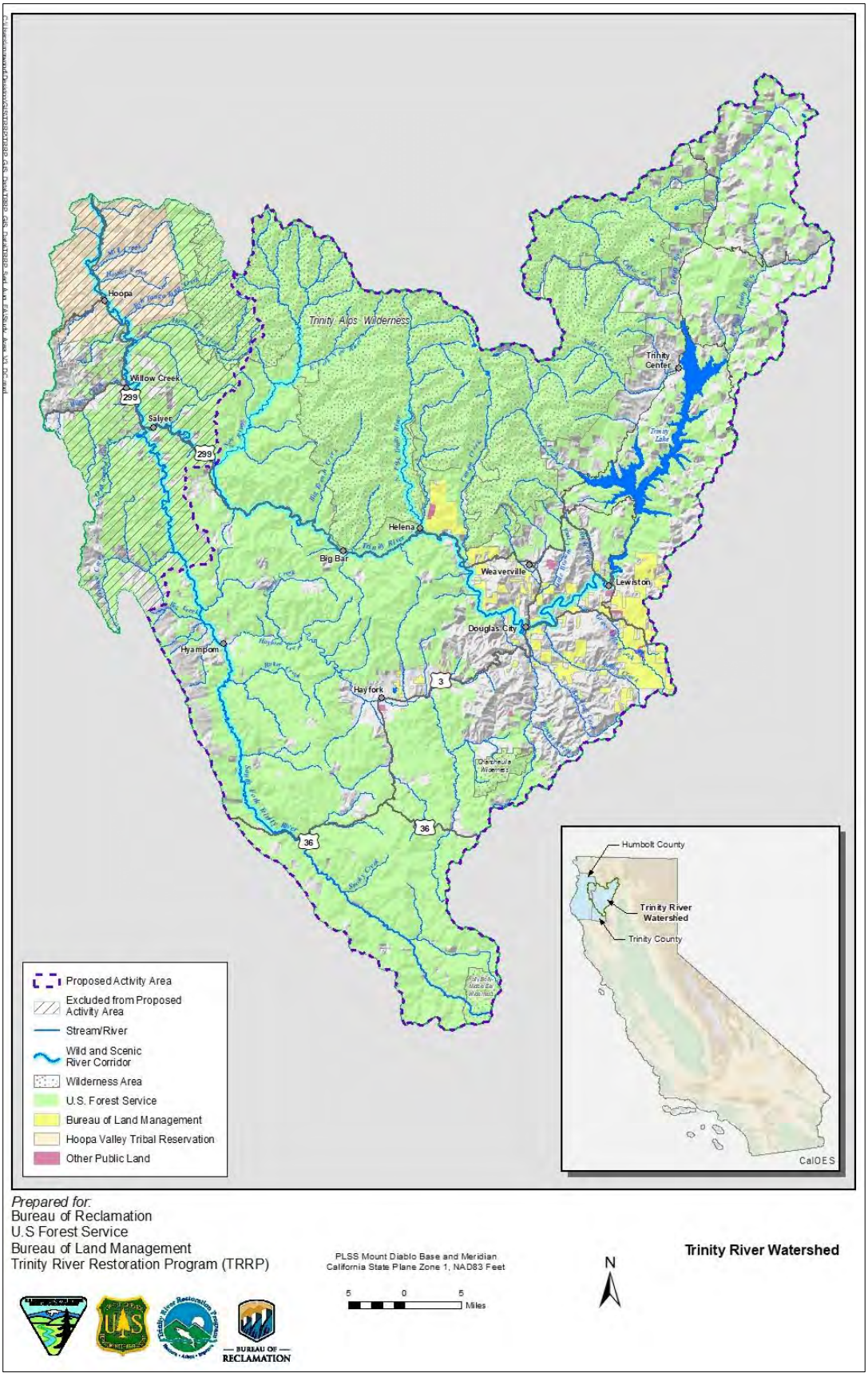


Figure 2. Map of the Trinity River Watershed where restoration activities may occur.

Proposed Activities

The PEA will identify and analyze a suite of instream and riparian restoration activities that are designed to maintain, enhance, and restore instream processes to benefit aquatic species, riparian habitats, and water quality. Activities include instream habitat restoration, native riparian and wetland revegetation/management, fish passage restoration, instream flow restoration, road decommissioning, maintenance, and rehabilitation activities. Figure 3 shows several common restoration activities at Mill Creek.

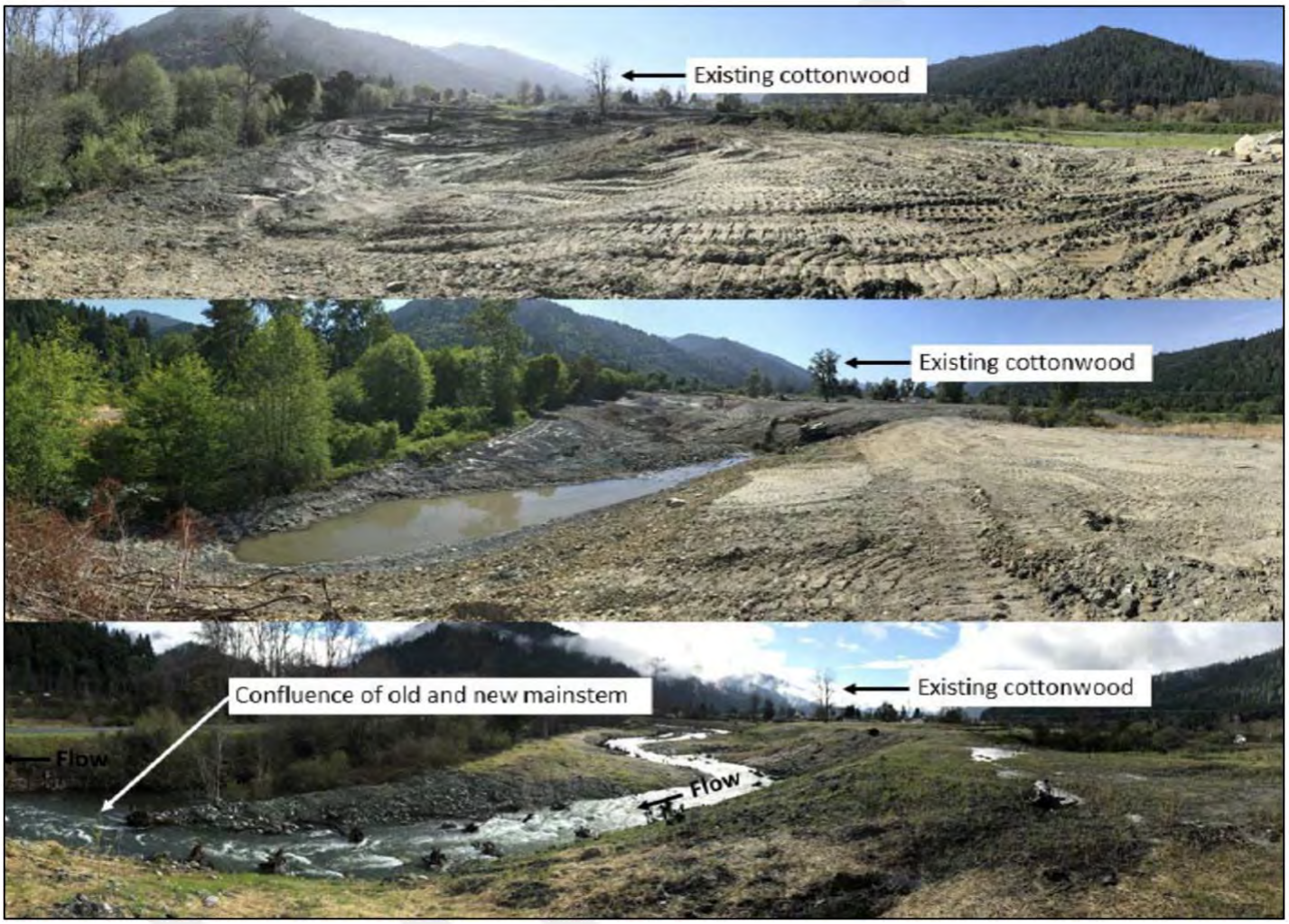


Figure 3. Watershed restoration activities at Mill Creek, during construction (top and middle) and after construction (bottom).

Instream Habitat Restoration

- **Restoration and enhancement of off-channel and side-channel habitat –** These activities would improve aquatic and riparian habitat for fish and wildlife. Habitat restoration and enhancement actions along tributaries and larger in-channel and floodplain rehabilitation projects include installation of habitat elements such as vegetation, large wood, trees with root wads, in-stream boulders, beaver dam analogs, and spawning gravel. These actions would improve aquatic and riparian habitat for fish and wildlife and/or restore the hydrologic, hydraulic, and biogeochemical functions and processes of streams.
- **Bioengineered bank stabilization** – These activities would reduce input of fine sediment, enhance aquatic and riparian habitat, and improve water quality by integrating vegetation into bank protection.
- **Floodplain restoration** – These activities would improve ecosystem function by creating hydrologic connections between streams and floodplains through such measures as breaching and removal of levees, berm and dike setbacks and hydraulic reconnection.

Native Riparian and Wetland Restoration

- **Removal of nonnative invasive species and revegetation with native plants** – These activities would improve watershed functions such as aquatic and riparian habitat for fish and wildlife. Revegetation may occur as a stand-alone project and/or part of larger watershed restoration activities to reduce upslope erosion from past land management practices, including timber harvest, mining, and road construction. Recurring wildfire also contributes to fine sediment and erosion reaching downslope aquatic habitats. Areas affected by fire would be targeted for revegetation.
- **Establishment, restoration, and enhancement of freshwater wetlands** – These activities would create or improve wetland ecological functions.
- **Establishment, restoration, and enhancement of stream and riparian habitat and upslope watershed sites** – These activities would create or restore the functions of streams and riparian areas, including upslope watershed sites that could contribute sediment to streams or disrupt floodplain and riparian functions.
- **Riparian vegetation restoration** – These actions would restore species composition, structural diversity, and resilience to disturbances. Riparian vegetation helps to maintain shade and promote large woody debris recruitment. Where existing vegetation exceeds riparian needs and is deemed hazardous (i.e., fuel, dead or dying vegetation near road) or adversely impacts desired conditions (such as conifers encroachment on hardwoods or riparian vegetation), selective vegetation removal may occur. Removed vegetation would be retained primarily for aquatic habitat support (i.e., large wood structures), erosion control, and soil amendment (e.g., mulching).

Fish Passage Restoration

- **Improvements to stream crossings and fish passage –** These activities would improve upstream and downstream habitat connectivity and allow movement by fish and other species by promoting sustainable stream function. Activities associated with restoring fish passage include improving road crossing (e.g., culverts or bridges) and removal and/or retrofitting barriers (e.g., small dams and diversions).

Instream Flow Restoration

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- **Removal of small dams, diversions, flood gates, pilings and other in-water structures** – These activities would improve circulation, flow, and water quality primarily by removing outdated in-stream structures.
- **Water conservation projects** – These activities would reduce low-flow stream diversions on tributary streams through the installation of features such as off-stream storage tanks and ponds and off-channel infrastructure. New systems may include the installation of slow flow systems including trickle fill, solar, and ram pumps; and full forbearance systems to eliminate stream withdrawal during the lowest flow periods. Project activities may include water conservation and efficiency outreach; monitoring to determine low flow thresholds; and designing, permitting, and implementing individualized water conservation systems.

Road Decommissioning, Maintenance, and Rehabilitation Activities

- **Road maintenance activities** – These activities would include work that results in insignificant or discountable effects on coho salmon habitat. Activities may include grading, rocking, and clearing of drainage structures on existing roads. Road-cut, fill-slope, fine sedimentation, and stream channel erosion from aging infrastructures and practices have resulted in poorly maintained roads and are contributing to deterioration of aquatic habitats.
- **Road rehabilitation** – These measures would include replacing undersized culverts with new culverts or bridges capable of accommodating a 100-year storm. Activities would include out sloping, rocking, energy dissipaters, and the addition of new drainage structures to reduce the accumulation of water in inboard ditches.
- **Road decommissioning** – These actions would remove stream-crossing structures, culverts, and Humboldt crossings. Depending on slope, soil type, and other factors, activities could also include reshaping, ripping, seeding, and mulching the road surface. Measures to minimize impacts to aquatic species for road-related work would include working in dry conditions or in isolated waters.

Potential Effects

The Public Draft PEA will analyze potential effects to resources, such as:

- Temporary water turbidity increases during restoration activities
- Temporary disturbances to vegetation and aesthetic values at restoration sites
- Effects on cultural resources and historic properties
- Effects on the aquatic environment and riparian habitat
- Other effects on resources identified during analyses and scoping

Decision to Be Made

Each federal agency's responsible official will sign and issue a separate NEPA decision that is specific to lands being managed, the funding for the potential project, and/or the areas of responsibility under their jurisdiction. The responsible officials will decide whether to implement the proposed action, implement an alternative action that meets the purpose and need, or take no action.

How to Participate in the Scoping Process

You are invited to participate in the Trinity River Watershed Restoration Project PEA by providing comments during the public scoping period. If you have information or analysis that you feel the agencies may not be aware or have issues (points of dispute, debate, or disagreement) regarding the proposed activities, please send

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these comments in writing to the address listed below. The agencies will consider all issues brought forward and determine if the proposed action should be adjusted or other alternatives be developed.

Comments received in response to this solicitation, including names and addresses of those who comment, will be part of the public record for this proposed action. Comments submitted anonymously will be accepted and considered; however, anonymous comments will not allow the agencies to provide the commentor with subsequent environmental documents.

To ensure your comments can be fully considered by the agencies, please provide all comments by the close of business on December 5, 2022.

- Send your comments via mail to:

  Brandt Gutermuth
  C/O TRRP
  P.O. Box 1300
  Weaverville, CA 96093

  Or send your comments via email to:

  info@trrp.net**.**

- For all submittals, please include *"Watershed Restoration Programmatic EA"* in the subject line with the following information:
  - Your name and address (telephone number and email address are also suggested).
  - Project-specific comments about the proposed action. Please include supporting information that would help identify issues, develop alternatives to respond to those issues, or predict the environmental effects of the proposal.
- A public scoping meeting will be held, and can be attended in-person or virtually, on Thursday, November 17, 2022. Details about the meeting and how to participate are available on the project website: https://www.trrp.net/restoration/watershed-activities/watershed-ea/.
- Your input will be used as a part of our scoping process to help identify issues and frame the analysis.
- The Draft PEA will be advertised and available for review in the Fall of 2023. Proposed Project Schedule.

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Project Information and Updates:

https://www.trrp.net/restoration/watershed-activities/watershed-ea/

Public Scoping:

November 4 – December 5, 2022

Public Scoping Meeting

Thursday, November 17, 2022

Draft PEA for public comment:

Fall 2023

Final PEA and Decision:

Winter 2023/24

Proposed implementation:

Watershed restoration projects would be implemented with site specific surveys and compliance for individual projects tiered to the PEA.

Works Cited

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Trinity River Restoration Program
Winter Flow Variability Project
Programmatic Environmental Assessment
Public Scoping Meeting

Thursday November 17, 2022 – 5:30-7:30 pm

In-Person and Virtual Public Scoping Meeting

To attend in-person: TRRP Office Conference Room, 1313 S. Main St, Weaverville, CA

To attend virtually: TEAMS LINK

Meeting ID: 253 747 272 227

Meeting Password: R6Ue99

To attend via telephone: 831-256-7142 code 708645838#

AGENDA

5:30 PM **Meeting Guidelines:** Emily Thorn, Ironwood Consulting

5:35 PM **Introduction:** Mike Dixon, TRRP Executive Director

- Purpose of this meeting
- Introduction of the Program Partners and Meeting Participants
- Trinity River Restoration Program (TRRP) Background

5:45 PM **Objectives: Overall and Proposed Project** Chad Abel, TRRP Implementation Branch Chief

Purpose and Need

Background

Proposed Watershed Restoration Activity Area

Proposed Activities

6:05 PM **Environmental Compliance:** Brandt Gutermuth, TRRP Environmental Scientist

- Agency Collaboration
- Schedule
- How to submit questions or comments

6:15 PM **Discussion - Question/Answer period**

Copies of the Scoping Notice are available for review on the TRRP website at https://www.trrp.net/restoration/watershed-activities/watershed-ea/.

Contact information:

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TEAMS VIRTUAL MEETING INFORMATION

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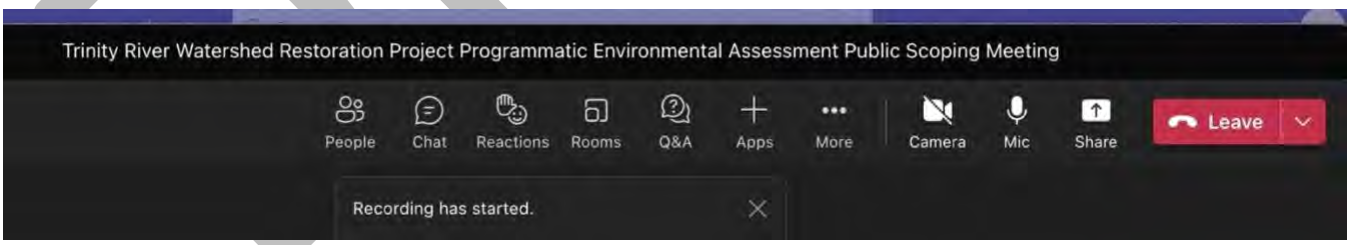
Join via web using MS Teams on your browser:

- MS Teams virtual meeting link
- Meeting ID: 253 747 272 227
- Meeting Password: R6Ue99

Attendees can join by selecting the meeting link above and your web browser should automatically open, and you will be prompted to use the MS Teams app or your web browser. Choose whichever method you prefer. You'll see different instructions based on how you join the event (from the Teams app or through your web browser).

Participating in the Live Event

- Please mute your microphone during presentations and while others are speaking.
- To conserve bandwidth, please turn off your camera unless you are speaking.
- At any point during the meeting, you can type questions in the Q&A panel by clicking on the "Q&A" button on the top of the screen. To ask a question, type your question in the compose box (located at the bottom of the panel), and then select the "Send" button or icon. Please be aware that all attendees and presenters will be able to see your name/identity on the question. Typed questions and comments will be read by the moderator during the Q&A session.
- If you wish to ask a question during the Q&A session, please "raise" your hand using the "Reactions" button on the top of the screen and wait to be called upon.
- Spoken comments and questions will be kept to a 3 minute limit in order to allow all of those who wish to speak the opportunity.
- If you wish to leave the meeting, you can do so at any time using the "Leave" button on the panel.



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Appendix H: Activity Cards

Public Draft

Restoration and Enhancement of In-Channel Habitat	
Condition, Situation, Trigger	This activity category typically applies to reaches of the mainstem Trinity River or tributaries where channel diversity is limited, and habitat complexity needs to be restored and/or enhanced. This activity category also applies to areas where side channels, alcoves, and other backwater habitats have been filled or blocked from the main channel, disconnecting them from most if not all flow events.
Applicable ACS Objectives	1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted. 2. Maintain and restore spatial and temporal connectivity within and between watersheds. 3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations. 4. 4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.
Proposed Treatments	"Restoration and Enhancement of In-Channel Habitat" includes: installation of habitat elements such as vegetation, loose large wood with and without rootwads, Structured Log Jams (SLJ) installation using vibratory pile-driving techniques (stabilizing the SLJs with timber piles), in-stream boulders, beaver dam analogues (BDAs), post-assisted log structures (PALS), spawning gravel, and other low-tech process-based restoration (LTPBR) techniques. Also included in this category is channel and streambank excavation, grading of floodplains, the addition of weir-like structures (constructed of logs and or rock) that do not impede fish passage, riparian vegetation removal (where necessary), construction of gravel and skeletal bars, construction of floodplain surfaces with elevations allowing periodic inundation, removal of riparian berms, bedrock fracturing (where necessary) using blasting techniques, and revegetation of restored floodplain surfaces.
Equipment Used	Excavators, bulldozers, dump trucks, front-end loaders, vibratory pile driver (used in the dry), chainsaws, hand tools, and hydraulic post pounders. Explosives may be used in the dry for bedrock fracturing.
Timing	In-water work would be restricted to the dry season (June 15 to October 15 for tributaries and July 15 to October 15 for the mainstem). Work in intermittent streams may continue beyond November 1, as long as weather conditions permit, and the stream channel remains dry. Work above OHWM can occur at other times of the year but would adhere to conservation measures such as wildlife seasonal restrictions and the use of erosion and sediment control BMPs. Post-project revegetation will take place during wet conditions (fall/winter) and will generally occur in riparian areas to maximize use by fish and wildlife species. Extended in water work periods may also be required depending on the project.
Duration	Each restoration effort would typically be completed in 1-2 construction seasons with the exception of related vegetation management, monitoring, and adaptive management actions.
Monitoring Metrics	Linear feet of restored/enhanced instream habitat

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Floodplain Restoration	
Condition, Situation, Trigger	This activity category typically applies to areas where floodplains have been disconnected from adjacent streams and rivers. Aimed primarily at restoring hydraulic connections and inundation across the floodplain to improve the diversity and complexity of aquatic, meadow, and riparian habitat, ecosystem function, and geomorphic function within the watershed.
Applicable ACS Objectives	1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted. 2. Maintain and restore spatial and temporal connectivity within and between watersheds. 4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities. 7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
Proposed Treatments	"Floodplain Restoration" may include: the setback, breaching, modification, and removal of levees, berms, and dikes as well as floodplain lowering (e.g., mine tailing excavation) or fill in support of hydraulic reconnection across the floodplain (including restoration to stage zero, which creates streams that are fully connected with their floodplains, typically with multi-thread channels). This activity category also includes rock placement (including engineered stream material, riffle ramps, or weirs); filling or reshaping of on- and off-channel gravel pits; LTPBR techniques such as BDAs and PALS; and other strategies to aggrade the channel and improve connectivity within the floodplain. Meadow and floodplain restoration may involve reconnecting down-cut or incising channels to their floodplains to restore hydrologic processes and meadow health; filling incised, entrenched channels; creating new stream channels; regrading floodplains or realigning channels; or installing stabilization structures (e.g., Zeedyk structures). Projects using fill to address channel incision should also incorporate habitat elements that offset the likelihood for incision to re-occur such as adding large wood and channel roughness.
Equipment Used	Excavators, bulldozers, dump trucks, front-end loaders, rock/gravel processors, chainsaws, hand tools, hydraulic post pounders, and similar equipment.
Timing	• In-water work would be restricted to the dry season (June 15 to October 15 for tributaries and July 15 to October 15 for the mainstem). Work in intermittent streams may continue beyond November 1, as long as weather conditions permit, and the stream channel remains dry. • Extended in water work periods may also be required depending on the project. • Post-project revegetation will take place during wet conditions (fall/winter) and will generally occur in riparian areas to maximize use by fish and wildlife species.
Duration	Each restoration effort would be completed in 1-2 construction seasons with the exception of related vegetation management, monitoring, and adaptive management actions.
Monitoring Metrics	Acres of floodplain habitat (aquatic, riparian, wetland, meadow) hydraulically reconnected

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Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures	
Condition, Situation, Trigger	The presence of any in-stream structure (small dam, fords, diversions, flood gates, pilings, legacy structures, etc.) that is blocking/obstructing hydrologic connectivity, fish passage, and/or habitat function.
Applicable ACS Objectives	1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted. 2. Maintain and restore spatial and temporal connectivity within and between watersheds. 3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations. 4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities. 5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport. 6. Maintain and restore instream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected. 7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
Proposed Treatments	"Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures" includes: removal or retrofitting (for fish passage) of small dams, diversions, flood gates, and legacy structures; separation of streams from artificial impoundments (e.g., ponds or lakes) by realigning and/or rerouting channels around or through these artificial waterbodies and/or through the use of vertical concrete or sheet-pile walls; fish passage enhancement at stream confluences through manual movement of deposited or placed material; and removal or retrofitting (for fish passage) of undersized, deteriorated, misaligned, or otherwise dysfunctional culverts (culvert replacement is included in the "Road Rehabilitation" activity category) or any other sort of fish passage barrier.
Equipment Used	Excavators, cranes, bulldozers, dump trucks, front-end loaders, and similar equipment may be used to implement these projects. Any use of blasting techniques for small dam removal must be justified by site-specific conditions, including equipment access difficulties.
Timing	• In-water work would be restricted to the dry season (June 15 to October 15 for tributaries and July 15 to October 15 for the mainstem). Work in intermittent streams may continue beyond November 1, as long as weather conditions permit, and the stream channel remains dry. • Work above OHWM can occur at other times of the year but would adhere to conservation measures such as wildlife seasonal restrictions and the use of erosion and sediment control BMPs. • Post-project revegetation will take place during wet conditions (fall/winter) and will generally occur in riparian areas to maximize use by fish and wildlife species.
Duration	Each restoration effort would be completed in 1-2 construction seasons with the exception of related vegetation management, monitoring, and adaptive management actions.
Monitoring Metrics	Number of instream structures removed or retrofitted

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Water Conservation Projects	
Condition, Situation, Trigger	Across the watershed, water use and associated infrastructure warrant improvement and efficiency upgrades to ensure that instream flows are available for fish and wildlife species and associated habitat. Particularly, wherever there are stream diversions that continue to withdraw water when streamflows are at low-flow conditions water conservation systems are warranted.
Applicable ACS Objectives	1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted. 6. Maintain and restore instream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected. 7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
Proposed Treatments	"Water Conservation Projects" include: water conservation and efficiency outreach; the Well Grant Program (to mitigate for adverse effects of restoration flows on water supplies of private riverside landowners), Instream Flow Dedication (Water Code 1707), storage and forbearance programs, and other similar programs; monitoring to determine low flow thresholds; designing, permitting, and implementing individualized water conservation systems and associated infrastructure (e.g., fish screens). Instream flow restoration from diversion projects will be designed to reduce water withdrawals especially during low flow conditions. New systems may include more efficient intake hoses (i.e., better overall functioning not higher flow conveyance) and low volume pumps; the installation of slow flow systems such as trickle fill, solar, and ram pumps, water storage (off-stream storage tanks and ponds and associated off-channel infrastructure) to raise water tables and other techniques to slow runoff; and full-season forbearance systems to eliminate stream withdrawal during lowest flow periods.
Equipment Used	Excavators, bulldozers, dump trucks, ditch-digging equipment, front-end loaders, and similar equipment may be used to install new and/or improved water systems.
Timing	• In-water work would be restricted to the dry season (June 15 to October 15 for tributaries and July 15 to October 15 for the mainstem). Work in intermittent streams may continue beyond November 1, as long as weather conditions permit, and the stream channel remains dry. • Work above OHWM can occur at other times of the year but would adhere to conservation measures such as wildlife seasonal restrictions and the use of erosion and sediment control BMPs. • Post-project revegetation will take place during wet conditions (fall/winter) and will generally occur in riparian areas to maximize use by fish and wildlife species.
Duration:	Each construction effort would typically be completed in 1-2 construction seasons; however, water conservation efforts and related adaptive management could be ongoing in many situations.
Monitoring Metrics	Volume (cubic feet) of annual average instream water savings

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Salmon Carcass Placement	
Condition, Situation, Trigger	All tributaries where salmon or steelhead runs currently occur but have been reduced compared to historic levels or used to occur but have now been eliminated; in which case, instream food webs are now experiencing a reduction of marine-derived nutrients that support aquatic organisms, including but not limited to juvenile salmonids.
Applicable ACS Objectives	4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.
Proposed Treatments	"Salmon carcass placement" entails obtaining excess carcasses from the Trinity River Hatchery and placing them in throughout the Trinity River watershed, where needed. Distribution of carcasses would occur where anadromous fish are known to be present within the watershed or within areas historically accessible to anadromous fish. Carcasses would be placed randomly within aquatic and riparian areas by placing individual or small groups of carcasses on the ground, in the water, or wedging them into accumulated wood.
Equipment Used	Trucks would be used to transport the fish carcasses from the hatchery to the placement sites and handtools would be used to distribute the carcasses at the site.
Timing	Carcasses would be placed during the normal migration and spawning times (October through January typically), as would naturally occur in the watershed.
Duration	This activity would occur when excess carcasses are available as determined by hatchery managers and when technicians are available to perform the carcass placement.
Monitoring Metrics	Number of HUC 12 tributaries that were supplemented with salmon carcasses per year

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Remote Site Incubation (RSI) Supplementation	
Condition, Situation, Trigger	All tributaries where salmon or steelhead runs currently occur but have been reduced compared to historic levels or used to occur but have now been eliminated. RSI's are used for supplementation in tributary streams. There is evidence that incubating and releasing salmonid fry in this way increases the survival of the fry compared to more traditional hatchery practices.
Applicable ACS Objectives	4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.
Proposed Treatments	RSI systems have been utilized throughout anadromous streams of the Pacific Coast to incubate, hatch, and stock various salmonid species as a supplementation tool in remote settings. Units consist of a clarifying tank, an incubation tank, a live cart tank, piping between the water intake and the tanks, a head box (at the upstream water intake point), and gravity-fed water. Salmonid eggs are loaded into the unit and after several weeks, fry volitionally leave the RSI system upon hatching.
Equipment Used	Trucks would be used to transport the eggs and supplies from the Trinity River Hatchery (TRH) to the RSI sites and handtools would be used to install, monitor, maintain, and disassemble the systems.
Timing	Throughout the year, corresponding to salmonid egg availability and life history timelines.
Duration	This activity would occur as determined by NMFS, fish biologists, and hatchery managers.
Monitoring Metrics	Egg survival. Snorkel surveys performed as allowed to document presence, visual health, and distribution.

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Bioengineered Bank Stabilization	
Condition, Situation, Trigger	Where streambanks are either actively eroding or at threat of eroding in locations where site conditions do not allow for natural channel meander. Streambank erosion may be a result of either scour related to streamflows or stormwater discharges from overland flows. Bioengineered bank stabilization may be incorporated into the design for a site where other restoration activity categories are proposed (e.g., culvert removal).
Applicable ACS Objectives	3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations. 8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.
Proposed Treatments	Bioengineered Bank Stabilization" may include the following activities individually or as in combination: bank reshaping; slope grading; coir log installation; deformable soil reinforcement (e.g., soil lifts, geogrids) using biodegradable materials; revetment consisting of trees, native plant material installation (herbaceous plants, shrubs, trees), or willow walls; willow siltation baffles; brush mattresses; brush check dams; and brush bundles. Bioengineered project types may also include the placement of large wood in combination with buried riprap, overlain with soil and native vegetation plantings and protected by livestock exclusion fencing. Bioengineered bank stabilization techniques use a minimal amount of hard materials (e.g., rock) and are not intended to include traditional hard engineering techniques. Utilize native materials (logs, cobbles, boulders, etc.) whenever possible, particularly in steeper headwater streams where native materials are readily available. The use of boulders should be limited in scope and quantity, to the minimum necessary to stabilize the slope and protect it from expected stream or overland flows during storms. Boulder structures must be part of a larger restoration design and must include a riparian revegetation element.
Equipment Used	Handtools (when possible), self-propelled logging yarders, excavators, backhoes, or dump trucks.
Timing	• In-water work would be restricted to the dry season (June 15 to October 15 for tributaries and July 15 to October 15 for the mainstem). Work in intermittent streams may continue beyond November 1, as long as weather conditions permit, and the stream channel remains dry. • Work above OHWM can occur at other times of the year but would adhere to conservation measures such as wildlife seasonal restrictions and the use of erosion and sediment control BMPs. • Post-project revegetation will take place during wet conditions (fall/winter) and will generally occur in riparian areas to maximize use by fish and wildlife species.
Duration	Each restoration effort would be completed in 1-2 construction seasons with the exception of related vegetation management, monitoring, and adaptive management actions.
Monitoring Metrics	Linear feet of streambank stabilized

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Aquatic, Wetland, Meadow, Riparian, and Upslope Habitat Enhancement, Including Removal of Nonnative Invasive Species and Revegetation with Native Plants	
Condition, Situation, Trigger	In aquatic, wetland, meadow, riparian, and upslope areas within the watershed where the vegetative community has been disturbed by past land practices, wildfire, introduction of nonnative species, or construction activities and where habitat functions (e.g., water quality, biodiversity, etc.) are not properly functioning.
Applicable ACS Objectives	8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability. 9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species
Proposed Treatments	"Aquatic, Wetland, Meadow, Riparian, and Upslope Habitat Enhancement" may involve: removing nonnative terrestrial and aquatic invasive plant species by manual and mechanical methods (i.e., no herbicides); removal of legacy ditches (from prior activities such as mining); removing trees where necessary for watershed restoration (and salvaging for instream placement when appropriate); and revegetating areas with native herbaceous plants (including sedges, rushes, grasses, and forbs), shrubs, and trees. In addition, this activity category includes gathering and installing willow cuttings, stakes, mats, and fences; temporary irrigation; and coordination with upstream operators to control dam releases or instream flow levels to provide water during plant establishment. There are a number of manual and mechanical non-native invasive plant removal methods including prescribed burning, mowing, prescribed grazing, etc. The "Aquatic, Wetland, Meadow, Riparian, and Upslope Habitat Enhancement" activity category would potentially be implemented in correspondence to any of the other restoration activity categories.
Equipment Used	Hand tools, self-propelled logging yarders, excavators, backhoes, dump trucks, chainsaws, and hydraulic post pounders.
Timing	• In-water work would be restricted to the dry season (June 15 to October 15 for tributaries and July 15 to October 15 for the mainstem). Work in intermittent streams may continue beyond November 1, as long as weather conditions permit, and the stream channel remains dry. • Work above OHWM can occur at other times of the year but would adhere to conservation measures such as wildlife seasonal restrictions and the use of erosion and sediment control BMPs. • Post-project revegetation will take place during wet conditions (fall/winter) and will generally occur in riparian areas to maximize use by fish and wildlife species. • Tree removal, clearing, and grubbing during the bird nesting season (January 1 through August 31 for raptors; mid-March through August 15 for non-raptors) would be avoided to the extent possible. When tree removal, clearing, and grubbing activities cannot avoid the bird nesting season, nest clearance surveys per the California Fish and Game Code guidance would be required.
Duration	Each restoration effort would be completed in 1-2 construction seasons with the exception of related vegetation management, monitoring, and adaptive management actions.
Monitoring Metrics	Acres of area restored with native vegetation; acres of invasive plant removal

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Road Decommissioning, Maintenance, and Rehabilitation	
Condition, Situation, Trigger	Locations where road-cuts, fill-slopes along roads, and infrastructure (much of which is aging) are not functioning properly as well as locations where roadside drainage is inadequate as shown by rilled or rutted roads and gullied roadside ditches. These conditions have resulted in fine sedimentation, stream channel erosion, and other road-related conditions that are degrading downslope aquatic habitat. In addition, locations along roadways with undersized, deteriorated, misaligned, or otherwise dysfunctional culverts or bridges that warrant replacement.
Applicable ACS Objectives	3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations. 4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities. 5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.
Proposed Treatments	• "Road Maintenance" includes: grading; rocking; and clearing, repairing, or adding drainage structures on existing roads to spread out overland flows and minimize erosion and sedimentation improving downslope hydrologic function. • "Road Rehabilitation" includes out-sloping (shaping the roadway surface to drain toward the fill slope or outside edge of the hillside), roadway rocking, installing rolling dips, the addition of water energy dissipaters, the addition of new drainage structures, addressing subsurface water (e.g., underdrains, French drains, French mattresses, permeable fills, etc.), culvert and bridge replacement, and the installation of rock buttresses to stabilize slopes (following slope failures) in an effort to improve drainage and minimize erosion and sedimentation. Constructing or installing a stream crossing, culvert, or bridge may include site excavation, formation, and pouring of a concrete foundation and walls/abutments; installation of metal piles using impact driving techniques for permanent and/or temporary bridge structures; installation of the crossing structure; and placement of bioengineered or rock slope protection (RSP) to protect abutments, piers, and walls. • "Road Decommissioning" includes removing stream-crossing structures, culverts, fords, and other types of stream crossings (e.g., "Humboldt crossings"). Depending on slope, soil type, and other factors, these activities could also include reshaping, ripping, removing berms, seeding, and mulching the decommissioned roadway surface. If the decommissioned road surface is sloped at all, outsloping would need to occur to the extent feasible so that it self-drains. If the decommissioned road surface drains onto unstable highly erodible slopes, it is appropriate to leave a berm in this area to prevent further erosion of soils.
Equipment Used	Excavators, graders, compactors, backhoes, pavers, cranes, vibratory and impact pile drivers, bulldozers, dump trucks, front-end loaders, and similar equipment may be used to implement these roadway projects.
Timing	• In-water work would be restricted to the dry season (June 15 to October 15 for tributaries and July 15 to October 15 for the mainstem). Work in intermittent streams may continue beyond November 1, as long as weather conditions permit, and the stream channel remains dry. • Work above OHWM can occur at other times of the year but would adhere to conservation measures such as wildlife seasonal restrictions and the use of erosion and sediment control BMPs. • Post-project revegetation will take place during wet conditions (fall/winter) and will generally occur in riparian areas to maximize use by fish and wildlife species.
Duration	Each restoration effort would be completed in 1-2 construction seasons with the exception of related vegetation management, monitoring, and adaptive management actions.
Monitoring Metrics	Number of culverts and stream crossings replaced or removed; linear feet of roadway/trail improved or decommissioned; linear feet of roadway out-sloped

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Appendix I: Water Quality and Hydrology Technical Report

Public Draft

WATER QUALITY AND HYDROLOGY TECHNICAL REPORT

TRINITY RIVER WATERSHED RESTORATION PROJECT

CGB-ED-2025-034
DOI-BLM-CA-N060-2025-0010-EA
PROJECT #63121 (FOREST SERVICE)

MARCH 2025

Prepared by: Christine Mai, Shasta-Trinity National Forest, Watershed Program Manager
Reviewed by: Elisabeth Bowers, Ironwood Consulting, Inc., Senior Biologist

Project Proponent and Federal Lead Agency:
U.S. Department of the Interior, Bureau of Reclamation

Federal Cooperating Agencies:
U.S. Department of the Interior, Bureau of Land Management
U. S. Department of Agriculture, Forest Service

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ACRONYMS AND ABBREVIATIONS

Acronym	Definition
ACS	Aquatic Conservation Strategy
AREMP	Aquatic and Riparian Effectiveness Monitoring Program
BLM	U.S. Bureau of Land Management
BMPs	Best Management Practices
CFR	Code of Federal Regulations
CR	Congressionally Reserved Lands
CVP	Central Valley Project
DOI or USDI	U.S. Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
GPM	General Protection Measure
HUC	Hydrologic Unit Code
LRMP	Land Resource Management Plan
LSR	Late Seral Reserves
NCIP	Northwest California Integrated Resource Management Plan
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NWFP	Northwest Forest Plan
Project	Trinity River Watershed Restoration Project
Reclamation	U.S. Bureau of Reclamation
Regional Water Board	North Coast Regional Water Quality Control Board
RFO	Redding Field Office
ROD	Record of Decision
RSI	Remote Site Incubation
SLJ	Structured Log Jams

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STNF	Shasta-Trinity National Forest
TMC	Trinity Management Council
TMDL	Total Maximum Daily Load
TRRP	Trinity River Restoration Program
TRFES	Trinity River Flow Evaluation Study
USDA	U.S. Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

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Executive Summary

This Technical Report analyzes the effects to the physical attributes of the Trinity River watershed, specifically water quality and hydrology, as a result of activities proposed as part of the Trinity River Watershed Restoration Project (Project). A detailed list of all general protection measures (GPMs), design guidelines, and conservation measures (CMs) by resource are included in Appendix B of the EA. This effects analysis (summarized below) considers both a Proposed Action and a No Action alternative and focuses on the watershed processes, characteristics, and conditions that would be changed with and without implementation of proposed restoration activities.

Table ES - 1. Summary of Project effects to the water quality and hydrology of the Trinity River watershed.

Attributes	Effects Summary
Water Quality	• Ground-disturbing restoration activities would have minor short-term sedimentation and turbidity effects to varying degrees. The duration of most turbidity plumes would be limited to hours or days, though large projects may continue to produce turbidity (though gradually declining) for weeks. Pulses of turbidity would be anticipated as flow is returned to the dewatered or dry channels. Turbidity may also occur during the first storm event following restoration. • Minor short-term increases in stream temperatures due to construction-related disturbance of riparian vegetation along stream channels and work area isolation/dewatering activities. • Long-term minor beneficial effects to water quality because of an increase in sediment storage capacity within Project waterways; a decrease of sediment discharge and roadway runoff as a result of the maintenance and decommissioning of roads; and improvements to water temperatures with installation of instream habitat features, aquatic and riparian habitat enhancements, and improved floodplain connectivity.
Hydrology	• Long-term minor beneficial effects to instream flow in Trinity River tributaries as a result of water conservation activities.

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1 Proposed Action

The Trinity River Restoration Program (TRRP) under the Bureau of Reclamation (Reclamation) is the lead agency and the U.S. Forest Service (USFS) and Bureau of Land Management (BLM) are cooperating agencies for the Project, the purpose of which is to improve instream and riparian habitat at a watershed scale and to accelerate the recovery of north coast salmon populations (coho salmon, steelhead, and Chinook salmon), thereby fulfilling tribal trust responsibilities and obligations to local communities as well as recreational and commercial fishing industries (per the Shasta-Trinity National Forest [STNF] Land and Resource Management Plan [LRMP], BLM's Redding Field Office [RFO] Northwest California Integrated Resource Management Plan [NCIP], and state and federal recovery plan goals [NMFS 2014; California Department of Fish and Game 2004]).

The following describes the overall objectives of the Proposed Action:

- Restore and improve instream conditions sufficient to support all life stages of salmonids and other aquatic species.
- Restore upstream and downstream fish passage for all life stages of salmonids.
- Restore continuous paths for wood dispersal, nutrient cycling, sediment transport, and movement of other vegetative material essential for productive aquatic habitat.
- Maintain or restore native plant communities and vegetative structure impacted by invasive plants and pathogens, while rehabilitating eroding streambanks to improve water quality, shade conditions, and large wood recruitment.
- Repair, replace, or remove ineffective instream structures.
- Restore and improve riparian and meadow habitat in order to promote healthy conditions for aquatic and terrestrial wildlife populations.
- Improve late summer/fall base flow conditions through process-based restoration, water conservation improvements, and meadow restoration.

The Proposed Action consists of a suite of instream and riparian restoration activities that are designed to meet the objectives described above. Detailed descriptions of each of the proposed activity categories are included in Chapter 3 of the Project's Environmental Assessment (EA) document. Proposed Activities are grouped into three general categories: instream habitat restoration; upslope habitat restoration; and road maintenance, rehabilitation, and decommissioning activities. The activities proposed under each of these categories are summarized below.

Instream Habitat Restoration:

- Restoration and Enhancement of In-Channel Habitat
- Floodplain Restoration
- Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures
- Water Conservation Projects

- Salmon Carcass Placement
- Remote Site Incubators

Upslope Habitat Restoration:

- Bioengineered Bank Stabilization
- Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement

Road Maintenance, Rehabilitation, and Decommissioning Activities:

- Road Maintenance
- Road Rehabilitation
- Road Decommissioning

The proposed activities would occur within a portion of the Trinity River watershed shown in Figure 1-1 below. Individual restoration actions would take place in and along tributaries of and the mainstem Trinity River (both above and below the Lewiston and Trinity dams) on both private (with permission of the landowner) and public lands (primarily managed by USFS and BLM).

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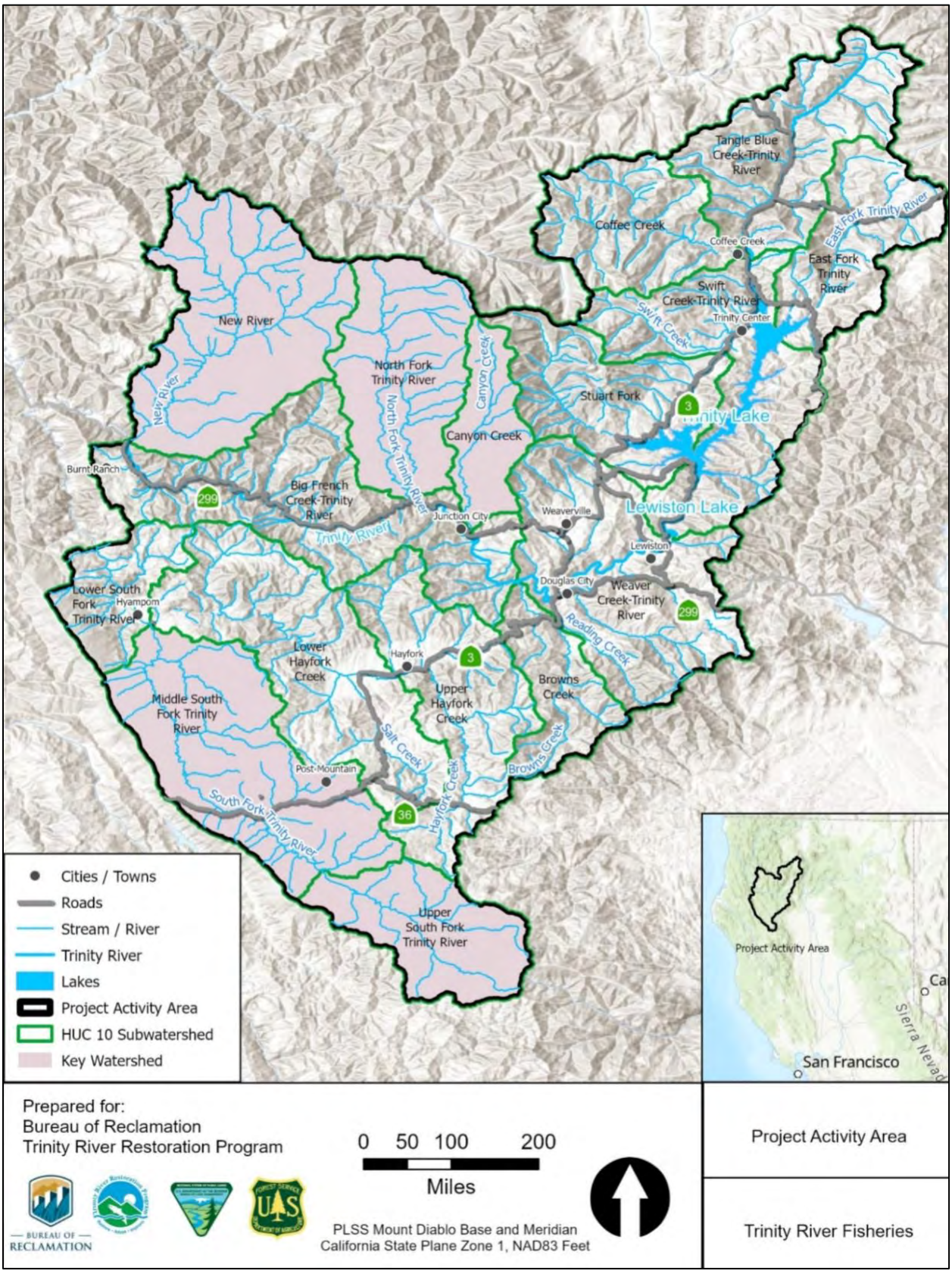

Figure 1-1. Project Activity Area (including Key Watersheds)

Key watersheds (further described below) within the restoration activity area include North Fork Trinity River, South Fork Trinity River, Canyon Creek, and New River. These watersheds are particularly important because of the instream habitat that they provide for aquatic species. Within these watersheds, new roads are prohibited in roadless areas, and a no net increase of roads outside roadless areas is enforced by the USFS with the intent of preventing further habitat degradation.

For the EA, including this technical report, effects analyses were performed for each of the hydrological unit code 10 (HUC 10) watersheds. See Table 1-1 below for watersheds included in the Project activity area.

Table 1-1. HUC 10 Watersheds within the Trinity River Basin.

Subregion (HUC 4)	Basin (HUC 6)	Subbasin (HUC 8)	Watershed (HUC 10)	HUC 10 Number	Acres in Project Activity Area
Klamath-Northern California Coastal 1801	Northern California Coastal 180102	Trinity California 18010211	Big French Creek-Trinity River[1]	1801021111	153,325
			Browns Creek	1801021106	47,110
			Canyon Creek[4]	1801021108	41,033
			Coffee Creek	1801021101	74,835
			East Fork Trinity River	1801021103	74,335
			Horse Linto Creek-Trinity River[2]	1801021112	0
			New River[4]	1801021110	149,597
			North Fork Trinity River[4]	1801021109	97,483
			Stuart Fork	1801021104	88,264
			Swift Creek-Trinity River	1801021105	121,055
			Tangle Blue Creek-Trinity River	1801021102	101,393
			Weaver Creek	1801021107	142,030
		South Fork Trinity 18010212	Lower South Fork Trinity River[3,4]	1801021205	44,229
			Lower Hayfork Creek	1801021203	142,161
			Upper Hayfork Creek	1801021202	105,697
			Middle South Fork Trinity River[4]	1801021204	145,776
			Upper South Fork Trinity River[4]	1801021201	73,634

1. A portion of Big French Creek is excluded from the Project activity area, namely the Sharber Creek HUC 12 subwatershed, because it is in the Six Rivers National Forest.
2. Horse Linto Creek is located in the Six Rivers National Forest and is not included in the Project activity area.
3. A portion of Lower South Fork Trinity River is excluded from the Project activity area, namely Grouse, Mingo, and Old Campbell Creeks (HUC 12 subwatersheds), because they are located in the Six Rivers National Forest.
4. ACS Key Watersheds

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2 Environmental Setting

The Trinity River basin is 2,861 square miles and is the largest tributary to the Klamath River. From Lewiston Dam, the Trinity River flows westward for 112 miles then enters the Klamath River near the town of Weitchpec, California. The Trinity River passes through Trinity and Humboldt counties and the Hoopa Valley (Hoopa Tribe) and Yurok Indian Reservations. The Klamath River flows northwesterly for approximately 40 miles from its confluence with the Trinity River before entering the Pacific Ocean near Requa, California.

The Trinity River originates in the rugged Salmon-Trinity Mountains of northern California in the northeast corner of Trinity County, California. It is located within two different geologic provinces, the inland Klamath Mountain and Coast Range provinces. Plate tectonics processes took a relatively thin oceanic plate and collided with a thicker, more buoyant continental crust, uplifting and deforming it to produce today's complex landscape. The Coast Range Province, which consists primarily of the Franciscan Assemblage and the South Fork Mountain Schist which is composed of generally unstable rocks of sedimentary and volcanic origin. The majority of the Trinity River basin lies within the Klamath Mountain Province to the east, formed by older metamorphic and igneous intrusive or plutonic rocks. Large granitic intrusions exist in the headwaters of Grass Valley Creek and along Rush and Weaver creeks, all originating in the Trinity Alps. Highly erodible slopes in these tributaries are a chronic source of fine sediment to the Trinity River system.

The Trinity River is an important water source for irrigation, hydroelectricity generation, and provides important habitat for threatened and endangered salmonid species. River channels are formed and maintained by the dynamic interaction of three primary components: sediment of various size classes, varying quantities and ages of vegetation, and varying amounts of water. Complex interactions between these three components define the geomorphic environment and provide a diversity of physical structures (TRRP 2007). This complexity provides a variety of riverine and riparian habitats that can be used by different species under a range of flows.

2.1 Water Quality

The Proposed Action is subject to compliance with the Basin Plan (North Coast RWQCB 2011). The beneficial uses for the Trinity River are outlined in Table 2-1 of the Basin Plan. In addition to municipal and domestic water supply, the beneficial uses affected by the water quality of the Trinity River are primarily those associated with supporting high-quality habitat for fish. Recreation (contact and non-contact) is another important beneficial use potentially affected by various water quality parameters (e.g., sediment and temperature). The Basin Plan identifies both numeric and narrative water quality objectives for the Trinity River.

Every six years the Regional Water Board evaluates water quality information and identifies waterbodies that do not meet water quality standards and are not supporting their beneficial uses. Those waters are placed on a list of impaired water bodies that identifies the pollutant or stressor causing impairment and establishes a schedule for developing a control plan to address the impairment (North Coast RWQCB 2024). The Trinity River basin is listed as impaired for several parameters as summarized in Table 2-1 below.

Table 2-1. Impaired Waterbodies within the Trinity River basin.

Waterbody Name	Listing Extent	Parameter
Lower Trinity River HA[1]	Entire waterbody except: (1) the New River and its tributaries, (2) Big French Creek and its tributaries, (3) the North Fork Trinity River and its tributaries, including the East Fork North Fork Trinity River and its tributaries, and (4) Manzanita Creek and its tributaries.	Sedimentation/ Siltation
Middle Trinity River HA	Entire waterbody	Sedimentation/Siltation
South Fork Trinity HA	Entire waterbody	Sedimentation/Siltation Temperature
Trinity Lake (was Claire Engle Lake)	Entire waterbody	Mercury
Upper Trinity River HA	Entire waterbody except the Stuart Fork and its tributaries	Sedimentation/ Siltation
Upper Trinity HA, Trinity River, East Fork Trinity River	Entire waterbody	Mercury Sedimentation/Siltation

1. HA: Hydrologic Area is a major subdivision of a hydrologic unit utilized by the Regional Water Board in analyzing water quality within waterbodies. Best described as major tributaries of a river, large valley groundwater basin, or a component of a stream or desert basin group.

Section 3.4 of the Trinity River Mainstem Fishery Restoration EIS/EIR (USDI 2000) summarizes the water quality objectives for each of the categories that have been established by the Regional Water Board to protect designated beneficial uses. The 2000 Environmental Impact Statement/Environmental Impact Report (EIS/EIR) also provides a comprehensive discussion of water quality parameters that influence water quality in the 40-mile reach of the Trinity River below Lewiston Dam with respect to the Lower Klamath watershed and the Central Valley.

The discussion below focuses on sedimentation and temperature because these are the parameters that the Proposed Action could affect.

2.1.1 Suspended Sediment and Turbidity

The Trinity River was added to the Environmental Protection Agency's (EPA's) list of impaired rivers in 1992, under the provisions of Section 303(d) of the Clean Water Act, in response to the State of California's determination that the river's water quality standards were not being met due to excessive sediment. In 1998, the EPA established a Total Maximum Daily Load (TMDL; EPA 1998) for sediment in the South Fork Trinity River and Hayfork Creek. In 2001, another sediment TMDL (EPA 1998) was issued for the Trinity River. The Regional Water Board has continued to identify the Trinity River as impaired in subsequent listing cycles.

The primary concern with too much or too little sediment transport within the river is the effect it has on aquatic habitat that supports fish species, including anadromous salmonids. Too much fine sediment in the river and spawning gravels could be smothered; too little sediment in the water and sediment transport decreases to a level where habitat complexity decreases which can also have adverse effects to aquatic fish and wildlife species.

TRRP now reports that Record of Decision (ROD) flows have mobilized the excessive fine sediment from the stretch of river below the dams may now experience a deficit of fine sediment in this area (Buxton 2021). The

primary issue now is that sediment inputs from upstream areas get trapped on the upstream end of the dams. This has contributed to the degraded sediment conditions within the Trinity River mainstem below the dams. The Trinity River now typically runs clear with background turbidity levels in the range of 0 to 1 nephelometric turbidity units (NTU) during low-flow conditions (300 to 450 cfs).

2.1.2 Temperature

Water temperature is one of the most important variables affecting salmonids and other aquatic organisms (Carter 2005). Temperature influences feeding rates and growth, metabolism, development, timing of migration, spawning and rearing, and the availability of food. Water temperatures in the Trinity River are primarily influenced by dam releases, flows, and distance downstream from the Lewiston Dam. TRRP, in collaboration with Reclamation and other decision makers, has been using flow management practices to meet specific temperature management targets, and temperature monitoring data have been collected as part of the Adaptive Environmental Assessment and Management (AEAM) process since 2002.

Since the construction of the Trinity River Division (TRD), discharges from Lewiston Dam have had a significant effect on water temperatures in the Trinity River downstream. Reservoir releases from Lewiston Dam have altered the natural temperature regime, making the river warmer in the winter and colder in the summer than under pre-dam conditions. Depending on the water year type and time of year, this effect diminishes to varying degrees with distance from Lewiston Dam.

Reclamation has worked to meet water temperature objectives and targets for protecting adult salmonids upstream of the North Fork Trinity River (adult holding targets) and out-migrating juvenile salmonids throughout the mainstem river, as measured at Weitchpec (outmigration targets), since the inception of TRRP in 2000. The adult holding temperature targets (Table 2-2) are implemented as part of the Basin Plan and WRO 90-05 and compliance is monitored by the Regional Water Board.

Table 2-2. Basin Plan and WRO 90-05 Temperature Objectives.

Location Measured	Dates	Target or Range
Douglas City	July 1 – September 14	≤60°F (15.5°C)
Douglas City	September 15 – 30	≤56°F (13.3°C)
North Fork Trinity River	October 1 – December 31	≤56°F (13.3°C)

In recent years, there have been studies indicating lower temperatures would be beneficial for coho survival. Recent studies (Martin et al. 2017; Anderson et al. 2022) have found that even the survival of Chinook salmon eggs, which are not as sensitive as coho salmon eggs, decreases rapidly as water temperatures increase above 53.5 °F (11.9°C) under natural spawning conditions. In 2022, TRRP recommended that Reclamation manage instream temperatures to less than 50°F (10°C) between October 1 and December 31, to support the survival of both Chinook salmon and coho salmon eggs in alignment with updated fisheries research.

2.2 Hydrology

California's Mediterranean climate brings challenges with cool, wet winters and hot, dry summers significantly increasing risks of wildfires. All other regions in the United States have precipitation year-round occurring heaviest in the spring and summer. Annual precipitation over the Trinity River watershed averages 57 inches (1,400 mm). Precipitation ranges from 37 inches (940 mm) in lowlands around Weaverville and Hayfork, to as

high as 85 inches (2,200 mm) in mountain ranges closer to the coast. The high rainfall rates combined with rugged geography results in rapid runoff and a high risk of flooding during winter storms. Large volumes of rock and sediment carried by floods are spread along the rivers forming wide alluvial channels.

The Trinity River is predominantly a rain-fed river below Lewiston and Trinity dams. The highest flows occur between December and April. Large intense Pacific storms (often referred to as the Pineapple Express) frequently strike California's north coast causing rapid runoff events and flooding. Little to no precipitation occurs in summer (August through October) and very low flow and warm waters limit available fisheries habitat during this time. The primary source of summer flow is groundwater base flow and snowmelt (when snowfall persists at higher elevations).

Historically, the Trinity River functioned as a dynamic river reach that provided quality spawning and rearing habitat for anadromous fish. Gold was found by settlers at Reading Bar near Douglas City in 1848 and by 1849 the Gold Rush was in full swing. The mining practices and water diversions that were constructed wreaked havoc in Northern California, including the Trinity River basin. Roads were built to access gold rapidly. The steep rugged terrain and complex geology of the region did not impede development. The construction of Trinity Dam (California's 3rd largest reservoir holding 2.4 million acre-feet [MAF]) began in 1956 and was finished in 1960 as part of the Central Valley Project (CVP) to divert water to the Sacramento River Basin. Lewiston Dam was completed in 1963 as the afterbay of the Trinity Power Plant. These Trinity River components of the CVP form the TRD.

After the establishment of the TRD, flow regulation on the Trinity River eliminated nearly all high flows adequate to form and maintain the alluvial river, and reduced scour by winter floods downstream of Lewiston (USFWS and HVT 1999). At times (starting in 1964), 90% of the Trinity River flow was diverted to the Sacramento River basin, also contributing to the decline of Chinook salmon, coho salmon, and steelhead (NMFS 2014). To address these precipitous declines, numerous pieces of legislation and a decades-long study led to the completion of the Trinity River Flow Evaluation Study (TRFES) by USFWS and HVT (1999) and the subsequent Trinity River FEIS and ROD. Following the signing of the ROD, the Department of the Interior (DOI) established the TRRP and opened Reclamation's TRRP office in 2002 to coordinate and oversee the restoration of fish and wildlife populations of the Trinity River affected by dam construction and related diversions. The TRRP is mandated by Congress to restore anadromous fisheries to pre-dam levels and implements variable annual instream flows ("ROD releases") to improve habitat-forming flows within the Trinity River. ROD releases from Lewiston Dam are determined by the TRRP through the recommendations of the Trinity Management Council (TMC). In addition, today, flow diversion from the Trinity River basin to the Sacramento River basin has been adjusted so that about 50% of flows are kept in the Trinity River system downstream of the dams.

Until recently, TRRP flow management resulted in most of the annual water volume being released after April 15 with a baseflow of 300 cubic feet per second (cfs) for seven months of the year (October to April) when streams in the region experience their largest and most variable flow events. During the first half of the water year (October 1 to April 15), the flow regime released approximately 20% of the entire water year's total flow. Without the operation of Trinity and Lewiston dams, approximately 50% of the total flow during the water year would occur between October 1 and April 15. However, starting in water year 2024, the TMC approved the TRRP-recommended winter variable flows and implementation of this program is underway. This program aims to mimic a more natural flow regime in support of the anadromous fisheries in the Trinity River. Undammed

tributaries to the Trinity River naturally flow higher during winter storm events and as high-elevation snowpack melts in early spring.

2.3 Aquatic Conservation Strategy

The Northwest Forest Plan (NWFP) developed an aquatic conservation strategy (ACS) with the primary objective of maintaining and restoring degraded habitats and ecosystem health at watershed and landscape scales. While promoting enhanced species distribution, diversity, and complexity of watershed-level features and processes to which aquatic and riparian species are uniquely adapted. This approach seeks to prevent further habitat degradation and restore habitat over broad landscapes as opposed to implementing individual projects or focusing on small watersheds. The objectives and components of the ACS are described further below.

2.3.1 ACS Components

- **Key Watersheds** (See Figure 1-1 and Table 2-1 above) – Four key watersheds within the Project activity area are the North Fork Trinity River, South Fork Trinity River, Canyon Creek, and the New River. New roads are prohibited in roadless areas, and a no net increase of roads outside roadless areas is enforced. USFS manages four primary tier key watersheds in the upper Trinity River watershed, primarily associated with the Trinity Alps Wilderness Area.
- **Watershed Analysis** – This process is used by BLM and USFS to summarize the existing characteristics of the watershed and is discussed more below.
- **Riparian Reserves** – These areas include all permanently flowing and intermittent streams, lakes, and wetland areas that are greater than one acre. Riparian reserves are commonly considered to as a buffer zone around stream courses.
- **Watershed Restoration** – Restoration activities have been implemented as part of the NWFP over time and the results of which are monitored by the Aquatic and Riparian Effectiveness Monitoring Program (AREMP). Some of this program's results related to water quality are discussed below.

2.3.2 Watershed Analysis

Per NWFP guidance, many watersheds in the Trinity River Basin were assessed utilizing the *Ecosystem Analysis at the Watershed Scale, Federal Guide for Watershed Analysis* (Regional Interagency Executive Committee and Intergovernmental Advisory Committee 1995). A watershed analysis describes not only the general location, local setting, and communities within; but also the climate, geomorphology, geology, soils, historic value, recreation uses, forest plan management direction, and goals for future restoration.

Watershed analysis/assessment reports[1] have been prepared for watersheds within the Project activity area and are in the process of being updated to reflect changed conditions such as wildfire and watershed restoration. These are listed below.

Trinity River (18010211):

[1] "Watershed Analysis/Assessment Reports" can be found at: https://www.fs.usda.gov/main/stnf/landmanagement/planning

- Big French Creek (2017/2010)
- Burnt Ranch and Soldier Creek (2009)
- Upper Trinity River (Trinity River, Coffee Creek, East Fork Trinity River, Stuart Fork, Trinity Reservoir; 2005)
- Weaverville (Weaver and Rush creeks 2005)
- North Fork Trinity River, East Fork North Fork Trinity River, and Canyon Creek (2003)
- Mainstem Trinity River (1995)
- South Fork Trinity River (18010212):
- Eltapom Creek and Corral Creek (2017)
- Hyampom Watershed (2011)
- Big Creek (2008)
- Hidden Valley, Plummer Creek and Rattlesnake Creek (2001)
- Middle Hayfork and Salt Creek (2000)
- Upper South Fork Trinity River - Happy Camp Creek (1999)
- East Fork/Smoky Creek (1998)
- Upper Hayfork Creek (1998)
- Lower Hayfork (1996)
- Butter Creek (1994)

By its nature, this Project is a comprehensive ecosystem restoration project intended to restore the physical processes and biological resources of the Trinity River watershed. The scope and scale of this Project promotes activities for restoration of ecological processes and functions that are expected to be consistent with the ACS. As project activities would be accomplished at the watershed scale, resource specialists completed their analysis using a conservative approach, analyzing all areas where proposed project activities would be feasible and appropriate. The intent of the Proposed Action is to enhance habitat function in the watershed, increasing its resilience to a changing climate (including wildfires), while restoring and conserving anadromous fish habitat, and ultimately meeting ACS goals and objectives.

2.3.3 Effectiveness Monitoring Results

Displayed below are monitoring results specific to sedimentation provided by of the Aquatic and Riparian Effectiveness Monitoring Program (AREMP, Dunham et al. 2023) that show a decrease in annual fine sediment in sampled subwatersheds within Late Seral Reserve (LSR), Matrix, and Congressional Reserve (CR) forest stands over time.

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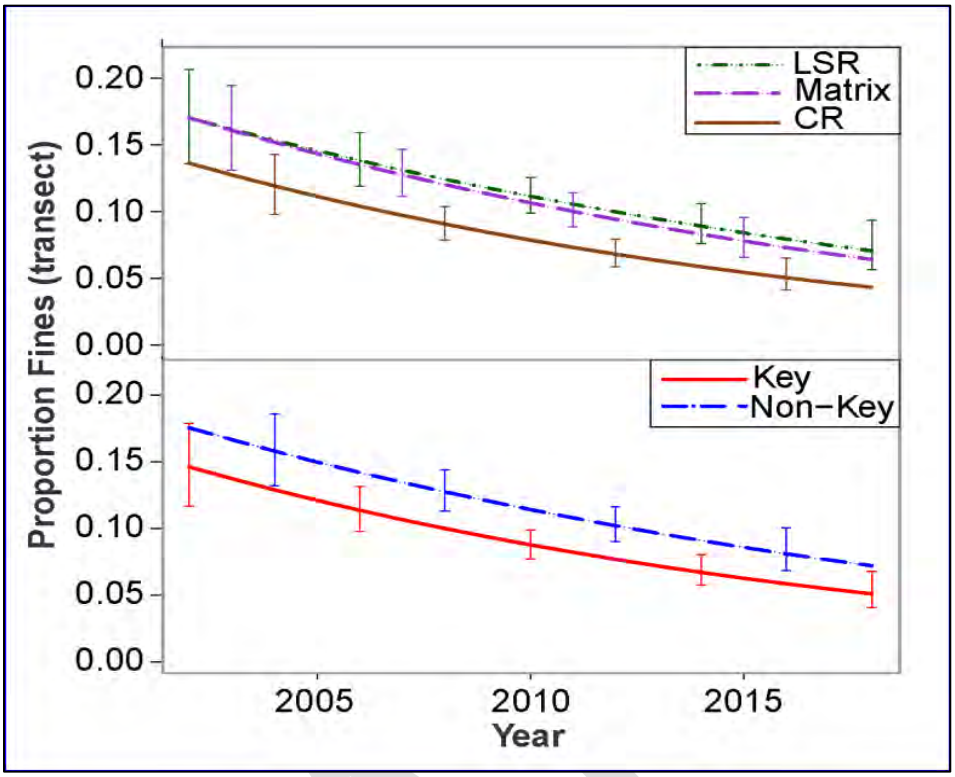

Figure 2-1. Trends in Proportion of Instream Fine Sediments from Transect-based Sampling for the 2002-2018 Time Period by Key and Non-Key Watershed in LSR, Matrix, and CR forest stands (Dunham et al. 2023).

These results indicate that aquatic habitat conditions are improving, in terms of fine sediment deposits, within both actively managed matrix lands as well as within reserves since the Northwest Forest Plan (NWFP) was initially developed. This and other indicators of the long-term benefits of watershed restoration activities are being monitored over time. The Project would be a continuation of these restoration efforts and was developed using the ACS objectives that would benefit populations of native cold-water fishes throughout their life cycles (Beechie et al. 2013, Bisson et al. 2009).

3 Environmental Consequences

Key considerations for the analysis of potential Project effects to the Trinity River basin include the current state of the watershed and the scope and nature of Project activities. This analysis looks at short- and long-term effects to the Trinity River basin. Short-term effects to waterways as a result of construction impacts are commonly related to ground disturbance with the floodplains, streambeds, or streambanks. Long-term effects are caused by the action and are later in time or farther removed in distance. Long-term effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

As previously mentioned, individual restoration actions would take place in and along tributaries of and the mainstem Trinity River (both above and below the Lewiston and Trinity dams) on both private and public lands. Key watersheds within the restoration activity area include North Fork Trinity River, South Fork Trinity River, Canyon Creek, and New River. Through coordination between TRRP, BLM, and USFS, it was determined that an effects analysis performed at the HUC 10 watershed scale would be sufficient to adequately characterize Project effects. Therefore, 16 HUC 10 watersheds are analyzed in this report. See Table 1-1 for HUC 10 names and acreages and Figure 1-1 for an overview map.

For the effects analysis related to hydrology and water quality as a result of the Project, the intensity of effects is described using the following terms:

- Negligible: Effects would not be measurable and have no perceptible consequences.
- Minor: Effects are detectable but are small and localized.
- Moderate: Effects are detectable, can be measured, and cover a larger area (e.g., a tributary stream).
- Major: Effects are easily measured, regional, and at the HUC 10 watershed-scale.

3.1 Affected Environment

The more ground disturbance and terrestrial habitat alteration there is within a watershed, the greater the potential there is for ongoing water quality issues. In addition, the more ground disturbance there is, the greater the opportunity there is for reducing and controlling disturbance footprints, restoring soil compaction, controlling surface runoff, promoting ground cover and reducing erosion potential. Therefore, HUC 10 watersheds have been characterized in Table 3-1 below by disturbance data compiled by the USFS. This information shows which HUC 10 watersheds have been subject to alteration and also where there is the most net benefit to be gained by addressing these issues. Disturbance concerns used to characterize each watershed include the following:

- High road/trail density (>5 miles/sq mi). Linear features, particularly roads, are one of the biggest disturbances known for being chronic sources of erosion and sedimentation.
- Wildfires that burn a significant portion of a watershed (>20%) at high and moderate severities often destroy existing vegetation and the protective soil groundcover. High intensity wildfires can cause hydrophobic soils that increase overland flow and can cause significant erosion. Severe wildfire effects can damage a watershed for decades.

- High percentage of the watershed that has been harvested over an extended period of time (1950's to the present). Watersheds with 50% or more of the drainage area harvested likely have compacted soils that interfere with drainage patterns and plant growth.
- Powerlines have similar erosion and sedimentation impacts as roads. They are often a source of disturbance in a watershed that get used as roadways or trails for recreation and hunting.

Table 3-1. Watershed Conditions Summary in Project Activity Area.

HUC 10 Watershed Name	Acres in Project Activity Area	Total Number of HUC 14 Drainages	HUC 14's with High Road/Trail Density	HUC 14's with >20% High or Moderate Burn Severity	HUC 14's with >50% Harvested	Power-lines
Big French Creek-Trinity River[1]	153,325	16	0	10	0	9
Browns Creek	47,110	6	3	1	4	3
Canyon Creek[2]	41,033	12	1	7	2	7
Coffee Creek	74,835	11	0	0	0	1
East Fork Trinity River	74,335	11	5	1	5	0
New River[2]	149,597	21	0	4	0	0
North Fork Trinity River[2]	97,483	14	0	2	0	3
Stuart Fork	88,264	15	5	1	2	8
Swift Creek-Trinity River	121,055	5	1	0	1	1
Tangle Blue Creek-Trinity River	101,393	16	2	0	1	4
Weaver Creek	142,030	7	4	0	1	7
Lower South Fork Trinity River[2,3]	44,229	7	1	5	0	6
Lower Hayfork Creek	142,161	14	4	12	0	6
Upper Hayfork Creek	105,697	21	10	13	3	14
Middle South Fork Trinity River[2]	145,776	15	5	0	0	6
Upper South Fork Trinity River[2]	73,634	12	1	3	0	0

1. A portion of Big French Creek is excluded from the Project activity area, namely the Sharber Creek HUC 12 subwatershed, because it is in the Six Rivers National Forest.
2. ACS Key Watersheds
3. A portion of Lower South Fork Trinity River is excluded from the Project activity area, namely Grouse, Mingo, and Old Campbell Creeks (HUC 12 subwatersheds), because they are located in the Six Rivers National Forest.

3.2 Effects to Water Quality and Hydrology

The Proposed Action has been specifically designed to improve riparian and aquatic habitat conditions, aligning with ACS objectives, and promote the enhancement and restoration of watershed within the Trinity River basin more rapidly than would occur if the No Action alternative was selected. If the No Action alternative was selected, it is likely that similar restoration projects would be implemented over time in the basin; however, these projects would take longer to plan and permit compared to the Proposed Action alternative, so improvements to hydrology and water quality would be realized more slowly within the Project activity area.

3.2.1 Water Quality

Construction activities would affect water quality, specifically sedimentation, turbidity, and potentially temperature. Another concern would be chemical contamination related to potential fuel and fluid leaks from heavy equipment or contaminated sediment being released with the removal of instream structures. However, the probability of such an uncontrolled event is low with the implementation of the best management practices (BMPs) provided in Appendix B of the EA. Therefore, chemical contamination will not be discussed further in this document.

3.2.1.1 Sedimentation and Turbidity

Many of the proposed activities are designed and would be implemented to restore more natural watershed processes that influence the production, transport, and deposition of sediments throughout watersheds and their stream and river networks. Project restoration activities would have short-term adverse effects on water quality to varying degrees; however, in the long-term the implementation of multiple restoration activities across the basin would be expected to improve instream sediment and turbidity conditions overall.

Project restoration activities involving construction with heavy machinery and earthmoving create the greatest potential for sediment and turbidity concerns. Restoration and Enhancement of In-Channel Habitat; Floodplain Restoration; Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures; Water Conservation Projects; Bioengineered Bank Stabilization; and Road Maintenance, Rehabilitation, and Decommissioning Activities would be those most likely to produce short-term construction-related sedimentation and turbidity impacts. The duration of most turbidity plumes would be limited to hours or days, though large projects may continue to produce turbidity (though gradually declining) for weeks. Actions in other activity categories have minor, if any, construction components.

Table 3-2. Sedimentation and Turbidity Effects Summary by Restoration Activity

Activity Category	Sedimentation and Turbidity Construction-Related Effects
Restoration and Enhancement of In-Channel Habitat	• Exposing, or reactivating existing off- or side-channels by removing fill plugs, would mobilize site or stream-reach sediment and increase turbidity either during initial water flows or during the first high flows. • Resulting sediment plumes would be most concentrated within, and immediately downstream of, the immediate action area during construction activities. For most actions, these plumes would extend no more than a few hundred feet. • Instream log and boulder placements would require the use of heavy equipment in riparian areas and stream channels. Sediment delivery to streams would occur when excavators disturb streambanks as they travel access routes between existing roads where materials are staged and the channels where the materials are placed. The volume of soil displaced would be small (less than two cubic yards) per access route.
Floodplain Restoration	• Short-term inputs of sediment would result from ground disturbance such as removal of levees, berms, and dikes; opening of side channels; stream channel reconstruction; and other activities that occur inside the bankfull channel.

Activity Category	Sedimentation and Turbidity Construction-Related Effects
Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures	• Removing large instream structures would potentially cause the release of sediment stored over time behind the structure. As the structures are notched or removed, an immediate increase in suspended sediment and turbidity would be anticipated. Downstream habitats would likely be degraded for a short period of time. • The removal of fish passage barriers that had also restricted natural hydrologic flows would restore a more natural and functional hydrologic condition, which would be expected to increase transport of sediment downstream.
Water Conservation Projects	• Water conservation projects would adversely impact water quality in the short-term where heavy equipment is used in and along streams in the course of removing improving or consolidating water diversions, fish screens, or other associated structures. In the long-term, more flow would remain in streams resulting in improved sediment transport conditions.
Bioengineered Bank Stabilization	• After the installation of bioengineered bank stabilization techniques, the first few higher-flow events of the rainy season would result in increased turbidity and sediment transport. This volume of action-related soil or sediment transport, however, would represent a small fraction of the sediment that naturally moves through and deposits in a stream reach in any one season.
Road Maintenance, Rehabilitation, and Decommissioning Activities	• There may be a slight increase in short-term sediment delivery by these actions if immediately adjacent to waterways, but for most actions, heavy equipment operation would be far enough from streams that catchment and avoidance and minimization measures would be effective in preventing the majority of sedimentation impacts. • Removing culverts and their associated fill and replacing undersized culverts with culverts and bridges of sizes to accommodate high flows could mobilize sediment for deposition downstream, which would increase sediment and turbidity in the short-term (days to weeks). The size of the stream and culvert being removed or replaced would correspond to the amount of sediment potentially mobilized. Larger culverts would generally produce more sediment than small culverts. • If non-fish-bearing culverts are replaced, these are generally smaller than fish-passage culverts so the volume of material moving downstream beyond the culverts would also be smaller (i.e., a few cubic yards per pipe).

In the long-term, the Project restoration activities proposed would have several beneficial long-term effects. These are summarized below.

Adding channel roughness, such as boulders, structured log jams (SLJs), and loose wood placements, would increase the sediment storage capability within Project waterways. One or more of these added instream habitat features could capture tens to hundreds of cubic yards of sediment and wood that would otherwise be lost through annual stream flows in the absence of placed structures.

Restoring floodplain connections by decommissioning roads and removing their associated culverts and cross-drains, paired with floodplain restoration activities, would increase sediment storage within its reconnected floodplain. Studies indicate that road decommissioning would reduce human-caused sediment to streams. One study (Black et al. 2017) noted an 80% reduction in sediment delivery to streams in National Forests in the Pacific Northwest, Northern, and Intermountain Forest Service Regions.

Newly constructed meandering stream channels established through channel reconstruction or relocation would be more sinuous than the relatively channelized stream that they replace. This would allow for an increase in sediment sorting and storage and would restore natural aquatic habitat forming processes.

3.2.1.2 Temperature

The Proposed Action could cause short-term increases in stream temperature due to construction-related disturbance of riparian vegetation along stream channels and work area isolation/dewatering activities. Restoration and Enhancement of In-Channel Habitat; Floodplain Restoration; Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures; Water Conservation Projects; Bioengineered Bank Stabilization; and Road Maintenance, Rehabilitation, and Decommissioning Activities would be those most likely to produce short-term construction-related temperature impacts due to riparian vegetation disturbance and work area isolation/dewatering activities. However, severe short-term water temperature impacts on aquatic life are not expected given the limited geographic scope of these activities, the limited effects within site-specific restoration activity areas, and the fact that site-specific projects would be dispersed in time and space within the watershed.

However, in the long-term, the Proposed Action is anticipated to have minor beneficial effects to water temperatures throughout the Project activity area. These effects, specific to restoration activity category, are described in Table 3-3 below.

Table 3-3. Temperature Long-Term Effects Summary by Restoration Activity.

Activity Category	Long-Term Temperature Effects
Restoration and Enhancement of In-Channel Habitat	• Improving instream habitat complexity through placement of SLJs, boulders, and loose wood can provide shade within the stream channel and may cool water temperatures. • Improving aquatic habitat across the floodplain would improve surface- and ground-water interactions and increase temperature heterogeneity within the floodplain, having long-term water temperature benefits (IMST 2004). • Following construction, riparian areas would be restored with native plants. Depending on the size of the channel and the size class of the plants that can be established in a certain area, taller plants (shrubs and trees) would provide shade, which would have a beneficial long-term effect on water temperatures.
Floodplain Restoration	• Improving aquatic habitat across the floodplain would improve surface- and ground-water interactions and increase temperature heterogeneity within the floodplain, having long-term water temperature benefits (IMST 2004). • Following construction, riparian areas would be restored with native plants. Depending on the size of the channel and the size class of the plants that can be established in a certain area, taller plants (shrubs and trees) would provide shade, which would have a beneficial long-term effect on water temperatures.
Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures	• Morphological changes to downstream aquatic habitat that would occur as a result of improved more natural sediment transport by instream structure removals would create habitat features conducive to cooler water temperatures. • Following construction, riparian areas would be restored with native plants. Depending on the size of the channel and the size class of the plants that can be established in a certain area, taller plants (shrubs and trees) can provide shade, which would have a beneficial long-term effect on water temperatures.

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Activity Category	Long-Term Temperature Effects
Water Conservation Projects	• Water conservation projects would be designed to retain continuity of flow and to reduce summer water temperatures. • Following minor streambank activities, riparian areas would be restored with native plants, which would have a beneficial long-term effect on water temperatures.
Bioengineered Bank Stabilization	• Using bioengineering techniques, streambanks would be restored with native plants. Depending on the size of the channel and the size class of the plants that can be established in a certain area, taller plants (shrubs and trees) would provide shade, which would have a beneficial long-term effect on water temperatures.
Road Maintenance, Rehabilitation, and Decommissioning Activities	• Any removal of road fill from floodplain areas that reconnects floodplain areas would increase overbank flooding and bank storage and sediment stored upstream of removed culverts would mobilize and deposit downstream creating habitat features conducive to cooler water temperatures. • Any riparian areas disturbed during this work would be restored with native plants. Depending on proximity to the stream channel and the size class of the plants that can be established in a certain area, taller plants (shrubs and trees) would provide shade, which would have a beneficial long-term effect on water temperatures.

3.2.2 Hydrology

The majority of the Project restoration activities would alter the geomorphology of stream channels and the conditions of the bed, bank, and floodplain through which water flows; however, would not affect the volume of water flowing through that stream reach. However, the "Water Conservation Project" activity category is intended to increase instream flow in the long-term and thereby improve aquatic habitat. Across the Trinity River basin, water use and associated infrastructure warrant improvement and efficiency upgrades to ensure that instream flows are available for fish and wildlife species and associated habitat. Particularly, wherever there are stream diversions along tributary streams that continue to withdraw water when streamflows are at low-flow conditions water conservation systems are warranted and would be proposed under this restoration activity category.

Many of these water conservation projects, particularly in small tributaries higher in the subwatersheds, could increase instream flows considerably, depending on the size of stream from which water had originally been diverted. These efforts would have minor beneficial effects to hydrology throughout the Trinity River basin. Effects to hydrology in the Trinity River mainstem would likely be negligible since flow is managed with the Trinity and Lewiston dams.

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4 Regional Effects

Regional effects include the short- and long-term impacts of the Project together with the past, present, and future actions of other projects. This analysis looks at other actions that have affected or could affect the same resources as action alternatives, in this case, watershed resources. The effects of past actions are reflected in the descriptions of current existing conditions. Lands in the vicinity of the Project activity area include USFS-, BLM-, and privately-owned land.

4.1 Flow Management

As previously mentioned, flows are highly managed on the Trinity River mainstem. ROD flows are released from the Lewiston Dam to mimic natural Trinity River flows and interact with downstream areas to enhance conditions for all life stages of fish and wildlife. However, about 50% of Trinity River flows are still diverted to the Sacramento River basin. Lower flows cause degradation of aquatic habitat within the Trinity River due to loss of deep-water habitats and a limited ability to maintain water temperatures required for cold-water fish survival. Over time, much of the mainstem between Lewiston and the North Fork Trinity River confluence has been confined to a narrow channel bordered by dense riparian berms. TRRP, upon the recommendations of the TMC, continues to strive toward managing flows in the river to support aquatic habitat downstream of the dams.

4.2 Cannabis Farming

In 2018, the State of California legalized the recreational use of cannabis, as well as the cultivation and manufacture of cannabis plants and products. In Trinity and Humboldt counties, there are many cannabis farms which collectively reduce flow volume and increase discharge of waste and pollutants in streams, which adversely affects water quantity and quality in the Project activity area. Presently, there is no watershed-scale evaluation of the effects of cannabis farming on aquatic habitat in the Trinity River or particular streams (NMFS 2020).

4.3 Residential Development

Residential development as a result of human population growth in the Project activity area is expected to remain relatively stable over the next 10 years. Once development and associated infrastructure (e.g., roads/trails, drainages, powerlines, and water development) are established, the effects to the landscape are typically permanent. Anticipated effects on aquatic resources include loss of riparian vegetation, changes to channel morphology and dynamics, altered hydrologic regimes (e.g., increased storm runoff), increased sediment loading, and elevated water temperatures where shade-providing canopy is removed (NMFS 2020).

The presence of structures, powerlines, and roads/trails near waterways may lead to the removal of large wood features in order to protect infrastructure from flood impacts. Commonly, around residential areas, there are also effects of home pesticide use, stormwater runoff of automobile-generated pollutants, introductions of invasive plant species to riparian areas, and land clearing activities. These all have adverse effects to water quality. However, the population growth rate in Trinity County decreased by about 11% between 2010 and 2019 (U.S. Census Brueau 2020). This may indicate a trend that could ameliorate or reduce the effects of residential development (NMFS 2020).

4.4 Resource Extraction

Resource-based industries are likely to continue to have an influence on environmental conditions within the Project activity area for the indefinite future. Logging continues to be conducted on both public and private lands throughout the tributaries of the Trinity River, except in Canyon Creek (Reclamation 2019). STNF's vegetation management projects include those for forest health/thinning and fuels reduction. Some mining for gravel, aggregate, and minor precious metals occurs on the Trinity River floodplain and a few tributary watersheds. Mining operations can affect coarse sediment supplies and impair water quality via contaminated and sediment-laden runoff from operations. The lack of protective measures in existing regulatory mechanisms, including land management plans (e.g., State Forest Practice Rules), contributes in varying degrees to ongoing water quality issues including sedimentation associated with poor forestry practices and roadbuilding are particularly chronic problems. However, some resource extraction industries have adopted management practices that reduce many of their most harmful impacts, which were unknown or not commonly used until recently (NMFS 2020). The STNF regularly implements forestry projects using resource protection measures and BMPs to reduce sedimentation into streams and otherwise reduce effects to environmental resources.

4.5 Wildland Fire Control

Control of wildland fires may include the removal or modification of vegetation due to the construction of firebreaks or setting of backfires to control the spread of fire. This removal of vegetation can trigger post-fire landslides as well as create chronic sediment erosion that can adversely affect water quality through sedimentation. In addition, the use of fire retardants may cause chemical contamination, adversely affecting water quality if used in a manner that does not sufficiently protect streams (NMFS 2020).

4.6 Aquatic Habitat Restoration

Since 2009, the TRRP has implemented Trinity River mainstem channel rehabilitation projects at all the Phase 1 channel rehabilitation sites named in the 2000 Master EIR and at nine of the Phase 2 sites. The Deep Gulch and Sheridan sites were constructed in 2017. The Bucktail site, constructed in 2008, was expanded in 2016 to include additional areas. The Dutch Creek project was constructed in 2020. The Chapman Ranch Phase A site was constructed in 2019 and the Phase B site was completed in 2021. The Oregon Gulch project was completed in 2023. These mainstem projects have improved anadromous fish spawning and rearing habitat throughout the extent of the Trinity River.

TRRP continues to add sediment within the 40-mile reach downstream of the Lewiston Dam. In addition, TRRP-managed flows have been implemented yearly since 2004. Ongoing monitoring efforts by TRRP partners continue to document improvements in aquatic habitat use, alluvial processes, and riparian vegetative communities along the mainstem. Continued sediment and wood augmentation projects are intended to improve anadromous fish spawning and rearing habitat in the Trinity River mainstem.

Beyond TRRP's mainstem channel rehabilitation and sediment augmentation projects, there have been several restoration and road sediment reduction projects implemented by various agencies and organizations throughout the Trinity River watershed. While some of these were considered in the 2009 Master EIR, the USFS, Five Counties Salmonid Conservation Program, Northwest Resource Conservation and Development Council, Watershed Research and Training Center, Trinity County Resource Conservation District, Yurok Tribe, Hoopa

Valley Tribe, Nor Rel Muk Wintu Nation, and other local nonprofits and governments have been funded for and/or completed additional projects intended to improve watershed conditions, restore aquatic habitat, improve aquatic connectivity, and reduce road-related sediment delivery to streams and rivers. These watershed restoration projects are intended to improve water quantity and quality as well as rearing habitat in the Trinity River watershed.

4.7 Proposed Action

The Project's Proposed Action is an extension of the watershed restoration projects mentioned above. The Project focuses on Trinity River tributaries as well as the mainstem. The objectives of the Proposed Action are as follows:

- Restore and improve instream conditions sufficient to support all life stages of salmonids and other aquatic species.
- Restore upstream and downstream fish passage for all life stages of salmonids.
- Restore continuous paths for wood dispersal, nutrient cycling, sediment transport, and movement of other vegetative material essential for productive aquatic habitat.
- Maintain or restore native plant communities and vegetative structure impacted by invasive plants and pathogens, while rehabilitating eroding streambanks to improve water quality, shade conditions, and large wood recruitment.
- Repair, replace, or remove ineffective instream structures.
- Restore and improve riparian and meadow habitat in order to promote healthy conditions for aquatic and terrestrial wildlife populations.
- Improve late summer/fall base flow conditions through process-based restoration, water conservation improvements, and meadow restoration.

The Project is an effort to streamline design and planning processes, including environmental compliance, for proposed restoration actions across the watershed, thereby increasing the number of restoration actions that can be implemented over time. Ultimately, the Project is anticipated to benefit water quality and quantity within the Trinity River basin. As previously discussed, the proposed restoration activities would have short-term sedimentation and temperature effects; however, in the long-term, the Proposed Action would have beneficial effects water quality and hydrology in terms of an increase in sediment storage capacity within Project waterways; a decrease of sediment discharge and roadway runoff as a result of the maintenance and decommissioning of roads; improvements to water temperatures as a result of installation of instream habitat features, aquatic and riparian habitat enhancements, and improved floodplain connectivity; and an increase in flow volume in tributaries as a result of site-specific water conservation projects. Ultimately, these water quality and hydrology benefits associated with the Proposed Action may serve to offset ongoing impacts associated with flow management, cannabis farming, residential development, resource extraction, and wildland fire control activities.

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Appendix J: Vegetation and Wetlands Specialist Report

Public Draft

Eriogonum alpinum (photo from California Native Plant Society, Eric White 2010)

VEGETATION AND WETLAND RESOURCES TECHNICAL REPORT

INCLUDING A BIOLOGICAL EVALUATION FOR SPECIAL STATUS PLANT SPECIES, WETLANDS, AND OTHER VEGETATION RESOURCES

TRINITY RIVER WATERSHED RESTORATION PROJECT

CGB-ED-2025-034

DOI-BLM-CA-N060-2025-0010-EA

PROJECT #63121 (FOREST SERVICE)

MARCH 2025

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Federal Cooperating Agencies:

U.S. Department of the Interior, Bureau of Land Management

U.S. Department of Agriculture, Forest Service

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ACRONYMS

ACS	Aquatic Conservation Strategy
ARCS	Aquatic and Riparian Conservation Strategy
AEAM	Adaptive Environmental Assessment and Management
BiOp	Biological Opinion
BLM	U.S. Bureau of Land Management
BMPs	best management practices
Cal-IPC	California Invasive Plant Council
CBM	Condition-based Management
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife

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CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CM	Conservation Measure
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CVP	Central Valley Project
DOI	U.S. Department of the Interior
EA	Environmental Assessment
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
GPM	General Protection Measure
HUC	Hydrologic Unit Code
HVT	Hoopa Valley Tribe
LRMP	Land Resource Management Plan
LUB	lacustrine unconsolidated bottom
LUS	lacustrine unconsolidated shore
NEPA	National Environmental Policy Act
NNIS	non-native invasive species
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NWFP	Northwest Forest Plan
NWI	National Wetlands Inventory
PAB	palustrine aquatic bed
PEM	palustrine emergent wetland
PFO	palustrine forested wetland
Project	Trinity River Watershed Restoration Project
PSS	palustrine scrub-shrub wetland
PUB	palustrine unconsolidated bottom
PUS	palustrine unconsolidated shore
RC	Resource Center
Reclamation	Bureau of Reclamation
Regional Water Board	North Coast Regional Water Quality Control Board
RFO	Redding Field Office

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ROD	Record of Decision
RMP	Resource Management Plan
RSB	riverine streambed
RSI	remote site incubator
RUB	riverine unconsolidated bottom
RUS	riverine unconsolidated shore
STNF	Shasta-Trinity National Forest
TCWMC	Trinity County Weed Management Cooperative
TMDL	Total Maximum Daily Load
TRD	Trinity River Division
TRFES	Trinity River Flow Evaluation Study
TRRP	Trinity River Restoration Program
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
WMAs	Weed Management Areas

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1. Executive Summary

This Technical Report analyzes the effects of restoration activities proposed to be implemented in the Trinity River Watershed as part of the Trinity River Watershed Restoration Project (Project). The following vegetation and wetland resources were reviewed and analyzed:

- National Land Cover types
- National Wetland Inventory (NWI) wetland types
- Federal Endangered Species Act (ESA) listed species
- California Endangered Species Act (CESA) listed species
- U.S. Forest Service (USFS) sensitive or watch lists
- Bureau of Land Management (BLM) sensitive or watch lists
- Non-native invasive species (NNIS)

ESA-listed, CESA-listed, USFS sensitive, and BLM sensitive species are collectively referred to as special status species in this document. Vegetation resources were described for sixteen hydrological unit code 10 (HUC 10) watersheds within the Trinity River watershed and effects were qualitatively described. Table 1-1 summarizes the effects on vegetation and wetland resources, including NWI-mapped wetland habitat, riparian reserves, special status plant species, and NNIS. A detailed list of all general protection measures (GPMs), design guidelines, and conservation measures (CMs) by resource is included in Appendix B of the Environmental Assessment (EA). GPMs apply Project-wide, design guidelines are activity-specific, and CMs are resource-specific.

Table 1-1. Summary of effects on vegetation resources

Vegetation Resource	Effects Summary[1]
Wetland habitat	Short-term minor effect from construction dewatering during instream activities, access roads and staging areas in the floodplains, implementing the suite of road activities, especially culvert removal, and NNIS management; long-term beneficial effect from restoration, enhancement, NNIS removal, road decommissioning, water conservation measures, and revegetation.
Riparian habitat within riparian reserves	Short-term minor effect from construction dewatering during instream activities, access roads and staging areas, the suite of road activities, and NNIS management; long-term beneficial effect from restoration, enhancement, NNIS removal, road decommissioning, water conservation measures, and revegetation.
Federal ESA-listed plant species: Whitebark pine (*Pinus albicaulis*)	With the implementation of CM V-3, project activities would not affect whitebark pine.
Special status plant species within riparian reserves and/or adjacent to roads	Project activities may affect individuals but are not likely to result in a trend toward Federal listing or loss of viability for special status plant species within riparian reserves and adjacent to roads. Some effects may be measurable and minor, but with the implementation of CMs V-1 and V-2, project activities would have no effect on most special status plant species.

Vegetation Resource	Effects Summary[1]
Special status plant species outside of riparian reserves and road corridors	With the implementation of CMs V-1 and V-2, Project activities would not affect special status plant species that occur outside of riparian reserves and road corridors.
Non-native invasive species	For most non-native invasive species, control and management would be a minor benefit. For other species that resprout more vigorously with manual and mechanical control, such as Himalayan blackberry, tree of heaven, scotch broom, and yellow star thistle, project activities would result in a minor adverse effect.

[1]No effect/Negligible: Effects would not be measurable and lack perceptible consequences.; Minor: Effects are detectable but are small and localized; Moderate: Effects are detectable, can be measured, and cover a larger area (e.g., a tributary stream); Major: Effects are easily measured, regional, and at the population-or community scale

For non-federally listed special status species (i.e. USFS- or BLM- sensitive species), the following determinations were also used to describe effects on species: Project activities would not affect special status species; Project activities may affect individuals but are not likely to result in a trend toward Federal listing or loss of viability for the special status species; Project activities may affect individuals and are likely to result in a trend toward Federal listing or loss of viability for special status species.

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2. Introduction

The purpose of this technical report is to evaluate the effects of the Trinity River Watershed Restoration Project (Project) on vegetation and wetland resources, which include general wetland, riparian, and aquatic habitat and special status plant species with known occurrences in the Project activity area. The potential for the Project to prevent or spread non-native invasive species (also referred to as NNIS or noxious weeds) is also discussed, and an NNIS risk analysis is included in this report. Proposed restoration activities would occur within the Trinity River watershed, including along the mainstem, tributaries to the mainstem, and the watershed above the Trinity and Lewiston dams. The Bureau of Reclamation's (Reclamation's) Trinity River Restoration Program (TRRP) office, the Bureau of Land Management (BLM), and the U.S. Forest Service (USFS) are preparing an environmental assessment (EA) for the Project.

Special status species include those that are:

- Listed under the Federal Endangered Species Act (ESA)
- Listed under the California Endangered Species Act (CESA)
- Included in the California Native Plant Society (CNPS) lists (1A, 1B, 2, or 4)
- Included in the USFS sensitive or watch lists
- Included in the BLM sensitive or watch lists

Project activities and potential effects would typically occur along roads and within areas designated as riparian reserves under the 1994 Northwest Forest Plan (NWFP; Forest Service 1994) and riparian management areas under the 2024 Northwest California Integrated Resource Management Plan (NCIP, BLM 2024) within the Trinity River watershed in Trinity and Humboldt counties, California. The primary objectives of the Project are to enhance habitat conditions for native anadromous fish species (i.e., salmon, steelhead, Pacific lamprey) within the Trinity River watershed and to support the objectives of the Aquatic Conservation Strategy (ACS), adopted by the BLM and USFS. The two primary objectives of the ACS that would be addressed by the Project are to restore watershed function and to conserve riparian reserves.

3. Proposed Action

TRRP is the lead agency and USFS and BLM are cooperating agencies for the Project, the purpose of which is to improve instream and riparian habitat at a watershed scale and to accelerate the recovery of north coast salmon populations (coho salmon, steelhead, and Chinook salmon), thereby fulfilling tribal trust responsibilities and obligations to local communities as well as recreational and commercial fishing industries (per the Shasta-Trinity National Forest Land and Resource Management Plan (LRMP; USFS Pacific Southwest Region 1995) and state and federal recovery plan goals (NMFS 2014; California Department of Fish and Game 2004).

The following describes the objectives of the Proposed Action:

- Restore and improve instream conditions sufficient to support all life stages of salmonids and other aquatic species;
- Restore upstream and downstream fish passage for all life stages of salmonids;

- Restore continuous paths for wood dispersal, nutrient cycling, sediment transport, and movement of other vegetative material essential for productive aquatic habitat;
- Maintain or restore native plant communities and vegetative structure impacted by invasive plants and pathogens, while rehabilitating eroding streambanks to improve water quality, shade conditions, and large wood recruitment;
- Repair, replace, or remove ineffective instream structures;
- Restore and improve riparian and meadow habitat in order to promote healthy conditions for aquatic and terrestrial wildlife populations;
- Improve late summer/fall base flow conditions through process-based restoration, water conservation improvements, and meadow restoration;
- Increase nutrient inputs through salmon carcass placement in the watershed; and
- Stabilize upslope areas around road infrastructure to minimize erosion and sediment discharges within the watershed to bring the sediment impaired watersheds into compliance with sediment reduction TMDLs for the South Fork Trinity and Trinity Mainstem rivers (EPA 1998 & EPA 2001).

The Proposed Action consists of a suite of instream and riparian restoration activities that are designed to meet the objectives described above. Detailed descriptions of each of the proposed activities are included in Chapter 4 of the Project's EA document. Proposed Activities are grouped into three general categories: instream habitat restoration; upslope habitat restoration; and road maintenance, rehabilitation, and decommissioning activities. The activities proposed under each of these categories are summarized below:

Instream Habitat Restoration

1. Restoration and Enhancement of In-Channel Habitat
2. Floodplain Restoration
3. Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures
4. Water Conservation Projects
5. Salmon Carcass Placement
6. Remote Site Incubators (RSIs)

Upslope Habitat Restoration

7. Bioengineered Bank Stabilization
8. Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement

Road Maintenance, Rehabilitation, and Decommissioning Activities

9. Road Maintenance
10. Road Rehabilitation
11. Road Decommissioning

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3.1 Project Location and Timing

The proposed activities would occur within a portion of the Trinity River watershed. Individual restoration actions would take place in and along the mainstem Trinity River and in and along tributaries of the mainstem Trinity River (both above and below the Lewiston and Trinity dams) on both private (with permission of the landowner) and public lands (primarily USFS- and BLM-managed). Vegetation and wetland resources were described for each of the hydrological unit code 10 (HUC 10) watersheds. Table 3-1 lists HUC 10 watersheds within the Project activity area. The locations of Key Watersheds and HUC 10 watersheds are shown on Figure 3-1. Key Watersheds are defined in Section 6.2 The South Fork Trinity River Key Watershed encompasses both the Middle South Fork Trinity River and the Upper South Fork Trinity River HUC 10 watersheds as shown on Figure 3-1.

Because of the presence of anadromous fish, Project activities within any wetted or flowing channel of tributaries of and the mainstem Trinity River below the Trinity and Lewiston dams shall be restricted to the dry season (i.e., June 15 to October 15 for tributaries and July 15 to October 15 for the Trinity River mainstem) before coho begin spawning. Revegetation outside of the active channel is typically implemented during the wet season, between October and April. Work in intermittent streams may continue beyond November 1, as long as weather conditions permit and the stream channel remains dry. Construction and restoration work within intermittent stream channels must be completed before cumulative seasonal rainfall is sufficient to result in surface flow within the channel. Most restoration activities could be completed in a single season except for subsequent weed management, monitoring, and adaptive management actions, but more complex projects could take multiple years.

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Table 3-1. HUC 10 Sub-watersheds within the Trinity River Basin.

Subregion (HUC 4)	Basin (HUC 6)	Subbasin (HUC 8)	Watershed (HUC 10)	HUC 10 Number	Acres in Watershed
Klamath-Northern California Coastal 1801	Northern California Coastal 180102	Trinity California 18010211	Big French Creek-Trinity River[1]	1801021111	153,325
			Browns Creek	1801021106	47,110
			Canyon Creek	1801021108	41,033
			Coffee Creek	1801021101	74,835
			East Fork Trinity River	1801021103	74,335
			New River	1801021110	149,597
			Horse Linto Creek-Trinity River[2]	1801021112	0
			North Fork Trinity River	1801021109	97,483
			Stuart Fork	1801021104	88,264
			Swift Creek-Trinity River	1801021105	121,055
			Tangle Blue Creek-Trinity River	1801021102	101,393
			Weaver Creek	1801021107	142,030
		South Fork Trinity 18010212	Lower South Fork Trinity River[3]	1801021205	44,229
			Lower Hayfork Creek	1801021203	142,161
			Upper Hayfork Creek	1801021202	105,697
			Middle South Fork Trinity River	1801021204	145,776
			Upper South Fork Trinity River	1801021201	73,634

1. A portion of Big French Creek is excluded from the Project activity area, namely the Sharber Creek HUC 12 subwatershed. because it is in the Six Rivers National Forest.
2. Horse Linto Creek is located in the Six Rivers National Forest and is not included in the Project activity area.
3. A portion of Lower South Fork Trinity River is excluded from the Project activity area, namely Grouse, Mingo, and Old Campbell creeks (HUC 12 subwatersheds) because they are located in the Six Rivers National Forest.

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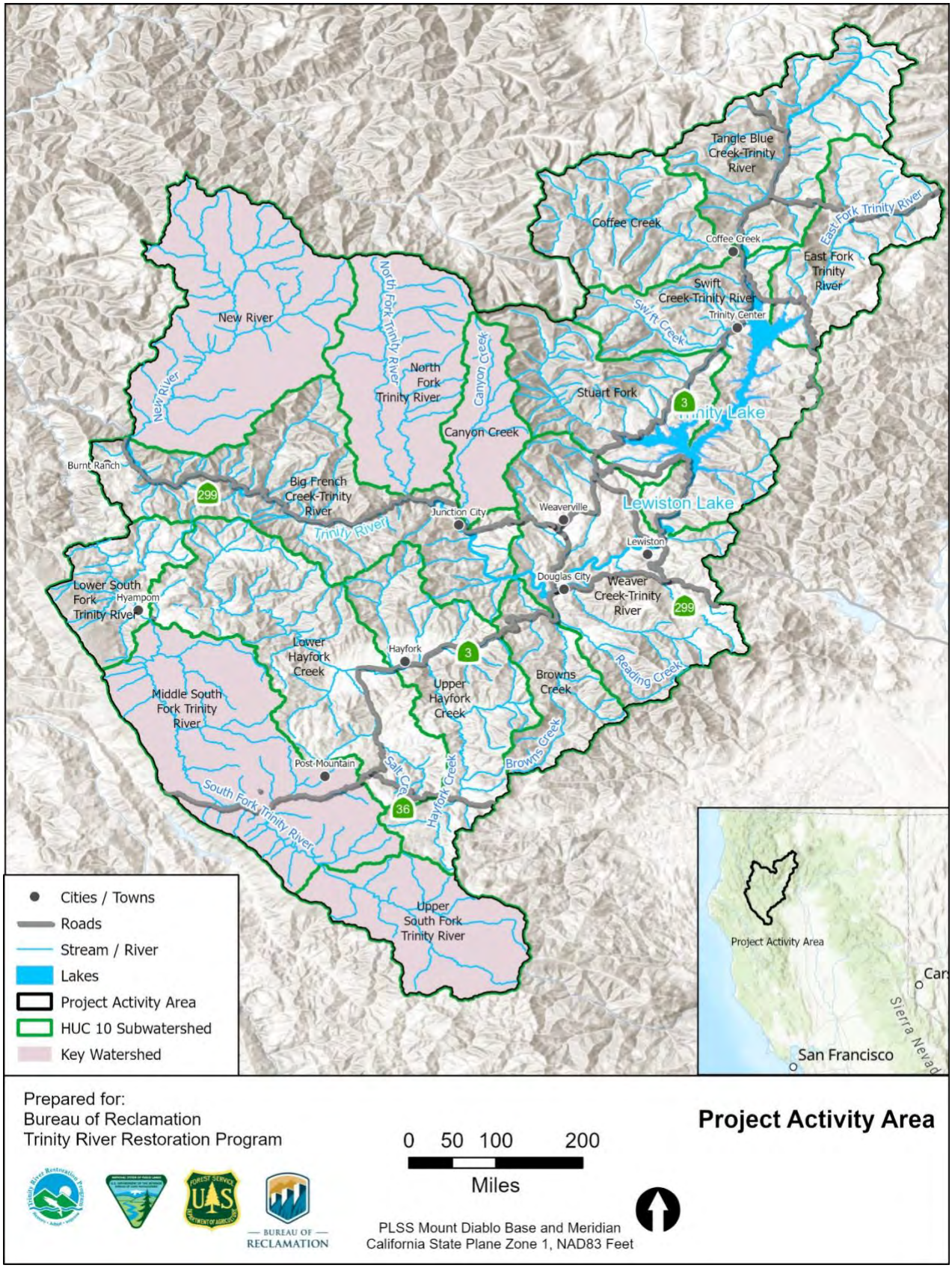

Figure 3-1. Project Activity Area

4. Avoidance and Minimization of Effects on Vegetation Resources

Design guidelines, BMPs, and CMs have been developed for proposed activities and for resources to avoid and minimize effects on ecologically important vegetation communities (land cover types), wetlands, riparian habitat, and special status plant species and to minimize the spread of NNIS. These would be incorporated into the planning, design, and implementation phases of each site-specific project. Many of these have been developed as part of the Project's ESA Section 7 consultation with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) and collaborative Project planning efforts by TRRP, USFS, and BLM. A detailed list of all design guidelines, BMPs and CMs by resource is included in Appendix B of the EA.

4.1 Limits on Proposed Activities Frequency and Location

Due to the large-scale nature of the Project, there are concerns about the potential for direct physical changes to the environment as a result of implementation at the watershed scale. A key design guideline entails setting annual project limits on the number of projects, which would limit adverse effects to ESA-listed species.

The 2020 NMFS Biological Opinion (TRRP BiOp, WCRO-2019-03827) limits instream watershed restoration projects covered by the BiOp annually to:

- 2 fish passage/dam removal projects;
- 8 channel/floodplain rehabilitation projects (4 mainstem and 4 tributary);
- 2 in-stream habitat enhancement projects;
- 3 streambank stabilization projects; and
- 4 road-related projects with in-water activities (i.e. road decommissioning with culvert removal).

TRRP is in the process of reinitiating consultation with NMFS to include all project activity categories described in the Proposed Action that were not previously analyzed in the 2020 TRRP BiOp. Project limitations will also be reviewed during the reinitiated consultation and are anticipated to change. During meetings with NMFS in regard to the ESA Section 7 consultation for this Project, NMFS recommended setting Project limits to control sedimentation and turbidity that would adversely affect ESA-listed salmonids. Preliminarily, it is being proposed that in addition to utilizing GPMs and CMs, such as erosion and sediment control BMPs, effects of turbidity would be controlled by limiting the number of floodplain reconnection projects that are over 100 acres as well as small dam removals, to one site-specific restoration project (of these specific project types) per HUC-12 watershed, per year. However, the latest applicable BiOp should be referred to, to determine current Project limits during site-specific project implementation.

Project limits would provide spatial and temporal flexibility during site-specific restoration project development and watershed planning efforts. Implementors within the watershed would continue to collaborate with the assistance of TRRP, USFS, and BLM to ensure significant regional effects would not occur.

4.2 Vegetation Protection Measures

The USFWS Statewide Restoration Biological Opinion (USFWS Statewide Restoration BiOp, USFWS 2025) and the TRRP Master Environmental Impact Report (EIR) provide vegetation protection measures that have been incorporated into the Project's CMs included in Appendix B of the EA. These measures would be followed and

implemented during site-specific restoration projects and include providing qualified biologists and guidance for conducting preconstruction special status plant surveys; identifying and marking sensitive areas such as wetlands, riparian habitat, and aquatic habitat; revegetation and restoration protocols; and NNIS management. A qualified biologist would ensure compliance with the Project's environmental commitments during restoration activities. The qualified biologist would need to meet general qualifications including a Bachelor's degree, previous experience with similar habitat types and species, as well as prior construction monitoring experience.

Preconstruction surveys would be conducted for special status species within appropriate habitat in the restoration activity area (CM V-1). A qualified botanist would conduct a minimum of two pre-project surveys to determine if special-status plant species occur within the project site (CM V-2). The agencies would develop a tracking system to document the status of surveys, known occurrences and suitable habitats in activity areas. Botanical surveys would be conducted during periods most appropriate for detection and identification of target species. The project botanist would communicate whether surveys were conducted in a sufficient manner and whether known occurrences or suitable habitats are present. If necessary, additional CMs would be developed appropriate for the particular species. If special status plant species are not observed during appropriately timed botanical surveys, the project botanist would communicate botanical clearance results to the implementation team.

Prior to any ground disturbance associated with restoration projects, wetlands and other waters would be delineated based on the 1987 *Corps of Engineers Wetlands Delineation Manual* (1987 Manual; Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (USACE 2010). Potential wetlands as defined by the 1987 Manual would be evaluated using a three-parameter approach: dominance of hydrophytic vegetation, hydric soils, and wetland hydrology. For each restoration project, a wetland delineation report and a Clean Water Act (CWA) Section 404 permit authorization request would be prepared and submitted to the U.S. Army Corps of Engineers (USACE) for compliance with CWA Section 404. Once wetlands are identified in the field, they would be flagged or fenced so that impacts would be avoided and minimized to the extent possible (CM V-2), especially for activities such as staging areas and access roads (CM V-13). Equipment and materials would be stored and stockpiled away from wetlands and surface water features (CM GWH-7).

All equipment operated in or adjacent to the waterbody will be clean of terrestrial and aquatic NNIS (CM NNIS-4) as well as oil and grease. Equipment that will come in contact with the Trinity River or tributaries will be inspected daily (CM GWH-7). Vehicles will receive proper and timely maintenance to reduce the potential for mechanical breakdowns leading to a spill of materials. External oil, grease, and mud will be removed from equipment using steam cleaning. Wash sites must be located in designated upland locations so that dirty wash water does not flow into stream channels or wetlands and in locations that would not cause additional impacts to the upland vegetation community. If possible, temporary wash sites would be constructed. Gasoline engines and pumps operated on the floodplain will be isolated from the ground by an impermeable barrier so that any leaking petroleum products are isolated from the ground (CM GWH-7). Invasive species and noxious weeds will be inventoried prior to any project activities (CM NNIS-1). A Weed Management Specialist would coordinate with the team on how to treat and manage species and how to prevent the spread during construction (CM NNIS -2). All GPMs, design guidelines, and CMs presented in Appendix B would be followed to provide vegetation protection to the greatest extent.

5. Methods

Vegetation communities and other land cover types were obtained from National Land Cover Database provided by the U.S. Geological Survey (USGS) for each HUC 10 watershed in the Project activity area. Wetlands within the Project activity area were assessed using the National Wetlands Inventory (NWI; USFWS 2024b). NWI represents the extent, approximate location and type of wetlands and deepwater habitats as defined by Cowardin et al. (1979). Effects are discussed qualitatively based on what ecologically important vegetation land cover types, including wetland and riparian vegetation, would be likely to be present at the activity areas.

A list of special status plant species and communities was compiled by searching the California Natural Diversity Database (CNDDB) (CDFW 2024) and CNPS Electronic Inventory database and reviewing BLM's special status species list for the Redding Field Office and USFS sensitive species for the Shasta-Trinity National Forest (STNF). A list of federal ESA-listed species (endangered, threatened, or candidate status) potentially occurring within the Project activity area was obtained from the USFWS Information for Planning and Consultation website (USFWS 2024a).

The California Department of Food and Agriculture (CDFA) noxious weed list was reviewed, and data from STNF were used to determine species known to occur within the Trinity River watershed.

5.1 Riparian Reserves/Riparian Management Areas

Under the Aquatic and Riparian Conservation Strategy (ARCS), which was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on all public lands, riparian reserves, otherwise known as Riparian Management Areas, are portions of watersheds where riparian-dependent resources receive primary emphasis and where special standards and guidelines apply. Based on the Project's objectives, riparian reserves are an integral part of project planning to implement best management practices during restoration activities and to increase or restore function of vegetation communities by focusing on ecological processes and conditions within and contributing to the physical and ecological health, function, and resiliency of these areas.

Riparian reserves occur at the margins of standing and flowing water, intermittent stream channels, lakes, ponds, springs, and wetlands, and the location of riparian reserves for the Trinity River Watershed has been estimated based on proximity to water. Quantifying riparian reserves provides an estimate of habitat where restoration and enhancement activities are anticipated (and prioritized) to take place. Potential effects on special status species are estimated based on documented or mapped occurrence within riparian reserves.

5.2 Intensity of Effects

The analysis of potential Project effects to vegetation and wetland resources considers the presence of a species in or near the Project activity area, the scope and nature of Project activities, and the potential effects to these resources associated with those activities. Short-term effects to vegetation and wetlands occurs as a result of construction impacts and are commonly related to ground disturbance within the floodplains, wetlands, meadows, streambanks, and other upslope areas. Long-term effects are caused by the action and are later in time or farther removed in distance. Long-term effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on

air and water and other natural systems, including ecosystems. For the purposes of analysis for this project, the intensity of effects is described using the following terms:

- Negligible/No effect: Effects would not be measurable and lack perceptible consequences.
- Minor: Effects are detectable but are small and localized.
- Moderate: Effects are detectable, can be measured, and cover a larger area (e.g., a tributary stream).
- Major: Effects are easily measured, regional, and at the population or community scale.

Effects have been analyzed for each vegetation resource, including wetland and riparian habitat as well as special status species. Throughout the analysis, all effects are considered adverse unless otherwise stated as beneficial. Effect analyses also consider avoidance and minimization measures that would either avoid causing a particular effect or minimize the effect's intensity. Effect analyses do not consider compensatory mitigation.

The following determinations were also used to describe effects on species:

- Project activities will not affect special status species
- Project activities may affect individuals but are not likely to result in a trend toward Federal listing or loss of viability for the special status species.
- Project activities may affect individuals and are likely to result in a trend toward Federal listing or loss of viability for special status species.

6. Environmental Setting

6.1 Trinity River Watershed

The Trinity River originates in the rugged Salmon-Trinity Mountains of northern California in the northeast corner of Trinity County, California. The entire Trinity River watershed is approximately 2,861 square miles and is the largest Klamath River tributary. From Lewiston Dam, the Trinity River flows westward for 112 miles until it enters the Klamath River near the town of Weitchpec on the Yurok Reservation. The Trinity River passes through Trinity and Humboldt counties and the Hoopa Valley (Hoopa Tribe) and Yurok Indian Reservations. The Klamath River flows northwesterly for approximately 40 miles from its confluence with the Trinity River before entering the Pacific Ocean.

Historically, the Trinity River functioned as a dynamic river reach that provided quality spawning and rearing habitat for anadromous fish. Construction of Lewiston Dam, part of the Central Valley Project (CVP), in 1963 near Lewiston is now the upper limit of anadromous fish migration on the Trinity River as no fish passage facilities were built. At times, 90% of the Trinity River flow was diverted into the Sacramento Basin, contributing to the decline of Chinook salmon, coho salmon, and Steelhead (NMFS 2014). These water withdrawals caused severe degradation of fish habitat of the Trinity River. The minimal flows released were insufficient to maintain the Upper Trinity River and, as a consequence, much of the river channel between Lewiston and the North Fork Trinity River confluence became confined within a narrow channel bordered by dense riparian berms.

Logging practices, road construction, mining, and floodplain development within the Trinity River watershed also contributed significantly to habitat degradation (USFWS and HVT 1999). Clear-cut logging, along with hundreds of miles of unpaved roads and skid trails, promoted increased sediment loading in the Trinity River and its

tributaries and removal of streamside vegetation increased water temperatures. Within the mainstem Trinity River, the distribution of Coho Salmon can likely be explained, at least in part, by water temperature (Reclamation 2019). Virtually all tributaries have been subjected to hydraulic mining activities. This has reduced the biological productivity and fish carrying capacity of much of the Trinity River basin (USFWS and HVT 1999; EPA 2001). In addition, degradation of freshwater habitat has been pervasive in the Lower Klamath River contributing to declines in native fish runs (Gale and Randolph 2000).

Subsequently, Congress enacted a number of legislative actions to restore Trinity River fishery resources. In 2000, the Secretary of the Interior signed the Record of Decision (ROD) for the Trinity River Mainstem Fishery Restoration Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) which required Reclamation (through TRRP) to implement a suite of actions to increase habitat quality and quantity for native anadromous fish. The five primary components of TRRP's river restoration work include:

1. **Variable Annual Instream Flows** – releasing water from Lewiston Dam, based on the water year type, to mimic natural Trinity River flows and interact with downstream areas to enhance conditions for all life stages of fish and wildlife. These variable annual instream flows are also called restoration releases or restoration flows and have generally occurred starting in April.
2. **Channel Rehabilitation** – restoring the functional floodplain of the river, which has been channelized and simplified by managed river flows and mining. To date, TRRP has constructed 34 of the rehabilitation projects identified in the 1999 Trinity River Flow Evaluation Study (USFWS and HVT 1999) and Trinity River FEIS (USFWS et al. 2000).
3. **Sediment Management** – introducing sediment to the river and providing flows to ensure its movement in the river. Sediment entering the river system upstream of Trinity Dam is blocked from the Trinity River below Lewiston Dam, which creates a downstream sediment deficit. TRRP resupplies the river with sediment downstream of the dams to offset the loss of sediment from upstream sources. Typically, coarse sediment additions are used to provide gravels (0.375 to 5 inches in diameter) downstream of Lewiston Dam, where the supply has been curtailed. Fine sediment control reduces silt and sand inputs from watershed sources (e.g., Grass Valley Creek, where sediment retention ponds have been periodically dredged to control impacts on redds). Recent studies indicate that the Trinity River reach near the dam is lacking fine sediment inputs, which is an objective addressed by the Proposed Action (Buxton 2021).
4. **Watershed Restoration** – addressing negative impacts resulting from land management in the Trinity River basin. Watershed restoration activities include ensuring fish passage to tributary habitat and creating better aquatic conditions in watershed areas to support stream life.
5. **Adaptive Environmental Assessment and Management** – monitoring, evaluating, and improving the effectiveness of river restoration actions.

Reclamation has been implementing, and continues to implement, the flows described in the ROD. Since the 2000 ROD, TRRP has both implemented and funded others to undertake restoration actions to improve instream habitat conditions in both the mainstem Trinity River and the tributaries.

6.2 Riparian Reserves and Key Watersheds

The ACS, which is described in Appendix B6 of the NWFP (Forest Service 1994), is a framework to guide the restoration and maintenance of the ecological health of watersheds and aquatic ecosystems on public lands within the habitat range of anadromous fish in the Pacific Northwest. The intent of the ACS is to maintain and restore ecosystem health at watershed and landscape scales to protect habitat for fish and other riparian-dependent species and resources and to restore currently degraded habitats. This approach seeks to prevent further habitat degradation and restore habitat over broad landscapes as opposed to implementing individual projects or focusing on small watersheds. The ACS provides a multi-agency framework and background for the activities and approach for this Project.

The ACS has 4 components:

- **Riparian Reserves/Riparian Management Areas** – Applies to all permanently flowing and intermittent streams, lakes, and wetland areas that are greater than one acre. They are the portions of a watershed directly coupled to streams and rivers that are required for maintaining hydrologic, geomorphic, and ecologic processes that affect standing and flowing water bodies, such lakes and ponds, wetlands, streams, stream processes, and fish habitats. The ACS objective is to maintain and restore riparian areas and enhance habitat conservation of streams. Management activities are limited to those benefiting aquatic and riparian-dependent species and guidelines may direct land uses to only those would meet the ACS objectives. The project area contains riparian reserves/Riparian Management Areas, as defined in the NCIP (BLM 2024) and Shasta-Trinity National Forest (STNF) LRMP. Watershed analyses have been completed by BLM and USFS for federal lands within the Trinity River watershed.
- **Key watersheds** – Applies to watersheds that serve as refugia for maintaining and recovering instream habitat for aquatic species. New roads are prohibited in roadless areas, and a no net increase of roads outside roadless areas is enforced. USFS manages four primary tier key watersheds in the upper Trinity River watershed, primarily associated with the Salmon-Trinity Alps Wilderness Area. These watersheds are the North Fork Trinity River, South Fork Trinity River, Canyon Creek, and the New River (Figure 3-1).
- **Watershed analysis** – Process to determine the current and desired conditions to provide both a framework and target for restoration efforts, along with specific goals and objectives. Watershed analysis is required in Key Watersheds and roadless areas prior to management activities.
- **Watershed restoration** – focuses on removing and improving roads, riparian vegetation and instream habitat improvements, and channel complexity and instream habitat restoration. By its nature, the Watershed Restoration Project is a comprehensive ecosystem restoration project intended to restore the physical processes and biological resources of the Trinity River watershed. The scale of the proposed activities ensures that restoration of ecological processes and functions will be consistent with the ACS.

ACS components are applied to the Proposed Action as follows: key watersheds (component 2) would be analyzed (component 3) and watershed restoration activities (component 4) would be applied primarily to riparian reserve areas (component 1). However, restoration activities would occur outside of key watersheds for this Project.

In addition, the ACS has 9 objectives that apply to all federal lands and funded projects within the Trinity River Watershed, and provide a basis and background for the proposed Watershed Restoration Project:

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1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

6. Maintain and restore instream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

9. Maintain restore habitat to support well-distributed populations of native plants, invertebrate, and vertebrate riparian-dependent species.

The Project has been designed to assist TRRP, BLM, USFS, and its partners in achieving these nine ACS objectives for the Trinity River watershed.

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7. Land Cover

7.1 Existing Conditions

The National Land Cover Database provides land use data for environmental modelling applications and is used to describe baseline landscape types throughout the Project activity area. The 15 land cover types found within the Project activity area are described in Table 6-1.

In general, evergreen forests have the highest cover within the Project activity area with about 56%. Scrub and shrub cover types are next common at approximately 24% of the Project Activity Area. Pastures, grassland/ herbaceous cover types follow at about 12%. Developed, open space, which included grassy spaces in developed areas, account for approximately 4% of the Project Activity Area. Mixed forest accounts for 2%. Open, natural land features including barren land, perennial snow and ice, and open water each make up less than 1% of the Project activity area.

Wetlands including emergent herbaceous and woody wetlands cover types make up a small amount of natural vegetation cover, each with less than 1%. Open water land cover type accounts for about 1% cover. Collectively, wetlands and open water account for a little over 1% and approximately 18,303 acres within the Project activity area. These cover types occur within areas designated as riparian reserves, which would be where most restoration activities are proposed.

The National Land Cover Database does not specify riparian vegetation, which may be included within shrub/scrub and deciduous forest. NWI-mapped wetlands, especially palustrine scrub-shrub and palustrine forested include areas typically considered riparian and are discussed in Section 8.

Table 6-1. National Land Cover Types within the Project Activity Area

National Land Cover Type	Classification Description	Percentage of the Project Activity Area	Acres within the Project Activity Area
Evergreen Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.	56%	895,805
Shrub/Scrub	Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.	24%	385,472
Grassland/ Herbaceous	Areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling but can be utilized for grazing.	12%	186,657
Developed, Open Space	Areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.	4%	64,856

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National Land Cover Type	Classification Description	Percentage of the Project Activity Area	Acres within the Project Activity Area
Mixed Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.	2%	25,965
Open Water	Areas of open water, generally with less than 25% cover of vegetation or soil.	1%	11,977
Barren Land	Areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.	1%	10,516
Deciduous Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.	<1%	4,879
Developed, Low Intensity	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.	<1%	4,832
Emergent Herbaceous Wetland[2]	Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	<1%	4,075
Woody Wetlands[3]	Areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	<1%	2,251
Developed, Medium Intensity	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.	<1%	1,798
Perennial Snow/Ice	Areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.	<1%	1,633
Developed, High Intensity	Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.	<1%	779
Hay/Pasture	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.	<1%	31
Total		**~100%**	**1,601,525**

The highest cover of emergent herbaceous wetlands occurs in Swift Creek Trinity River watershed (2,093 acres), Stuart Fork (949 acres), East Fork Trinity River (676 acres), and Coffee Creek (142 acres; Table 6-2).Other watersheds, including Big French Creek, Middle South fork Trinity River, and Weaver Creek have less than 100 acres of emergent herbaceous wetlands, while Canyon Creek, Lower Hayfork, New River, North Fork Trinity River, and Upper South Fork Trinity River have less than 10 acres of emergent herbaceous wetlands. The highest cover of woody wetlands occurs in Coffee Creek (1,002 acres), Tangle Blue Creek (441 acres), Swift Creek Trinity River (310 acres), and Weaver Creek (218 acres). The remaining watersheds have less than 100 acres of woody

wetlands. The Swift Creek Trinity River has the highest cover of open water with 6,970 acres. Stuart Creek has 3,128 acres of open water, East Fork Trinity River has 586 acres, and Big French Trinity River has 241 acres of open water. The remaining watersheds have between zero and about 200 acres of open water. Big French Creek Trinity River, Middle south Fork Trinity River, and Stuart Fork have the highest acreage of deciduous forest.

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Table 6-2. HUC 10 watershed National Land Cover types

National Land Cover Type	Big French Creek Trinity River	Browns Creek	Canyon Creek*	Coffee Creek	East Fork Trinity River	Lower Hayfork Creek	Lower South Fork Trinity River	Middle South Fork Trinity River	New River*	North Fork Trinity River	Stuart Fork	Swift Creek Trinity River	Tangle Blue Creek Trinity River	Upper Hayfork Creek	Upper South Fork Trinity River*	Weaver Creek Trinity River	Total
Barren Land	223	<1	1,058	320	590	4	286	26	64	786	2,705	2,457	1,963	<1	4	30	10,516
Deciduous Forest	551	474	131	121	9	224	269	532	33	223	633	364	33	229	25	1,028	4,879
Developed, High Intensity	30	1	3	55	2	63	22	26	22	270	58	56	64	3	3	101	779
Developed, Low Intensity	501	46	28	276	208	522	158	491	171	146	135	593	417	215	93	831	4,883
Developed, Medium Intensity	130	5	2+	111	32	196	90	114	81	138	71	193	166	33	33	388	1,798
Developed, Open Space	5,077	1,412	919	2,070	895	8,771	2,306	10,555	3,245	1,307	4,112	6,546	415	6,658	4,585	5,984	64,856
Emergent Herbaceous Wetlands	55	0	8	142	676	3	19	65	1	6	949	2,093	16	0	2	42	4,075
Evergreen Forest	91,949	32,086	21,463	54,572	53	78,762	17,385	76,288	50,095	54,965	54,624	70,618	81,894	55,909	20,187	81,043	895,805
Hay/Pasture	<1	0	0	0	963	24	<1	0	0	0	0	1	4	3	0	0	31
Herbaceous	3,482	1,420	7,032	2,719	6,126	6,550	5,108	31,128	49,053	615	2,703	7,515	1,237	8,001	43,662	10,307	186,657
Mixed Forest	1,800	1,495	907	867	598	2,244	367	1,832	248	1,337	2,108	3,665	590	1,533	135	6,237	25,956
Open Water	341	0	56	82	586	46	149	178	4	77	3,128	6,970	152	2	6	199	11,977
Perennial Snow/Ice	0	0	606	4	0	0	0	0	0	376	586	59	0	0	0	1	1,633
Shrub/Scrub	49,126	10,128	8,785	12,468	10,515	44,715	18,071	24,513	46,401	37,211	16,436	19,590	13,985	33,101	4,862	35,590	375,472
Woody Wetlands	60	28	20	1,002	102	36	0	1	0	13	7	310	441	11	3	218	2,251

Data from the United States Geological Survey (USGS) for National Land Cover Types

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7.2 Effects

Most activities within the Project activity area, including instream and side channel restoration, floodplain restoration, water conservation projects, instream structure removal, bank stabilization, habitat enhancement and road decommissioning at stream crossing would be along streams and within floodplains, which would have the greatest effect on emergent herbaceous wetland and woody wetlands land cover types, which only consist of 0.38% of the land cover in the HUC 10 watersheds within the Project activity area. Effects on NWI-mapped wetlands and riparian vegetation, which would overlap with the herbaceous and woody wetland cover types, are discussed in Section 8. and not replicated in this section.

A suite of enhancement and invasive species management projects would occur on roads or other disturbed areas. While these effects on vegetation communities along roads and in other upland areas affected by NNIS control would be temporary, effects could last for several months to up to two years before vegetation is re-established. Reducing NNIS would be an overall long-term beneficial effect on the vegetation communities. An overall reduction in ecologically important land cover types, such as herbaceous and woody wetlands is unlikely to occur since the Proposed Action would restore habitat throughout the floodplain and in upland areas where NNIS control and revegetation would be implemented. Some roads would be decommissioned and restored with native vegetation, resulting in a gain in native habitat and higher quality vegetation communities.

8. Wetlands, Other Waters, and Riparian Vegetation

8.1 Existing Conditions

Table 8-1 summarizes the Cowardin classes of wetlands and other waters (Cowardin et al. 1979) that occur within the HUC 10 watersheds. The Cowardin classification system is used in the USFWS NWI (USFWS 2024b) for describing and categorizing wetlands and deepwater habitats based on a variety of characteristics. The following list describes the general Cowardin classes of wetlands and other waters that are known to occur within the Project activity area:

- Freshwater emergent wetlands are classified as palustrine emergent (PEM) wetlands and are dominated by herbaceous species such as pale spikerush (*Eleocharis macrostachya*), annual rabbitsfoot grass (*Polypogon monspeliensis*), annual hairgrass (*Deschampsia danthonioides*), reed canarygrass (*Phalaris arundinacea*), and mugwort (*Artemesia douglasiana*).
- Freshwater Forested wetlands are classified as palustrine forested (PFO) wetlands and are typically dominated by woody riparian species such as cottonwood *(Populus* spp.), big-leaf maple (*Acer macrophyllum*), black walnut (*Juglans nigra*), and blue elderberry (*Sambucus nigra* ssp. *cerulea*).
- Freshwater scrub-shrub wetlands are classified as palustrine scrub-shrub (PSS) wetlands and are typically dominated by woody riparian, such as willows (*Salix* spp.), white alder (*Alnus rhombifolia*), Oregon ash (*Fraxinus latifolia*), and Himalayan blackberry (*Rubus armeniacus).*
- Open water, including rivers, ponds and lakes, is classified as riverine streambed (RSB), riverine unconsolidated bottom (RUB), riverine unconsolidated shore (RUS), palustrine aquatic bed (PAB, palustrine unconsolidated bottom (PUB), palustrine unconsolidated shore (PUS), lacustrine unconsolidated bottom (LUB), and lacustrine unconsolidated shore (LUS).

Over 5,000 acres of NWI-mapped wetland habitat (PEM, PSS, and PFO), 17,000 acres of NWI-mapped lake habitat (LUB and LUS), and 24,000 acres of NWI-mapped riverine habitat occur throughout the watershed (Table 8-1). The Swift Creek Trinity River HUC 10 watershed has over 10,000 acres of NWI-mapped lake habitat because Trinity and Lewiston lakes occur within this watershed.

The Trinity River, the North Fork Trinity River, and the South Fork Trinity River, all perennial streams, are considered Waters of the U.S. that are subject to the jurisdiction of the USACE. Other perennial streams located throughout the watershed would also be under USACE jurisdiction, as well as some intermittent streams, both of which would also be Waters of the State of California because of their surface hydrologic connection with the Trinity River. Wetlands adjacent to perennial and intermittent streams would also likely be subject to USACE jurisdiction because of the continuous hydrologic connection with the Trinity River.

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Table 8-1. Summary of wetland and other waters within HUC 10 watersheds.

Wetlands and Other Waters (NWI Type)[1]	Big French Creek Trinity River	Browns Creek	Canyon Creek[2]	Coffee Creek	East Fork Trinity River	Lower Hayfork Creek	Lower South Fork Trinity River	Middle South Fork Trinity River	New River[2]	North Fork Trinity River[2]	Stuart Fork	Swift Creek Trinity River	Tangle Blue Creek Trinity River	Upper Hayfork Creek	Upper South Fork Trinity River[2]	Weaver Creek Trinity River	Total
Freshwater emergent wetland (PEM)	2	10	0	270	256	44	9	4	5	0	7	334	389	5	4	42	1,381
Freshwater forested/ shrub wetland (PFO, PSS)	125	90	29	1,152	133	90	5	29	16	36	7	323	549	126	4	621	3,336
Freshwater pond (PAB, PUB, PUS)	49	0	28	74	65	20	15	<1	14	2	57	49	108	5	4	39	5230
Lake (LUB, LUS)	0	0	28	32	1,412	43	0	0	0	71	4,806	10,769	60	0	0	7	17,228
Riverine (RSB, RUB, RUS)	2,284	430	460	717	821	2,304	1,862	2,252	1,535	1,063	1,033	1,377	1,198	1,591	755	1,997	21,678

[1] PEM = palustrine emergent; PFO = palustrine forested wetland; PSS = palustrine scrub-shrub; PAB= palustrine aquatic bed; PUB = palustrine unconsolidated bottom; PUS = palustrine unconsolidated shore; LUB = lacustrine unconsolidated bottom; LUS = lacustrine unconsolidated shore; RSB = riverine streambed; RUB = riverine unconsolidated bottom; RUS = riverine unconsolidated shore

[2]HUC 10 waters included in the Key Watersheds

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Most but not all project activities would occur within riparian reserves, where most wetland and riparian vegetation occurs (PEM, PSS, and PFO). Throughout the Trinity River, there are about 196,983 acres of riparian reserves. Many HUC 10 watersheds have over 10,000 acres, including North Fork Trinity River, Upper Hayfork Creek, Stuart Fork, Middle South Fork Trinity River, New River, Big French Creek Trinity River, and two HUC 10 watersheds (Lower Hayfork Creek and Swift Creek Trinity River) have over 20,000 acres of riparian reserves Table 8-2. Browns Creek watershed has the lowest acreage of riparian reserves with 2,441 acres. Wetland and riparian vegetation occur mostly in the riparian reserves.

Table 8-2. Acreage of riparian reserves for each HUC 10 watershed.

HUC 10 Watershed	Riparian Reserves (acres)
Big French Creek-Trinity River	19,010
Browns Creek	2,441
Canyon Creek	4,905
Coffee Creek	6,821
East Fork Trinity River	7,325
Lower Hayfork Creek	22,370
Lower South Fork Trinity River	6,545
Middle South Fork Trinity River	17,521
New River	18,487
North Fork Trinity River	12,483
Stuart Fork	17,088
Swift Creek-Trinity River	25,429
Tangle Blue Creek-Trinity River	8,075
Upper Hayfork Creek	15,761
Upper South Fork Trinity River	7,632
Weaver Creek-Trinity River	5,089
Total	**196,983**

8.2 Effects

A suite of restoration and enhancement activities and invasive species management projects would occur within riparian areas and floodplains, which are typically within the riparian reserves. In-channel projects and floodplain enhancement that require heavy equipment would require removal of vegetation for access roads, staging areas, grading of floodplain areas, and re-contouring of streambanks. Effects on NWI-mapped wetlands (PEM, PSS, and PFO) and riparian vegetation within riparian reserves would occur from habitat restoration and enhancement, floodplain restoration, removal or retrofitting of fish passage barriers, small dams, flood gates, pilings, and other in-water structures, bioengineered bank stabilization, and road rehabilitation that entail access roads and staging areas and vegetation removal. While these effects would be temporary, they could last for several months to up to two years before vegetation is re-established. The overall effect of Project activities would be a long-term benefit on wetlands.

Implementing water conservation measures would benefit wetland and riparian vegetation in the long-term by maintaining or increasing instream flow. Increasing instream flow levels by reducing withdrawals and increasing use efficiency would increase groundwater levels, especially during the summer and early fall when flows are lowest, providing added hydrologic support for wetland and riparian vegetation.

Project activities would ultimately increase floodplain connectivity and reactivate channel migration across floodplains, which would improve and/or increase riparian and wetland habitat. Restoration activities that target vegetation could increase the quality of wetland and riparian vegetation by increasing species and structural diversity and restoring ecological functions. Dewatering necessary during construction for restoration activities would have a temporary effect on wetlands and riparian vegetation, but no long-term effects are expected from dewatering.

Effects on riverine habitat are discussed in detail in the Fisheries Technical Report (Appendix K of the EA). Effects would be unlikely to occur on pond (PAB, PUB, and PUS) and lake (LUB and LUS) habitat since the proposed restoration activities would target fish-bearing streams. Some of the NWI PSS and PFO wetlands would not be under USACE jurisdiction but would fall under riparian habitat, especially areas dominated by cottonwood and willow species with more variable groundwater levels. For each site-specific project, wetlands and other waters (streams) would be delineated per USACE guidelines, and CWA Section 404 authorization would be requested from the USACE for effects on wetlands subject to USACE jurisdiction.

Several CMs, including V-2, V-5, V-9, V-11, V-12, V-13, V-14, V-15, and V-18, would be used to avoid and minimize effects on wetland and riparian vegetation. CMs would include fencing sensitive wetland or riparian communities, selecting access routes and staging areas that avoid or minimize disturbance to riparian and wetland vegetation, and using equipment with the greatest practicable reach to minimize effects on vegetation and soil. Other CMs that provide mitigation for unavoidable impacts on vegetation communities are listed in Appendix B of the EA. With the use of CMs, short-term effects on NWI wetlands, wetland subject to USACE jurisdiction, and riparian vegetation, especially within riparian reserves and Key Watersheds, would be avoided and minimized. The Proposed Action is expected to have short-term adverse effects on wetland and riparian vegetation during construction but would provide a net long-term benefit on wetland and riparian habitat along the mainstem and many Trinity River tributaries, which would be a moderate beneficial effect.

9. Special Status Species

9.1 Existing Conditions

Several special status plant species, including ESA-listed species, CESA-listed species, BLM sensitive species, USFS sensitive species, and species considered rare or endangered in California based on the Rare Plant Ranks are known to occur within the HUC 10s, many of which occur within riparian reserves or adjacent to roads (Table 9-1). Whitebark pine (*Pinus albicaulis*), a federally ESA-listed as threatened species, is known to occur within the Tangle Blue Creek Trinity River HUC 10 watershed at the upper elevations (USFWS 2024a). This species is also known to occur within riparian reserves. Other occurrences of this species are nearby but are outside the Trinity River watershed boundary.

Several of special status plant species, including watch species, are documented to occur within riparian reserves and/or within 10 feet of roads where many of the Project activities are proposed (Table 9-1). One special status plant community, upland Douglas fir (*Pseudotsuga menziesii)* forest, occurs within the Middle South Fork Trinity River and Upper South Fork Trinity River. This community is relatively undisturbed and was documented in a roadless area (not in riparian reserves or adjacent to roads).

Table 9-1. Status of Special Status Species with occurrence in Project activity area HUC 10s and project activity effects.

Scientific Name	Common Name	Documented HUC 10 Occurrence	Status[1]	Habitat	Known with Riparian Reserves	Adjacent to Roads	Project activities that would potentially affect species	Determination of effect
Federal ESA-Listed Species								
Pinus albicaulis	Whitebark pine	Tangle Blue Creek-Trinity River	FT	Upper red-fir forest to timberline, especially subalpine forest,6562 to 12139 ft (2000 to 3700 m)	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-3 will be implemented and effects on *Pinus albicaulis* would be avoided; project activities will not affect *Pinus albicaulis*
CESA-listed Endangered, BLM and/or USFS sensitive species								
Brodiaea rosea	Indian Valley brodiaea	Stuart Fork	SE, 1B3.1, USFS_S	Chaparral, Cismontane woodland, Closed-cone coniferous forest, Valley and foothill grassland; 1,095–4,755 ft (334 to 1449 m)	No	Yes	Road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for the *Brodiaea rosea*
Eriogonum alpinum	Trinity buckwheat	East Fork Trinity River, Tangle Blue Creek	SE, S2, 1B.2, USFS_S	Serpentine; alpine boulder and rock field, Subalpine coniferous forest, Upper montane coniferous forest; 6562 to 9186 ft (2000 to 2800 m)	No	No	Project activities unlikely to affect *Eriogonum alpinum*	CM V-1 and V-2 would be implemented; project activities will not affect *Eriogonum alpinum*
BLM and /or USFS sensitive species								
Anisocarpus scabridus	Scabrid alpine tarplant	Coffee Creek, Tangle Blue Creek, Upper South Fork Trinity River	S3, 1B.3, USFS_S	Open ridges or slopes on metamorphics; 5249 to 7874 ft (1600 to 2400 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals but are not likely to result in a trend toward Federal listing or loss of viability for *Anisocarpus scabridus*.
Boletus pulcherrimus	red-pored bolete	Middle South Fork Trinity River	USFS_S	Perennially moist, mature or late-seral fir forest that includes tankoak. Elevations that support general habitat.	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Boletus pulcherrimus*
Botrychium crenulatum	Scalloped moonwort	East Fork Trinity River, Swift Creek	S3, 2B.2, USFS_S	Saturated hard water seeps and stream margins; 4921 to 11,811 ft (1500 to 3600 m)	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Botrychium crenulatum*
Botrychium minganense	Mingan moonwort	Tangle Blue Creek	S4, 4.2, USFS_S	Meadows, open forest along streams or around seeps; 4921 to 10,171 ft (1500 to 3100 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Botrychium minganense*

Scientific Name	Common Name	Documented HUC 10 Occurrence	Status[1]	Habitat	Known with Riparian Reserves	Adjacent to Roads	Project activities that would potentially affect species	Determination of effect
Botrychium montanum	Western goblin	Tangle Blue Creek-Trinity River	S2, 2B.1, USFS_S	Shady conifer woodland, especially under *Calocedrus* along streams; 4921 to 6890 ft (1500 to 2100 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Botrychium montanum*
Botrychium pinnatum	Northwestern moonwort	No CNDDB record in watershed	USFS_S	Saturated wetland soils and stream edges, often among dense, herbaceous vegetation. Partly to heavily shaded sites, 4700-12000 ft (1432 to 3658 m)	No	No	Project activities unlikely to affect *Botrychium pinnatum*	CM V-1 and V-2 would be implemented; project activities will not affect *Botrychium pinnatum*
Botrychium pumicola	Pumice moonwort	No CNDDB record in watershed	USFS_S	Saturated wetland soils and stream edges, often among dense, herbaceous vegetation. Partly to heavily shaded sites, 4700-12000 ft (1432 to 3658 m)	No	No	Project activities unlikely to affect *Botrychium pumicola*	CM V-1 and V-2 would be implemented; project activities will not affect *Botrychium pumicola*
Buxbaumia viridis	Green shield-moss	Big French Creek-Trinity River	S2, 2B.2, BLM_S, USFS_S	Large diameter coarse woody debris in advanced decay stage and inserted directly in perennially wet seeps or streams; riparian habitat in conifer forest. Any elevation below subalpine.	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Buxbaumia viridis*
Calochortus greenei	Green's mariposa-lily	No CNDDB record in watershed	USFS_S	Shrubby hillsides, open woodlands, pinyon-juniper, meadows, volcanics 3,400 – 6200 ft.	No	No	Project activities unlikely to affect *Calochortus greenei*	CM V-1 and V-2 would be implemented; project activities will not affect *Calochortus greenei*
Calochortus longebarbatus var. longebarbatus	Long-haired star-tulip	No CNDDB record in watershed	USFS_S	seasonally wet meadows with mesic conditions among openings in lower montane coniferous forests or Great Basin scrub, heavy clay soil	No	No	Project activities unlikely to affect *Calochortus longebarbatus var. longebarbatus*	CM V-1 and V-2 would be implemented; project activities will not affect *Calochortus longebarbatus var. longebarbatus*
Campanula shelteri	Castle Crags harebell	No CNDDB record in watershed	USFS_S	Rock crevices, rocky lower montane coniferous forest 4,000 to 6,000 ft.	No	No	Project activities unlikely to affect *Campanula shelteri*	CM V-1 and V-2 would be implemented; project activities will not affect *Campanula shelteri*
Campanula wilkinsiana	Wilkins' harebell	Canyon Creek, Stuart Fork	USFS_S	Streambanks & springs in red fir subalpine forests; 5500-8600 ft	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Campanula wilkinsiana*

Scientific Name	Common Name	Documented HUC 10 Occurrence	Status[1]	Habitat	Known with Riparian Reserves	Adjacent to Roads	Project activities that would potentially affect species	Determination of effect
Chaenactis suffrutescens	Shasta chaenactis	Big French Creek, Browns Creek, Coffee Creek, Middle South Fork Trinty River, New River, North Fork Trinity River, Swift Creek, Tangle Blue Creek, Upper Hayfork Creek	S2S3, 1B.3, BLM_S, USFS_S	Unstable, sandy to rocky, generally serpentine soils, scree, drainages; 2297 to 7546 ft (700 to 2300 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Chaenactis suffrutescens*
Clarkia borealis ssp. borealis	Northern clarkia	Swift Creek - Trinity River	S4, 4.3, BLM_S, USFS_S	Foothill woodland, forest margin; 1312 to 2625 ft (400 to 800 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Clarkia borealis ssp. boreali*
Collomia larsenii	Talus collomia	No CNDDB record in watershed	USFS_S	Volcanic talus (Little Mount Hoffman)	No	No	Project activities unlikely to affect *Collomia larsenii*	CM V-1 and V-2 would be implemented; project activities will not affect *Collomia larsenii*
Cordylanthes tenuis ssp. pallescens	Pallid bird's-beak	No CNDDB record in watershed	USFS_S	Open volcanic alluvium (near Black Butte)	No	No	Project activities unlikely to affect *Cordylanthes tenuis ssp. pallescens*	CM V-1 and V-2 would be implemented; project activities will not affect *Cordylanthes tenuis ssp. pallescens*
Cudonia monticola	none	No CNDDB record in watershed	USFS_S	On spruce needle mats and coniferous debris in perennially moist, shady late-seral forest. Elevations that support general habitat.	No	No	Project activities unlikely to affect *Cudonia monticola*	CM V-1 and V-2 would be implemented; project activities will not affect *Cudonia monticola*
Cypripedium fasciculatum	Clustered lady's slipper	Coffee Creek, Lower Hayfork Creek, Middle South Fork Trinity River, Stuart Fork,	S4, 4.2, BLM_S, USFS_S	Mesic to moist, shady conifer forest; 328 to 6562 ft (100 to 2000 m)	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Cypripedium fasciculatum*
Cypripedium montanum	Mountain lady's slipper	Coffee Creek, Lower Hayfork Creek, Middle South Fork Trinity River, North Fork Trinity River, Swift Creek Trinity River, Weaver Creek Trinity River,	S4, 4.2, BLM_S, USFS_S	Moist areas, dry slopes, mixed-evergreen or conifer forest; 656 to 7218 ft (200 to 2200 m)	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Cypripedium montanum*
Dendriscocaulon intricutalum	Northern moon shrub	No CNDDB record in watershed	S1, BLM_S	Open-grown conifer and mixed conifer/deciduous stands, mixed oak/conifer forested communities, coastal fog areas, old growth forests. Associated with high humidity and the presence of cyanolichens	No	No	Project activities unlikely to affect *Dendriscocaulon intricutalum*	CM V-1 and V-2 would be implemented; project activities will not affect *Dendriscocaulon intricutalum*

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Dendrocollybia racemosa	branched shanklet	Big French Creek-Trinity River, Stuart Fork	USFS_S	Nutrient rich leaf mulch or decaying fungi in moist, mid-mature to late-seral conifer forest; Elevations that support general habitat.	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Dendrocollybia racemosa*
Draba carnosula	Mt. Eddy draba	Tangle Blue Creek - Trinity River	S2, 1B.3, USFS_S	Rocky slopes; 6562 to 9022 ft (2000 to 2750 m)	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Draba carnosula*
Epilobium oreganum	Oregon fireweed	Browns Creek, Coffee Creek, East Fork Trinity River, Lower South Fork Trinity River, Middle South Fork Trinty River, Stuart Fork, Swift Creek, Tangle Blue Creek, Upper Hayfork Creek, Upper South Fork Trinity River	S2, 1B.2, USFS_S	Bogs, small streams; 1804 to 5906 ft (550 to 1800 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Epilobium oreganum*
Eriastrum tracyi	Tracy's eriastrum	Lower South Fork Trinity River	Rare, S3, 3.2, USFS_S	Shale barrens, open hillsides, ridge tops, flats, floodplains, dry washes, disturbed areas, generally in chaparral, grassland, savannah, woodland, forest; 1050 to 5282 ft (320 to 1610 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Eriastrum tracyi*
Eriogonum ursinum var. erubescens	Blushing wild buckwheat	East Fork Trinity River, Swift Creek-Trinity River, Tangle Blue Creek -Trinity River, Weaver Creek	S3, 1B.3, USFS_S	Gravel; Chaparral (montane), Lower montane coniferous forest; 5249 to 6234 ft (1600 to 1900 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Eriogonum ursinum var. erubescens*
Eucephalus vialis	wayside aster	No CNDDB record in watershed	USFS_S	Openings in dry, conifer/hardwood forest, serpentine-influenced conifer forest with a dense grass and forb cover. 1800-5000 feet elev. Western Klamath Ranges and North Coast Ranges. No occurrences known from California.	No	No	Project activities unlikely to affect *Eucephalus vialis*	CM V-1 and V-2 would be implemented; project activities will not affect *Eucephalus vialis*
Frasera umpquaensis	Umpqua green-gentian	Middle South Fork Trinity River, Upper South Fork Trinity River	S1, 2B.2, USFS_S	Mountain meadows; 5577 to 6234 ft (1700 to 1900 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Frasera umpquaensis*

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Fritillaria eastwoodiae	Butte County fritillary	No CNDDB record in watershed	USFS_S	Dry benches, slopes, chaparral, woodland openings of lower montane coniferous forest, sometimes serpentine Below 5,000 ft west slope of Sierra-Cascades	No	No	Project activities unlikely to affect *Fritillaria eastwoodiae*	CM V-1 and V-2 would be implemented; project activities will not affect *Fritillaria eastwoodiae*
Galium serpenticum ssp. scotticum	Scott Mountain bedstraw	Coffee Creek, Tangle Blue Creek, Upper South Fork Trinity River	S2, 1B.2, BLM_S	Steep slopes in open pine forest; 3281 to 6562 ft (1000 to 2000 m)	No	Yes	Road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities will not affect *Galium serpenticum ssp. scotticum*
Harmonia doris-nilesiae	Niles' harmonia	Brown's Creek, Lower Hayfork Creek, Middle South Fork Trinity River, Upper Hayfork Creek, Upper South Fork Creek	S2S3, 1B.1, USFS_S	Serpentine slopes; 2625 to 5249 ft (800 to 1600 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Harmonia doris-nilesiae*
Harmonia stebbinsii	Stebbins' harmonia	Middle South Fork Trinity River, Upper Hayfork Creek, Upper South Fork Trinity River	S2, 1B.2, BLM_S, USFS_S	Serpentine slopes;chaparral, Lower montane coniferous forest; 3609 to 5249 ft (1100 to 1600 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Harmonia stebbinsii*
Hydrothyria venosa	Hydrothyria lichen	No CNDDB record in watershed	USFS_S	Grows on rocks in freshwater streams in North America	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Hydrothyria venosa*
Iliamna latibracteata	California globe mallow	Lower South Fork Trinity River, Middle South Fork Trinity River, New River	S2, 1B.2, USFS_S	Conifer forest, streamsides; 1640 to 6562 (500 to 2000 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Iliamna latibracteata*
Ivesia longibracteata	Castle Crags ivesia	No CNDDB record in watershed	USFS_S	Granite crevices-lower montane 3,900 ft to 4,600 ft.(Castle Crags)	No	No	Project activities unlikely to affect *Ivesia longibracteata*	CM V-1 and V-2 would be implemented; project activities will not affect *Ivesia longibracteata*
Ivesia pickeringii	Pickering's ivesia	East Fork Trinity River, Stuart Fork, Tangle Blue Creek	S2, 1B.2, USFS_S	Wet, rocky meadows, generally on serpentine clay; 2625 to 4921 ft (800 to 1500 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Ivesia pickeringii*

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Leptosiphon nuttallii ssp. *howellii*	Mount Tedoc leptosiphon	No CNDDB record in watershed	USFS_S	Open Jeffrey pine/incense cedar woodland on a variety of soils, but usually on ultramafic soil. 4000-5000 feet elev. Localized around the base of Tedoc Mountain, Tehama Co.	No	No	Project activities unlikely to affect *Leptosiphon nuttallii ssp. howellii*	CM V-1 and V-2 would be implemented; project activities will not affect *Leptosiphon nuttallii ssp. howellii*
Lewisia cantelovii	Cantelow's lewisia	No CNDDB record in watershed	USFS_S	Granite cliff faces, rocky outcrops, ravines, serpentine seeps, chaparral, woodland, conifer forest 10,85 to 4500 ft. west slope N Sierras & NE Shasta County	No	No	Project activities unlikely to affect *Lewisia cantelovii*	CM V-1 and V-2 would be implemented; project activities will not affect *Lewisia cantelovii*
Lewisia cotyledon var. heckneri	Heckner's lewisia	Big French Creek, Browns Creek, Canyon Creek, Coffee Creek, East Fork Trinity River, Lower Hayfork Creek, Lower Fork South Trinity River, Middle South Fork Creek, New River, North Fork Trinity River, Stuart Fork, Swift Creek, Tangle Blue Creek, Upper Hayfork Creek, Weaver Creek	S3, 1B.2, BLM_S	Crevices in cliffs, rocky slopes of granite or basalt, conifer forest; 738 to 7218 ft (225 to 2200 m)	No	Yes	Road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities will not affect *Lewisia cotyledon var. heckneri*
Lewisia kelloggii ssp *hutchinsonii*	Hutchison's lewisia	No CNDDB record in watershed	USFS_S	Habitat of ridge tops or relatively flat, open areas with bare, rocky soil at moderately high elevations from 5100-7000 ft in the Klamath Ranges.	No	No	Project activities unlikely to affect *Lewisia kelloggii ssp hutchinsonii*	CM V-1 and V-2 would be implemented; project activities will not affect *Lewisia kelloggii ssp hutchinsonii*
Meesia uliginosa	broad-nerved hump-moss	No CNDDB record in watershed	USFS_S	Fens and sloping wetlands between 5500 and 9200 feet. Eastern Trinity County and Shasta County.	No	No	Project activities unlikely to affect *Meesia uliginosa*	CM V-1 and V-2 would be implemented; project activities will not affect *Meesia uliginosa*
Mielichhoferia elongata	Elongate copper moss	North Fork Trinity River, Big French Creek	S3S4, 4.3, USFS_S	Seasonally moist seeps in rock outcrops containing copper or other heavy metals. Roadcuts. Narrow river drainages (Trinity River). Below 3600 m (11,811 ft).	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Mielichhoferia elongata*
Minuartia rosei	Peanut sandwort	Lower Hayfork Creek, Middle South Fork Trinity River, Upper Hayfork Creek	USFS_S	Rocky peridotite slopes and openings among shrubs and Jeffrey pine/incense cedar woodland. 2500-5800 ft; Rattlesnake Creek Terrane of southern Klamath Ranges.	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Minuartia rosei*

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Minuartia stolonifera	Scott Mountain sandwort	No CNDDB record in watershed	USFS_S	Rocky ultramafic soils; montane mixed conifer forest above 3800 ft Scott Mountain.	No	No	Project activities unlikely to affect *Minuartia stolonifera*	CM V-1 and V-2 would be implemented; project activities will not affect *Minuartia stolonifera*
Neuviusia cliftonii	Shasta snow-wreath	No CNDDB record in watershed	USFS_S	Shaded north facing slopes near Shasta Lake or tributaries. Sometimes limestone. 950 to 2000 ft	No	No	Project activities unlikely to affect *Neuviusia cliftonii*	CM V-1 and V-2 would be implemented; project activities will not affect *Neuviusia cliftonii*
Ophioglossum pusillum	northern adder's tongue	No CNDDB record in watershed	USFS_S	Periodically flooded wet meadows and lake margins. 3600-6600 feet elev. Eastern Klamath Range and upper N. Coast Range.	No	No	Project activities unlikely to affect *Ophioglossum pusillum*	CM V-1 and V-2 would be implemented; project activities will not affect *Ophioglossum pusillum*
Parnassia cirrata var. intermedia	Cascade grass-of-Parnassus	East Fork Trinity River, Stuart Fork, Swift Creek-Trinity River, Tangle Blue Creek -Trinity River	S3, 2B.2, USFS_S	Wet places; 2297 to 9514 ft (700 to 2900 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federl listing or loss of viability for *Parnassia cirrata var. intermedia*
Peltigera gowardii	western waterfan	No CNDDB record in watershed	USFS_S	Fully shaded streams less than 8" deep with low nutrient levels and good aeration, primarily in late-seral forest.	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Peltigera gowardii*
Penstemon tracyi	Tracy's beardtongue	Canyon Creek, Coffee Creek, New River, North Fork Trinity River, Weaver Creek	S2, 1B.3, USFS_S	Upper montane coniferous forest (rocky); Exposed outcrops; 6562 to 7382 ft (2000 to 2250 m)	No	Yes	Road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities will not affect *Penstemon tracyi*
Phacelia cookei	Cook's phacelia	No CNDDB record in watershed	USFS_S	Open areas of shrublands, sandy,volcanic soils north of Mt Shasta	No	No	Project activities unlikely to affect *Phacelia cookei*	CM V-1 and V-2 would be implemented; project activities will not affect *Phacelia cookei*
Phacelia greenei	Scott Valley phacelia	Tangle Blue Creek Trinity Creek	S2, 1B.2, BLM_S, USFS_S	Serpentine soils, openings in conifer forest; 2625 to 5906 ft (800--1800 m)	No	No	Project activities unlikely to affect *Phacelia greenei*	CM V-1 and V-2 would be implemented; project activities will not affect *Phacelia greenei*

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Phacelia leonis	Siskiyou phacelia	Coffee Creek, East Fork Trinity River, Middle South Fork Trinity River, New River, Swift Creek, Tangle Blue Creek	S2?, 1B.3, BLM_S	Sandy flats, slopes, conifer forest; 3937 to 9022 ft (1200--2750 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Phacelia leonis*
Phaeocollybia olivacea	olive phaeocollybia	Lower Hayfork Creek, Middle South Fork Trinity River, Stuart Fork	USFS_S	Moist, mixed conifer forest containing oak or tanoak. Elevations that support general habitat.	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Phaeocollybia olivacea*
Phaeocollybia spadicea	Spadicea phaecollybia	No CNDDB record in watershed	BLM_S	Restricted to very moist mesic late successional and old growth coniferous forests.	No	No	Project activities unlikely to affect *Phaeocollybia spadicea*	CM V-1 and V-2 would be implemented; project activities will not affect *Phaeocollybia spadicea*
Polemonium chartaceum	Mason's sky pilot	No CNDDB record in watershed	USFS_S	Rocky serpentine, alpine	No	No	Project activities unlikely to affect *Polemonium chartaceum*	CM V-1 and V-2 would be implemented; project activities will not affect *Polemonium chartaceum*
Ptilidium californicum	Pacific fuzzwort	East Fork Trinity River, Middle South Fork Trinity River, North Fork Trinity River	S3S4, 4.3, BLM_S	Lower montane coniferous forest, Upper montane coniferous forest	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Ptilidium californicum*
Raillardella pringlei	Showy raillardella	Coffee Creek, East Fork Trinity River, Stuart Fork, Swift Creek, Tangle Blue Creek	S2S3, 1B.2, USFS_S	Wet meadows, streambanks, seeps, on serpentine-derived soils, in conifer forest; 4265 to 7218 ft (1300--2200 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Raillardella pringlei*
Rorippa columbiae	Columbia yellow cress	No CNDDB record in watershed	USFS_S	Streambanks, lake or pond margins,meadows, wet fields, seeps, vernal pools-Mesic 3,900 to 5,900 ft. Mostly Modoc Plateau and east of Cascades (Humboldt County outlier)	No	No	Project activities unlikely to affect *Rorippa columbiae*	CM V-1 and V-2 would be implemented; project activities will not affect *Rorippa columbiae*
Sanicula tracyi	Tracy's sanicle	Lower South Fork Trinity River	S4, 4.2, USFS_S	Openings in conifer forest, woodland; 131 to 5085 ft (40--1550 m)	yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Sanicula tracyi*

Scientific Name	Common Name	Documented HUC 10 Occurrence	Status[1]	Habitat	Known with Riparian Reserves	Adjacent to Roads	Project activities that would potentially affect species	Determination of effect
Sedum paradisum ssp. paradisum (synonym= Sedum obtusatum)	Canyon Creek stonecrop	Big French Creek, Canyon Creek, Lower Hayfork Creek, Middle South Fork Creek, Stuart Fork, Weaver Creek	S3, 1B.3, USFS_S, BLM_S	Dry to mesic outcrops, rocky slopes, lava flows, not on serpentine; 656 to 6890 ft (200--2100 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Sedum paradisum ssp. paradisum*
Silene salmonacea	Klamath Mountain catchfly	Coffee Creek, East Fork Trinity River, Stuart Fork, Swift Creek, Tangle Blue Creek, Weaver Creek	S3, 1B.2, USFS_S	Serpentine and iron-rich soils in openings or mixed-evergreen forest; 2493 to 3445 ft (760 to 1050 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Silene salmonacea*
Smilax jamesii	English Peak greenbriar	Stuart Fork	S3S4, 1B.3, BLM_S	Lakesides, streambanks, alder thickets in montane conifer forest; generally 4921 to 8202 ft (1500 to 2500 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Smilax jamesii*
Smithiastrum wilkinsianum	Wilkin's harebell	Canyon Creek, Stuart Fork, Swift Creek	S2, 1B.2, USFS_S	Meadows and seeps, subalpine coniferous forest, upper montane coniferous forest	No	No	Project activities unlikely to affect *Smithiastrum wilkinsianum;* if species is located in the project area, it would be avoided	CM V-1 and V-2 would be implemented; project activities will not affect *Smithiastrum wilkinsianum;* if species is located in the project area, it would be avoided
Streptanthus oblanceolatus	Trinity River jewelflower	Big French Creek	S1, 1B.2, USFS_S	Cliffs, canyon walls, in conifer forest; +-1312 ft (400 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Streptanthus oblanceolatus*
Sulcaria badia	bay horsehair	No CNDDB record in watershed	USFS_S	Coastally influenced, open white oak grassland or mature Douglas fir-oak forest with a black oak component, growing in tree canopy. Below 1800 ft in western Trinity County.	No	No	Project activities unlikely to affect *Sulcaria badia*	CM V-1 and V-2 would be implemented; project activities will not affect *Sulcaria badia*
Thermopsis robusta	Robust false lupine	Lower South Fork Trinity River	S2, 1B.2, USFS_S	Shale, serpentine, open sites, forest; 328 to 4921 ft (150 to 1500 m)	No	No	Project activities unlikely to affect *Thermopsis robusta*	CM V-1 and V-2 would be implemented; project activities will not affect *Thermopsis robusta*
Vaccinium shastense subsp. shastense	Shasta huckleberry	No CNDDB record in watershed	S3, 1B.3, BLM_S	Acidic soils, stream banks, conifer forest understory, crevices or seeps among rock outcrops, chaparral; 1050 to 4019 ft (320--1225 m)	No	No	Project activities unlikely to affect *Vaccinium shastense* subsp. *shastense*	CM V-1 and V-2 would be implemented; project activities will not affect *Vaccinium shastense* subsp. *shastense*
Other Rare Plants								

Scientific Name	Common Name	Documented HUC 10 Occurrence	Status[1]	Habitat	Known with Riparian Reserves	Adjacent to Roads	Project activities that would potentially affect species	Determination of effect
Antennaria sawyeri	Sawyer's pussy-toes	Stuart Fork	S2, 1B.2	Open, subalpine serpentine slopes, ridges; 6808 to 7972 ft (2075 to 2430 m)	No	No	Project activities unlikely to affect *Antennaria sawyeri*	CM V-1 and V-2 would be implemented; project activities will not affect *Antennaria sawyeri*
Arabis rigidissima var. rigidissima	Trinity Mountains rockcress	East Fork Trinity River, New River, North Fork Trinity River	S3, 1B.3	Rocky areas in open conifer forest; 5906 to 6890 ft (1800 to 2100 m)	No	Yes	Road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities will not affect *Arabis rigidissima* var. *rigidissima*
Arctostaphylos klamathensis	Klamath manzanita	Coffee Creek, East Fork Trinity River, Stuart Fork, Swift Creek, Tangle Blue Creek	S2, 1B.2	Rocky outcrops, slopes, subalpine forest; 5249 to 6562 ft (1600 to 2000 m)	No	Yes	Road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities will not affect *Arctostaphylos klamathensis*
Arctostaphylos manzanita ssp. elegans	Konocti manzanita	Middle South Fork Trinity River, Upper Hayfork Creek	S3, 1B.3	Woodland, chaparral, conifer forest, generally volcanic soils; 722 to 6070 ft (220 to 1850 m)	No	Yes	Road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities will not affect *Arctostaphylos manzanita* ssp. *elegans*
Arnica venosa	Shasta County arnica	Coffee Creek, Swift Creek Trinity River, Upper South Fork Trinity River	S3, 4.2	Open, often disturbed oak/pine woodland; 1312 to 4593 ft (400 to 1400 m)	No	No	Project activities unlikely to affect *Arnica venosa*	CM V-1 and V-2 would be implemented; project activities will not affect *Arnica venosa*
Balsamorhiza sericea	Silky balsamroot	Tangle Blue Creek - Trinity River	S3, 1B.3	Serpentine outcrops, rocky slopes; 1312 to 5906 ft (400 to 1800 m)	No	Yes	Road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities will not affect *Balsamorhiza sericea*
Boechera serpenticola	Serpentine rockcress	Lower Hayfork Creek, Middle South Fork Trinity River, North Fork Trinity River, Weaver Creek	S1, 1B.2	Serpentine ridges, talus; 3609 to 6890 ft (1100 to 2100 m)	No	Yes	Road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities will not affect *Boechera serpenticola*
Botrypus virginianus	Rattlesnake fern	Tangle Blue Creek, Weaver Creek	S2, 2B.2	Moist shaded valleys along small streams; 2297 to 3937 ft (700 to 1200 m)	No	Yes	Road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities will not affect *Botrypus virginianus*
Campylopodiella stenocarpa	Flagella-like atractylocarpus	No CNDDB record in watershed	2B.2	Cismontane woodland	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Campylopodiella stenocarpa*
Carex leptalea	Bristle-stalked sedge	Swift Creek-Trinity River	S1, 2B.2	Wet meadows, swamps; < 2297 ft (700 m)	yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Carex leptalea*
Cuscuta jepsonii	Jepson's dodder	East Fork Trinity River, Lower Hayfork Creek, Lower Fork South Trinity River, Stuart Fork, Swift Creek, Upper Hayfork Creek, Upper South Fork Trinity River	S3, 1B.2	Mesic to moist, shady conifer forest; 328 to 6562 ft (100 to 2000 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Cuscuta jepsonii*

Scientific Name	Common Name	Documented HUC 10 Occurrence	Status[1]	Habitat	Known with Riparian Reserves	Adjacent to Roads	Project activities that would potentially affect species	Determination of effect
Dermatocarpon meiophyllizum	Silverskin lichen	North Fork Trinity River, Swift Creek, Tangle Blue Creek	S3, 2B.3	Coastal prairie, Lower montane coniferous forest, North Coast coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest	No	No	Project activities unlikely to affect *Dermatocarpon meiophyllizum*	CM V-1 and V-2 would be implemented; project activities will not affect *Dermatocarpon meiophyllizum*
Epilobium siskiyouense	Siskiyou fireweed	Coffee Creek, East Fork Trinity River, Stuart Fork, Swift Creek, Tangle Blue Creek	S3, 1B.3	Scree, moist ledges, serpentine ridges; 5577 to 8202 ft (1700 to 2500 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Epilobium siskiyouense*
Erigeron bloomeri var. nudatus	Waldo daisy	Tangle Blue Creek - Trinity River	S3, 2B.3	Serpentine slopes, rocky ridges; 1969 to 7546 ft (600 to 2300 m)	No	No	Project activities unlikely to affect *Erigeron bloomeri* var. *nudatus*	CM V-1 and V-2 would be implemented; project activities will not affect *Erigeron bloomeri* var. *nudatus*
Erythranthe trinitiensis	Pink-margined monkeyflower	Lower Hayfork Creek, Lower South Fork Trinity River, Middle South Fork Trinity River,	S2, 1B.3	Moist, generally clay soils in full sun; 4265 to 6562 ft (1300 to 2000 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Erythranthe trinitiensis*
Gilia capitata ssp. pacifica	Pacific gilia	Lower South Fork Trinity River	S2, 1B.2	Steep slopes, ravines, open flats, or coastal bluffs, grassland, dunes; generally <1312 ft (400 m)	No	Yes	Road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Gilia capitata* ssp. *pacifica*
Hemieva ranunculifolia	Buttercup-leaf hemieva	Canyon Creek	S2, 2B.2	Moist rocky slopes; Meadows and seeps, Upper montane coniferous forest; 4921 to 8202 ft (1500 to 2500 m)	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Hemieva ranunculifolia*
Hosackia yollabolliensis	Yolla Bolly Mtns. bird's-foot trefoil	Lower South Fork Trinity River, Middle South Fork Trinity River, Upper South Fork Trinity River	S2, 1B.2	Open, dry slopes, fir forest; 5577 to 6890 ft (1700 to 2100 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Hosackia yollabolliensis*
Howellanthus dalesianus	Scott Mountain howellanthus	East Fork Trinity River, Swift Creek, Tangle Blue Creek	S3, 4.3	Ultramafic substrates, meadows, streambanks, conifer forest; 4921 to 6562 ft (1500 to 2000 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Howellanthus dalesianus*

Scientific Name	Common Name	Documented HUC 10 Occurrence	Status[1]	Habitat	Known with Riparian Reserves	Adjacent to Roads	Project activities that would potentially affect species	Determination of effect
Iliamna bakeri	Baker's globe mallow	Canyon Creek	S3, 4.2	Mountain slopes, juniper woodland, lava beds; 3281 to 8202 ft (1000 to 2500 m)	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Iliamna bakeri*
Juncus dudleyi	Dudley's rush	Canyon Creek, Swift Creek Trinity River, Weaver Creek Trinity River	S1, 2B.3	Wet areas in montane conifer forest; <6562 ft (2000 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Juncus dudleyi*
Kopsiopsis hookeri	Small groundcone	Lower South Fork Trinity River	S1S2, 2B.3	Open woodland, mixed conifer forest, generally on Gaultheria shallon, occassionally on *Arbutus menziesii*, <2297 ft (700 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Kopsiopsis hookeri*
Limnanthes floccosa ssp. floccosa	Woolly meadowfoam	Lower Hayfork Creek	S3, 4.2	Vernal pool edges; <1969 ft (600 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Limnanthes floccosa* ssp. f*loccosa*
Lupinus elmeri	South Fork Mountain lupine	Lower South Fork Trinity River, Middle South Fork Trinity River	S2, 1B.2	Open areas in conifer forest; 4495 to 6562 ft (1370 to 2000 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Lupinus elmeri*
Lycopodium clavatum	Running-pine	Lower South Fork Trinity River	S3, 3.1	Moist ground, swamps (on trees); <656 ft (200 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Lycopodium clavatum*
Montia howellii	Howell's montia	Big French Creek	S2, 2B.2	Vernally wet sites, often compacted soil; <1312 ft (400 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Montia howellii*

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Scientific Name	Common Name	Documented HUC 10 Occurrence	Status[1]	Habitat	Known with Riparian Reserves	Adjacent to Roads	Project activities that would potentially affect species	Determination of effect
Oenothera wolfii	Wolf's evening-primrose	Swift Creek - Trinity River	S1, 1B.1	Coastal sand, including dunes, bluffs, roadsides, Lower montane coniferous forest; generally moist places; <328 up to 2625 ft (<100 up to 800 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Oenothera wolfii*
Penstemon filiformis	Thread-leaved beardtongue	Coffee Creek, East Fork Trinity River, Stuart Fork, Swift Creek, Tangle Blue Creek, Weaver Creek	S4, 4.2	Open, rocky places among shrubs, yellow-pine forest; 1312 to 5577 ft (400 to 1700 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Penstemon filiformis*
Picea engelmannii	Engelmann spruce	Stuart Fork, Swift Creek Trinity River	S2, 2B.2	Cool, moist, mixed-conifer, subalpine forests; 3937 to 6890 (1200--2100 m)	No	No	Project activities unlikely to affect *Picea engelmannii*	CM V-1 and V-2 would be implemented; project activities will not affect *Picea engelmannii*
Piperia candida	White flowered rein orchid	Middle South Fork Trinity River	S3, 1B.2	Open to shady sites, conifer and mixed-evergreen forest; < 5085 ft (1500 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Piperia candida*
Polemonium eddyense	Mt. Eddy sky pilot	Tangle Blue Creek - Trinity River	S1, 1B.2	Serpentine soils; 8690 to 9022 ft (2649--2750 m)	No	No	Project activities unlikely to affect *Polemonium eddyense*	CM V-1 and V-2 would be implemented; project activities will not affect *Polemonium eddyense*
Potentilla cristae	Crested potentilla	Tangle Blue Creek - Trinity River	S2, 1B.3	Seasonally moist, often serpentine-like gravels, talus; 5906 to 9186 ft (1800-2800 m)	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federl listing or loss of viability for *Potentilla cristae*
Rhynchospora alba	White beaked-rush	Middle South Fork Trinity River, Swift Creek Trinity River	S2, 2B.2	Boggy open sites; <6562 ft (2000 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Rhynchospora alba*
Rhynchospora capitellata	Brownish beaked rush	Swift Creek-Trinity River	S2, 2B.2	et meadows, fens, seeps, marshes; <6562 ft (2000 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Rhynchospora capitellata*
Scytinium siskiyouense	Siskiyou jellyskin lichen	Lower Hayfork Creek	S1, 1B.1	Lower montane coniferous forest, North Coast coniferous forest	No	No	Project activities unlikely to affect *Scytinium siskiyouense*	CM V-1 and V-2 would be implemented; project activities will not affect *Scytinium siskiyouense*

Scientific Name	Common Name	Documented HUC 10 Occurrence	Status[1]	Habitat	Known with Riparian Reserves	Adjacent to Roads	Project activities that would potentially affect species	Determination of effect
Sedum flavidum	Pale yellow stonecrop	Lower Hayfork Creek, Lower South Fork Trinity River, Middle South Fork Trinity River, Upper Hayfork Creek, Upper South Fork Trinity River	S3, 4.3	Dry sunny or partly shaded rocky slopes, scree, outcrops, barrens, serpentine, basalt, or metamorphic; also duff of scattered pines in chaparral; 656 to 7218 ft (200 to 2200 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Sedum flavidum*
Sedum sanhedrinum	Sanhedrin Mountain stonecrop	Upper South Fork Trinity River	S2S3, 1B.2	Dry rocky slopes, ridges, talus, full sun or partial shade; on varied substrates including serpentine; 4593 to 7546 ft (1400--2300 m)	No	No	Project activities unlikely to affect *Sedum sanhedrinum*	CM V-1 and V-2 would be implemented; project activities will not affect *Sedum sanhedrinum*
Selaginella scopulorum	Rocky Mountain spike-moss	Stuart Fork, Canyon Creek	S2S3, 2B.3	Open, rocky spots, conifer forest; Elevation: 4593 to 7218 ft (1400-2200 m)	No	No	Project activities unlikely to affect *Selaginella scopulorum*	CM V-1 and V-2 would be implemented; project activities will not affect *Selaginella scopulorum*
Sidalcea malviflora ssp. patula	Siskiyou checkerbloom	Lower South Fork Trinity River	S2, 1B.2	Open coastal forests, bluffs; generally <2297 ft (700 m)	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Sidalcea malviflora ssp. patula*
Sidalcea oregana ssp. eximia	Coast checkerbloom	Lower South Fork Trinity River	S1, 1B.2	Meadows; < 3937 ft (1200 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Sidalcea oregana ssp. eximia*
Silene hookeri	Hooker's catchfly	Lower Hayfork Creek, Middle South Fork Trinity River	S2, 2B.2	Serpentine soils, dry rocky ground, talus, or pine or oak forest; <4593 ft (1400 m)	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Silene hookeri*
Tonestus lyallii	Lyall's tonestus	Canyon Creek, North Fork Trinity River, Stuart Fork	S1, 2B.3	Meadows, barrens, rocky sites; 4921 to 986 ft (1500--2800 m)	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Tonestus lyallii*
Tracyina rostrata	Beaked tracyina	No CNDDB record; likely found in Upper South Fork Trinity River	S2, 1B.2	Grassy slopes; 328 to 1312 ft (100--400+ m)	No	No	Project activities unlikely to affect *Tracyina rostrata*	CM V-1 and V-2 would be implemented; project activities will not affect *Tracyina rostrata*

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Scientific Name	Common Name	Documented HUC 10 Occurrence	Status[1]	Habitat	Known with Riparian Reserves	Adjacent to Roads	Project activities that would potentially affect species	Determination of effect
STNF Watch Species								
Arnica viscosa	Mount Shasta arnica	Stuart Fork	Species of conservation concern	Open, rocky, subalpine to alpine sites: 2000 to 2500 m	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Arnica viscosa*
Asclepias solanoana	Serpentine milkweed	Upper South Fork Trinity River	Species of conservation concern	Serpentine outcrops; 700 to 1600 m	Yes	No	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Asclepias solanoana*
Cypripedium californicum	California lady's-slipper	Swift Creek-Trinity River	Species of conservation concern	Streambanks, moist slopes, fens, partial shade to full sun, mixed-evergreen or conifer forest; 50 to 2200 m	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Cypripedium californicum*
Erythronium citrinum var. roderickii	Scott Mountains fawn lily	East Fork Trinity River, Stuart Fork, Swift Creek-Trinity River, Tangle Blue Creek-Trinity River	Species of conservation concern	Dry conifer woodland (+- on serpentine); 850 to 1300 m	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Erythronium citrinum var. roderickii*
Fritillaria glauca	Siskiyou fritillaria	Lower Hayfork Creek, Middle South Fork Trinity River	Species of conservation concern	Talus slopes, serpentine; 600 to 2100 m	No	Yes	Road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Fritillaria glauca*
Fritillaria purdyi	Purdy's fritillary	Middle South Fork Trinity River	Species of conservation concern	Dry ridges, generally on serpentine; 400 to 2100 m	No	Yes	Road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Fritillaria purdyi*
Galium serpenticum ssp. scotticum	Scott Mountain bedstraw	Tangle Blue Creek-Trinity River	Species of conservation concern	Steep slopes in open pine forest; 1000 to 2000 m	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Galium serpenticum ssp. scotticum*

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Scientific Name	Common Name	Documented HUC 10 Occurrence	Status[1]	Habitat	Known with Riparian Reserves	Adjacent to Roads	Project activities that would potentially affect species	Determination of effect
Lewisia cotyledon var. heckneri	Heckner's lewisia	Big French Creek-Trinity River, Canyon Creek, New River, North Fork Trinity River, Stuart Fork, Swift Creek-Trinity River	Species of conservation concern	Crevices in cliffs, rocky slopes of granite or basalt, conifer forest; 225 to 2200 m	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Lewisia cotyledon var. heckneri*
Lilium rubescens	Redwood lily	Lower Hayfork Creek, Middle South Fork Trinity River, Stuart Fork	Species of conservation concern	Dry soils in chaparral, gaps in conifer forest; 30 to 1800 m	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Lilium rubescens*
Phacelia leonis	Siskiyou phacelia	Tangle Blue Creek-Trinity River	Species of conservation concern	Sandy flats, slopes, conifer forest; 1200 to 2750 m	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Phacelia leonis*
Sedum laxum ssp. flavidum	Pale-yellow stonecrop	Lower Hayfork Creek, Middle South Fork Trinity River, Tangle Blue Creek-Trinity River, Upper Hayfork Creek	Species of conservation concern	Dry sunny or partly shaded rocky slopes, scree, outcrops, barrens, serpentine, basalt, or metamorphic; also duff of scattered pines in chaparral; 200 to 2200 m	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Sedum laxum ssp. flavidum*
Trillium ovatum ssp. oettingeri	Salmon Mountains wakerobin	Tangle Blue Creek-Trinity River	Species of conservation concern	Mixed montane or conifer forest on moist slopes; 1200 to 2000 m	Yes	Yes	Channel restoration and enhancement, floodplain restoration, bioengineered bank stabilization, aquatic, wetland, riparian, and upslope habitat enhancement including noxious weed/invasive species management, road maintenance, rehabilitation and decommissioning activities	CM V-1 and V-2 would be implemented; project activities may affect individuals, but are not likely to result in a trend toward Federal listing or loss of viability for *Trillium ovatum ssp. oettingeri*
Rare Plant Community								
Upland *Pseudotsuga menziesii* Forest	Upland Douglas Fir Forest	Middle South Fork Trinity River, Upper South Fork Trinity River	S3.1	Conifer forests; between 2000 and 6000 ft (600 to 1850 m) in the California mountains	No	No	Project activities unlikely to affect Upland *Pseudotsuga menziesii* forest	CM V-1 and V-2 would be implemented; Project activities would not affect Upland *Pseudosuga menziesii* forest

[1]Federal ESA Listing Status (FESA): FT – Federally threatened

State ESA Listing Status (CESA): SE – State endangered; Rare - classification provided to a native plant species, subspecies, or variety when, although not presently threatened with extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens. This designation stems from the Native Plant Protection Act of 1977.

California Rare Plant Rank (CNPS): 1B.1 - plants rare, threatened, or endangered in California and elsewhere, seriously threatened in California; 1B.2 - plants rare, threatened, or endangered in California and elsewhere, fairly threatened in California; 1B.3 - plants rare, threatened, or endangered in California and elsewhere; not very threatened in California; 2B.1 – Plants rare, threatened, or endangered in California, but more common elsewhere, seriously threatened in California; 2B.2 - plants rare, threatened, or endangered in California, but more common elsewhere, fairly threatened in California; 2B.3 - plants rare, threatened, or endangered in California, but more common elsewhere, not very threatened in California; 3.1 – plants about which more information is needed, seriously threatened in California; 3.2 – plants about which more information is needed, fairly threatened in California; 4.1 – plants of limited distribution, seriously threatened in California; 4.2 – plants of limited distribution, fairly threatened in California; 4.3 - plants of limited distribution, not very threatened in California

California State Rank:S1 — Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state; S2 — Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state; S3 — 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; S4 - Apparently secure; at a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible factors.

Agency listing status: BLM_S – BLM sensitive species; USFS_S – U.S. Forest Service sensitive species; Species of Conservation Concern - a plant or animal for which the USFS has concerns about its ability to remain on a landscape for a long time.

Source: CDFW 2024 and with a follow up review from CNDDB January 2025 Special Vascular Plants, Bryophytes, and Lichens List

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9.2 Effects

Many special status plant species would not be affected by the Proposed Action because they have not been documented within riparian reserves, or along or on roads, where most of the restoration activities are proposed (Table 9-1). Some NNIS management may occur outside of riparian reserves, but this activity would be in already degraded habitat. Special status species that occur within the Project activity area are less likely to be affected with the implementation of CMs V-1 and V-2. Although whitebark pine, a federal ESA-listed as threatened species, has been documented within riparian reserves, with the implementation of CM V-3, effects on whitebark pine would be avoided, and the project activities would not affect whitebark pine.

Water conservation measures that would benefit wetland and riparian vegetation by maintaining or increasing instream flow and groundwater levels would also provide benefits to special status plant species that occur in riparian habitat. Proposed activities, such as restoration and enhancement of off-channel and side channel habitat, floodplain restoration, and wetland and riparian habitat enhancement could affect species within riparian reserves. Species that occur within riparian reserves or along roads are listed in Table 9-1. For species that have been documented within riparian reserves and/or adjacent to roads, project activities may affect individuals but are not likely to result in a trend toward Federal listing or loss of viability. With the implementation of CM V-1 and V-2, most effects on these species would be avoided. It was determined that species not known to occur in riparian reserves or adjacent to roads would not be affected, especially when CMs V-1 and V-2 are implemented. To avoid and minimize effects on a special status species, CMs V-1 and V-2, which include preconstruction surveys, species salvage and translocation, biological monitoring, and leaving plants in place, when possible, during project activities, would be implemented during site-specific activities. A full list of GPMs, design guidelines, and CMs is in Appendix B of the EA. These GPMs, design guidelines, and CMs would ensure that effects would not lead to a special status plant species population decline or result in a trend toward Federal listing or loss of viability. The proposed activities would result in short-term effects on species within riparian reserves and/or adjacent to roads but would provide long-term benefits as new habitat is created and disturbed areas are restored.

10. Non-native Invasive Species

10.1 Existing Conditions

NNIS occur throughout the Trinity River watershed, particularly in areas that have been subject to ground-disturbing activities (e.g., roads and recreation sites). NNIS affect the functions and values of native ecosystems. Further, under Executive Order (EO) 13112 as amended by EO 13751, executive departments and federal agencies are required to prevent the introduction of NNIS due to federal actions and to coordinate federal prevention and control efforts related to NNIS. Some of NNIS have a California Department of Food and Agriculture (CDFA) Pest rating of either C or as a CCR 4500 noxious weed (Table 10-1). The California invasive plant council (Cal-IPC) ratings are also provided in Table 10-1. In addition to the NNIS listed in Table 10-1, STNF maintains a list of priority species for NNIS management. Table 10-2 provides a list of STNF priority species.

Weed Management Areas (WMAs) are local organizations that bring together landowners and managers (private, city, county, state, and federal) in a county, multi-county, or other geographical area to coordinate

efforts and expertise against common invasive (noxious) weed species. The WMAs function under the authority of a mutually developed memorandum of understanding and are subject to statutory and regulatory weed control requirements. The lead agency for the WMAs is the CDFA. The Trinity County Weed Management Cooperative (TCWMC) acts as the local Trinity County WMA. TCWMC cooperators include the Trinity County Department of Agriculture, Trinity County Planning Department, Natural Resources Conservation Service, STNF, and the Trinity County Resource Conservation District.

Trinity County has weed eradication programs in place for spotted knapweed (*Centaurea maculosa*), diffuse knapweed (*Centaurea diffusa*), dalmatian toadflax (*Linaria genistifolia ssp. dalmatica*), and plumeless thistle (*Carduus acanthoides*). Table 10-1 lists other common invasive plant species known to occur within the Project activity area. Invasive plant species can occur with greater density in areas that have been previously disturbed such as road rights-of-way, areas near parking areas, around buildings, or bare areas from natural or human causes. Two especially prevalent species that are known to occur throughout the watershed are Himalayan blackberry (*Rubus armeniacus*) and yellow star thistle (*Centaurea solstitialis*).

Didymo is an invasive aquatic algae that forms a slimy mass and attaches to plants and rocks along stream bottoms. This organism can cover up to 100% of stream bottoms and has potential to cause ecological damage and disrupt stream ecosystems by causing higher mortality rates in fish and aquatic plants (Spaulding and Elwell 2007). Didymo has been documented to occur in the Trinity River from the Trinity Dam to Helena and spreads easily through contaminated fishing gear, watercraft, or vehicles.

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Table 10-1. NNIS documented to occur in the HUC 10 watersheds and riparian reserves.

Scientific Name	Common Name	Documented within Riparian Reserves	Life Form/Habit	CDFA Rating[1]	Cal-IPC Rating[2]	Known in HUC 10 watershed[3]
Ailanthus altissima	tree of heaven	Yes	Tree	C	Moderate	Swift Creek- Trinity River, Stuart Fork, North Fork Trinity River, Upper Hayfork Creek
Bromus tectorum	cheatgrass	Yes	Grass	C	High	Big French Creek-Trinity River, Coffee Creek, Lower Hayfork Creek, Lower South Fork-Trinity River, New River, Tangle Blue Creek-Trinity River, Upper Hayfork Creek, Weaver Creek-Trinity River
Genista monspessulana	french broom	Yes	Shrub	C	High	Lower South Fork Trinity River, Swift Creek-Trinity Creek
Hypericum perforatum	common St. Johnswort	Yes	Perennial forb	C	Limited	Canyon Creek, Lower South Fork Trinity River, New River, North Fork Trinity River, Swift Creek-Trinity River, Upper Hayfork Creek
Aegilops triuncialis	barbed goatgrass	Yes	Grass	CCR 4500 noxious weed	High	Lower Hayfork Creek, Middle South Fork Trinity River
Cardaria chalepensis	hoary cress	Unknown	Perennial forb	CCR 4500 noxious weed	Moderate	Middle South Fork Trinity River
Carduus acanthoides	plumeless thistle	Unknown	Perennial forb	CCR 4500 noxious weed	Limited	No mapping available
Carduus nutans	nodding plumeless thistle	Yes	Perennial forb	CCR 4500 noxious weed	Moderate	Middle South Fork Trinity River

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Scientific Name	Common Name	Documented within Riparian Reserves	Life Form/Habit	CDFA Rating[1]	Cal-IPC Rating[2]	Known in HUC 10 watershed[3]
Carduus pycnocephalus	Italian plumeless thistle	Yes	Perennial forb	CCR 4500 noxious weed	Moderate	Big French Creek, North Fork Trinity River, Swift Creek Trinity River
Centaurea calcitrapa	purple star-thistle	Unknown	Perennial forb	CCR 4500 noxious weed	Moderate	Unknown
Centaurea diffusa	diffuse knapweed	Yes	Perennial forb	CCR 4500 noxious weed	Moderate	Lower Hayfork Creek, Lower South Fork Trinity River, Middle South Fork Trinity River, Upper Hayfork Creek, Weaver Creek-Trinity River
Centaurea solstitialis	yellow star thistle	Yes	Perennial forb	CCR 4500 noxious weed	High	Big French Creek-Trinity River, Browns Creek, Canyon Creek, Coffee Creek, Lower Hayfork Creek, Lower South Fork Trinity River, Middle South Fork Creek Trinity River, New River, North Fork Trinity River, Stuart Creek, Swift Creek-Trinity River, Tangle Blue Creek-Trinity River, Upper Hayfork Creek, Upper South Fork Trinity River, Weaver Creek-Trinity River
Chondrilla juncea	rush skeletonweed	Yes	Perennial forb	CCR 4500 noxious weed	Moderate	Middle South Fork Trinity River
Cirsium arvense	Canada thistle	Yes	Perennial forb	CCR 4500 noxious weed	Moderate	Browns Creek, Coffee Creek, Lower Hayfork Creek, Lower South Fork Trinty River, Middle South Fork Trinity River, Upper Hayfork Creek, Upper South Fork Trinity River

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Scientific Name	Common Name	Documented within Riparian Reserves	Life Form/Habit	CDFA Rating[1]	Cal-IPC Rating[2]	Known in HUC 10 watershed[3]
Cirsium vulgare	bull thistle	Yes	Perennial forb	CCR 4500 noxious weed	Moderate	Big French Creek-Trinity River, Canyon Creek, Coffee Creek, Lower Hayfork Creek, Lower South Fork Trinity River, Middle South Fork Creek Trinity River, New River, North Fork Trinity River, Stuart Creek, Swift Creek-Trinity River, Tangle Blue Creek-Trinity River, Upper Hayfork Creek, Upper South Fork Trinity River, Weaver Creek-Trinity River
Cynara cardunculus	artichoke thistle	Unknown	Perennial forb	CCR 4500 noxious weed	Moderate	Unknown
Cytisus scoparius	Scotch broom	Unknown	Shrub	CCR 4500 noxious weed	High	Big French Creek-Trinity River, Lower Hayfork Creek, Lower South Fork Trinity River, Weaver Creek-Trinity River
Isatis tinctoria	Dyer's woad	Unknown	Annual to short-lived perennial forb	CCR 4500 noxious weed	Moderate	Big French Creek-Trinity River, Coffee Creek, East Fork Trinity River, Lower Hayfork Creek, Lower South Fork Trinity River, Middle South Fork Creek Trinity River, North Fork Trinity River, Stuart Creek, Swift Creek-Trinity River, Tangle Blue Creek-Trinity River, Upper South Fork Trinity River, Weaver Creek-Trinity River
Lepidium latifolium	perennial pepperweed	Unknown	Perennial forb	CCR 4500 noxious weed	High	Unknown

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Scientific Name	Common Name	Documented within Riparian Reserves	Life Form/Habit	CDFA Rating[1]	Cal-IPC Rating[2]	Known in HUC 10 watershed[3]
Linaria genistifolia ssp. dalmatica	Dalmation toadflax	Unknown	Perennial forb	CCR 4500 noxious weed	Moderate	Big French Creek-Trinity River
Potentilla recta	sulphur cinquefoil	Yes	Perennial forb	CCR 4500 noxious weed	Watch	Big French Creek
Spartium junceum	Spanish broom	Yes	Shrub	CCR 4500 noxious weed	High	Big French Creek-Trinity River, Stuart Fork, Swift Creek-Trinity River
*Taeniatherum caput-medusae (*synonym = *Elymus caput-medusae)*	medusahead	Yes	Annual grass	CCR 4500 noxious weed	High	Lower Hayfork Creek, Middle South Fork Trinity River, Weaver Creek-Trinity River
Tribulus terrestris	puncturevine	Yes	Perennial forb	CCR 4500 noxious weed	Limited	Big French Creek-Trinity River
Avena barbata	slender oat	Yes	Grass	Not rated (STNF invasive species)	Moderate	Weaver Creek-Trinity River
Bromus diandrus	ripgut brome	Yes	Grass	Not rated (STNF invasive species)	Moderate	Lower South Fork Trinity River
Bromus madritensis ssp. rubens	red brome	Yes	Grass	Not rated (STNF invasive species)	High	Lower South Fork Trinity River
*Centaurea maculosa (*synonym = *Centaurea stoebe ssp. micranthos)*	spotted knapweed	Yes	Perennial forb	CCR 4500 noxious weed	High	Big French Creek-Trinity River, Lower Hayfork Creek, Middle South Fork Trinity River, New River, Stuart Creek, Swift Creek Trinity River, Tangle Blue Creek-Trinity River, Upper Hayfork Creek
Conium maculatum	poison hemlock	Yes	Perennial forb	Not rated (STNF invasive species)	Moderate	Lower South Fork Trinity River

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Scientific Name	Common Name	Documented within Riparian Reserves	Life Form/Habit	CDFA Rating[1]	Cal-IPC Rating[2]	Known in HUC 10 watershed[3]
Cynoglossum officinale	gypsyflower	Yes	Perennial forb	Not rated (STNF invasive species)	Moderate	Stuart Creek
Didymosphenia geminata	didymo	Yes	Aquatic diatom	Not rated (STNF invasive species)	No rating provided	Stuart Fork, Weaver Creek-Trinity River, Big French Creek-Trinity River
Digitalis purpurea	purple foxglove	Yes	Perennial forb	Not rated (STNF invasive species)	Limited	Coffee Creek
Foeniculum vulgare	sweet fennel	Yes	Perennial forb	Not rated (STNF invasive species)	Moderate	Big French Creek-Trinity River, Tangle Blue Creek-Trinity River, Upper Hayfork Creek
Holcus lanatus	common velvetgrass	Yes	Grass	Not rated (STNF invasive species)	Moderate	Stuart Creek
Hordeum marinum ssp. gussoneanum	Mediterranean barley	Yes	Grass	Not rated (STNF invasive species)	Moderate	Lower Hayfork Creek, Lower South Fork Trinity River, Middle South Fork Trinity River
Ilex aquifolium	English holly	Yes	Shrub, tree	Not rated (STNF invasive species)	Limited	Swift Creek-Trinity River
Lathyrus latifolius	perennial pea	Yes	Perennial forb	Not rated (STNF invasive species)	Watch	Big French Creek-Trinity River, Coffee Creek, Lower South Fork Trinity River, Middle South Fork Creek Trinity River, New River, North Fork Trinity River, Stuart Creek, Swift Creek-Trinity River, Tangle Blue Creek-Trinity River, Upper Hayfork Creek, Weaver Creek
Leucanthemum vulgare	oxeye daisy	Yes	Perennial forb	Not rated (STNF invasive species)	Moderate	New River

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Scientific Name	Common Name	Documented within Riparian Reserves	Life Form/Habit	CDFA Rating[1]	Cal-IPC Rating[2]	Known in HUC 10 watershed[3]
Melilotus albus	sweetclover	Yes	Perennial forb	Not rated (STNF invasive species)	No rating provided	Lower Hayfork Creek, Middle South Fork Trinity River
Phalaris aquatica	bulbous canarygrass	Yes	Grass	Not rated (STNF invasive species)	Moderate	North Fork Trinity River
Robinia pseudoacacia	Black locust	Unknown	Tree	Not rated (STNF invasive species)	Limited	Big French Creek-Trinity River, North Fork Trinity River, Weaver Creek-Trinity Creek
Rubus armeniacus	Himalayan blackberry	Yes	Shrub	Not rated (STNF invasive species)	High	Big French Creek-Trinity River, Coffee Creek, Lower South Fork Trinity River, New River, North Fork Trinity River, Swift Creek-Trinity River, Upper Hayfork Creek, Weaver Creek-Trinity River
Rubus laciniatus	cutleaf blackberry	Yes	Shrub	Not rated (STNF invasive species)	No rating provided	Weaver Creek-Trinity River
Saponaria officinalis	bouncingbet	Yes	Perennial forb	Not rated (STNF invasive species)	Limited	Weaver Creek-Trinity River
Verbascum blattaria	moth mullein	Yes	Perennial forb	Not rated (STNF invasive species)	No rating provided	North Fork Trinity River
Verbascum thapsus	common mullein	Yes	Perennial forb	Not rated (STNF invasive species)	Limited	Big French Creek-Trinity River, Canyon Creek, Coffee Creek, Lower Hayfork Creek, Lower South Fork Trinity River, Middle South Fork Creek Trinity River, New River, Stuart Creek, Swift Creek-Trinity River, Upper Hayfork Creek, Upper South Fork Trinity River

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Scientific Name	Common Name	Documented within Riparian Reserves	Life Form/Habit	CDFA Rating[1]	Cal-IPC Rating[2]	Known in HUC 10 watershed[3]
Vinca major	bigleaf periwinkle	Yes	Perennial forb	Not rated (STNF invasive species)	Moderate	New River

[1]CDFA rating: C - State endorsed holding action and eradication only when found in a nursery; action to retard spread outside of nurseries at the discretion of the commissioner; reject only when found in a cropseed for planting or at the discretion of the commissioner. CCR 4500 noxious weed – the specific purpose of section 4500 is to provide authority to the state to regulate the movement of the listed noxious weed species into or within California

[2]High - These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically. Moderate - These species have substantial and apparent-but generally not severe-ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread. Limited - These species are invasive, but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic. Alert - An Alert is listed on species with High or Moderate impacts that have limited distribution in California but may have the potential to spread much further. Watch - These species have been assessed as posing a high risk of becoming invasive in the future in California.

[3]Mapping locations provided from STNF Forest Biologist

CDFA Weed Pest Ratings and CCR 4500 Noxious Weeds as of June 22, 2021.

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Table 10-2. STNF NNIS Priority List

Species	Common Name	Cal-IPC Raing	CDFA Rating	Family
Terrestrial Species				
Acroptilon repens (Rhaponticum repens)	Russian knapweed	Moderate	CCR 4500	Asteraceae
Aegilops cylindrica	jointed goatgrass	Watch	CCR 4500	Poaceae
Aegilops triuncialis	barb goatgrass	High	CCR 4500	Poaceae
Ailanthus altissima	tree-of-heaven	Moderate	C / CCR 4500	Simaroubaceae
Alliaria petiolata	garlic mustard	Moderate	No rating	Brassicaceae
Arundo donax	giant reed	High	CCR 4500	Poaceae
Carduus acanthoides	plumeless thistle	Limited	CCR 4500	Asteraceae
Carduus nutans	musk thistle	Moderate	CCR 4500	Asteraceae
Carduus tenuiflorus and C. pycnocephalus	slenderflower and Italian thistle	Moderate	CCR 4500	Asteraceae
Centaurea diffusa	diffuse knapweed	Moderate	CCR 4500	Asteraceae
Centaurea jacea nothossp. pratensis (= Centaurea debeauxii)	meadow knapweed	Moderate	CCR 4500	Asteraceae
Centaurea melitensis	Malta starthistle, tocalote	Moderate	CCR 4500	Asteraceae
Centaurea solstitialis	yellow starthistle	High	CCR 4500	Asteraceae
Centaurea stoebe ssp. micranthos (= Centaurea maculosa)	spotted knapweed	High	CCR 4500	Asteraceae
Centaurea virgata ssp. squarrosa	squarrose knapweed	Moderate	CCR 4500	Asteraceae
Chondrilla juncea	rush skeletonweed	Moderate	CCR 4500	Asteraceae
Cirsium arvense	Canada thistle	Moderate	CCR 4500	Asteraceae
Cortaderia jubata	jubatagrass	High	CCR 4500	Poaceae
Cortaderia selloana	pampasgrass	High	No rating	Poaceae
Cynara cardunculus	artichoke thistle	Moderate	CCR 4500	Asteraceae
Cynoglossum officinale	houndstongue	Moderate	No rating	Boraginaceae
Cytisus scoparius	Scotch broom	High	CCR 4500	Fabaceae
Dittrichia graveolens	stinkwort	Moderate	CCR 4500	Asteraceae
Elymus caput-medusae (= Taeniatherum caput-medusae)	medusahead	High	CCR 4500	Poaceae
Euphorbia lathyris	caper spurge	Watch	No rating	Euphorbiaceae
Euphorbia oblongata	Oblong spurge	Limited	CCR 4500	Euphorbiaceae
Euphorbia virgata (= Euphorbia esula)	leafy spurge	High	CCR 4500	Euphorbiaceae

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Species	Common Name	Cal-IPC Raing	CDFA Rating	Family
Fallopia japonica (= Polygonum cuspidatum)	Japanese knotweed	Moderate	A / CCR 4500	Polygonaceae
Genista monspessulana	French broom	High	C / CCR 4500	Fabaceae
Holcus lanatus	common velvet grass	Moderate	No rating	Poaceae
Ilex aquifolium	English holly	Limited	No rating	Aquifoliaceae
Isatis tinctoria	dyer's woad	Moderate	CCR 4500	Brassicaceae
Lathrus latifolius	perennial sweet pea	Watch	No rating	Fabaceae
Lepidium appelianum (= Cardaria pubescens)	hairy whitetop	No rating	No rating	Brassicaceae
Lepidium chalepense (= Cardaria chalepensis and C. draba)	Lenspod whitetop and whitetop	No rating	CCR 4500	Brassicaceae
Lepidium latifolium	perennial pepperweed	High	CCR 4500	Brassicaceae
Linaria dalmatica ssp. dalmatica (= Linaria genistifolia ssp. dalmatica)	Dalmatian toadflax	Moderate	CCR 4500	Plantaginaceae
Lythrum salicaria	purple loosestrife	High	CCR 4500	Lythraceae
Melilotus albus	sweetclover	No rating	No rating	Fabaceae
Melilotus officinalis	yellow sweetclover	No rating	No rating	Fabaceae
Onopordum acanthium	Scotch thistle	High	CCR 4500	Asteraceae
Rubus armeniacus (= Rubus discolor)	Himalayan blackberry	High	No rating	Rosaceae
Rubus laciniatus	cutleaf blackberry	No rating	No rating	Rosaceae
Sesbania punicea	red sesbania, scarlet wisteria	High	CCR 4500	Fabaceae
Sorghum halepense	Johnson grass	No rating	No rating	Poaceae
Spartium junceum	Spanish broom	High	CCR 4500	Fabaceae
Tamarix parviflora	smallflower tamarisk	High	CCR 4500	Tamaricaceae
Tamarix ramosissima	saltcedar, tamarisk	High	CCR 4500	Tamaricaceae
Tribulus terrestris	puncturevine	Limited	CCR 4500	Zygophyllaceae
Ventenata dubia	North Africa grass	Watch	No rating	Poaceae
Verbena bonariensis	tall vervain, seashore vervain	Watch	No rating	Verbenaceae
Aquatic Species				
Alternanthera philoxeroides	alligator weed	High	A	Amaranthaceae
Didymosphenia geminata	Didymo / rock snot	No rating	No rating	diatomaceous algae
Dopatrium junceum	Horsefly's eye	No rating	No rating	Plantaginaceae

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Species	Common Name	Cal-IPC Raing	CDFA Rating	Family
Eichhornia crassipes	water hyacinth	High	No rating	Pontederiaceae
Limnobium spongia	South American spongeplant	High	CCR 4500	Hydrocharitaceae
Ludwigia hexapetala	Uruguay and creeping water-primrose	High	C / CCR 4500	Onagraceae
Ludwigia peploides	creeping water-primrose	High	No rating	Onagraceae
Myriophyllum aquaticum	parrotfeather	High	C	Haloragaceae
Myriophyllum spicatum	Eurasian watermilfoil	High	No rating	Haloragaceae

Source: STNF Forest Botanist (01/31/2025); CDFA ratings updated based on CDFA Weed Pest Ratings and CCR 4500 Noxious Weeds as of June 22, 2021.

For definitions, see footnotes below Table 10-1.

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10.2 Effects

One of the activities for the Proposed Action is to restore and enhance aquatic, wetland, riparian and upslope habitats by removing NNIS and revegetating with native plants. This activity would have a beneficial effect on native plant communities. Implementation of restoration activities could result in the spread of NNIS, some of which are listed on the CDFA noxious weed list. Prior to any disturbance, noxious weeds would be inventoried and managed according to treatment plans for specific species. Several CMs (Appendix B) are proposed that would reduce the spread of invasive and noxious weeds before, during, and following site-specific project activities. Protocols would be followed to ensure vehicles are not spreading seeds or vegetative parts of noxious weeds.

The invasive aquatic species didymo could spread easily into new areas during instream activities if construction vehicles, hand tools, or contractors' boots have been in areas where it exists and are not cleaned properly. Once in a stream, this organism can alter the stream environment including invertebrate and fish species diversity and population size (Spaulding and Elwell 2007). Effects on the abundance and diversity of benthic macroinvertebrates from the spread of didymo would eventually adversely affect fish and other organisms that feed on them. Extensive mats of didymo could impact stream processes, including ecosystem metabolism and nutrient cycling. CM NNIS-11 would eliminate the possibility of this species spreading from project activities. CMs such as educating the contractors working on restoration projects and thoroughly cleaning equipment coming from other streams would prevent the spread of didymo. With the use of CMs, the effect of the Proposed Action on the spread of didymo would be minor.

Federal EO 13112 as amended by EO 13751 requires federal agencies to use relevant programs and authorities to:

- Prevent the introduction of invasive species and provide for their control;
- Detect and control populations in a cost-effective and environmentally sound manner;
- Provide for restoration of native species;
- Promote public education on invasive species;
- Not authorize, fund or carry out actions to cause or promote the spread or introduction of invasive species; and
- Coordinate Federal prevention and control efforts related to invasive species.

Trinity County has several policies that discourage the use of synthetic herbicides for weed control. The Board of Supervisors has passed the following resolutions declaring forest herbicides a public nuisance:

- Resolution # 45-91 – April 2, 1991: Declares that the application of forestry herbicides in Trinity County is a public nuisance and that alternatives to forestry herbicides are available that create jobs. The resolution proclaims Trinity County timberlands an herbicide-free zone and requests forest managers not use herbicides on Trinity County timberlands.
- Resolution re-declaring the application of forest herbicides in Trinity County a public nuisance – April 7, 1997: This resolution identifies dangers associated with herbicide use and declares their use a public nuisance.
- Resolution # 2004-066 – July 20, 2004: This resolution acknowledges Trinity County's history of concerns about spraying herbicides and reaffirms its stance that herbicides are a public nuisance, and that Trinity County is an herbicide-free zone.

County ordinances would not apply to USFS lands; regardless, TRRP has determined that herbicides would not be used to control NNIS in the Project activity area as part of the Proposed Action. Some species, including Himalayan blackberry, scotch broom, tree of heaven, and yellow star thistle, are difficult to impossible to control without herbicides. For example, tree of heaven has been observed to come back aggressively within five years with more stems and vegetative volume when it is chopped or mowed. Management of these species would likely be labor and time intensive through manual or mechanical removal and continued monitoring and management. Without the use of herbicides, these species may spread into more areas than they currently occupy. For other species, GPMs, design guidelines, and CMs would avoid and minimize the spread of NNIS from the implementation of project activities. The net effect of controlling existing NNIS, using these environmental commitments to prevent new infestations and replanting native species, would be an overall benefit on native vegetation communities, but the benefits may be diminished by the increase in Himalayan blackberry, tree of heaven, scotch broom, and yellow star thistle, which would have minor adverse effects throughout the Project activity area.

11. Regional Effects

Regional effects include the short- and long-term impacts of the Project together with the past, present, and future actions of other projects. This analysis looks at other actions that have affected or could affect the same resources as action alternatives, in this case, vegetation and wetland resources. The effects of past actions are reflected in the descriptions of current existing conditions. Lands in the vicinity of the Project activity area include USFS-, BLM-, and privately-owned land.

Potential adverse effects of the Project on vegetation resources consist of temporary vegetation removal, adverse effects to special status plant species habitat, and NNIS spread from project activities. The incremental effects on vegetation resources are considered in relation to several past, present, and reasonably foreseeable actions, including cannabis farming, residential development, resources extraction, wildland fire control, fuels reduction, aquatic habitat restoration, and climate change that could contribute to regional effects.

11.1 Cannabis Farming

In 2018, the State of California legalized the recreational use of cannabis, as well as the cultivation and manufacture of cannabis plants and products. In Trinity and Humbold counties, there are many cannabis farms which collectively reduce flow volume and increase discharge of waste and pollutants in streams which affects water quantity and quality in the Project activity area. Presently, there is no watershed scale evaluation of the effects of cannabis farming on aquatic habitat in the Trinity River or to particular streams from cannabis farms. The operation of cannabis farms throughout the watershed will continue to negatively affect aquatic resources in the Trinity River and tributaries (NMFS 2020).

Illegal cannabis gardens on public lands also occurs. Marijuana cultivation on USFS land is an illegal activity. The Forest Service law enforcement actively searches for and removes any grow-sites found; however, it is unknown how many sites exist on national forest land. This illegal activity contributes to the loss of native vegetation communities, could adversely affect habitat for special status species, and spread NNIS.

11.2 Residential Development

Human population growth in the Project activity area is expected to remain relatively stable over the next 10 years as California's economy continues to recover from a long-lasting nationwide recession. The recession has had significant economic impacts at both the statewide and local scales with widespread impacts to residential development and resource industries such as timber and fisheries. However, some development will continue to occur which, on a small-scale, can affect localized aquatic habitat. Once development and associated infrastructure (e.g., roads, drainage, and water development) are established, the effects to aquatic species are expected to be permanent (NMFS 2020).

Anticipated effects to aquatic resources include loss of riparian vegetation, changes to channel morphology and dynamics, altered hydrologic regimes (increased storm runoff), increased sediment loading, and elevated water temperatures where shade-providing canopy is removed (NMFS 2020).

The presence of structures and/or roads near waters may lead to the removal of large wood to protect those structures from flood impacts. The anticipated effects on vegetation resources from continued residential development are expected to be sustained and locally intense. Commonly, there are also effects of home pesticide use and roadway runoff of automobile pollutants, introductions of invasive species to nearby streams and ponds, and loss of riparian and upland habitat due to land clearing activities. All these factors associated with residential development can have negative effects on vegetation resources by impacting vegetation communities and habitat for special status species. However, population growth rate in Trinity County decreased by about 11% between 2010 and 2019 (U.S. Census Bureau 2020). This may indicate a trend that could ameliorate or reduce the effects of residential development (NMFS 2020).

11.3 Resource Extraction

Resource-based industries are likely to continue to have an influence on environmental conditions within the Project activity area for the indefinite future. Logging continues to be conducted on both public and private lands throughout the HUC 10 watersheds, except in Canyon Creek (Reclamation 2019). STNF's vegetation management projects include those for forest health/thinning and fuels reduction. Some mining for gravel, aggregate, and minor precious metals occurs on the Trinity River floodplain and a few tributary watersheds. If flow is decreased by mining operations, riparian vegetation could be affected. The lack of protective measures in existing regulatory mechanisms, including land management plans (e.g., State Forest Practice Rules), contributes in varying degrees to the decline of vegetation resources. However, resource extraction industries have adopted management practices that reduce many of their most harmful impacts, which were unknown or not commonly used until recently (NMFS 2020). The STNF regularly implements forestry projects using resource protection measures and BMPs to reduce sedimentation into streams and otherwise reduce effects to environmental resources.

11.4 Wildland Fire Control and Fuels Reduction

Control of wildland fires may include the removal or modification of vegetation due to the construction of firebreaks or setting of backfires to control the spread of fire. This removal of vegetation can trigger post-fire landslides as well as create chronic sediment erosion. In addition, the use of fire retardants may adversely affect vegetation communities.

Fuels reduction is often employed by BLM and USFS to proactively prevent wildfires or to slow the spread of fire, especially near human structures. The BLM has initiated the Statewide Wildland Urban Interface Fuels Treatments (SWFT) program (BLM 2023). Fuels reduction treatments are intended to reduce fire by modifying the vegetation structure, density, and fuel loads by removing live and dead vegetation. Fuels reduction implementation affects vegetation resources by removing, altering, or destroying native vegetation and altering habitat for special status species. It would also create conditions favorable for the spread of noxious weeds/invasive species. Reducing fuels in specific areas may prevent catastrophic wildfires that would alter a greater number and acreage of native communities and special species habitats. Fuels reduction is proposed more often in and adjacent to the Wildland Urban Interface. Streams create a natural fire break, and most fuels reduction treatments would not affect streams or riparian habitat. Because the Project restoration activities would improve and increase native vegetation, the Proposed Action would offset some of the loss of vegetation from fuels reduction and would not add incrementally to regional effects.

11.5 Aquatic Habitat Restoration

Since 2009, the TRRP has implemented Trinity River mainstem channel rehabilitation projects at all the Phase 1 channel rehabilitation sites named in the 2000 Master EIR and at nine of the Phase 2 sites. The Deep Gulch and Sheridan sites were constructed in 2017. The Bucktail site constructed in 2008 was expanded in 2016 to include additional areas. The Dutch Creek project was constructed in 2020. The Chapman Ranch Phase A site was constructed in 2019, and the Phase B site was completed in 2021. The Oregon Gulch project was completed 2023. These mainstem projects have restore riparian vegetation by creating a greater diversity of wetland and riparian habitat within the Trinity River floodplain.

TRRP continues to add sediment within the 40-mile reach downstream of Lewiston Dam. In addition, TRRP-managed flows have been implemented yearly since 2004. Ongoing monitoring efforts by TRRP partners continue to document improvements in aquatic habitat use, alluvial processes, and riparian vegetative communities along the mainstem.

Beyond TRRP's mainstem channel rehabilitation and sediment augmentation projects, there have been several restoration and road sediment reduction projects implemented by various agencies and organizations throughout the Trinity River watershed. While some of these were considered in the 2009 Master EIR, USFS, Five Counties Salmonid Conservation Program, Watershed Research and Training Center, Trinity County Resource Conservation District, Northwest Resource Conservation and Development Council, Yurok Tribe, Hoopa Valley Tribe, Nor Rel Muk Wintu Nation, and other local nonprofits and governments have been funded for and/or completed additional projects intended to improve watershed conditions, restore aquatic habitat, improve aquatic connectivity, and reduce road-related sediment delivery to streams and rivers. These watershed restoration projects are intended to improve water quantity and quality as well as spawning and rearing habitat in the Trinity River watershed.

11.6 Conclusion

Restoration activities and NNIS control under the Proposed Action would have long-term benefits on native vegetation communities. The Proposed Action and past, present, and future restoration projects would offset the adverse effects on wetland and riparian habitat and other vegetation communities from cannabis farming, residential development, resource extraction, and wildland fires. The Proposed Action could have minor adverse

effects on the vegetative communities throughout the Project activity area because NNIS, such as tree of heaven, scotch broom, Himalayan blackberry, and yellow star thistle, may spread and become more abundant and vigorous when only managed with manual or mechanical treatments. If cannabis farming (legal and illegal), residential development, resource extraction, wildland fire control, and fuels reduction also cause these invasive species to spread, the overall regional effect on vegetation resources including wetland and riparian vegetation, would be a minor adverse effect.

The Proposed Action would have long-term beneficial effects on special status plant species as more disturbed habitat is restored and floodplains become more connected with the streams. No potentially adverse regional effects on special status plant species are anticipated from the Proposed Action.

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Appendix K: Fisheries Technical Report

Public Draft

FISHERIES TECHNICAL REPORT

INCLUDING BIOLOGICAL EVALUATION FOR SENSITIVE FISH AND FRESHWATER MUSSEL SPECIES AND EFFECTS ANALYSIS FOR ENDANGERED SPECIES ACT LISTED FISH SPECIES

TRINITY RIVER WATERSHED RESTORATION PROJECT

CGB-ED-2025-034

DOI-BLM-CA-N060-2025-0010-EA

PROJECT #63121 (FOREST SERVICE)

MARCH 2025

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U.S. Department of the Interior, Bureau of Land Management

U.S. Department of Agriculture, Forest Service

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Acronyms

Acronym	Definition
ACS	Aquatic Conservation Strategy
ANSI	American National Standards Institute
BiOp	biological opinion
BLM	US Bureau of Land Management
Caltrans	California Department of Transportation
CH	critical habitat
CMs	conservation measures
CVP	Central Valley Project
dB	decibels
DC	direct current
DPS	distinct population segment
EA	Environmental Assessment
EFH	essential fish habitat

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EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FMP	fishery management plan
GPM	general protection measure
HUC	hydrologic unit code
KMP	Klamath Mountains Province
L_{PEAK}	instantaneous peak sound pressure level
LW	large wood
mm	millimeters
MSA	Magnuson Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NTUs	nephelometric turbidity units
PAHs	polycyclic aromatic hydrocarbons
PBFs	physical and biological features
Project	Trinity River Watershed Restoration Project
Reclamation	Bureau of Reclamation
Regional Water Board	North Coast Regional Water Quality Control Board
RMS	root mean square sound pressure level
ROD	Record of Decision
SEL	sound exposure level
SONCC	Southern Oregon/Northern California Coast
TRD	Trinity River Division
TRH	Trinity River Hatchery
TRRP	Trinity River Restoration Program
UKTR	Upper Klamath-Trinity Rivers
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VSP	Viable Salmonid Population

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Executive Summary

This Technical Report analyzes the effects to fish and freshwater mussel species with documented presence within the Trinity River watershed as a result of activities proposed as part of the Trinity River Watershed Restoration Project (Project). Some species were not analyzed in detail because the Project is not anticipated to have measurable effects on these species. Table 1-1 lists effects summaries for each species or group analyzed in detail in this document. A detailed list of all general protection measures (GPMs), design guidelines, and conservation measures (CMs) is included in Appendix B of the Environmental Assessment (EA). Effect determinations for special status species are provided in Section 6.

Table 1-1. Summary of effects on special-status freshwater mussels and fisheries.

Species / Group	Effects Summary
Salmon and steelhead	Minor adverse effects anticipated as a result of construction impacts to riparian vegetation, in-channel heavy equipment use, turbidity/sedimentation, chemical contamination, hydroacoustic noise, dewatering, and fish relocation. Long-term benefits include an increase in habitat quantity and quality, which would lead to an increase in salmonid rearing capacities for coho, Chinook, and steelhead.
Green sturgeon	Negligible effects to the species because of the low numbers of green sturgeon anticipated to be above Gray Falls along the Mainstem Trinity River, which is on the edge of the Project activity area. The historic range of green sturgeon is located outside of the Project activity area[1] along the South Fork Trinity River. Any individuals present in the Project activity area could experience similar minor adverse effects as those listed for salmon and steelhead as a result of construction impacts. Long-term benefits of the Project for green sturgeon entail increased foraging opportunities as a result of increased salmonid numbers.
Pacific lamprey	Minor adverse effects as a result of construction impacts related to in-channel heavy equipment use, turbidity/sedimentation, chemical contamination, dewatering, and fish relocation. Long-term benefits of the Project entail improved aquatic habitat conditions and fish passage.
Freshwater mussels	Minor adverse effects as a result of construction impacts related to in-channel heavy equipment use, turbidity/sedimentation, chemical contamination, dewatering, and salvage and relocation. Disturbance to mussel beds would be avoided to the extent possible. Long-term benefits of the Project entail an increase in aquatic habitat complexity that could allow for future establishment of mussel beds.

[1] The Project activity area boundary lies between Panther and Underwood creeks along the South Fork Trinity River.

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1 Proposed Action

The Trinity River Restoration Program (TRRP) was established to restore the fisheries of the Trinity River affected by dam construction and related diversions of the Trinity River Division (TRD) of the Central Valley Project (CVP). Administered by the Bureau of Reclamation (Reclamation), TRRP is a partnership of federal and state resource agencies, Tribes, and Trinity County. TRRP works to restore the processes and attributes of a properly functioning river and watershed to support the recovery of diminished salmon and steelhead populations while retaining the Trinity and Lewiston Dams' delivery of water and power to the Trinity River and California's Central Valley.

The purpose of the Project, of which TRRP is the lead agency, is to improve instream and riparian habitat at a watershed scale and to accelerate the recovery of north coast salmon populations (coho salmon, steelhead, and Chinook salmon), thereby fulfilling tribal trust responsibilities and obligations to local communities as well as recreational and commercial fishing industries (per the Shasta-Trinity National Forest Land and Resource Management Plan and state and federal recovery plan goals [NMFS 2014; CDFG 2004]).

The following describes the objectives of the Proposed Action:

- Restore and improve instream conditions sufficient to support all life stages of salmonids and other aquatic species.
- Restore upstream and downstream fish passage for all life stages of salmonids.
- Restore continuous paths for wood dispersal, nutrient cycling, sediment transport, and movement of other vegetative material essential for productive aquatic habitat.
- Maintain or restore native plant communities and vegetative structure impacted by invasive plants and pathogens, while rehabilitating eroding streambanks to improve water quality, shade conditions, and large wood (LW) recruitment.
- Repair, replace, or remove ineffective instream structures.
- Restore and improve riparian and meadow habitat in order to promote healthy conditions for aquatic and terrestrial wildlife populations.
- Improve late summer/fall base flow conditions through process-based restoration, water conservation improvements, and meadow restoration.

The Proposed Action consists of a suite of instream and riparian restoration activities that are designed to meet the objectives described above. Detailed descriptions of each of the proposed activities are included in chapter 4 of the Project's EA document. Proposed Activities are grouped into three general categories: instream habitat restoration; upslope habitat restoration; and road maintenance, rehabilitation, and decommissioning activities. The activities proposed under each of these categories are summarized below.

Instream Habitat Restoration:

1. Restoration and Enhancement of In-Channel Habitat
2. Floodplain Restoration
3. Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures

4. Water Conservation Projects
5. Salmon Carcass Placement
6. Remote Site Incubators

Upslope Habitat Restoration:

7. Bioengineered Bank Stabilization
8. Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement Including Removal of Nonnative Invasive Species and Revegetation with Native Plants

Road Maintenance, Rehabilitation, and Decommissioning Activities:

9. Road Maintenance
10. Road Rehabilitation
11. Road Decommissioning

1.1 Project Location and Timing

The proposed activities would occur within a portion of the Trinity River watershed (Figure 1-1). Individual restoration actions would take place in and along tributaries of and the mainstem Trinity River (both above and below the Lewiston and Trinity dams) on both private (with permission of the landowner) and public lands (primarily managed by the U.S. Forest Service [USFS] and U.S. Bureau of Land Management [BLM]). Key watersheds within the restoration activity area include North Fork Trinity River, South Fork Trinity River, Canyon Creek, and New River. The watershed-scale analysis was performed for each of the hydrological unit code 10 (HUC 10) watersheds. See Table 1-1 below for watersheds included in the Project activity area.

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Table 1-1. HUC 10 Watersheds within the Trinity River Basin.

Subregion (HUC 4)	Basin (HUC 6)	Subbasin (HUC 8)	Watershed (HUC 10)	HUC 10 Number	Acres in Project Activity Area
Klamath-Northern California Coastal 1801	Northern California Coastal 180102	Trinity California 18010211	Big French Creek-Trinity River[1]	1801021111	153,325
			Browns Creek	1801021106	47,110
			Canyon Creek[4]	1801021108	41,033
			Coffee Creek	1801021101	74,835
			East Fork Trinity River	1801021103	74,335
			Horse Linto Creek-Trinity River[2]	1801021112	0
			New River[4]	1801021110	149,597
			North Fork Trinity River[4]	1801021109	97,483
			Stuart Fork	1801021104	88,264
			Swift Creek-Trinity River	1801021105	121,055
			Tangle Blue Creek-Trinity River	1801021102	101,393
			Weaver Creek	1801021107	142,030
		South Fork Trinity 18010212	Lower South Fork Trinity River[3,4]	1801021205	44,229
			Lower Hayfork Creek	1801021203	142,161
			Upper Hayfork Creek	1801021202	105,697
			Middle South Fork Trinity River[4]	1801021204	145,776
			Upper South Fork Trinity River[4]	1801021201	73,634

1. [1] A portion of Big French Creek is excluded from the Project activity area, namely the Sharber Creek HUC 12 subwatershed, because it is in the Six Rivers National Forest.
2. [2] Horse Linto Creek is located in the Six Rivers National Forest and is not included in the Project activity area.
3. [3] A portion of Lower South Fork Trinity River is excluded from the Project activity area, namely Grouse, Mingo, and Old Campbell Creeks (HUC 12 subwatersheds), because they are located in the Six Rivers National Forest.
4. Aquatic Conservation Strategy (ACS) Key Watersheds

GPMs, CMs, and design guidelines have been developed for proposed activities to avoid and minimize effects to fish and freshwater mussel species. These would incorporate into the planning, design, and implementation phases of each site-specific project. These have been developed as part of the Project's Endangered Species Act (ESA) Section 7 consultation with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS), and collaborative Project planning efforts by TRRP, USFS, and BLM. A detailed list of all BMPs, CMs, and design guidelines by resource is included in Appendix B of the EA.

Project activities within any wetted or flowing channel of tributaries of and the mainstem Trinity River below the Trinity and Lewiston dams shall be restricted to the dry season (i.e., June 15 to October 15 for tributaries and July 15 to October 15 for the Trinity River mainstem) before coho begin spawning. Revegetation outside of the active channel is typically implemented during the wet season, between October and April. Work in intermittent streams may continue beyond November 1, as long as weather conditions permit and the stream channel remains dry. Construction and restoration work within intermittent stream channels must be completed before cumulative seasonal rainfall is sufficient to result in surface flow within the channel.

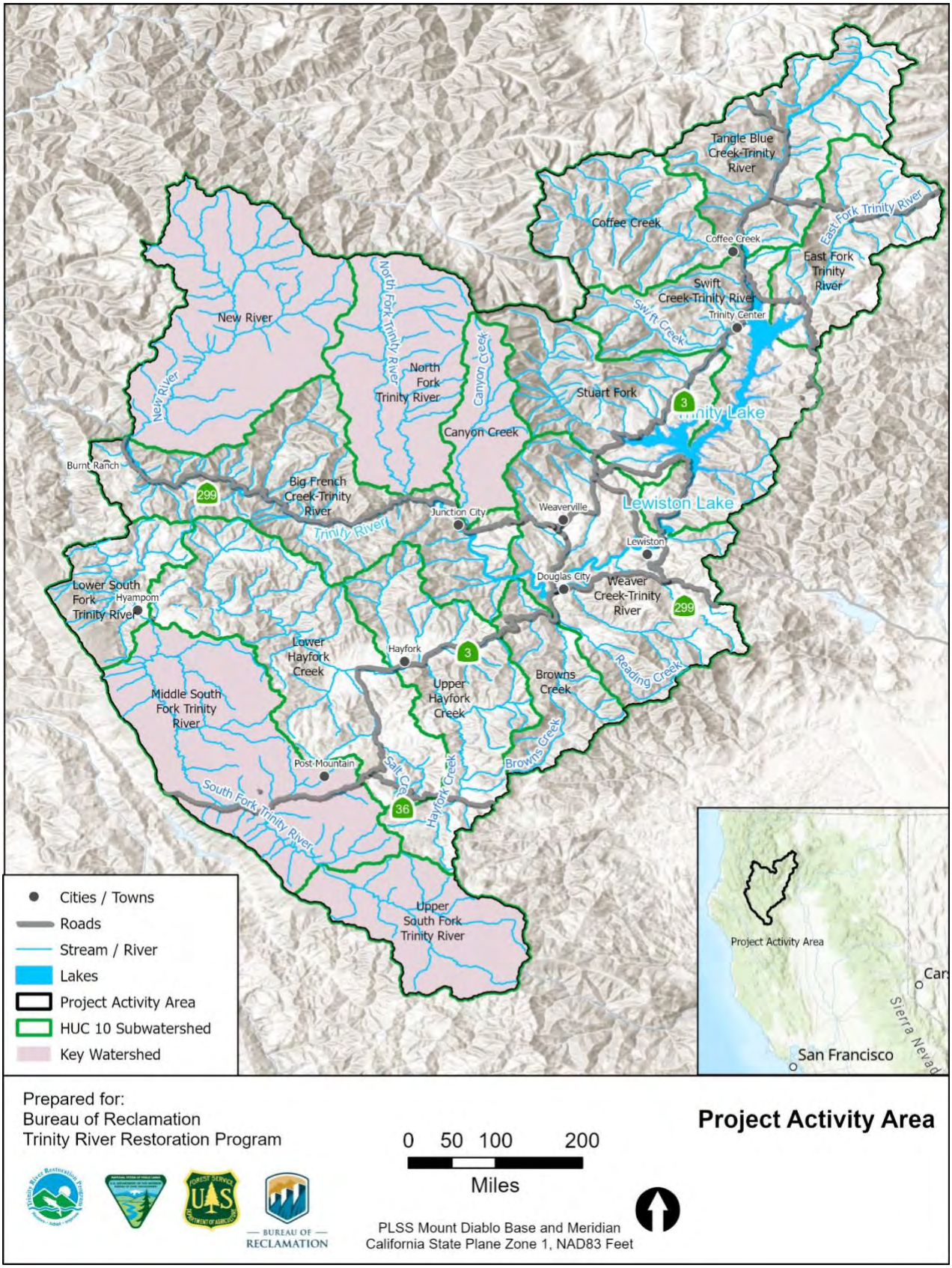

Figure 1-1. Project Activity Area, where restoration activities would occur.

1.2 Fisheries Impact Avoidance and Minimization

The 2020 NMFS Biological Opinion (BiOp; NMFS No. WCRO-2019-03827) specifies a suite of BMPs and CMs related to instream construction, water quality, riparian vegetation, and research and fish capture intended to protect special-status fish species. These are included in Appendix B of the EA and are subject to change during subsequent ESA Section 7 consultations with NMFS. The 2020 NMFS BiOp is anticipated to undergo reinitiation in order to include all activities proposed by TRRP and the Project. Additional BMPs, CMs, and design guidelines are provided by the 2025 USFWS California Statewide Programmatic Restoration Effort BiOp (FWS Ref. 2022-0005149-S7) and are also included in Appendix B.

1.2.1 Limits on Proposed Activities Frequency and Location

Due to the large-scale nature of the Project, there are concerns about the potential for direct physical changes to the environment as a result of implementation at the watershed scale. A key design guideline entails setting annual project limits on the number of projects, which would limit adverse effects to ESA-listed species.

The 2020 TRRP BiOp limits instream watershed restoration projects covered by the BiOp annually to:

- 2 fish passage/dam removal projects;
- 8 channel/floodplain rehabilitation projects (4 mainstem and 4 tributary);
- 2 in-stream habitat enhancement projects;
- 3 streambank stabilization projects; and
- 4 road-related projects with in-water activities (i.e. road decommissioning with culvert removal).

TRRP is in the process of reinitiating consultation with NMFS to include all project activity categories described in the Proposed Action that were not previously analyzed in the 2020 TRRP BiOp. Project limitations will also be reviewed during the reinitiated consultation and are anticipated to change. During meetings with NMFS in regard to the ESA Section 7 consultation for this Project, NMFS recommended setting Project limits to control sedimentation and turbidity that would adversely affect ESA-listed salmonids. Preliminarily, it is being proposed that in addition to utilizing GPMs and CMs, such as erosion and sediment control BMPs, effects of turbidity would be controlled by limiting the number of floodplain reconnection projects that are over 100 acres as well as small dam removals, to one site-specific restoration project (of these specific project types) per HUC-12 watershed, per year. However, the latest applicable BiOp should be referred to, to determine current Project limits during site-specific project implementation.

Project limits would provide spatial and temporal flexibility during site-specific restoration project development and watershed planning efforts. Implementors within the watershed would continue to collaborate with the assistance of TRRP, USFS, and BLM to ensure significant regional effects would not occur.

2 Environmental Setting

The Trinity River originates in the rugged Salmon-Trinity Mountains of northern California in the northeast corner of Trinity County. The entire Trinity River watershed is approximately 2,861 square miles in size and is the largest Klamath River tributary. From Lewiston Dam, the Trinity River flows westward for 112 miles until it

enters the Klamath River near the town of Weitchpec on the Yurok Reservation. The Trinity River passes through Trinity and Humboldt counties and the Hoopa Valley (Hoopa Tribe) and Yurok Indian Reservations. The Klamath River flows northwesterly for approximately 37 miles from its confluence with the Trinity River before entering the Pacific Ocean.

2.1 Aquatic Habitat

Historically, the Trinity River functioned as a dynamic river reach that provided quality spawning and rearing habitat for anadromous fish. In 1955, Congress authorized construction of the Trinity River Division (TRD) of the Central Valley Project (CVP; Public Law 386, 84th Congress, First Session). Authorized water uses from the TRD include irrigation and beneficial uses in the Central Valley, power production, and the preservation of fish and wildlife. The TRD began operations in 1960, blocking 109 miles of important salmonid habitat above the Lewiston Dam and exporting as much as 90% of the Trinity River's inflows into Trinity Lake to the Sacramento River Basin. Fisheries resource managers observed an almost instantaneous decline in the numbers of naturally-produced adult salmonids returning to the Trinity River basin to spawn. Returning salmonid numbers declined by 53% to 96%, depending on species (USFWS and HVT 1999). Diverting water from the Trinity basin to the Sacramento basin caused severe degradation of instream fish habitat of the Trinity River. The minimal flows released were insufficient to maintain the Upper Trinity River and, consequently, much of the river channel between the Lewiston Dam and the North Fork Trinity River confluence became confined within a narrow channel bordered by dense riparian berms.

In addition to the development of TRD, logging practices, road construction, mining, and floodplain development within the Trinity River watershed also contributed significantly to instream habitat degradation (USFWS and HVT 1999). Clear-cut logging, along with hundreds of miles of unpaved roads and skid trails, promoted increased sediment loading in the Trinity River and its tributaries, and removal of streamside vegetation increased water temperatures. Within the mainstem Trinity River, the distribution of coho salmon can likely be explained, at least in part, by water temperature. Moreover, virtually all tributaries have been subjected to hydraulic mining activities that degraded habitat complexity, the volume of large wood within the watersheds, and spawning habitat. Hydraulic mining also led to head-cutting in upstream areas as fine sediments were washed downstream, which decreased groundwater storage and caused subsurface flows in some areas. This has reduced the biological productivity and fish-carrying capacity of much of the Trinity River Subbasin (USFWS and HVT 1999; EPA 2001). In addition, degradation of freshwater habitat has been pervasive in the Lower Klamath River, contributing to declines in native fish runs (Gale and Randolph 2000).

Subsequently, Congress enacted a number of legislative actions to restore Trinity River fishery resources. In 2000, the Secretary of the Interior signed the Record of Decision (ROD) for the Trinity River Mainstem Fishery Restoration Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) which required Reclamation (through TRRP) to implement a suite of actions to increase habitat quality and quantity for native anadromous fish. The five primary components of TRRP's river restoration work include:

1. **Variable Annual Instream Flows** – releasing water from Lewiston Dam, based on the water year type, to mimic natural Trinity River flows and interact with downstream areas to enhance conditions for all life stages of fish and wildlife. These variable annual instream flows are also called restoration releases or restoration flows and have generally occurred starting in April.

2. **Channel Rehabilitation** – restoring the functional floodplain of the river, which has been channelized and simplified by managed river flows and mining. To date, TRRP has constructed 34 of the rehabilitation projects identified in the 1999 TRFEFR and Trinity River FEIS (USFWS et al. 2000).
3. **Sediment Management** – introducing sediment to the river and providing flows to ensure its movement in the river. Sediment entering the river system upstream of Trinity Dam is blocked from the Trinity River below Lewiston Dam, which creates a downstream sediment deficit. TRRP resupplies the river with sediment downstream of the dams to offset the loss of sediment from upstream sources. Typically, coarse sediment additions are used to provide gravels (0.375 to 5 inches in diameter) downstream of Lewiston Dam, where the supply has been curtailed. Fine sediment control reduces silt and sand inputs from watershed sources (e.g., Grass Valley Creek, where sediment retention ponds have been periodically dredged to control impacts on redds). Recent studies indicate that the Trinity River reach near the dam is lacking fine sediment inputs, which is an objective addressed by the Proposed Action (Buxton 2021).
4. **Watershed Restoration** – addressing negative impacts resulting from land management in the Trinity River basin. Watershed restoration activities include ensuring fish passage to tributary habitat and creating better aquatic conditions in watershed areas to support stream life.
5. **Adaptive Environmental Assessment and Management** – monitoring, evaluating, and improving the effectiveness of river restoration actions.

Reclamation has been implementing, and continues to implement, the flows described in the Trinity ROD. Since the 2000 ROD, TRRP has both implemented and funded others to undertake restoration actions to improve instream habitat conditions in both the mainstem Trinity River and the tributaries.

2.2 Fish Passage

There are numerous fish passage barriers and diversions within the Project activity area. In the "Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Significant Unit (ESU) of Coho Salmon *(Oncorhynchus kisutch)"* (NMFS 2014), dams and diversions were identified as a key limiting factor for populations of Southern Oregon/Northern California Coast (SONCC) coho in the Trinity River. Numerous small-scale wells and diversions for domestic uses, stock watering, and small agricultural operations occur throughout the watershed and reduce stream flows during critical low-flow periods in the late summer and fall. A ten-foot defunct concrete diversion dam on Garden Gulch prevents access to high-quality, low-gradient habitat (NMFS 2014).

Numerous vineyards, small farms, and marijuana plantations use water from the South Fork Trinity River and its tributaries including, but not limited to, Rattlesnake Creek and Post Creek (Trinity County 1987; 1994). The effects of water diversions are particularly acute in the Hyampom and Hayfork Valleys, as well as in the Forest Glenn area, where summer low-flows lead to elevated water temperatures and a constriction of summer rearing habitat (NMFS 2014). In addition, the diversions that remain unscreened can lead to fish stranding. Although more recent assessments are necessary, the need for fish screens has already been identified on diversions in Barker, Big, East Fork Hayfork, Upper Hayfork, Little, Olsen, Salt, and Tule Creeks (PWA 1994). Because of the impacts on summer rearing, diversions pose a very high threat to the juvenile life stage of coho salmon and other salmonids (NMFS 2014).

Fish passage barriers and diversions for each HUC 10 watershed are summarized in Table 2-1 below. Appendix A of this document shows fish passage information for each HUC 10. It should be noted that, at the time of the preparation of this document, winter steelhead distribution was in the process of being updated to show that winter steelhead cannot migrate past natural total barriers, which is a changed not reflected in the Appendix A figures.

Table 2-1. Number of fish passage barriers per HUC 10 watershed in the Project activity area.[1]

HUC 10 Name	Natural Partial Barrier	Natural Total Barrier	Partial Barrier	Total Barrier	Unscreened Diversion	Unknown/ Unassessed	Remediated Barrier[2]
Big French Creek-Trinity River	2	16	23	11	28	109	8
Browns Creek	1	6	3	4	0	23	1
Canyon Creek	0	3	7	4	0	2	1
Coffee Creek	0	0	0	1	0	9	0
East Fork Trinity River	0	0	0	3	0	16	0
Lower Hayfork Creek	3	32	20	24	0	64	2
Lower South Fork Trinity River	3	17	1	5	0	12	0
Middle South Fork Trinity River	3	30	12	22	0	51	0
New River	2	2	0	3	0	8	0
North Fork Trinity River	0	8	1	1	0	0	0
Stuart Fork	0	0	1	1	0	20	0
Swift Creek-Trinity River	0	0	7	7	0	11	0
Tangle Blue Creek-Trinity River	0	0	0	3	0	17	0
Upper Hayfork Creek	3	16	16	5	0	36	9
Upper South Fork Trinity River	2	7	0	5	0	8	1
Weaver Creek-Trinity River	2	13	19	16	97	126	4

[1] CalFish 2023. [2]Fish response unconfirmed.

In addition, the Trinity County Resource Conservation District (RCD) has evaluated fish passage at culverts within Trinity County (within the watershed) and prioritized them for repair or replacement. This list was updated in 2019 and is included in the *Landscape Level Restoration Gap and Trend Analysis for the Tributaries of the Trinity River, California* (Rupp 2019).

2.3 Water Quality

Water quality is of particular importance to the health of fisheries. The North Coast Regional Water Quality Control Board (Regional Water Board) identified the primary water quality issues in the Trinity River watershed as

sedimentation of streams, high water temperatures, mercury contamination in fish, and historic wood treatment facility contamination. In 1971, Congress created the Trinity River Task Force with a mandate to formulate and implement a management program to restore fish and wildlife populations in the Trinity River watershed and achieve temperature objectives that meet the life cycle needs of the fish (North Coast RWQCB 2018). Both the Trinity River mainstem and the South Fork Trinity River have been declared as sediment impaired and placed on the Clean Water Act (CWA) Section 303(d) list as impaired waters. The U.S. Environmental Protection Agency (EPA) developed and adopted a Total Maximum Daily Load (TMDL) for sediment in the Trinity River in 2001 (EPA 2001) and in the South Fork Trinity River in 1998 (EPA 1998).

2.4 Key Watersheds

As described by the Aquatic Conservation Strategy (ACS), Key Watersheds are watersheds that provide high-quality water, and a large system of refugia that are crucial to at-risk fish species and stocks. These are designated areas that either provide, or are expected to provide, high-quality habitat to be used as refugia for anadromous salmonids and resident fish species. Key watersheds can provide high-quality habitat as well as degraded areas of habitat. In turn, this allows the lower-quality areas to have high potential for restoration, and to become future sources of high-quality habitat with the implementation of a comprehensive restoration program. The Project would work towards enhancing Key Watersheds.

There are four key watersheds within the Project activity area (Figure 1-1) including the North Fork Trinity River, Canyon Creek, New River, and South Fork Trinity River (a portion of which does not lie within the Project activity area).

2.5 Essential Fish Habitat

The Magnuson Stevens Fishery Conservation and Management Act (MSA) requires federal agencies to consult with NMFS on all actions, or proposed actions, which are authorized, funded, or undertaken by the agency which may adversely affect essential fish habitat (EFH; MSA §305[b][2]). The EFH mandate applies to all species managed under a federal fishery management plan (FMP). The FMP applicable to this Project is the Pacific Coast Salmon FMP and the species with EFH in the Trinity River are coho and Chinook salmon. Because eight of the Project HUC 10s are documented for coho and all 16 HUC 10s are documented for Chinook, EFH overlaps with the majority of the instream habitat within the watershed.

EFH refers to those waters and substrates necessary for spawning, breeding, feeding, or growth to maturity. As defined, the term “waters” includes aquatic areas and their associated physical, chemical, and biological properties that are used by fish or, where appropriate, have historically been used by fish. The term “substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities. “Necessary” means the habitat required for a sustainable fishery and the managed species’ contribution to a healthy ecosystem. Finally, “spawning, breeding, feeding, or growth to maturity” refers to a species’ full life cycle. “Adverse effect” means any impact that reduces the quality and/or quantity of EFH, and may include short-term, long-term, site-specific, or habitat-wide effects, including individual or collective consequences of actions.

2.6 Critical Habitat

Section 7(a)(2) of the ESA requires federal agencies, in consultation with and with the assistance of the Secretaries of the Interior and Commerce, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of critical habitat (CH) of such species (50 CFR 402.02). "Destruction or adverse modification" was clarified to mean "… alteration that appreciably diminishes the value of CH for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features" (81 FR 7214, February 11, 2016).

CH for the SONCC coho salmon ESU[2] was designated in 1999 by NMFS. It is identified as, "the water, substrate, and adjacent riparian zone [within the range of an ESU] . . . [below] longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years)" (64 FR 24049, May 5, 1999). NMFS has excluded from the SONCC coho CH designation all tribal lands in northern California and areas that are above certain dams which block access to historic habitats of listed salmonids. This includes a portion of the Lower Klamath River subbasin, which lies within the Yurok Tribe Reservation.

Physical and biological features (PBFs) for SONCC coho CH entail all the water, riverbed, and bank areas, and riparian areas within the ESU boundaries except as noted above. Waterways include estuarine areas and tributaries. Adjacent riparian area is defined as, "the area adjacent to a stream that provides the following functions: shade, sediment, nutrient, or chemical regulation, streambank stability, and input of large woody debris or organic matter" (64 FR 24049, May 5, 1999). In other words, riparian areas are those that produce physical, biological, and chemical features that help to create biologically productive stream habitat for salmonids. PBFs essential to the conservation of SONCC coho include juvenile summer and winter rearing areas, juvenile migration corridors, areas for growth and development to adulthood, adult migration corridors, and spawning areas (64 FR 24049, May 5, 1999).

3 Environmental Consequences

Key considerations for the analysis of potential Project effects to fish and freshwater mussel species include the presence of a species in or near the Project activity area, the scope and nature of Project activities, and the potential effects associated with those activities. This analysis looks at short- and long-term effects to fish and freshwater mussel species and their associated instream habitat. Short-term effects to waterways as a result of construction impacts are commonly related to ground disturbance within the floodplains, streambeds, or streambanks. Long-term effects are caused by the action and are later in time or farther removed in distance. Long-term effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

[2] Evolutionarily Significant Unit

Specific to fish and freshwater mussel species, construction-related effects may result in immediate physical harm or death to individuals, or the disruption of key behaviors that also harm individuals. Long-term effects include impacts to habitat (e.g., flow, water quality, riparian and aquatic vegetation, etc.) that occur later in time (e.g., a decrease in foraging opportunities) that would affect individuals and populations in the long term.

As previously mentioned, individual restoration actions would take place in and along tributaries of and the mainstem Trinity River (both above and below the Lewiston and Trinity dams) on both private and public lands. Key Watersheds within the restoration activity area include North Fork Trinity River, South Fork Trinity River, Canyon Creek, and New River. Through coordination between TRRP, BLM, and USFS, it was determined that an effects analysis performed at the HUC 10 watershed scale would be sufficient to adequately characterize Project effects. Therefore, 16 HUC 10 watersheds are analyzed in this report. See Table 2-1 for HUC 10 names and acreages and Figure 1-1 for an overview map.

For the purposes of the fisheries analysis for this Project, the intensity of effects is described using the following terms:

- Negligible/No effect: Effects would not be measurable, with no perceptible consequences.
- Minor: Effects are detectable but are small and localized.
- Moderate: Effects are detectable, can be measured, and cover a larger area (e.g., a tributary stream).
- Major: Effects are easily measured, regional, and at the population-scale.

Effect analyses include consideration of avoidance, minimization, and mitigation measures to lessen effects. Compensatory mitigation is not proposed for the Project since the overall intent of the Project is to restore and enhance ecosystem function to benefit fish and wildlife species. Compensatory mitigation means the restoration, establishment, enhancement, and in certain circumstances, preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts that remain after all appropriate and practicable avoidance and minimization has been achieved (33 CFR 332.2).

3.1 Species Analyzed in Detail

The native anadromous fish species of interest in the mainstem Trinity River and its tributaries are Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), steelhead (*Oncorhynchus mykiss irideus*), and Pacific lamprey (*Entosphenus tridentatus*). There are two spawning races of Chinook salmon, spring- and fall-run, and two spawning races of steelhead, winter- and summer-run.

Per the ACS, the BLM and USFS are tasked to conserve and restore native anadromous fish habitat, and TRRP exists to re-establish endangered salmonid populations to the Trinity River, in part through restoration activities within the tributaries. Federal and state special-status fish species of particular concern that occur within the Project activity area include:

- Southern Oregon/Northern California Coast (SONCC coho salmon ESU (federal and California state ESA-listed as threatened, with designated CH)
- Upper Klamath-Trinity rivers (UKTR) spring-run Chinook salmon ESU (federal candidate species, California state ESA-listed as endangered, USFS sensitive).

The UKTR Chinook salmon ESU, while not a federal ESA-listed species and no CH has been designated, is a stock covered under the Pacific Coast Salmon FMP. Therefore, its habitat within the Trinity River watershed is considered EFH. SONCC coho habitat is also considered EFH. EFH receives federal protection under the MSA.

Table 3-1 below displays all special-status fish and freshwater mussel species with the potential to occur within the Trinity River watershed according to the California Natural Diversity Database (2024a), BLM sensitive species Redding Field Office list, USFS sensitive species list for the Shasta-Trinity National Forest, University of California Davis PISCES Database current fish distribution maps (CalFish 2024), and consultation with local expertise, namely TRRP. Table 3-1 includes the species status, documented HUC 10 presence within the Project activity area, and whether designated CH is present within the analysis area. These species are focused on in the fisheries effects analysis, and life history information for each is included in Section 3. See Section 3.2 below for a list of common species found throughout the watershed.

Table 3-1. Special-status fish and freshwater mussel species with potential to occur within the Project activity area.

Common Name	Scientific Name	Federal Status[1]	Other Status[2]	Documented HUC 10 Presence	Designated CH in the Watershed?
Fish Species					
Coho salmon, SONCC ESU	*Oncorhynchus kisutch*	FT	ST, S2	Browns Creek, Big French Creek, Canyon Creek, East Fork Trinity River, New River, North Fork Trinity River, Stuart Fork, Swift Creek-Trinity River, Weaver Creek, Lower Hayfork Creek, Lower South Fork Trinity River, Middle South Fork Trinity River	Yes
Spring Chinook salmon, UKTR ESU	*Oncorhynchus tshawytscha*	FC	SE,SSC, USFS-S, S2	Big French Creek, Browns Creek, Canyon Creek, Coffee Creek, East Fork Trinity River, New River, North Fork Trinity River, Stuart Fork, Swift Creek-Trinity River, Tangle Blue Creek-Trinity River, Weaver Creek, Lower South Fork Trinity River, Lower Hayfork Creek, Upper Hayfork Creek, Middle South Fork Trinity River, Upper South Fork Trinity River	No
Steelhead, Klamath Mountains Province DPS[3]	*Oncorhynchus mykiss irideus*	NL	SSC,USFS-S, S2	Browns Creek, Canyon Creek, Coffee Creek, East Fork Trinity River, New River, North Fork Trinity River, Stuart Fork, Swift Creek-Trinity River, Tangle Blue Creek-Trinity River, Weaver Creek, Lower South Fork Trinity River, Lower Hayfork Creek, Upper Hayfork Creek, Middle South Fork Trinity River, Upper South Fork Trinity River	No
Green sturgeon, Northern DPS[3]	*Acipenser medirostris*	NL	SSC, S1	Big French Creek[4]	No

Common Name	Scientific Name	Federal Status[1]	Other Status[2]	Documented HUC 10 Presence	Designated CH in the Watershed?
Pacific lamprey	*Entosphenus tridentatus*	NL	SSC, USFS-S, BLM-S, S3	Big French Creek, Browns Creek, Canyon Creek, Coffee Creek, New River, North Fork Trinity River, Tangle Blue Creek-Trinity River, Weaver Creek, Lower South Fork Trinity River, Lower Hayfork Creek, Upper Hayfork Creek, Middle South Fork Trinity River	No
Freshwater Mussel Species					
Western pearlshell	*Margaritifera falcata*	NL	S1S2	Common in the Trinity River and tributaries	No
California floater	*Anodonta californiensis*	NL	USFS-S, S2	Documented in low numbers in the Klamath and Trinity rivers	No

[1] FT = Federally-listed as threatened and species likely to become endangered within the foreseeable future; FC = Federal candidate for listing; NL = Not listed.

[2] SSC = California Species of Special Concern; SE = State-listed as endangered; ST = State-listed as threatened; BLM-S = BLM sensitive species, USFS-S = USFS sensitive species; NatureServe California State Rank S1 = critically imperiled, S2 = imperiled, S3 = vulnerable.

[3] Distinct Population Segment (DPS)

[4] Green sturgeon is found outside the Project activity area in this HUC 10 watershed.

3.2 Other Fish Species

Other fish species that are not considered special-status species, common within the Project activity area, could be affected by the proposed restoration activities. These activities are proposed to occur within or near aquatic, riparian, wetland, and upslope areas. Other fish species for each HUC 10 are shown in Table 3-2 below.

Table 3-2. Other fish species in HUC 10 subwatersheds.[1,2]

HUC 10 Watershed	HUC 10 Number	Typical Native Fish Species	Nonnative Fish Species
Big French Creek-Trinity River	1801021111	Threespine stickleback, Klamath smallscale sucker, Klamath speckled dace, UKTR fall Chinook salmon	Brook trout, brown trout, green sunfish, golden shiner, largemouth bass
Browns Creek	1801021106	Threespine stickleback, Klamath River lamprey, Klamath speckled dace, UKTR fall Chinook salmon	Brook trout, brown trout
Canyon Creek	1801021108	Threespine stickleback, Klamath River lamprey, Klamath speckled dace, UKTR fall Chinook salmon	Brook trout, largemouth bass
Coffee Creek	1801021101	Threespine stickleback, Klamath River lamprey, Klamath speckled dace, UKTR fall Chinook salmon	Brook trout, brown trout, largemouth bass, sockeye (Kokanee) salmon,
East Fork Trinity River	1801021103	Threespine stickleback, Klamath River lamprey, Klamath speckled dace	Brook trout, brown bullhead, brown trout, green sunfish, largemouth bass, smallmouth bass, sockeye (Kokanee) salmon, western mosquitofish

HUC 10 Watershed	HUC 10 Number	Typical Native Fish Species	Nonnative Fish Species
New River	1801021110	Threespine stickleback, Klamath smallscale sucker, Klamath River lamprey, Klamath speckled dace, UKTR fall Chinook salmon	Brook trout, brown trout, green sunfish, largemouth bass, golden shiner
North Fork Trinity River	1801021109	Threespine stickleback, Klamath smallscale sucker, Klamath River lamprey, Klamath speckled dace, UKTR fall Chinook salmon	Brook trout, brown trout, green sunfish, largemouth bass, golden shiner
Stuart Fork	1801021104	Threespine stickleback, Klamath River lamprey, Klamath speckled dace	Brook trout, brown trout, brown bullhead, green sunfish, largemouth bass, smallmouth bass, Western mosquitofish, sockeye (Kokanee) salmon
Swift Creek-Trinity River	1801021105	Threespine stickleback, Klamath River lamprey, Klamath speckled dace,	Brook trout, brown trout, brown bullhead, green sunfish, golden shiner, largemouth bass, smallmouth bass, Western mosquitofish, sockeye (Kokanee) salmon,
Tangle Blue Creek-Trinity River	1801021102	Threespine stickleback, Klamath River lamprey, Klamath speckled dace	Bluegill, brook trout, brown trout, golden shiner, largemouth bass, Western mosquitofish, sockeye (Kokanee) salmon,
Weaver Creek	1801021107	Threespine stickleback, Klamath smallscale sucker, Klamath River lamprey, Klamath speckled dace, UKTR fall Chinook salmon	Brook trout, golden shiner, green sunfish, largemouth bass, smallmouth bass
Lower South Fork Trinity River	1801021205	Threespine stickleback, Klamath River lamprey, Klamath speckled dace, white sturgeon, UKTR fall Chinook salmon	Brown bullhead, brown trout, golden shiner, green sunfish, largemouth bass
Lower Hayfork Creek	1801021203	Threespine stickleback, Klamath smallscale sucker, Klamath River lamprey, Klamath speckled dace, UKTR fall Chinook salmon	Brook trout, brown trout, golden shiner, green sunfish, largemouth bass
Upper Hayfork Creek	1801021202	Threespine stickleback, Klamath smallscale sucker, Klamath River lamprey, Klamath speckled dace, UKTR fall Chinook salmon	Brook trout, brown bullhead, brown trout, golden shiner, green sunfish, largemouth bass
Middle South Fork Trinity River	1801021204	Threespine stickleback, Klamath River lamprey, Klamath speckled dace, UKTR fall Chinook salmon, white sturgeon[3]	Brown trout, golden shiner, green sunfish, largemouth bass
Upper South Fork Trinity River	1801021201	Threespine stickleback, Klamath smallscale sucker, Klamath River lamprey, Klamath speckled dace, UKTR fall Chinook salmon	Brook trout, golden shiner, green sunfish, largemouth bass

1. CalFish 2024

2. Resident rainbow trout may be found throughout the basin.

3. Based on limited records.

3.3 Salmon and Steelhead

The following Figure 3-1 demonstrates that salmon and steelhead at various life history stages are present within the Trinity River throughout the entire year. Special-status species are discussed in more detail below.

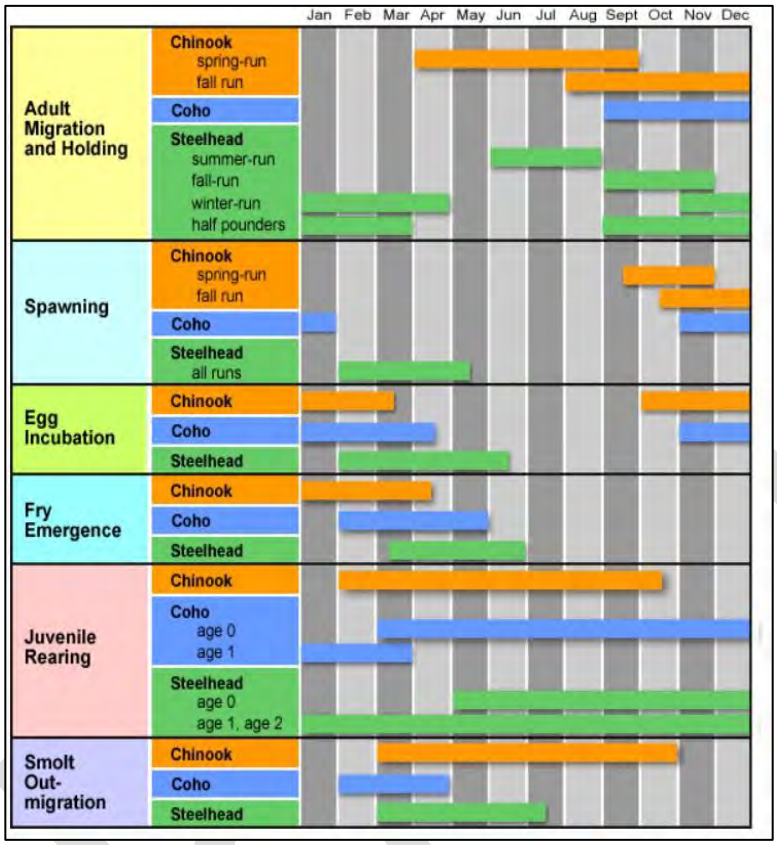

Figure 3-1. Life history timing of Trinity River salmon and steelhead (*reproduced from TRRP Website*).

3.3.1 SONCC Coho Salmon ESU (*Oncorhynchus kisutch*)

The SONCC coho salmon ESU was first listed as threatened on May 6, 1997 (62 FR 24588) and includes all populations of coho in coastal streams from the Elk River near Cape Blanco, Oregon, southward to, and including, the Mattole River near Punta Gorda, California. CH for this species was designated on May 5, 1999 (64 FR 24049) and includes the mainstem Trinity River and accessible tributary reaches that are occupied by freshwater life stages of coho and include one or more of the PBFs essential to the conservation of the SONCC coho ESU. These PBFs may include, but are not limited to, the following: spawning sites; food resources; water quality and quantity; and riparian vegetation.

Most coho spawning streams flow directly into the ocean or are tributaries of large rivers. Females tend to prepare their redds (gravel nests) and spawn soon after arriving on spawning grounds between November and January, with timing varying by watershed within the ESU (Weitkamp et al. 1995). Klamath-Trinity River basin populations of SONCC ESU coho salmon generally migrate upstream from September through late December with arrival in the upper reaches peaking in November and December (Leidy and Leidy 1984; NMFS 1997; NMFS 2012). In the Trinity River, spawning mainly occurs in November and December Leidy and Leidy 1984; Shaw et al.

1997; CDFG 2024; see Figure 3-1). Prime spawning habitat conditions generally occur near the head of a riffle, just below a pool, where there is abundant small to medium gravel (Shapovalov and Taft 1954) and suitable water depths and velocity.

Depending on river temperatures and dissolved oxygen levels, eggs incubate in the redds for 1.5 to 4 months before hatching as alevins (a larval life stage). The percentage of eggs and alevins that survive to fry emergence is dependent on stream and riverbed conditions during winter flooding, with associated scour and gravel movement accounting for a high proportion of losses (NMFS 2014). In the Trinity River and other Klamath River tributaries, fry emergence typically occurs two to three weeks after hatching, beginning from about February and continuing through mid-May. Following emergence, fry move into shallow areas near streambanks. As coho fry grow, they disperse upstream and downstream, usually remaining in, or moving into, small tributary streams, and establish and defend territories (Leidy and Leidy 1984; Hassler 1987).

The dominant life history pattern is for juvenile coho to feed and rear within streams of their natal watershed for a year before migrating to the ocean. However, they may spend up to two years rearing in fresh water (Bell and Duffy 2007) or emigrate to an estuary shortly after emergence (Tschaplinski 1988). Coho have also been shown to utilize non-natal streams for rearing and to redistribute into riverine ponds following fall rains (Peterson 1982). The extent to which fish utilizing these alternate life history patterns contributes to adult returns is not known, however, they demonstrate the diversity of strategies that are potentially used by juvenile coho in this ESU (NMFS 2014).

During the summer, coho salmon fry prefer shallow pools and riffles with wood cover, undercut banks, boulders, and overhanging vegetation (Shapovalov and Taft 1954). During summer, juvenile coho may also move into deep pools and areas with dense shade and large wood for refuge from high summer temperatures (Nickelson et al. 1992). During the winter, coho salmon fry prefer to rear in large mainstem pools, backwater areas and secondary pools with LW, and undercut bank areas (Hassler 1987). After rearing in fresh water, coho migrate to the sea as smolts generally from February through mid-June, peaking in April and May throughout their range in California, including the Trinity River (Shapovalov and Taft 1954; Leidy and Leidy 1984; Petros et al. 2015).

Recent Klamath-Trinity monitoring data show the average length of out-migrating coho smolts is approximately 128 millimeters (mm), with the largest smolts originating from the Trinity River (average length 147 mm) and the smallest originating from Blue Creek on the Klamath River (average length 104 mm; NMFS 2014; Petros et al. 2015). The large average size of smolts produced from the Trinity River is likely a result of hatchery operations, which generally produce larger smolts when compared to naturally produced smolts (NMFS 2014; Petros et al. 2015).

The status and viability of the SONCC ESU coho salmon were evaluated in the most recent 5-Year Status Review (NMFS 2011) and described in the Final Recovery Plan (NMFS 2014) using the concept of Viable Salmonid Populations (VSPs) and the population viability criteria described by McElhany et al. (2000) and expanded upon by Williams et al. (2008). Long-term population estimates for SONCC coho are scarce; however, available monitoring data indicate that many populations have declined, and that the ESU does not appear to support a single VSP (i.e., a population at low risk of extinction). Most of the 30 independent populations are at high risk of extinction for abundance because they are below or likely below their depensation threshold (NMFS 2014).

To compensate for these declines, hatcheries supplement naturally-spawning SONCC coho (CDFG and NMFS 2001). Supplementation of hatchery salmon into SONCC coho populations with low productivity has

subsequently led to a continued reduction of population diversity. Additionally, recent fish distribution data indicate that the range of SONCC coho has decreased, as evidenced by previously-occupied streams in which coho are now absent (NMFS 2001).

Given the recent trends in population abundance, productivity, spatial structure, and diversity across the ESU, the SONCC coho ESU is not considered to be viable and is at high risk of extinction, with a likelihood to become endangered in the foreseeable future (Williams et al. 2011).

3.3.2 Spring Chinook Salmon, UKTR ESU (*Oncorhynchus tshawytscha*)

In 1998, a status review of all west coast Chinook salmon stocks (Myers et al. 1998) determined that the UKTR Chinook salmon ESU was not warranted for federal ESA listing as a threatened or endangered species. However, UKTR spring-run Chinook salmon (spring Chinook) is a California Fish Species of Special Concern (Moyle et al. 1995).

UKTR spring Chinook is known to occur in the mainstem Klamath River, Trinity River, and perennial tributary streams. Similar to coho, Chinook require cool streams with deep pools and riffles, and gravel or cobble substrate. Suitable over-summering, spawning, and rearing habitat as well as migration corridors for Chinook exist throughout the Project activity area.

While spring Chinook salmon are still scattered throughout the lower Klamath and Trinity basins, the only viable wild population appears to be limited to the Salmon River and South Fork Trinity River. Mainstem Trinity River numbers are presumably largely influenced by fish from the Trinity River Hatchery (TRH), as are most tributary populations. Even if Trinity River tributary spawners are considered to be wild fish, the total number of spring Chinook in the UKTR ESU rarely exceeds 1,000 and may drop to less than 300 in many years. Even recent large runs (i.e., approximately 2,500) of spring Chinook returning to the South Fork Trinity and Salmon River, combined, represent less than 3% of the total number of spring Chinook historically spawning in the Klamath Basin (Walbaum 2024).

While UKTR spring Chinook are not a federal ESA-listed species and CH has not been designated, Chinook are included in the Pacific Coast Salmon FMP, for which habitat is protected as EFH (as previously discussed). Effects to UKTR spring Chinook as a result of implementation of the Project would be similar to those described for coho salmon.

3.3.3 Klamath Mountains Province Steelhead DPS (*Oncorhynchus mykiss irideus*)

The Klamath Mountains Province (KMP) steelhead DPS, which includes stock from the Trinity River, was proposed for federal listing as threatened in 1995. However, in 1998, NMFS determined that the population was not warranted for listing under the federal ESA. A court decision overturned the ruling in 2000, finding that NMFS relied too heavily on expected effects of future conservation efforts. A final decision was reached on April 4, 2001 (CFR Vol. 66, No. 65), and the listing of KMP steelhead under the federal ESA was again determined to be unwarranted. The KMP steelhead DPS is also not listed under the state ESA, however, it is a California Fish Species of Special Concern and a USFS sensitive species (Moyle et al. 1995).

KMP steelhead require cool, swift, shallow water, clean loose gravel for spawning, and suitable large pools in which to spend the summers (specific to summer steelhead, CDFW 2024b). They are known to occur in the

mainstem Klamath River, Trinity River, and perennial tributary streams. Suitable spawning, rearing, and migration corridor habitats exist throughout the Project activity area.

Because KMP steelhead have distinctive life history variations (i.e., winter, summer, fall, half-pounder, and resident forms), diverse watershed characteristics and impairments, and are hard to monitor during periods of high flow and turbidity, abundance estimates for the entire KMP steelhead DPS are not available. Instead, abundance is examined by watershed, and because of seasonal conditions, summer and fall adult steelhead have the largest data sets (CDFW 2010). KMP summer steelhead have a spotty distribution throughout their range and specialized habitat requirements, making each subpopulation more susceptible to environmental changes and anthropogenic threats than adult winter and fall steelhead. Adult abundance for summer steelhead was and continues to be small, but most populations appear to be stable. However, specific threats (e.g., fire, sedimentation, climate change, and poaching) are more likely to impact subpopulations, leading to local extirpations. Currently, there are no coordinated basin-wide management plans in place for the protection of summer steelhead. Watersheds identified by McEwan and Jackson (1996) as high priority areas for stream restoration to benefit KMP steelhead included the South Fork of the Trinity River, Scott River, and Shasta River (CDFW 2010).

Potential effects to the KMP steelhead DPS in the Trinity River resulting from implementation of the Project would be similar to those described for coho and Chinook salmon. Long-term benefits are expected to substantially outweigh temporary adverse effects.

3.3.4 Effects on Salmon and Steelhead and Habitat

The Project activity area is used by all life stages of coho, Chinook, and steelhead during proposed work. Adult salmonid spawning and migration, juvenile migration, and juvenile rearing are likely to be affected by the proposed action. In-water Project activities would occur during the summer low flow period (i.e., June 15 through October 15 or the first rainfall) to avoid effects to SONCC coho to the extent possible after the majority of smolts have left the watershed but before most adults return. Restoration activities that may adversely affect salmonids or their habitat include stream dewatering and bypass, fish relocation, bank stabilization, heavy equipment operating in the channel, bridge replacement, bedrock fracturing, large and small wood installation, and instream structure removal.

Existing conditions for SONCC critical habitat PBFs include all water, riverbed, and bank areas, and riparian areas within the ESU boundaries. In the Trinity River basin, the function of these PBFs vary widely from poor to excellent. Climate change and human development have and continue to adversely impact critical habitat. The implementation of some site-specific restoration projects would have short-term adverse effects on PBFs at the site-specific project scale. The long-term effect of these activities across the Project activity area would be anticipated to accrue habitat benefits (and improved PBFs) as projects mature and natural processes take over. It is expected that critical habitat quality and quantity would improve over time as a result of the Project and therefore, the Project would not result in the appreciable reduction in the value of designated SONCC critical habitat.

Likewise, effects to coho and Chinook salmon EFH, the waters and substrates necessary for spawning, breeding, feeding, or growth to maturity, are anticipated to be similar. The implementation of some site-specific restoration projects would have short-term adverse effects on EFH at the site-specific project scale. The long-

term effects to EFH as a result of the Project would entail an increase in quality and quantity at the watershed scale.

While implementation of the Project would have some adverse effects to individual fish and habitat, the Project would have a long-term beneficial effect on salmonid habitat in the Project activity area. Overall improvement of aquatic habitat quantity and quality and salmonid rearing capacities for coho, Chinook, and steelhead would be anticipated.

3.4 North American Green Sturgeon (*Acipenser medirostris*)

The North American green sturgeon (*Acipenser medirostris*) is an anadromous fish species that is also present in the Trinity River basin. These fish spend their early life stages in freshwater, migrate to the ocean for maturation, and return to their natal streams to spawn. Green sturgeon typically spawn during late spring and early summer in the mainstems of large river systems and in relatively fast flow conditions. The Klamath/Trinity River basin is known to contain the largest spawning population of green sturgeon in California (Moyle 2002). Spawning occurs in freshwater rivers in cool, deep water with turbulent flows over clean hard substrate. Juvenile green sturgeon are found in the Trinity River near Willow Creek from June through September, and appear to outmigrate during their first summer to the lower river or estuary, where they rear for some time before moving to the ocean (TRRP 2024).

NMFS published a final rule listing the Southern DPS of green sturgeon as threatened in 2006 (71 FR 17757). Two green sturgeon DPSs are defined: a Southern DPS that spawns in the Sacramento River, and a Northern DPS with spawning populations in the Klamath and Rogue rivers. The Southern DPS includes all spawning populations of green sturgeon south of the Eel River in California, of which only the Sacramento River currently contains a spawning population. The Southern DPS of green sturgeon has been listed as threatened under the ESA (71 FR 17757), whereas the Northern DPS is only a species of concern. McLain (2006) noted that southern DPS green sturgeon were first determined to occur in Oregon and Washington waters in the late 1950s, when tagged San Pablo Bay green sturgeon were recovered in the Columbia River Estuary (CDFG 2002a). Northern DPS green sturgeon have been documented up to Gray Falls (River Mile 43.5) in the mainstem Trinity River outside of the Project activity area. There used to be spawning populations of green sturgeon in the South Fork Trinity River but there is currently no evidence of spawning habitat within the South Fork Trinity River (Moyle 2002) and the historic range for green sturgeon is located outside of the Project activity area. The distribution of northern and southern DPS green sturgeon overlaps outside of their spawning streams in coastal estuaries and marine waters from southern California to Alaska.

CH for southern DPS green sturgeon was designated by NMFS in 2009 (74 FR 52300) but does not overlap with the Project activity area. CH includes specific PBFs essential for the conservation of southern DPS green sturgeon. PBFs for freshwater riverine systems include abundant food sources, suitable substrate for spawning and egg development, adequate flow regime, and suitable water quality. While southern DPS green sturgeon have not been documented in the Trinity River, according to NMFS, the presence of southern DPS green sturgeon is likely (based on limited records of confirmed Northern DPS green sturgeon and those of unknown DPS) but not confirmed within the Klamath/Trinity River Estuary (74 FR 52300).

In 2011, a USFS fisheries biologist (Eric Wiseman, Fisheries Biologist [Yurok Tribe, Trinity River Division], text message to TRRP, November 16, 2018) observed a 50-inch green sturgeon coming down over Gray Falls, which is

the supposed green sturgeon barrier located at River Mile 43.5. Therefore, some green sturgeon may make it upstream of the falls. Though green sturgeon have not been documented within the Project activity area, a small number of individuals could be present in the mainstem Trinity River at the outer edge of the Project activity area.

3.4.1 Effects on Green Sturgeon

Construction-related effects to green sturgeon would be limited to a small number of individuals that are able to move above Gray Falls on the mainstem and are therefore, effects are anticipated to be negligible. Any effects that occur to these individual fish are described in Section 3.6, Effects on Salmon, Steelhead, and other Special-Status Fish Species, below. Overall, the Project is expected to have a beneficial effect to green sturgeon by increasing local populations of salmonids over the long term, which would improve foraging opportunities for green sturgeon.

3.5 Pacific Lamprey (*Entosphenus tridentatus*)

Pacific lamprey are another native anadromous fish within the Trinity River, beginning their life cycle as an ammocoete or larvae, usually within a freshwater stream. Ammocoetes burrow tail-first into mud or soft substrate where they filter-feed on algae and organic matter during their four-to-five-year stay in freshwater. When they grow to the adult (parasitic) form, Pacific lamprey swim downstream toward the Pacific Ocean where they feed for 6 to 18 months. Like salmon, Pacific lamprey return to fresh water and migrate upstream to spawn and die (CalFish 2024). Adult Pacific lamprey spawn from spring through early summer and again in the fall. Pacific lamprey have been documented throughout much of the Trinity River.

Pacific lamprey, along with three other lamprey species, were petitioned for federal ESA listing in 2003. On December 27, 2004, the USFWS announced that the petition accompanied by additional information did not present substantial scientific or commercial information to warrant the listing of these species (CFR Vol. 64, No. 86, December 27, 2004).

3.5.1 Effects on Pacific Lamprey

Potential construction-related effects to fish, including Pacific lamprey, as a result of the Project are described in 3.6, Effects on Salmon, Steelhead, and other Special-Status Fish Species, below. Specific to Pacific lamprey, the removal of riparian vegetation at specific restoration sites would have temporal effects to adult Pacific lamprey by reducing holding and hiding habitat, which is particularly important for upstream migrating adults. However, revegetation efforts following restoration activities would be anticipated to improve conditions in the long term. In addition, special efforts would be made to ensure that burrowed Pacific lamprey ammocoetes are salvaged during dewatering activities. Recent studies have shown that electrofishing after dewatering (or “dry shocking”), which involves positioning probes on moist sediment to entice burrowed larval lampreys to emerge, may be a technique to increase survivorship of ammocoetes. Avoidance and minimization measures specific to Pacific lamprey are incorporated into Project documents. With the incorporation of these measures, only minor effects to Pacific lamprey are anticipated as a result of Project implementation. In the long-term, the Project would benefit Pacific lamprey by improving aquatic habitat conditions and fish passage within the Trinity River watershed.

3.6 Effects on Salmon, Steelhead, and other Special-Status Fish Species

Table 3-3 below summarizes the potential construction components or construction impacts by restoration activity category that could affect individual fish and their habitat. Effects of particular concern are described in more detail below Table 3-3. Construction-related effects on special-status fish per activity categoryTable 3-3.

Table 3-3. Construction-related effects on special-status fish per activity category.

Restoration Activity Category	Potential Construction-Related Effects with CMs Implemented
1. Restoration and Enhancement of Off-Channel and Side-Channel Habitat	Construction impacts to riparian vegetation, in-channel heavy equipment use, turbidity, incidental chemical contamination, bedrock fracturing hydroacoustic noise, dewatering, fish relocation
2. Floodplain Restoration	Construction impacts to riparian vegetation, in-channel heavy equipment use, turbidity, incidental chemical contamination, dewatering, fish relocation
3. Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings, and Other In-water Structures	Construction impacts to riparian vegetation, in-channel heavy equipment use, sedimentation, incidental chemical contamination, dewatering, fish relocation
4. Water Conservation Projects	Turbidity, incidental chemical contamination, potential for dewatering/fish relocation associated with fish screen installation
5. Salmon Carcass Placement	No adverse construction-related effects anticipated
6. Remote Site Incubators	Minor streambed disturbance during install of system and demobilization.
7. Bioengineered Bank Stabilization	Construction impacts to riparian vegetation, incidental chemical contamination, sedimentation
8. Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement Including Removal of Nonnative Invasive Species and Revegetation with Native Plants	Construction impacts to riparian vegetation, incidental chemical contamination, sedimentation
9. Road Maintenance	Incidental chemical contamination, sedimentation
10. Road Rehabilitation	Construction impacts to riparian vegetation, in-channel heavy equipment use, sedimentation, incidental chemical contamination, dewatering, fish relocation, hydroacoustic noise from pile driving
11. Road Decommissioning	Construction impacts to riparian vegetation, in-channel heavy equipment use, sedimentation, incidental chemical contamination, dewatering, fish relocation

3.6.1 Dewatering and Fish Relocation

Dewatering and fish relocation will be necessary for a number of activity categories as summarized in Table 3-3. This work would take place during seasonally low flow, and salmonids are likely to be exposed to potential adverse effects. Adults are physically able to avoid work activity and are not expected to be present during fish removal, but in the unlikely event that adults are found in the work areas, they will be safely removed via herding to the extent possible.

Dip nets have been successfully employed for collection in the past, but fish relocation may include use of electrofishing following applicable NMFS protocols. Most captured fish would be expected to be released unharmed. However, it is possible that relocation efforts, including electrofishing, could induce physiological stress or mortality even when performed by a skilled fisheries biologist. Any fish-collecting gear, whether passive or active (Hayes 1983), has some associated risk to fish, including stress, disease transmission, injury, or death. The amount of injury and mortality attributable to fish capture varies widely depending on the methods used, the ambient conditions, and the expertise and experience of the field crew. Electrofishing can kill juvenile salmonids, and researchers have found serious sublethal effects including spinal injuries (Habera et al. 1999, Nielsen 1998, Nordwall 1999).

The long-term effects of electrofishing on salmonids are not well-understood. Although chronic effects may occur, most effects from electrofishing would occur at the time of capture and handling. Referencing results from similar restoration and fish salvage efforts in northwestern California (CDFW 2013, 2014, 2015, 2016, 2017, 2018; NOAA RC 2012, 2018, 2019, 2020), it is anticipated that under typical water temperature conditions within the Trinity River watershed, no more than 2% mortality of captured fish at each fish relocation site would occur (NMFS 2020).

3.6.2 Desiccation or Mechanical Crushing During In-Channel Heavy Equipment Use

Any fish not recovered during salvage operations would be subject to desiccation or mechanical injury. Salmonids may be injured by contact with construction equipment operating in the channel, but numerous measures would be employed to reduce this probability. In-channel construction activities would be conducted during the summer to early fall low-flow conditions (June 15 through October 15), avoiding the potential for construction-related effects on spawning coho salmon and alevins, since this period is outside the adult migration, spawning, and egg incubation season in the action area (Shaw et al. 1997). The in-channel work window also corresponds to the season when the fewest number of juvenile coho salmon are known to occur in the action area, after age -0 pre-smolt emigration, but before active yearling smolt migration (Glase 1994; Petros et al. 2015).

Pre-construction surveys would identify and avoid potential injury to collections of juvenile or adult fish. Heavy equipment would also operate in a slow, deliberate manner, allowing fish to avoid contact with equipment in an open channel. Seining would be employed at some sites to herd fish out of the site before block nets are placed, preventing reentry of juvenile fish into the work area. Based on a report on fish capture efficiency (USDA FA et al. 2013), it is anticipated that up to 5% of juvenile salmonids would not be removed from fish herding or salvage and be left behind to suffer mortality from desiccation or direct mechanical crushing (NMFS 2020).

3.6.3 Increased Suspended Sediment Concentrations

Multiple activity categories have the potential to increase sediment mobilization caused by actions including, but not limited to, in-channel construction, barrier removal, heavy equipment use, and floodplain grading. Suspended sediment concentrations increase rapidly with the initiation of in-channel work and recede markedly with the cessation of work (Reid and Anderson 1998). The effects of suspended sediment, which contribute to turbidity, on fish have been well documented and range from beneficial to lethal. Moderate turbidity levels (i.e., from 35 to 150 nephelometric turbidity units [NTUs]) can provide cover and accelerate foraging rates in juvenile salmonids (Gregory and Northcote 1993). Conversely, higher turbidity concentrations can cause physiological

stress and inhibit growth and survival, while direct mortality can occur at very high concentrations and/or extended durations of suspended solids (Newcombe and Jensen 1996).

Fish would be exposed to increased sediment mobilization by Project activities, but several measures would reduce the potential impact of suspended sediment. Erosion and sediment control BMPs would be maintained to ensure compliance with the turbidity thresholds specified by the Project's Section 401 water quality certification (i.e., more than 20 NTUs at 500 feet downstream of in-river construction when background turbidity is less than or equal to 20 NTUs, and more than a 20% increase in turbidity at 500 feet downstream when background is greater than 20 NTUs). If standards are not met, construction activities would cease.

It should be noted that higher flows in the spring typically produce elevated background turbidity levels, and in the first year following construction, fish within 500 feet downstream of a site could potentially experience adverse effects. Fish would have unrestrained opportunity to physically avoid intense turbidity, but it is assumed that some juvenile salmonids would not vacate these reaches and would be exposed to turbidity levels capable of causing stress and decreased feeding for up to seven days while the turbidity plume persists. These effects would not be expected to significantly change the growth or fitness of any fish. Sustained turbidity generated from the proposed instream restoration projects would likely cause temporary physiological and behavioral effects, such as dispersing salmonids from established territories, potentially increasing interspecific and intraspecific competition, and temporarily increasing predation risk for a small number of affected juveniles (NMFS 2020).

3.6.4 Bank Stabilization

In some cases, bank stabilization is used to protect property by impeding further lateral migration of the channel, which can be a critical process for creating habitat conditions on which salmonids depend. Lateral migration is important for producing undercut banks and side channels and recruiting gravel and woody debris to the channel (Spence et al. 1996). These are features that increase both the quantity and quality of habitat, which are necessary to increase the number of juvenile coho salmon that the action area can support. Bank stabilization generally prevents the channel from lengthening, leading to a relative increase in bed slope and reduction in bed and bank area. The result is often increased stream energy, expressed as erosion downstream from the armoring and/or channel incision at the armoring, and sometimes extending upstream and/or downstream. Increased stream energy and competency can alter particle size distribution in the channel. In addition to destabilizing other portions of the bank and bed, bank protection prevents the channel from creating additional salmonid habitat in the immediate vicinity of the armoring through normal riverine processes (Schmetterling et al. 2002). In summary, bank protection typically reduces both habitat quantity and habitat quality for salmonids over the long term, which eventually reduces the number of fish that the Project activity area can support (NMFS 2020).

Therefore, the long-term effect of channelizing a stream through bank stabilization entails the continuation of impaired juvenile salmonid abundance over successive generations, relative to what would be expected under natural stream conditions and channel function. Some individual fish would likely grow slower due to less food supplied by the channelized stream as compared to a natural streambank. If these smaller fish are unable to move to areas with better resources for growth, they would likely experience lower survival upon ocean entry (Holtby et al. 1990), especially if unfavorable ocean conditions exist. As a result, these smaller fish would be less likely to return and spawn (NMFS 2020).

However, the bioengineered bank stabilization approach (e.g., riparian planting and instream wood placement that create natural cover elements) proposed would improve habitat conditions relative to what currently exists within the channelized Project activity area (Zika and Peter 2002). It is anticipated that more juvenile fish would be able to successfully rear in these areas after bioengineering bank stabilization improves habitat conditions. Successful rearing includes a likelihood of returning to spawn relatively similar to fish rearing in other areas of the watersheds where these bank stabilization projects occur. These improved habitat conditions do not fully offset the ongoing impact to habitat function and future juvenile population growth caused by extending channelization into the foreseeable future, however, adverse effects would be minimized to the extent possible (NMFS 2020).

3.6.5 Electrofishing

Electrofishing can cause a suite of effects ranging from disturbance to mortality. The amount of unintentional mortality attributable to electrofishing varies widely depending on the equipment used, the settings on the equipment, and the expertise of the technician. Most studies on the effects of electrofishing on fish have been conducted on adult fish greater than 300 mm in length (Dalbey et al. 1996). The relatively few studies that have been conducted on juvenile salmonids indicate that spinal injury rates are substantially lower than they are for large fish. Smaller fish are subjected to a lower voltage gradient than larger fish (Sharber and Carothers 1988) and may, therefore, be subject to lower injury rates (Thompson et al. 1997). The incidence and severity of electrofishing damage is partly related to the type of equipment used and the waveform produced (Dwyer and White 1997). Continuous direct current (DC) or low frequency (i.e., 30 hertz) pulsed DC have been recommended for electrofishing (Dalbey et al. 1996) because lower spinal injury rates, particularly in salmonids, occur with these waveforms (Sharber et al. 1994, Dalbey et al. 1996). Only a few recent studies have examined the long-term effects of electrofishing on salmonid survival and growth (Dalbey et al. 1996, Ainslie et al. 1998). These studies indicate that although some of the fish suffer spinal injury, few die as a result. However, severely-injured fish grow at slower rates, and sometimes show no growth at all (Dalbey et al. 1996).

Conservation measures for the Project require that all technicians follow NMFS' electrofishing guidelines (NMFS 2020). In all cases, electrofishing is used only when other relocation methods are not feasible. ESA-listed fish would be handled with extreme care and kept in cold water to the maximum extent possible. During relocation operations, a healthy environment must be provided. Electrofishing is not permitted if water temperatures exceed 64 degrees Fahrenheit (NMFS 2020).

3.6.6 Construction Impacts to Riparian Vegetation

Dewatering, heavy equipment use in the channel, removal of riparian vegetation to access sites, grading of floodplain areas, and re-contouring of streambanks would likely result in a temporary reduction of available forage and instream habitat. Project designs would preserve large riparian trees or reuse them to create instream large wood structures to the extent possible. In some cases, riparian vegetative cover would be disturbed or removed, which would result in a temporal reduction of cover and shading, reduced nutrient cycling, and reduced terrestrial invertebrate production on a localized and temporary scale. Displacement of salmonids from preferred habitat may also result in an increased predation risk or reduced feeding efficiency through the loss of cover (Michney and Hampton 1984; Michney and Deibel 1986).

These effects would be short-term and would therefore be negligible for salmonids and other migrating fish. Invertebrates would rapidly recolonize disturbed areas following reintroduction of water (Harvey and White 2008). No net loss of riparian vegetation would occur, and new plantings would offset the temporal loss of riparian function. The addition of large wood structures would provide cover and shade adjacent to pools and encourage natural sediment build-up next to the wood structures, allowing the bank to fill in and recruit more vegetation for improvement of long-term streambank functions and development of habitat features. Increases in shallow-water habitat at point bars and along floodplains, including side channels and alcoves, would benefit invertebrate production, and increases in point bar surface areas would increase salmon spawning habitat within the boundaries of the rehabilitation sites (Goodman et al. 2012; Beechie et al. 2014). Project activities would ultimately increase floodplain connectivity, reactivate channel migration across floodplains, and improve riparian and aquatic habitat diversity for anadromous salmonids throughout the Project activity area.

3.6.7 Invasive Aquatic Species

During instream restoration activities, the invasive aquatic species (e.g., didymo) could spread easily into new areas if construction vehicles, hand tools, or contractors' boots have been in areas where these exist and are not cleaned properly. Once in a stream, these species can alter the stream environment including invertebrate and fish species diversity and population size (Spaulding and Elwell 2007). Effects on the abundance and diversity of benthic macroinvertebrates from the spread of invasive aquatic species would eventually adversely affect fish and other aquatic organisms that feed on them. Avoidance and minimization measures such as educating the contractors working on restoration projects about these species and thoroughly cleaning equipment coming from other streams would prevent the spread of aquatic invasives. With the use of these measures, the effect of the Proposed Action on the spread of these species is anticipated to be negligible.

3.6.8 Activities Taking Place in Dry Conditions

Certain activities, including road maintenance and Stage Zero channel restoration, would take place under dry conditions and are consequently expected to have little adverse impact on fish or habitat. As stated previously, road maintenance activities would include only work that would result in negligible effects on salmonid habitat because of work being accomplished in the dry. After the implementation of Stage Zero restoration activities, a surge of mobilized sediment (first flush) would potentially occur when flow returns to these channels in the winter or spring, but the increase in turbidity is expected to be short-lived and minimal with the use of erosion and sediment control BMPs. The small amount of sediment temporarily mobilized is not expected to persist long enough to cause significant irritation to fish or redistribute in a way that would compromise invertebrate or spawning habitat. Upslope activities are expected to be entirely beneficial in that they will arrest introduction of fine sediment into the channel in the long term and restore habitat access with little immediate risk of sediment mobilization to aquatic habitat. Possible effects to salmonid habitat and individual fish from activities occurring in the dry are therefore expected to be negligible.

3.6.9 Instream Flow Restoration from Diversions

Implementing water conservation measures would benefit salmonids by maintaining or increasing instream flow such that rearing and migration conditions would be improved. Increasing instream flow levels by reducing withdrawals and increasing use efficiency would enhance juvenile salmonid access to suitable rearing habitat, especially during the summer and early fall when flows are lowest. Installing water monitoring devices would

result in discountable effects to listed species because they are nonintrusive, do not hinder salmonid behavior, and installation does not involve significant manipulation of the channel or riparian zone. Additionally, installation of rainwater collection devices and associated storage, forbearance, and other water conservation measures that improve water flow in streams would have beneficial effects. For these reasons, any adverse effects to salmonids and their habitat would be negligible (NMFS 2020).

3.6.10 Incidental Chemical Contamination

Impairment of water quality could result from accidental releases of fuel, oil, and other contaminants that could injure or kill aquatic organisms. Such releases, while rare, could occur from the use of heavy equipment. Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons (PAHs), which can kill salmonids at high levels of exposure, and can cause sub-lethal adverse effects at lower concentrations (Meador et al. 2006). Due to emergency spill control measures and other BMPs, spills into salmonid waterways or releases larger than a few ounces as a result of construction activities would be unlikely to occur. Any fish in the immediate vicinity would experience temporary and minor irritation at most or would disperse from the affected area (NMFS 2020). For these reasons, effects to individual fish and their habitat from PAHs and other chemical contamination would be negligible to minor.

3.6.11 Pile Driving

Impact pile driving conducted in or near waterways can generate underwater sound pressure that has the potential to injure or kill fish (Caltrans 2015). The extent of these effects depend on the intensity and characteristics of the sound pressure, the distance and location of fish in the water column relative to the sound source, the size and mass of the fish, and the fish's anatomical characteristics (Yelverton et al. 1975). Generally, decibels (dB) are the metric used to describe noise levels, including underwater noise, when evaluating environmental effects. Specific to underwater noise, the following key metrics (measured in dB) are used to evaluate hydroacoustic effects:

- L_{PEAK} = instantaneous peak sound pressure level.
- RMS = root mean square sound pressure level.
- SEL = sound exposure level, which is used as a metric for acoustic events and often as an indication of the energy dose (Caltrans 2020).

To avoid injuring fish, specifically ESA-listed species, it was determined necessary to avoid exceeding an underwater L_{PEAK} of 206 dB, which was included in the "Interim Criteria for Injury to Fish from Pile Driving Activities" (FHWG 2008). It is also necessary to estimate the cumulative SEL ($SEL_{CUMULATIVE}$) associated with daily pile strike events. $SEL_{CUMULATIVE}$ can be estimated from a representative single-strike SEL value and the number of strikes that likely would be required to place the pile at its final depth by using the following equation:

$$SEL_{CUMULATIVE} = SEL_{SINGLE\ STRIKE} + 10\ log\ (\#\ of\ pile\ strikes)$$

Table 3-4 below provides typical single-strike SELs associated with various types of piles used for project planning purposes.

Table 3-4. Single-strike sound levels associated with different piles (measured at 10 meters from pile).[1]

Pile	L_{PEAK} (dB)	RMS (dB)	SEL (dB)
Timber (12-inch) drop[2]	177	165	157
CISS[3] (12-inch) drop	177	165	152
Concrete (24-inch) impact	193/183[4]	175/171[4]	160
Steel H-type (12-inch) impact	190	175	160
CISS (12-inch) impact	190	180	165
CISS (12-inch) impact	200	184	174
CISS (30-inch) impact	208	190	180
CISS (96-inch) impact	220	205	194

[1] Caltrans 2020

[2] Drop impact hammer as opposed to a diesel impact hammer

[3] CISS = cast-in-shell steel

[4] Dual values for 24-inch concrete represent the range of measured levels

It was also determined that a $SEL_{CUMULATIVE}$ of 187 dB for fish larger than 2 grams and 183 dB for fish less than 2 grams should not be exceeded (FHWG 2008). In April 2024, the California Department of Transportation (Caltrans) released a Hydroacoustic Technical Advisory that reviewed recent studies conducted since the 2008 NMFS Interim Criteria were released. This review of the best-available science suggests that pile driving has less effects on fish than previously thought. Caltrans recommended that the effects thresholds be changed to an L_{PEAK} of 207 dB and a $SEL_{CUMULATIVE}$ of 203 dB for all pile-driving projects in California, per guidelines (Popper et al. 2014) that were accredited by the American National Standards Institute (ANSI; Caltrans 2024). Hydroacoustic effects thresholds are summarized in Table 3-5below.

Table 3-5. Pile driving hydroacoustic effects thresholds.

Source	Metric	Fish Mass	Threshold
2008 Interim Criteria[1]	L_{PEAK}	N/A	206 dB
	$SEL_{CUMULATIVE}$	≥ 2 grams	187 dB
		< 2 grams	183 dB
	RMS (behavior)	N/A	150 dB
2014 ANSI-accredited Guidelines[2]	L_{PEAK}	N/A	207 dB
	$SEL_{CUMULATIVE}$	N/A	203 dB

[1] FHWG 2008

[2] Popper et al. 2014

For the Project, timber piles will be used to construct and stabilize some structured log jams and would typically be installed using a vibratory hammer. Therefore, installation of these timber piles would result in minor acoustic effects compared to the installation of metal piles. Metal piles would likely be required for the replacement of bridges as part of the Project, either for temporary construction bridges or for the main bridge structures themselves.

Avoidance and minimization measures would be incorporated into site-specific designs to ensure that all Project activities with pile driving would stay below injury effect thresholds. Specifically, hydroacoustic effects would need to stay below the 207 dB L_{PEAK} and 203 dB $SEL_{CUMULATIVE}$ thresholds (or the most current thresholds accepted by NMFS). The following avoidance and minimization measures would be prioritized as shown below:

1. Design channel spanning bridge structures so that in-channel pile driving would not be required.
2. Avoid installing 24-inch and larger piles when possible
3. Pile driving would be performed during recommended in-water work window.
4. Accomplish pile driving in the dry utilizing dewatering techniques as necessary without impeding fish passage to the extent possible.
5. Utilize vibratory hammers when considered an appropriate installation method according to site conditions.
6. Incorporate attenuation methods into pile driving activities (e.g., bubble curtain, isolation casing, dewatered cofferdam, or a cushioning block could be used between the hammer and pile).
7. If impact pile driving is implemented in, or adjacent to, a wetted stream, monitoring of fish shall occur during pile-driving activity to ensure no fish stranding or mortality occurs. If sound level thresholds are met, pile driving shall cease for a minimum of 12 hours.

Implementors proposing pile driving would provide information similar to that required by the Caltrans Hydroacoustic Project Information Checklist[3] during site-specific project design to evaluate potential hydroacoustic effects. This information would then be used in concert with the NMFS Multi-Species Pile Driving Calculator Tool[4] to ensure that project effects do not exceed hydroacoustic effects thresholds.

Despite the incorporation of avoidance and minimization measures into site-specific project designs, a small number of juvenile salmonids may be exposed to underwater sound levels (greater than 150 dB RMS) that could cause a behavioral response such as startle or disorientation during the initial phases of pile driving but not physical injury. Fish would likely flee the area of disturbance upon initial pile strikes and relocate to other suitable habitat before the number of strikes and sound levels accumulated to a level that can cause physical harm. Fish passage would be prioritized in site-specific designs; however, individuals may be disturbed and temporarily unable to pass through a site or occupy potential rearing habitat. This would only be the case for a few hours at a time over a period of no more than one week until pile driving is completed. Any turbidity generated from pile driving is expected to be short-lived and not in sufficient amounts to interfere with foraging or other behaviors. For these reasons, potential effects to salmonids and associated habitat as a result of pile driving is expected to be limited to a minor disturbance.

It should also be noted that impact pile driving in the dry can also generate underwater noise in adjacent aquatic habitats. Sound flanking occurs when a pressure wave travels down the pile, is transmitted into the soil, and then travels back up through the soil and into the water column. Currently, there is no method for calculating transmission loss through soil outside of the water, to then calculate loss in the water. However, in recent

[3] https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/hydroacoustic-project-information-checklist-ally.pdf

[4] https://www.fisheries.noaa.gov/resource/data/multi-species-pile-driving-calculator-tool

studies, current hydroacoustic effects thresholds were not exceeded. Therefore, pile driving in the dry is thought to be effective at minimizing hydroacoustic effects, thereby protecting fish (Caltrans 2020).

3.6.12 Blasting

Blasting is proposed as a technique to remove bedrock as part of the "Restoration and Enhancement of Off-Channel and Side-Channel Habitat" activity category. It is seen as a potential tool for channel restoration in case a bedrock area needs to be removed in order to meet design feature and grade criteria, and there is no other reasonable alternative. In addition, blasting could be used to removed fish passage barriers as part of the "Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures" activity category.

Little is known about the potential effects of explosions on fish. Most data available on behavioral responses of fish to impulsive hydroacoustic effects come from pile driving studies. While these studies' results directly relate to pile driving, they also provide valuable information on potential effects of other impulsive sounds on fish. As such, they have been incorporated into the most recent guidelines for evaluating hydroacoustic effects (Popper et al. 2019). One field study that looked specifically at the effects of underwater explosions on fish found that the $SEL_{SINGLESTRIKE}$ ranged from 182 to 187 dB and the L_{PEAK} ranged from 229 to 239 dB (Govoni et al. 2008). The $SEL_{SINGLESTRIKE}$ for underwater explosions is comparable to those generated by pile driving, whereas the L_{PEAK} is higher than those generated by pile driving (Bolle et al. 2012; Popper et al. 2019).

Because the hydroacoustic effects of blasting are similar to those of pile driving, the Project would take a similar avoidance and minimization approach for proposed blasting activities. Avoidance and minimization measures would be incorporated into site-specific designs to ensure that all Project activities with pile driving stay below injury effect thresholds. Specifically, hydroacoustic effects would need to stay below the 207 dB L_{PEAK} and 203 dB $SEL_{CUMULATIVE}$ thresholds (or the most current thresholds accepted by NMFS). The following avoidance and minimization measures would be incorporated:

1. TRRP personnel and implementors would coordinate with NMFS when blasting is determined to be unavoidable.
2. Blasting would be performed during recommended in-water work windows.
3. Accomplish blasting in dry conditions utilizing dewatering techniques as necessary and without impeding fish passage to the extent possible.
4. Incorporate attenuation methods into blasting activities as directed by NMFS (e.g., bubble curtain, isolation casing, and dewatered cofferdam).
5. If blasting is implemented in, or adjacent to, a wetted stream, monitoring of fish shall occur during pile-driving activity to ensure no fish stranding or mortality occurs.

Implementors proposing blasting would provide information similar to that required by the Caltrans Hydroacoustic Project Information Checklist[5] during site-specific project design to evaluate potential hydroacoustic effects. Information provided would be adapted to include details about blasting (e.g., types and

[5] https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/hydroacoustic-project-information-checklist-ally.pdf

numbers of explosions, locations of explosions, etc.). This information would then be used in concert with the NMFS Multi-Species Pile Driving Calculator Tool[6] to ensure that project effects do not exceed hydroacoustic effects thresholds.

In addition to hydroacoustic effects to individual fish, detonation of explosives in or near fish habitat may also result in the physical and/or chemical alteration of fish habitat. Sedimentation resulting from the use of explosives may cover spawning areas or may reduce or eliminate important benthic fish food organisms. Byproducts from the detonation of explosives may include ammonia or similar compounds and may be toxic to fish and other aquatic biota (Wright and Hopky 1998). However, with the incorporation of avoidance and minimization measures to site-specific project designs, the effects of blasting are anticipated to be minor.

3.6.13 Beneficial Effects

In addition to effects associated with proposed construction activities, in the long-term, the Project would also enhance or restore the following aquatic habitat functions: stream structure/complexity, stream sinuosity and length, bank stability, floodplain connectivity, and riparian vegetation structure and diversity. These improvements would promote conditions that maintain or decrease stream temperature, reduce turbidity and sediment discharges (via stable streambanks, improved sediment retention through increased channel structure, riparian areas, and floodplains), and improve nutrient input (via improved riparian conditions) and retention (via increased channel structure, sinuosity, and floodplain areas). Removing or repairing in-water structures would restore fish passage for spawning, migrating, and rearing fish, and would increase aquatic habitat area. Restoration of riparian vegetative communities would improve shade along streambanks in the long-term, which would help maintain water temperatures.

Large wood and boulder placement would enhance habitat elements for migrating and rearing fish. A literature review by Roni et al. (2014) reported that the vast majority of studies on wood placement have reported improvements in physical habitat (e.g., increased pool frequency, cover, and habitat diversity) with most evaluations of fish response showing a positive response from salmonids. The resulting effect of large wood on fish habitat is significant. Crispin et al. (1993) also noted increased salmon spawning activity in an area where gravels accumulated behind large wood. Bjornn and Reiser (1991) cited several studies that documented an increase in fish densities with higher levels of large wood, and Fausch and Northcote (1992) documented that coho salmon and cutthroat trout production was greater in large wood-dominated streams.

Restoring side channels would increase adult and juvenile rearing habitat where low flows and cooler water temperatures would provide refugia from mainstem temperatures. Streambank restoration projects would decrease direct sediment inputs into the stream channel, thereby enhancing conditions for rearing juvenile fish (USFS 2019).

3.7 Freshwater Mussels

Freshwater mussel populations have recently experienced well-documented declines across their historic range in North America. Many watersheds support a fraction of both the richness and abundance found just a few decades ago, and mussel populations in the western US are believed to have experienced a 35% decline in

[6] https://www.fisheries.noaa.gov/resource/data/multi-species-pile-driving-calculator-tool

richness since 1990 (Blevins et al. 2017). Freshwater mussels are valuable to river systems and for the numerous ecosystem services they provide. They filter and store excess nutrients, stabilize river sediment, and increase food web complexity (Vaughn 2018).

The western pearlshell mussel (*Margaritifera falcata*) is one of the most abundant freshwater mussels in the western US. While downward western pearlshell population trends are evident in some river systems, little is known about their distribution within the Trinity River watershed (Felbeck and Hause 2020). Western pearlshell mussels prefer cold clean creeks and rivers that support salmonid populations, such as those of the Trinity River watershed. They are found in smaller headwater creeks but are more common in larger rivers. Sand, gravel, and cobble are their preferred substrates, especially in stable areas of streambeds. Western pearlshells are sensitive to sedimentation and any sort of anthropogenic disturbance (Nedeau et al. 2009).

California floater (*Anodonta californiensis*) mussels occur in "lakes and slow rivers" (Taylor 1981), "generally on soft substrates (mud-sand), in fairly large streams and lakes only, in relatively slow current; a low elevation species" (Frest and Johannes 1995). Howard and Cuffey (2003) found that California floater mussels were almost exclusively found in pools, with no occurrences in riffles, and very few in runs in the South Fork of the Eel River (Howard 2010). Emily Davis (2008) and Aaron David (2008) discovered a small population of *Anodonta* mussels below the Iron Gate Dam on the Klamath River. Individuals are believed to reach sexual maturity in about 7 years and live from 10 to 20 years (USFS 2019).

3.7.1 Effects on Freshwater Mussels

Mussels are relatively immobile, and an individual mussel may have been present in a certain location for decades. Mussels are present year-round, and in-channel work windows for salmonids do not protect freshwater mussels (Blevins et al. 2017). Any freshwater mussel beds would be identified during the planning process for each site-specific restoration action that is part of the Project. To the extent practicable, construction-related effects would be minimized through implementation of erosion and sediment control BMPs and/or avoidance of physical disturbance to any freshwater mussel beds using a buffer of 5 meters from any construction activities or any scour as a result of construction activities (Blevins et al. 2019). If avoidance is not possible, freshwater mussel salvage and relocation BMPs described in "Conserving the Gems of Our Waters" (Blevins et al. 2017) would be considered during Project actions. Incorporating these avoidance and minimization measures into site-specific designs would entail minor effects to freshwater mussels within the Trinity River watershed. Benefits to freshwater mussels would entail an increase in aquatic habitat complexity that could provide more locations within floodplains where mussel beds could be established in the long term.

4 Regional Effects

Regional effects include the short- and long-term impacts of the Project together with the past, present, and future actions of other projects. This analysis looks at other actions that have affected or could affect the same resources as action alternatives, in this case, watershed resources. The effects of past actions are reflected in the descriptions of current existing conditions. Lands in the vicinity of the Project activity area include USFS-, BLM-, and privately-owned land.

4.1 Hatchery Influence

The TRH first began releasing coho salmon in 1960. Although substantial efforts were made to trap and haul coho above the dam during the construction of the Trinity Dam, adult returns fell to essentially zero during the 1962 to 1963 run (i.e., zero females, seven males, and nine jacks). Transfer of coho eggs from outside of the Trinity River basin occurred, which imported coho that were likely not as well-adapted to the Trinity River watershed's habitat conditions as were the original stock. TRH originally used Trinity River fish for broodstock, though coho from the Eel (1965), Cascade (1966, 1967, and 1969), Alsea (1970), and Noyo (1970) Rivers have also been reared and released at the hatchery as well as elsewhere in the Trinity River basin (NOAA 2003).

Hatchery influences are substantial in the Trinity River watershed. Each year, TRH releases approximately 300,000 coho smolts, 448,000 steelhead, and 4.3 million Chinook, and currently, returns are dominated by hatchery fish (USFWS and HVT 1999). The Recovery Plan (NMFS 2014) ranked adverse hatchery-related effects as a very high limiting factor for Trinity River SONCC coho.

The TRH likely has played a role in the long-term productivity of the Trinity River population of SONCC ESU coho salmon through the well-documented genetic and ecological interactions between hatchery- and natural-origin salmon (Nickelson 2003; Reisenbichler et al. 2003; Chilcote et al. 2011). Competition with, and predation by, hatchery-origin fish released from TRH may limit rearing and spawning capacity of natural-origin coho in the Trinity River. Competition of hatchery fish with naturally-produced fish has the potential to displace wild fish from portions of their habitat (Flagg et al. 2000;Chilcote et al. 2011). Competition may occur among hatchery and natural adults for spawning sites, and may lead to decreased production, especially for natural origin coho. Hatchery fish, outnumbering natural fish, may overwhelm available spawning habitat when first-generation hatchery-origin fish spawn naturally in the river. The negative effect of such competition is magnified by naturally-spawning hatchery stocks which have been found to exhibit lower reproductive success than natural-origin fish (Reisenbichler et al. 2003). This is especially true for anadromous salmonid stocks near carrying capacity, which may occur more often in river reaches near hatcheries (Lister 2014). Predation on wild coho fry by hatchery-reared salmonids is also an important factor (Naman 2008). In concert with other habitat-related stresses, adverse hatchery-related impacts are a key stressor for the population.

In recent years, hatcheries in California have stopped all inter-basin stock transfers, limited out-planting (e.g., all TRH coho smolts are released volitionally at the hatchery), marked outplants, and placed limits on production levels. Therefore, the current level of impact of hatchery fish on natural fish may be significantly less than in the past (CDFG 2002b). No hatcheries or artificial propagation occur in the Lower Klamath River coho population area, but there are two hatcheries in the Klamath River Basin that influence fisheries: TRH and the Fall Creek Hatchery (which replaced the Iron Gate Hatchery).

4.2 Cannabis Farming

In 2018, the State of California legalized the recreational use of cannabis, as well as the cultivation and manufacture of cannabis plants and products. In Trinity and Humboldt counties, there are many cannabis farms which collectively reduce flow volume and increase discharge of waste and pollutants in streams, which affects water quantity and quality in the Project activity area. Presently, there is no watershed-scale evaluation of the effects of cannabis farming on aquatic habitat in the Trinity River or particular streams. The operation of

cannabis farms throughout the watershed will continue to negatively affect fishery resources in the Trinity River and its tributaries (NMFS 2020).

4.3 Residential Development

Residential development as a result of human population growth in the Project activity area is expected to remain relatively stable over the next 10 years. Once development and associated infrastructure (e.g., roads/trails, drainages, powerlines, and water development) are established, the effects to the landscape are typically permanent. Anticipated effects on aquatic resources include loss of riparian vegetation, changes to channel morphology and dynamics, altered hydrologic regimes (e.g., increased storm runoff), increased sediment loading, and elevated water temperatures where shade-providing canopy is removed (NMFS 2020).

The presence of structures, powerlines, and roads/trails near waterways may lead to the removal of large wood features in order to protect those structures from flood impacts. The anticipated impacts to fisheries from continued residential development are expected to be sustained and locally intense. Commonly, there are also effects of home pesticide use and roadway runoff of automobile pollutants, introductions of invasive species to nearby streams and ponds, attraction of piscivorous animals due to human occupation (e.g., raccoons), increased incidences of poaching, and loss of riparian habitat due to land clearing activities. All of these factors associated with residential development can have negative impacts on salmon populations. However, the population growth rate in Trinity County decreased by about 11% between 2010 and 2019 (U.S. Census Brueau 2020). This may indicate a trend that could ameliorate or reduce the effects of residential development (NMFS 2020).

4.4 Resource Extraction

Resource-based industries are likely to continue to have an influence on environmental conditions within the Project activity area for the indefinite future. Logging continues to be conducted on both public and private lands throughout the tributaries of the Trinity River, except in Canyon Creek (Reclamation 2019). STNF's vegetation management projects include those for forest health/thinning and fuels reduction. Some mining for gravel, aggregate, and minor precious metals occurs on the Trinity River floodplain and a few tributary watersheds. Mining operations can affect coarse sediment supplies and impair water quality via contaminated and sediment-laden runoff from operations. The lack of protective measures in existing regulatory mechanisms, including land management plans (e.g., State Forest Practice Rules), contributes in varying degrees to the decline of salmonids. Sedimentation and loss of spawning gravels associated with poor forestry practices and roadbuilding are particularly chronic problems that can reduce the productivity of fisheries. However, resource extraction industries have adopted management practices that reduce many of their most harmful impacts, which were unknown or not commonly used until recently (NMFS 2020). The STNF regularly implements forestry projects using resource protection measures and BMPs to reduce sedimentation into streams and otherwise reduce effects to environmental resources.

4.5 Wildland Fire Control

Control of wildland fires may include the removal or modification of vegetation due to the construction of firebreaks or setting of backfires to control the spread of fire. This removal of vegetation can trigger post-fire landslides as well as create chronic sediment erosion that can negatively affect aquatic habitat important to

fisheries and freshwater mussels. In addition, the use of fire retardants may adversely affect aquatic habitat if used in a manner that does not sufficiently protect streams, with the potential for aquatic organisms to be exposed to lethal amounts of the retardant (NMFS 2020).

4.6 Aquatic Habitat Restoration

Since 2009, the TRRP has implemented Trinity River mainstem channel rehabilitation projects at all the Phase 1 channel rehabilitation sites named in the 2000 Master EIR and at nine of the Phase 2 sites. The Deep Gulch and Sheridan sites were constructed in 2017. The Bucktail site, constructed in 2008, was expanded in 2016 to include additional areas. The Dutch Creek project was constructed in 2020. The Chapman Ranch Phase A site was constructed in 2019 and the Phase B site was completed in 2021. The Oregon Gulch project was completed in 2023. These mainstem projects have improved anadromous fish spawning and rearing habitat throughout the extent of the Trinity River.

TRRP continues to add sediment within the 40-mile reach downstream of the Lewiston Dam. In addition, TRRP-managed flows have been implemented yearly since 2004. Ongoing monitoring efforts by TRRP partners continue to document improvements in aquatic habitat use, alluvial processes, and riparian vegetative communities along the mainstem. Continued sediment and wood augmentation projects are intended to improve anadromous fish spawning and rearing habitat in the Trinity River mainstem.

Beyond TRRP's mainstem channel rehabilitation and sediment augmentation projects, there have been several restoration and road sediment reduction projects implemented by various agencies and organizations throughout the Trinity River watershed. While some of these were considered in the 2009 Master EIR, the USFS, Yurok Tribe, Hoopa Valley Tribe, Nor Rel Muk Wintu Nation, Five Counties Salmonid Conservation Program, Northwest Resource Conservation and Development Council, Watershed Research and Training Center, Trinity County Resource Conservation District, and other local nonprofits and governments have been funded for and/or completed additional projects intended to improve watershed conditions, restore aquatic habitat, improve aquatic connectivity, and reduce road-related sediment delivery to streams and rivers. These watershed restoration projects are intended to improve water quantity and quality as well as rearing and spawning habitat in the Trinity River watershed.

4.7 Proposed Action

The Project's Proposed Action is an extension of the watershed restoration projects mentioned above. The Project focuses on Trinity River tributaries as well as the mainstem. The objectives of the Proposed Action are as follows:

- Restore and improve instream conditions sufficient to support all life stages of salmonids and other aquatic species;
- Restore upstream and downstream fish passage for all life stages of salmonids;
- Restore continuous paths for wood dispersal, nutrient cycling, sediment transport, and movement of other vegetative material essential for productive aquatic habitat;
- Maintain or restore native plant communities and vegetative structure impacted by invasive plants and pathogens, while rehabilitating eroding streambanks to improve water quality, shade conditions, and large wood recruitment;

- Repair, replace, or remove ineffective instream structures;
- Restore and improve riparian and meadow habitat in order to promote healthy conditions for aquatic and terrestrial wildlife populations;
- Improve late summer/fall base flow conditions through process-based restoration, water conservation improvements, and meadow restoration;
- Increase nutrient inputs through salmon carcass placement in the watershed; and
- Stabilize upslope areas around road infrastructure to minimize erosion and sediment discharges within the watershed to bring the sediment impaired watersheds into compliance with sediment reduction total maximum daily loads (TMDLs) for the South Fork Trinity and Trinity Mainstem rivers (EPA 1998 & EPA 2001).

The Project is an effort to streamline design and planning processes, including environmental compliance, for proposed restoration actions across the watershed, thereby increasing the number of restoration actions that can be implemented over time. Ultimately, the Project is anticipated to provide many benefits to aquatic organisms, particularly fish species and populations.

5 Effects Determination

Table 5-1 below summarizes the effects determinations for fish and freshwater mussel species for the Project.

Table 5-1. Fisheries and Freshwater Mussels Effects Determinations

ESA SPECIES CONSIDERED:	Southern Oregon / Northern California Coast (SONCC) coho salmon ESU
ESA CRITICAL HABITAT CONSIDERED:	SONCC coho salmon critical habitat
ESA DETERMINATIONS:	May Affect, Likely to Adversely Affect SONCC coho salmon and its Designated Critical Habitat
SENSITIVE SPECIES CONSIDERED:	Upper Klamath-Trinity Rivers (UKTR) Chinook salmon ESU Klamath Mountains Province (KMP) steelhead DPS Green sturgeon, Northern DPS Pacific lamprey (proposed for ESA listing) Western pearlshell California floater
SENSITIVE SPECIES DETERMINATIONS:	Would not jeopardize the continued existence of the proposed Pacific lamprey. Not likely to result in a trend toward listing or loss of viability of UKTR Chinook salmon, KMP steelhead, green sturgeon, western pearlshell, or California floater in the short- or long-term.
ESSENTIAL FISH HABITAT:	The Project would adversely affect Chinook and coho salmon EFH.

6 References

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Appendix A: Trinity River Watershed Fisheries by HUC 10

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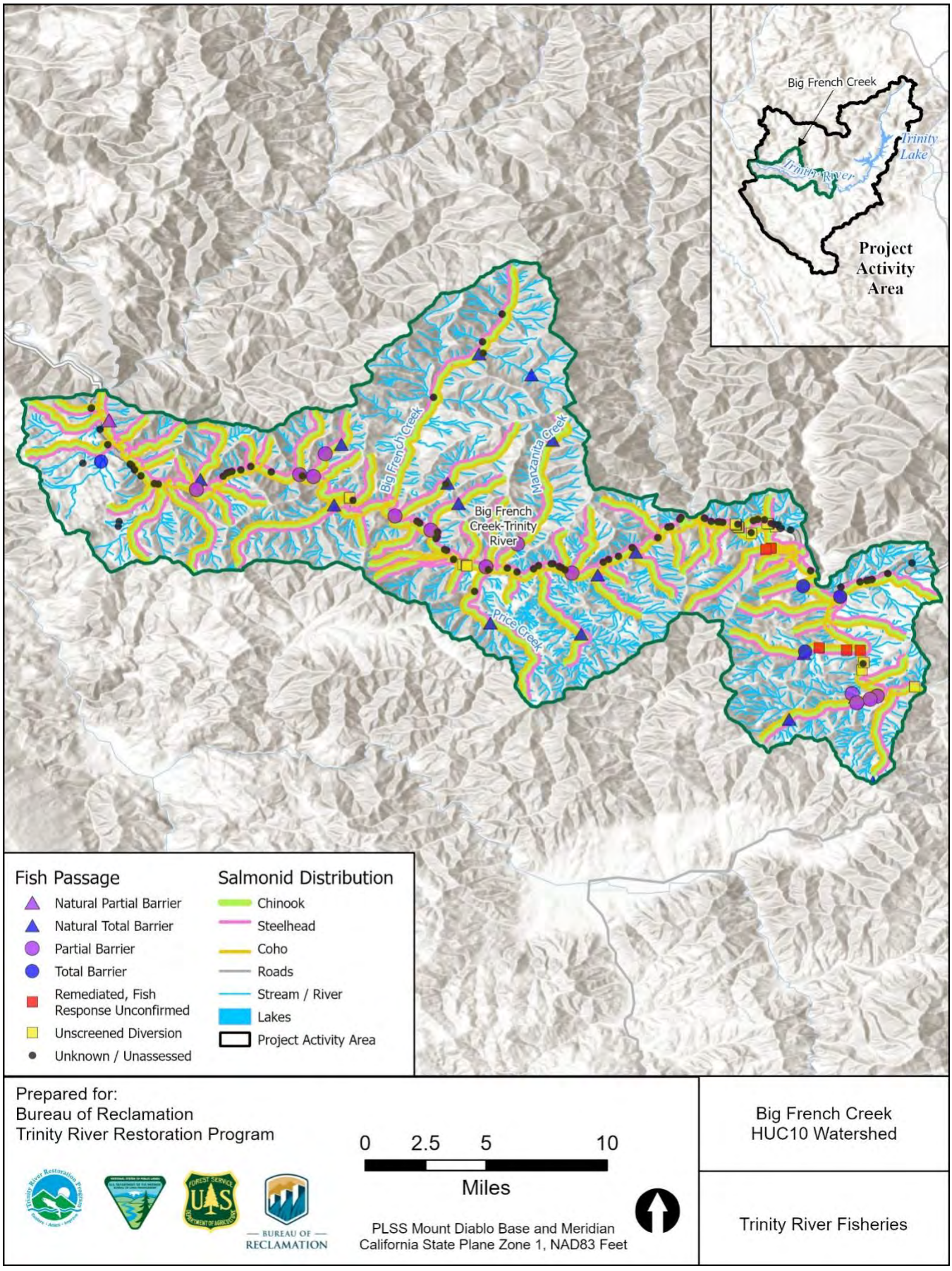
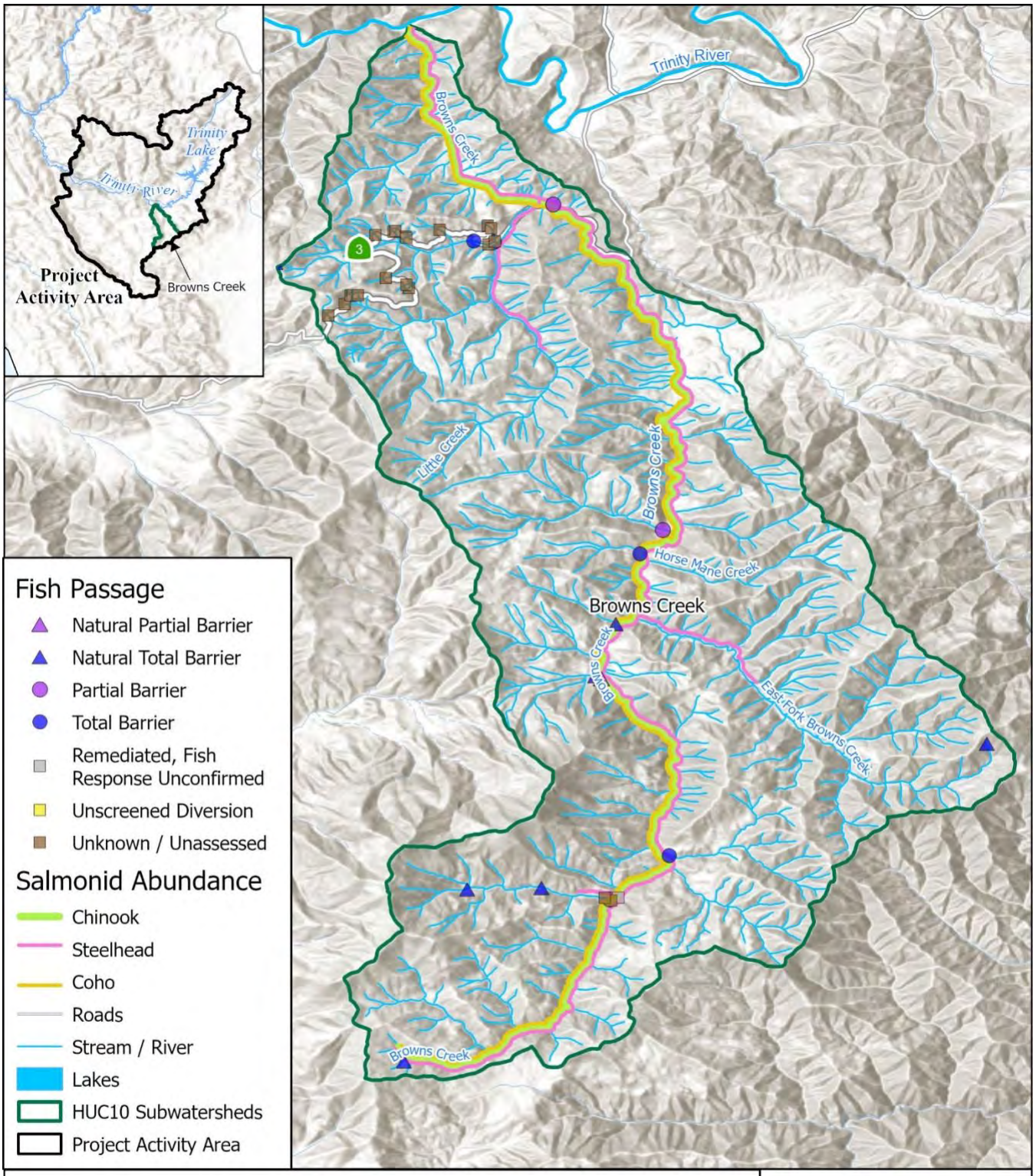

Big French Creek
Trinity Lake
Trinity River
Project Activity Area
Big French Creek
Manzanita Creek
Big French Creek-Trinity River
Price Creek
Fish Passage
Natural Partial Barrier
Natural Total Barrier
Partial Barrier
Total Barrier
Remediated, Fish Response Unconfirmed
Unscreened Diversion
Unknown / Unassessed
Salmonid Distribution
Chinook
Steelhead
Coho
Roads
Stream / River
Lakes
Project Activity Area
Prepared for:
Bureau of Reclamation
Trinity River Restoration Program
BUREAU OF RECLAMATION
0 2.5 5 10
Miles
PLSS Mount Diablo Base and Meridian
California State Plane Zone 1, NAD83 Feet
Big French Creek
HUC10 Watershed
Trinity River Fisheries



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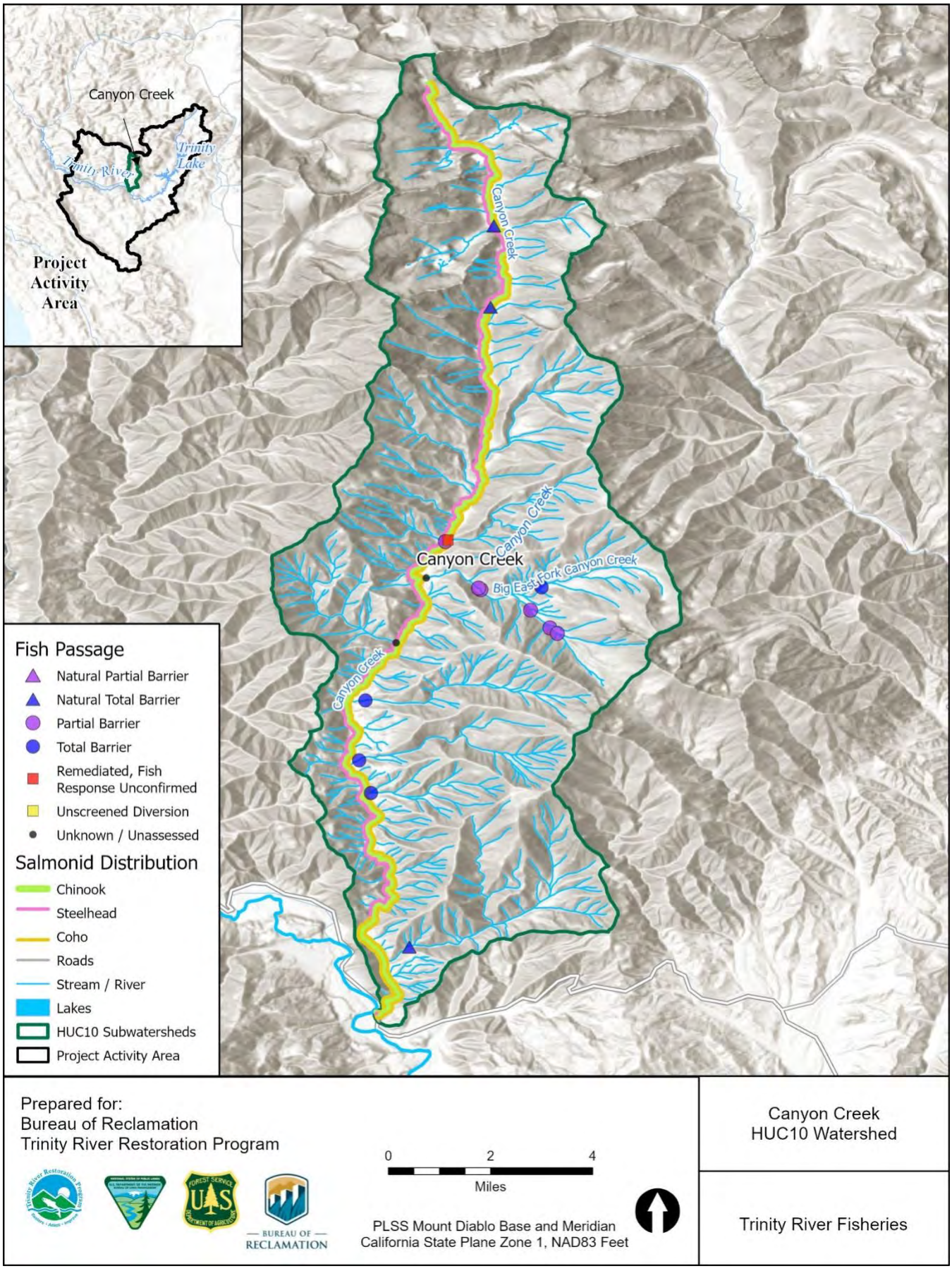
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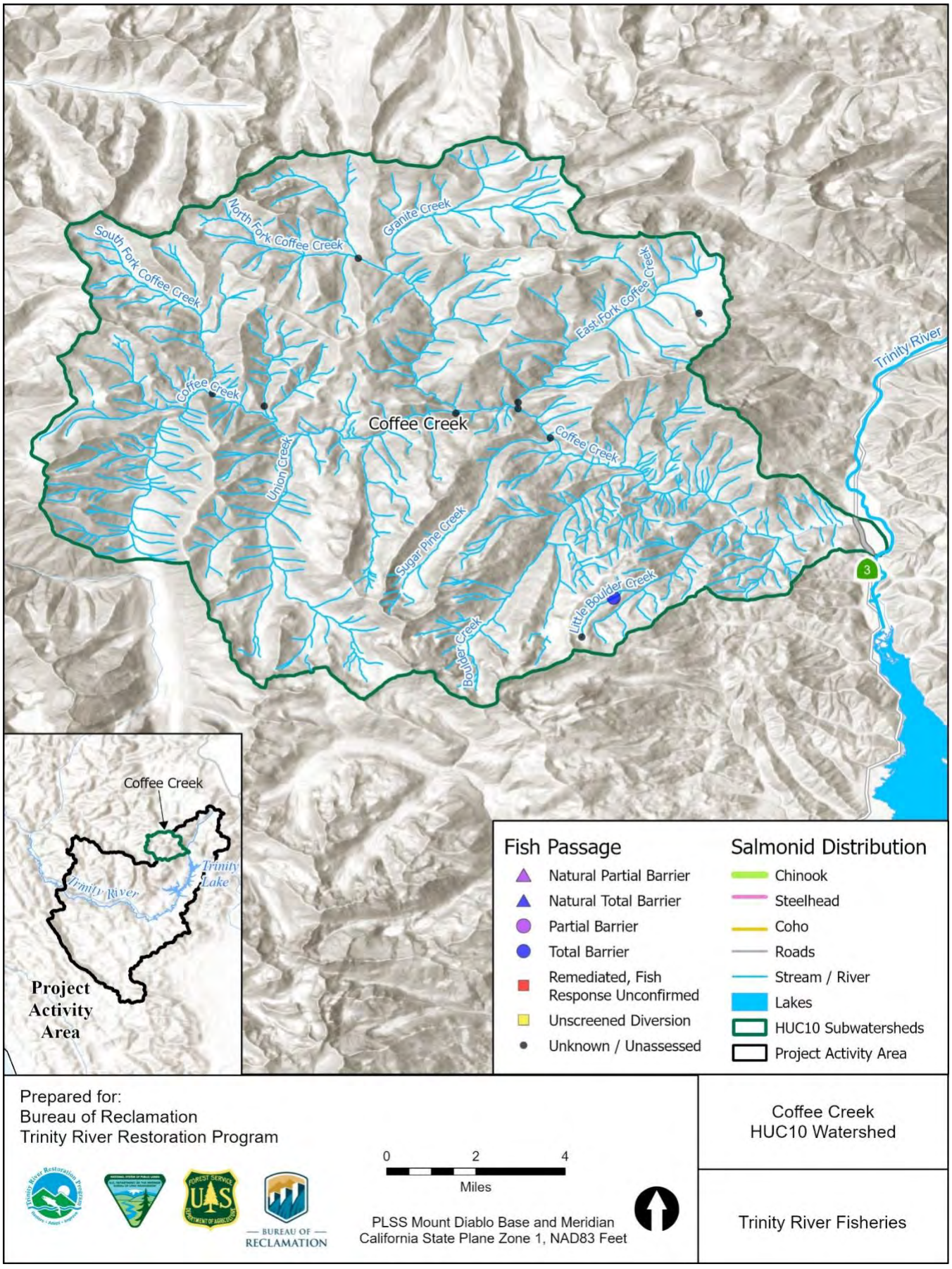
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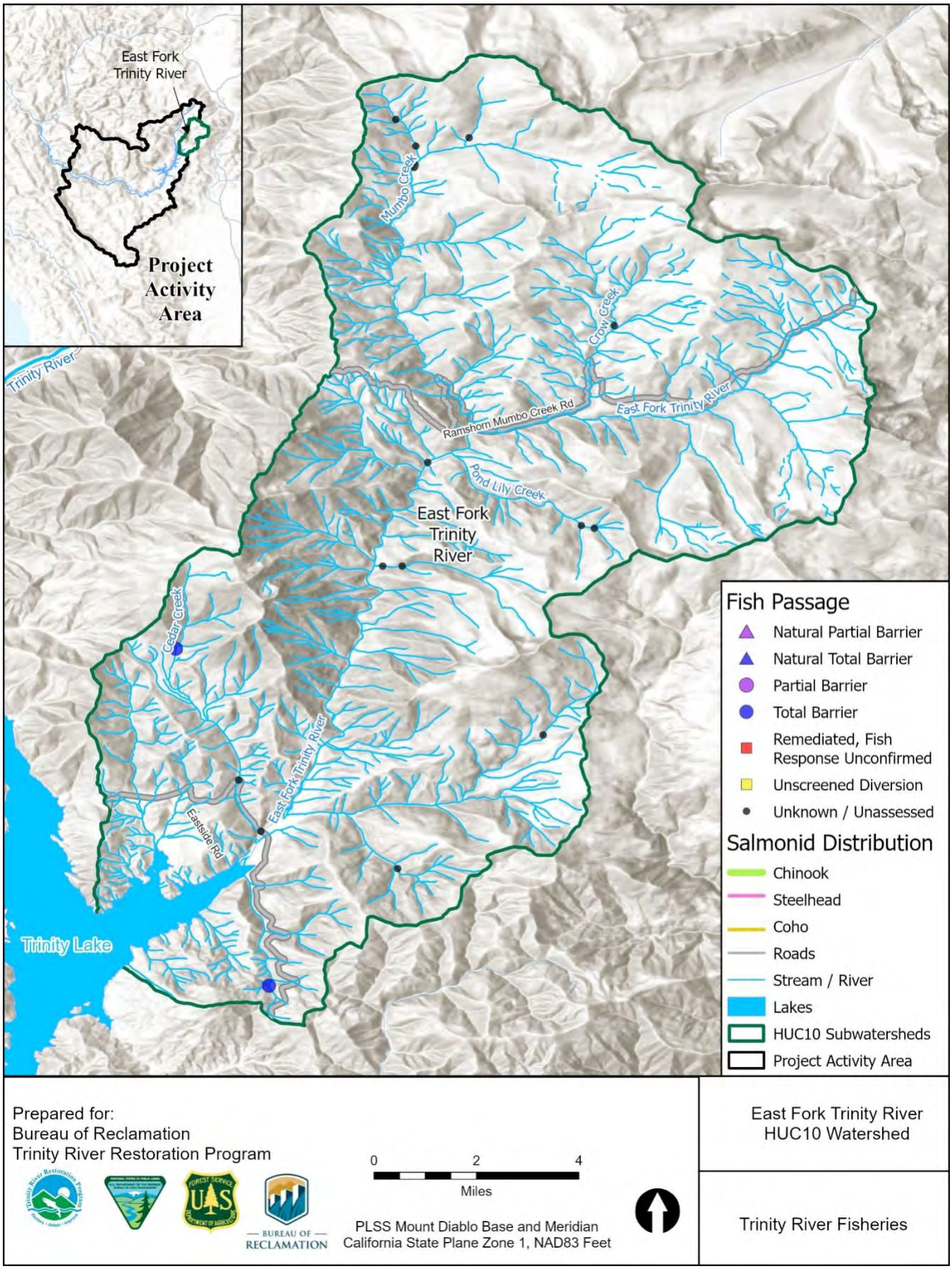
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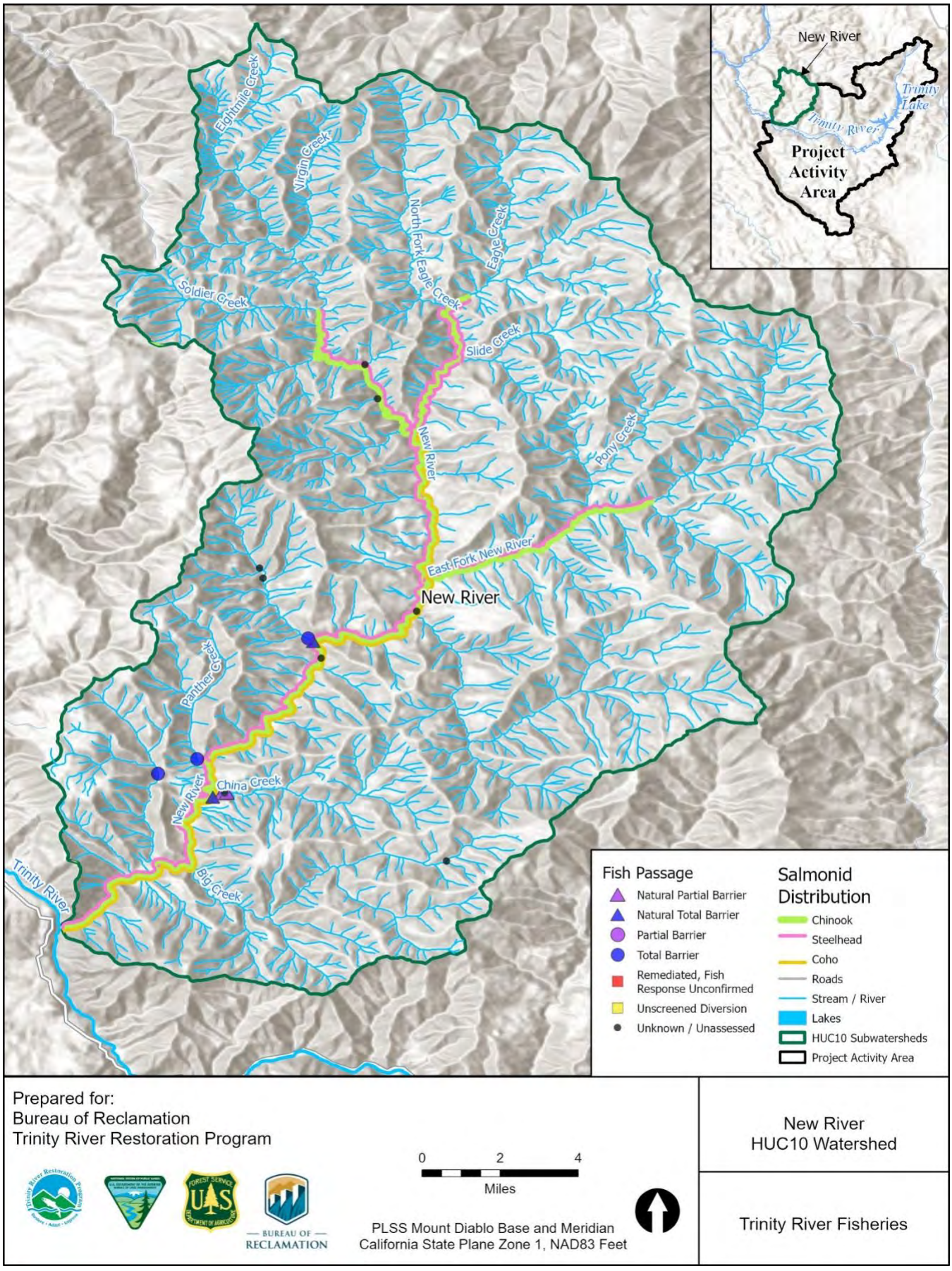
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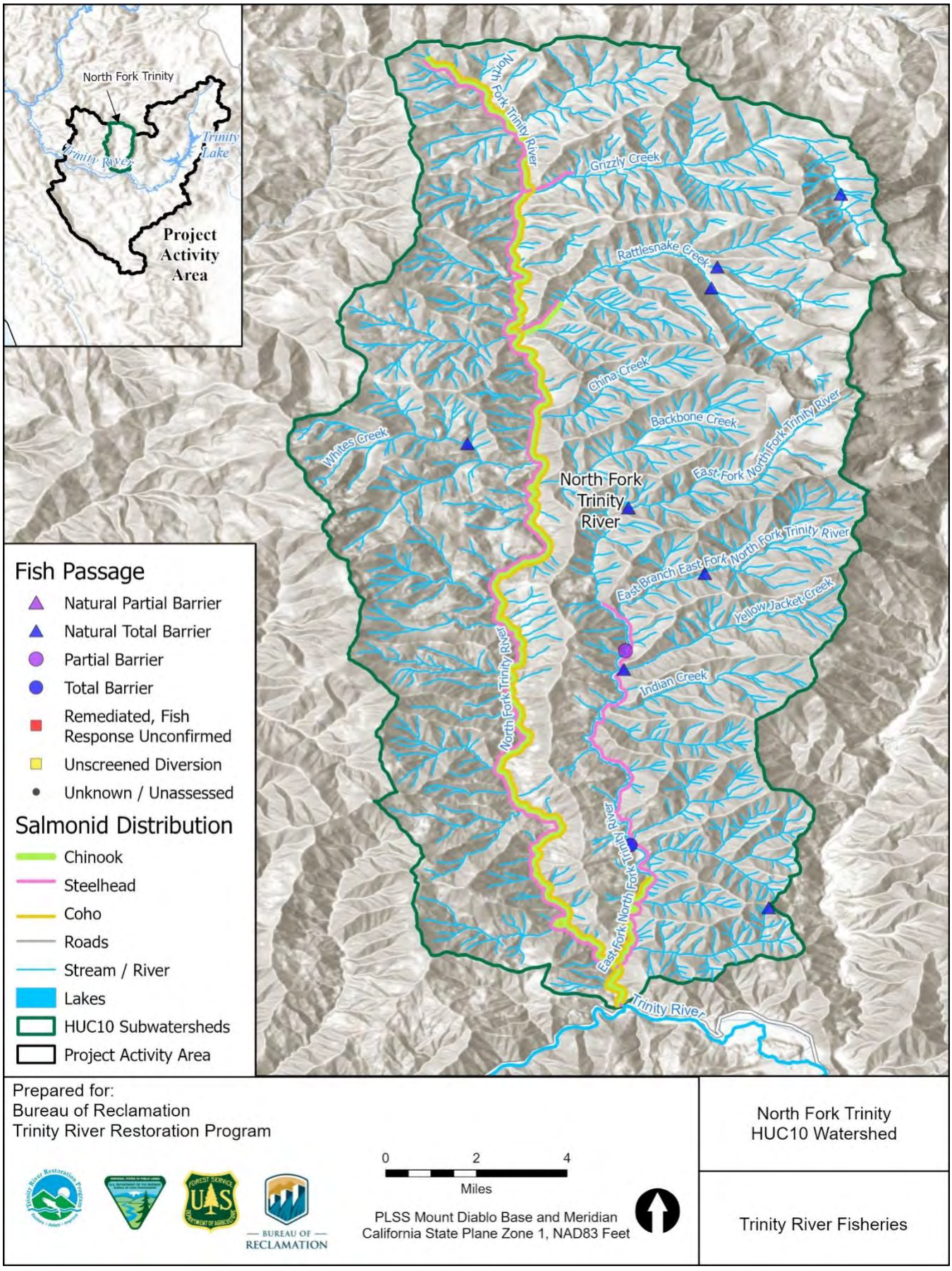
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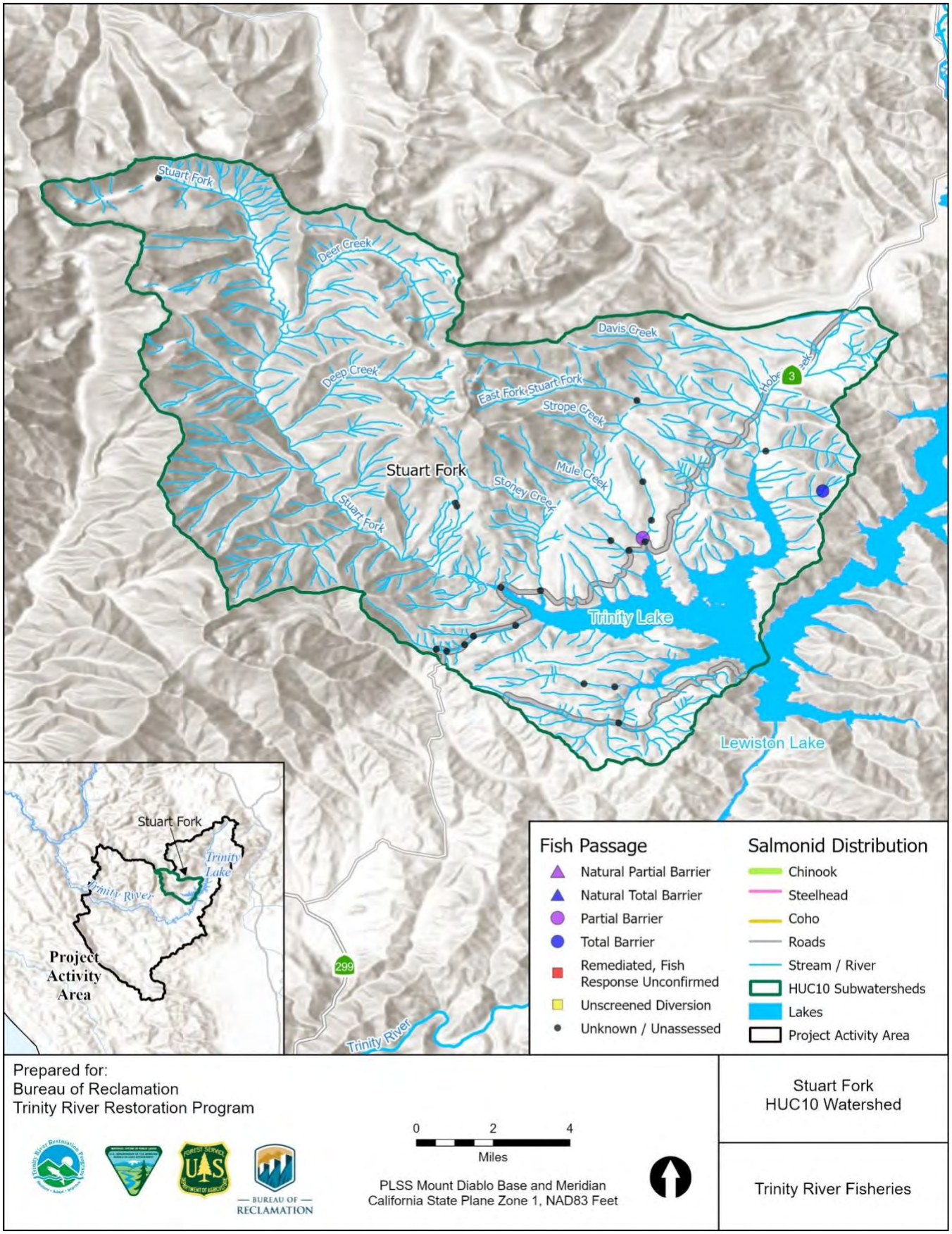
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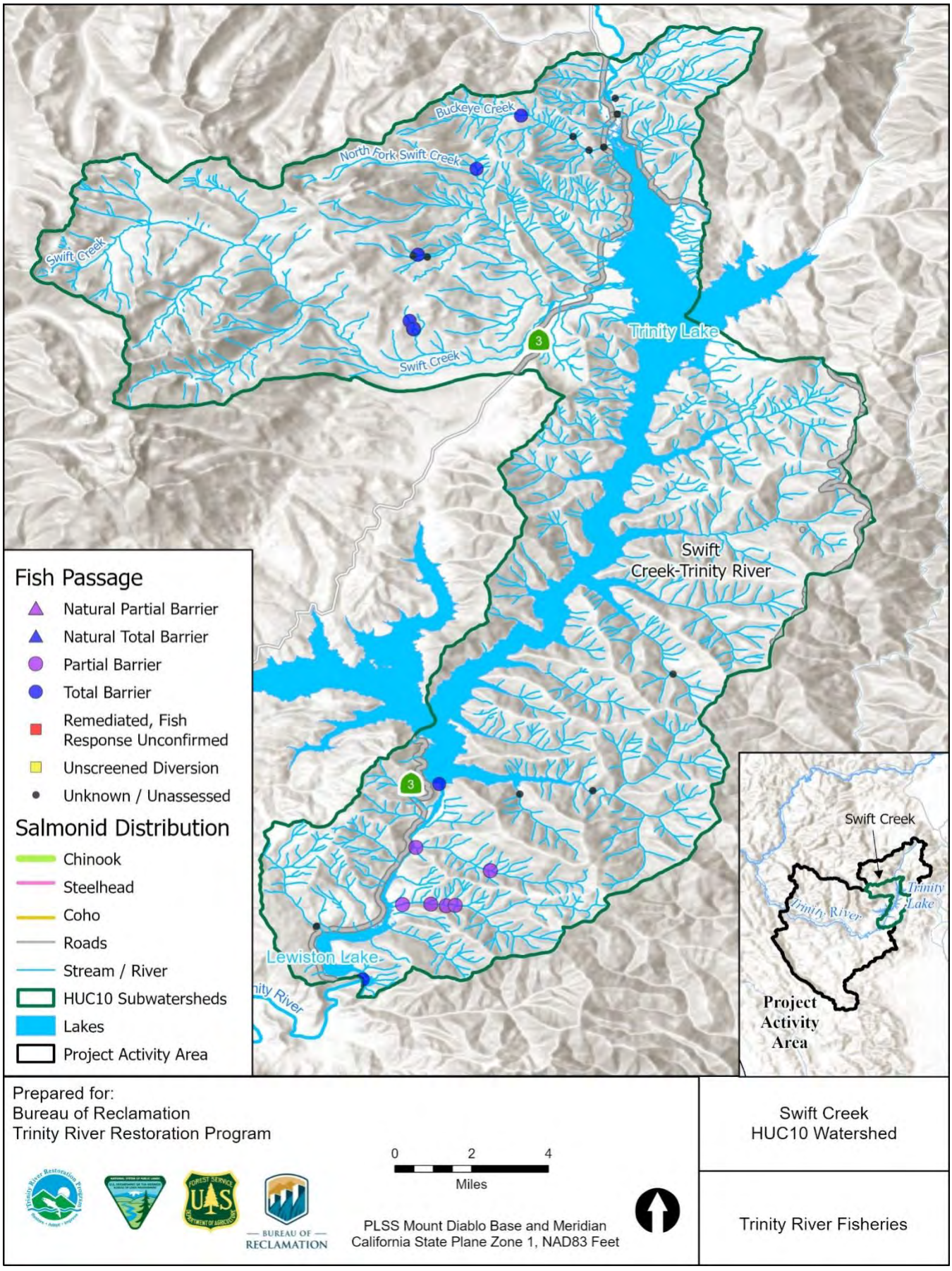
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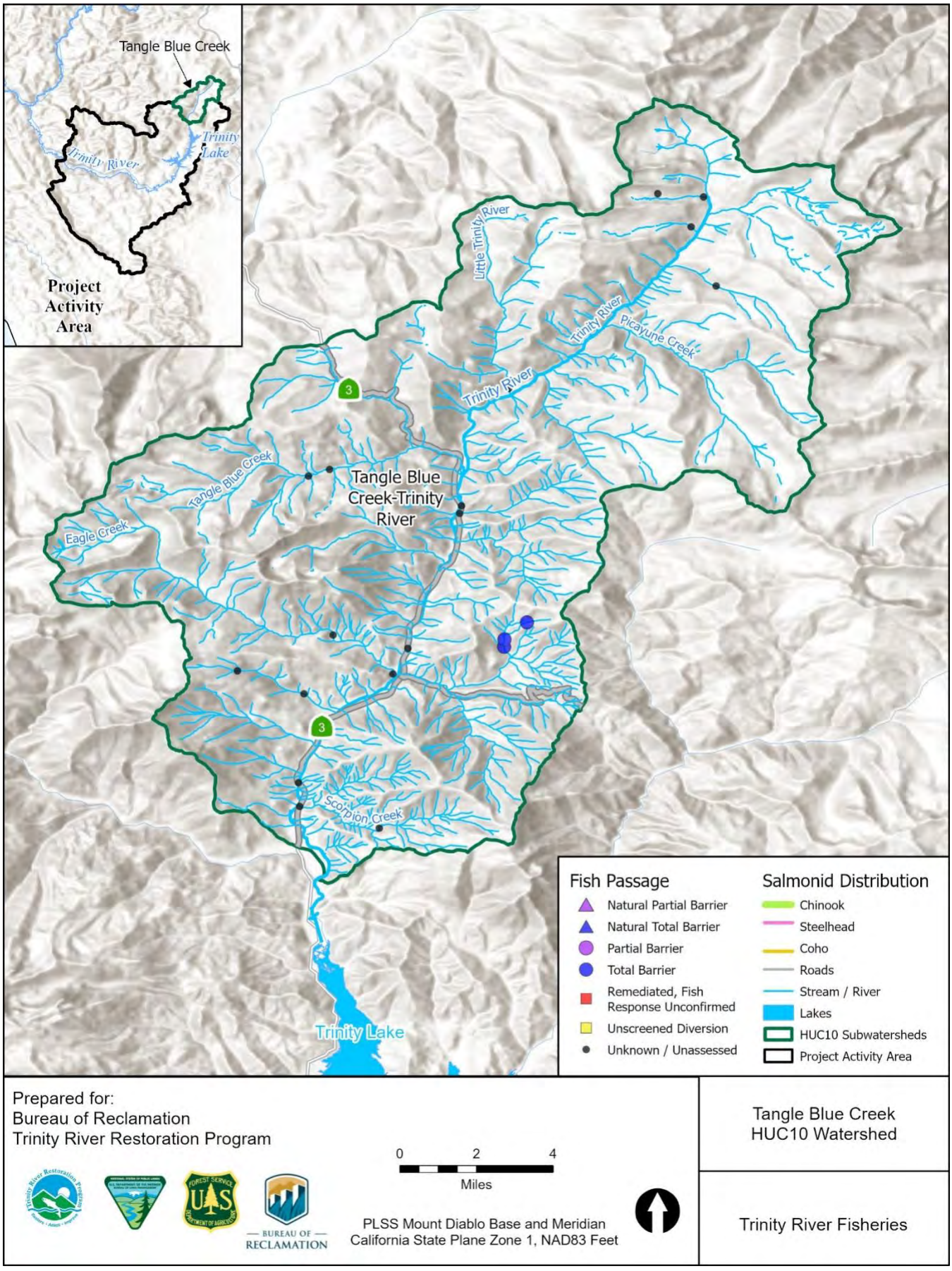
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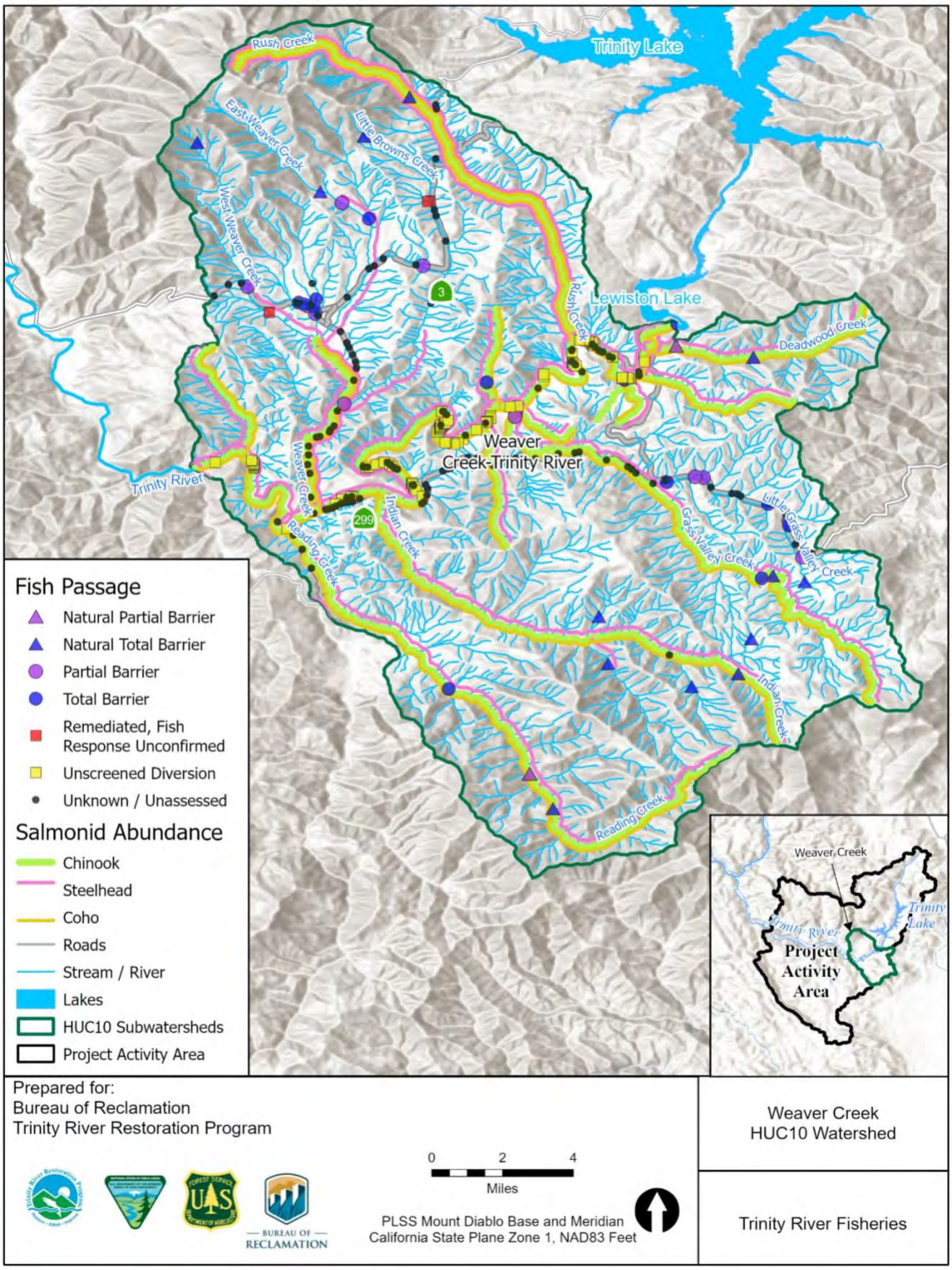
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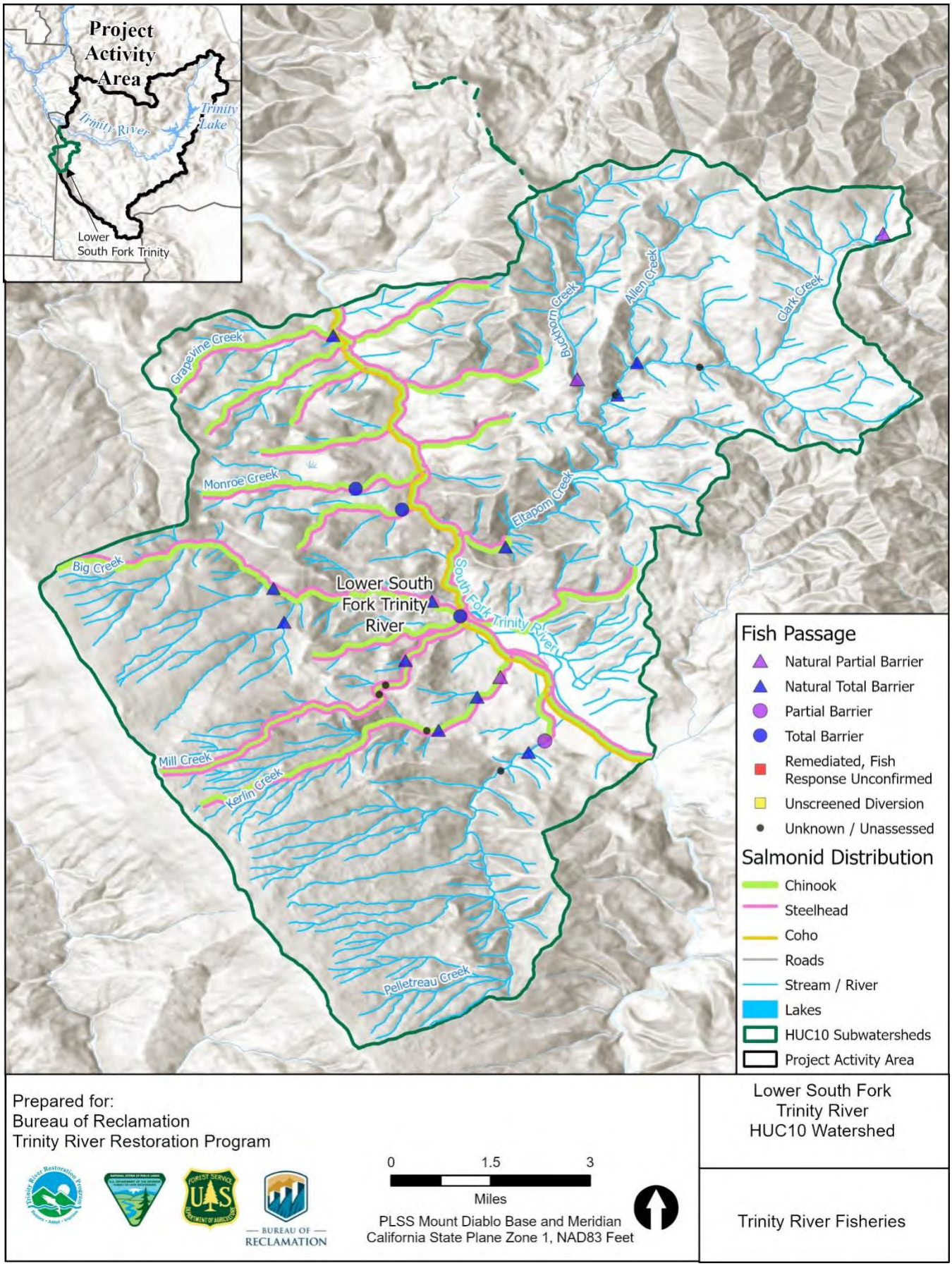
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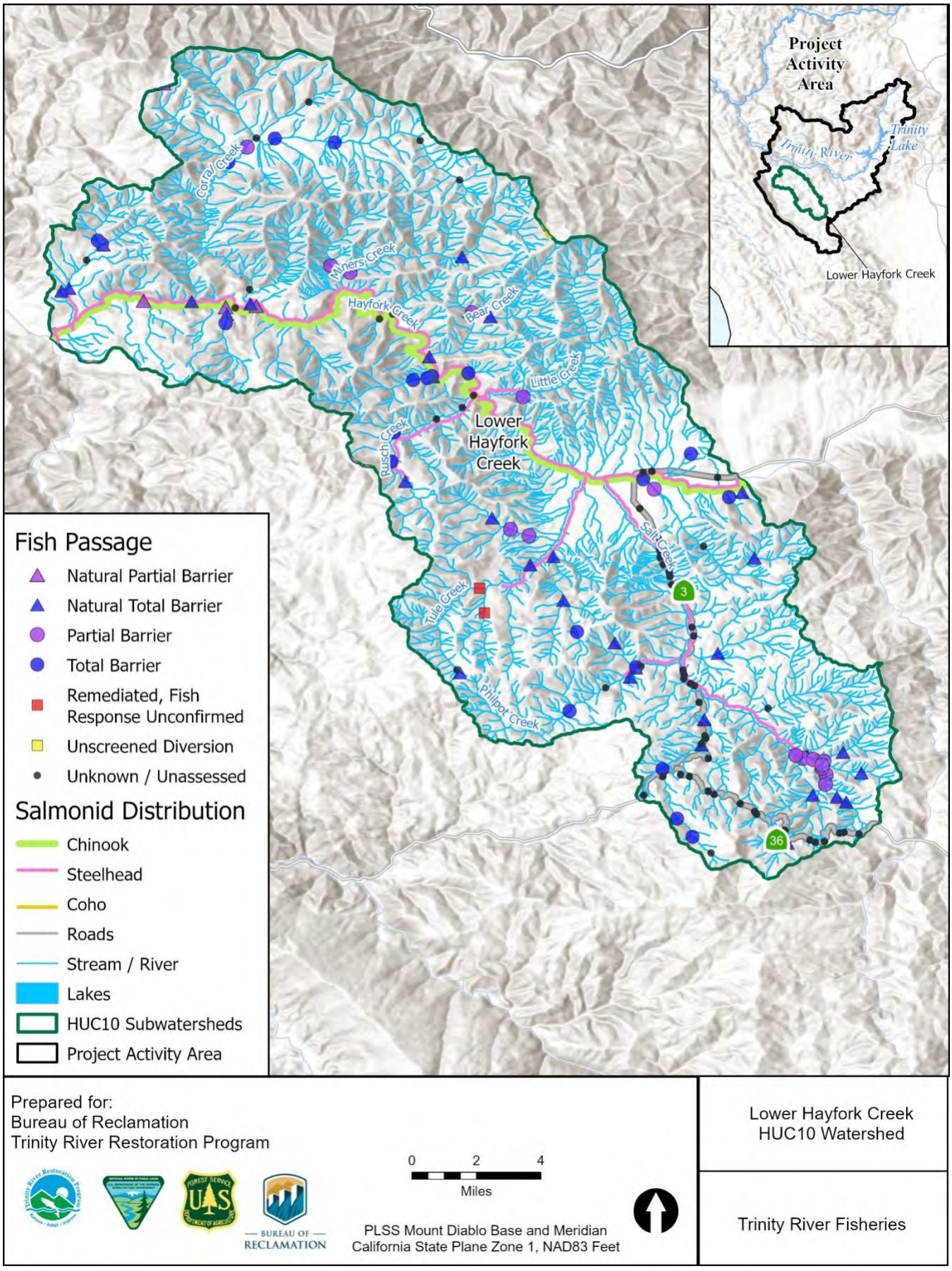
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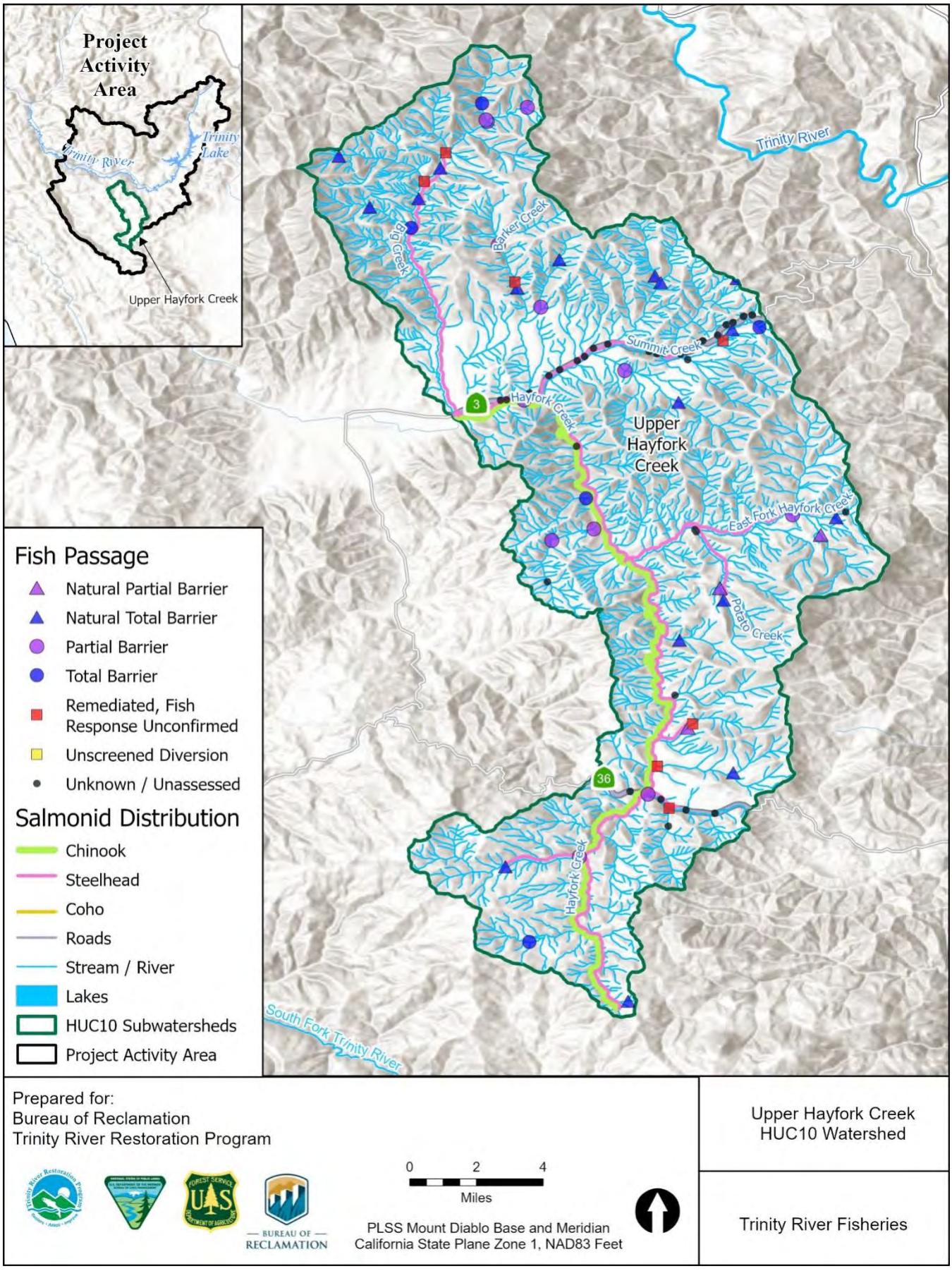
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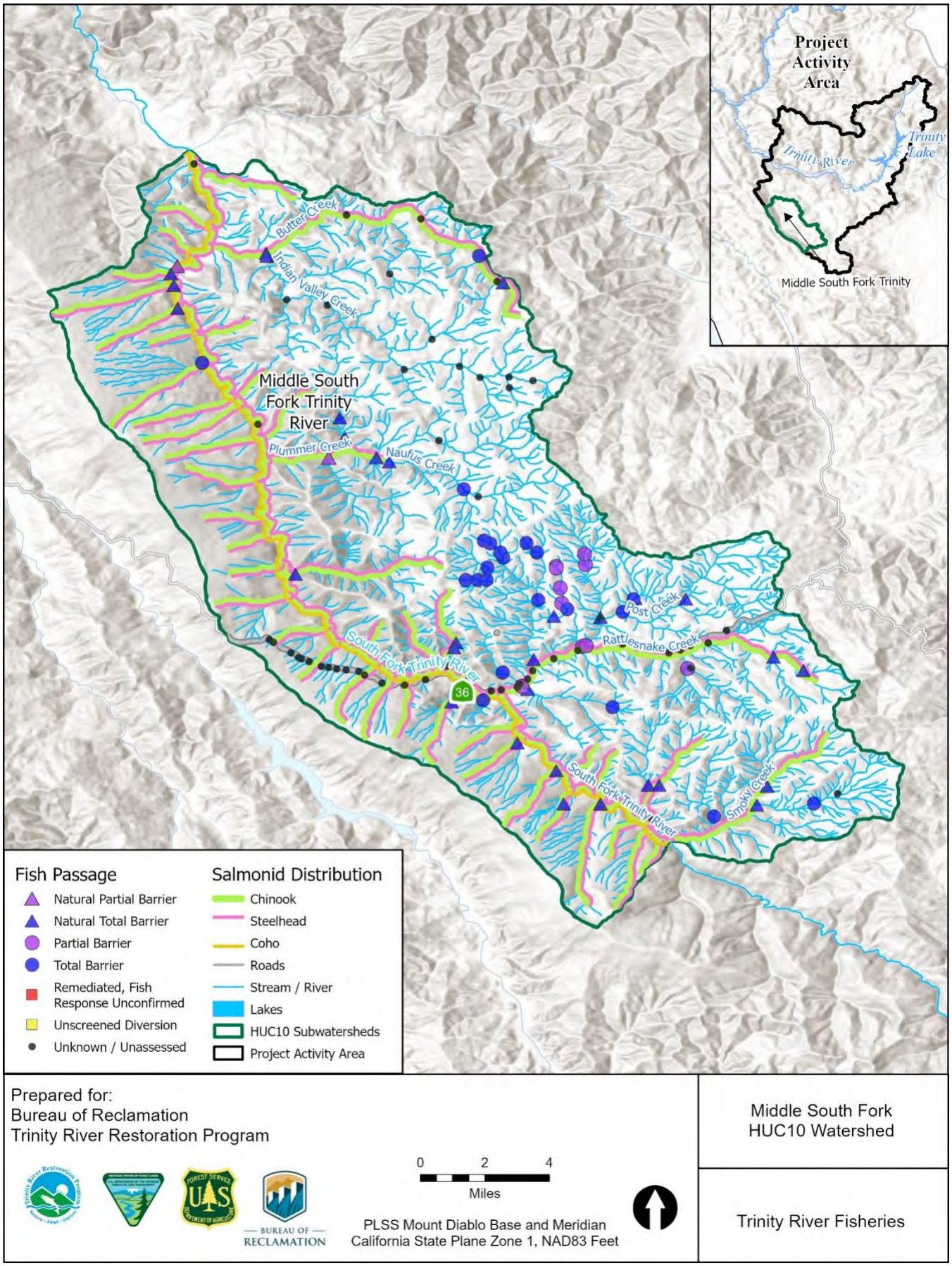
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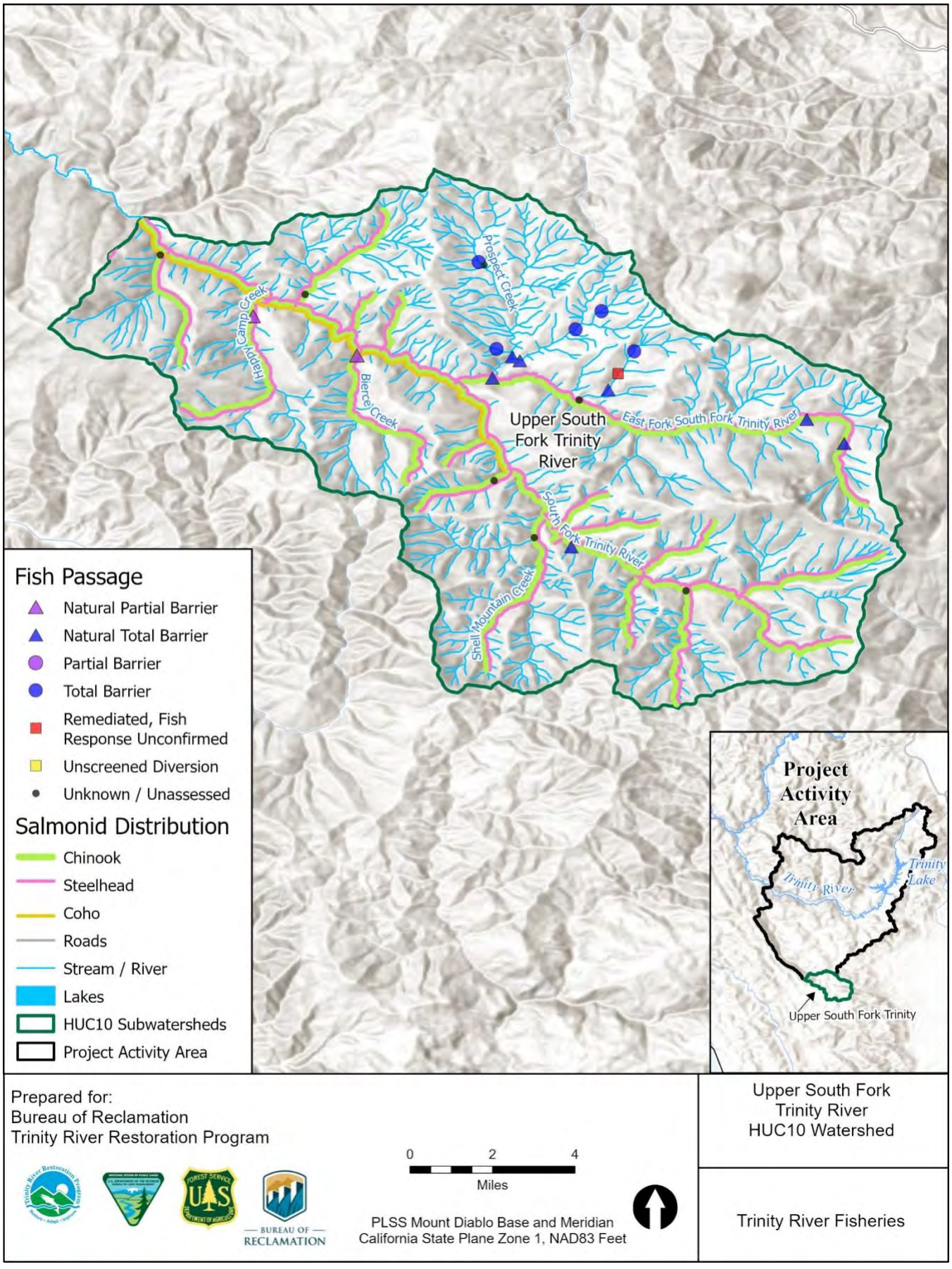
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Appendix L: Wildlife Technical Report

Public Draft

WILDLIFE TECHNICAL REPORT

INCLUDING BIOLOGICAL EVALUATION FOR SENSITIVE WILDLIFE SPECIES AND ANALYSIS FOR ENDANGERED SPECIES ACT LISTED WILDLIFE SPECIES

TRINITY RIVER WATERSHED RESTORATION PROJECT

CGB-ED-2025-034

DOI-BLM-CA-N060-2025-0010-EA

PROJECT #63121 (FOREST SERVICE)

MARCH 2025

Prepared by: **Jacqueline White, Wildlife Biologist, Ironwood Consulting Inc.**
Reviewed by: **Carla De Juilio, Wildlife Biologist, U.S. Forest Service**

Project Proponent and Federal Lead Agency:
U.S. Department of the Interior, Bureau of Reclamation

Federal Cooperating Agencies:
U.S. Department of the Interior, Bureau of Land Management
U.S. Department of Agriculture, Forest Service

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ACRONYMS

ACS	Aquatic Conservation Strategy
ACU	Adaptive capacity unit
AGOS	American goshawk
BiOp	Biological Opinion
BLM	U.S. Bureau of Land Management
BMPs	best management practices

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CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CMs	conservation measures
CNDDB	California Natural Diversity Database
dB	Decibels
DPS	Distinct Population Segment
EA	Environmental Assessment
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FYLF	foothill yellow-legged frog
GPM	General Protection Measure
HUC	Hydrologic Unit Code
LTPBR	low-tech process-based restoration
MMs	Minimization Measures
NMFS	National Marine Fisheries Service
NRIS	Natural Resource Information System
NSO	Northern spotted owl
NWPT	Northwestern Pond turtle
Project	Trinity River Watershed Restoration Project
Reclamation	Bureau of Reclamation
RWQCB	Regional Water Quality Control Board
SLJ	structured log jam
SR	seasonal restriction
STNF	Shasta-Trinity National Forest
TMDL	total maximum daily load
TRRP	Trinity River Restoration Program
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

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1 Executive Summary

This Wildlife Technical Report analyzes the effects of restoration activities proposed to be implemented in the Trinity River Watershed, on U.S. Forest Service (USFS) sensitive species, Bureau of Land Management (BLM) sensitive species, and federal and state Endangered Species Act- (ESA-) listed species with the potential to occur within the watershed. Table 1-1 summarizes effect determinations for sensitive wildlife species analyzed in detail in this technical report. ESA-listed species affect determinations are outlined in Table 1-2. For the species with suitable habitat or known occurrences within or near the project area, the tables also summarize conservation measures (CMs) and minimization measures (MMs) that reduce the potential impacts of proposed activities. Species outside of the project range or with no suitable habitat and marked as low or moderate potential to occur in Table 3-1 are not analyzed in detail because the Project would have no effect on them.

Table 1-1. Summary of Effects to Special Status Wildlife Species[1]

Species	Effects Summary	Conservation Measures/Minimization Measures[2]
American goshawk *Accipiter atricapillus*	**Minor**: Effects would be detectable but would be small and localized.	USFWS Statewide Restoration BiOp conservation measures for NSO[3]. AGBE-1 – AGBE-5
Golden Eagle *Aquila chrysaetos*	**Minor**: Effects would be detectable but would be small and localized.	USFWS Statewide Restoration BiOp conservation measures for NSO[3]. AGBE-1 – AGBE-5
Bald eagle *Haliaeetus leucocephalus*	**Minor**: Effects would be detectable but would be small and localized.	USFWS Statewide Restoration BiOp conservation measures for NSO[3]. AGBE-1 – AGBE-5
Pallid bat *Antrozous pallidus*	**Minor**: Effects would be detectable but would be small and localized.	USFWS Statewide Restoration BiOp conservation measures for NSO[3]. BAT-1 – BAT-5
Fringed myotis *Myotis thysanodes*	**Minor**: Effects would be detectable but would be small and localized.	USFWS Statewide Restoration BiOp conservation measures for NSO[3]. BAT-1 – BAT-5
Townsend's big-eared bat *Corynorhinus townsendii*	**Minor**: Effects would be detectable but would be small and localized.	USFWS Statewide Restoration BiOp conservation measures for NSO[3]. BAT-1 – BAT-5
Pacific/American marten *Martes caurina*	**Minor**: Effects would be detectable but would be small and localized.	USFWS Statewide Restoration BiOp conservation measures for NSO[3]. MRCF-1 – MRCF-2
Fisher *Pekania pennanti*	**Minor**: Effects would be detectable but would be small and localized.	USFWS Statewide Restoration BiOp conservation measures for NSO[3]. MRCF-1 – MRCF-2

Species	Effects Summary	Conservation Measures/Minimization Measures[2]
Ringtail cat *Bassariscus astutus*	**Minor**: Effects would be detectable but would be small and localized.	USFWS Statewide Restoration BiOp conservation measures for NSO[3]. MRCF-1 – MRCF-2
California Mountain Kingsnake *Lampropeltis zonata*	**Minor**: Effects would be detectable but would be small and localized.	WPT-1 – WPT-7
Foothill yellow-legged frog *Rana boylii* North Coast DPS (pop. 1*)*	**Minor**: Effects would be detectable but would be small and localized.	FYLF-4 – FYLF-7 USFWS Statewide Restoration BiOp conservation measures AMPs and FYLF-1 through FYLF-3.[4]
Cascades Frog *Rana Cascades*	**Minor**: Effects would be detectable but would be small and localized.	FYLF-4 – FYLF-7 USFWS Statewide Restoration BiOp conservation measures AMPs and FYLF-1 through FYLF-3.[4]
Coastal giant salamander *Dicamptodon tenebrosus*	**Minor**: Effects would be detectable but would be small and localized.	FYLF-4 – FYLF-7 USFWS Statewide Restoration BiOp conservation measures AMPs and FYLF-1 through FYLF-3.[4]
Big Bar Hesperian snail *Vespericola pressleyi*	**Minor**: Effects would be detectable but would be small and localized.	INV-1 – INV-2
Trinity bristlesnail *Monadenia infumata setosa*	**Minor**: Effects would be detectable but would be small and localized.	INV-1 – INV-2
Western bumble bee *Bombus occidentalis*	**Minor**: Effects would be detectable but would be small and localized.	INV-2 – INV-3 No use of herbicides or pesticides during project activities.

1. Occurrence data pulled from IPaC Information and Planning (USFWS 2024a), California Natural Diversity Database (CNDDB) (CDFW 2024d), and the Natural Resource Information System (NRIS) (USFS 2024a).
2. See Appendix B of the EA for detailed information on all GPMs, CMs, MMs, and design guidelines.
3. Northern spotted owl (NSO) conservation measures are applied to multiple species due to the nature of overlapping habitat. This is described further in Section 5.
4. AMPs and FYLF-1 through FYLF-3 would only be implemented if the North Coast DPS becomes an ESA-listed species within the lifespan of the EA and project implementation.

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Table 1-2. Summary of Effects to ESA-listed Species[1]

Species and Listing Status	Effects Summary[2,3]	Conservation Measures/Minimization Measures
Northern spotted owl *Strix occidentalis caurina* ESA and CESA Threatened	The Project may affect, is likely to adversely affect northern spotted owls and designated critical habitat.	USFWS Statewide Restoration BiOp conservation measures NSO-1 through NSO-8.
Northwestern pond turtle *Actinemys marmorata* ESA Proposed Threatened	The Project may affect, is likely to adversely affect Northwestern pond turtles because many of the proposed activities would occur in suitable habitat.	WPT-1 – WPT-7 USFWS Statewide Restoration BiOp for NWPTs.
Monarch butterfly *Danaus Plexippus* ESA Proposed Threatened	The Project may affect, is likely to adversely affect western monarch butterflies because many of the proposed activities would occur in suitable habitat.	INV-2 – INV-3 No use of herbicides or pesticides during project activities.

1. Occurrence data pulled from IPaC Information and Planning (USFWS 2024a), CNDDB (CDFW 2024d), and the NRIS (USFS 2024a).
2. Effects to federal ESA-listed species would be determined during the site-specific restoration project analysis. In alignment with the 2025 USFWS Statewide Restoration Biological Opinion (BiOp), the goal for each site-specific restoration project is to have only discountable adverse effects to federal ESA-listed species and their critical habitat through implementation of relevant environmental commitments (Appendix B) and/or offsetting habitat restoration or enhancement as part of the site-specific project design and within the project footprint, when feasible.
3. Effect determinations for federal ESA-listed species included in the analysis below are at the Project-level and reflect those included in the 2025 USFWS Statewide Restoration BiOp. If either proposed species is listed as threatened during the implementation of the Project, the effect determination language would be updated to match those in the most current USFWS Statewide Restoration BiOp.

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2 Proposed Action

The Trinity River Restoration Program (TRRP) was established to restore the fisheries of the Trinity River affected by dam construction and related diversions of the Trinity River Division of the Central Valley Project. Administered by the Bureau of Reclamation (Reclamation), TRRP is a partnership of federal and state resource agencies, Tribes, and Trinity County. TRRP works to restore the processes and attributes of a properly functioning river and watershed to support the recovery of diminished salmon and steelhead populations while retaining the Trinity and Lewiston dams' delivery of water and power to the Trinity River and California's Central Valley.

The purpose of the Trinity River Watershed Restoration Project (the Project), of which TRRP is the lead federal agency and USFS and BLM are cooperating agencies, is to improve instream and riparian habitat at a watershed-scale and to accelerate the recovery of north coast salmon populations (coho salmon, steelhead, and Chinook salmon), thereby fulfilling tribal trust responsibilities and obligations to local communities as well as recreational and commercial fishing industries (per the Shasta-Trinity National Forest Land and Resource Management Plan and state and federal recovery plan goals [NMFS 2014, CDFG 2004]).

The following describes the objectives of the Proposed Action:

- Restore and improve instream conditions sufficient to support all life stages of salmonids and other aquatic species;
- Restore upstream and downstream fish passage for all life stages of salmonids;
- Restore continuous paths for wood dispersal, nutrient cycling, sediment transport, and movement of other vegetative material essential for productive aquatic habitat;
- Maintain or restore native plant communities and vegetative structure impacted by invasive plants and pathogens, while rehabilitating eroding streambanks to improve water quality, shade conditions, and large wood recruitment;
- Repair, replace, or remove ineffective instream structures;
- Restore and improve riparian and meadow habitat in order to promote healthy conditions for aquatic and terrestrial wildlife populations;
- Improve late summer/fall base flow conditions through process-based restoration, water conservation improvements, and meadow restoration;
- Increase nutrient inputs through salmon carcass placement in the watershed; and
- Stabilize upslope areas around road infrastructure to minimize erosion and sediment discharges within the watershed to bring the sediment impaired watersheds into compliance with sediment reduction total maximum daily loads (TMDLs) for the South Fork Trinity and Trinity Mainstem rivers (EPA 1998 & EPA 2001).

The Proposed Action consists of a suite of instream and riparian restoration activities that are designed to meet the objectives described above. Detailed descriptions of each of the proposed activities are included in chapter 4 of the Project's Environmental Assessment (EA) document. Proposed Activities are grouped into three general categories: instream habitat restoration; upslope habitat restoration; and road maintenance, rehabilitation, and decommissioning activities. The activities proposed under each of these categories are summarized below:

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Instream Habitat Restoration

1. Restoration and Enhancement of In-Channel Habitat
2. Floodplain Restoration
3. Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-Water Structures
4. Water Conservation Projects
5. Salmon Carcass Placement
6. Remote Site Incubators

Upslope Habitat Restoration

7. Bioengineered Bank Stabilization
8. Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement Including Removal of Nonnative Invasive Species and Revegetation with Native Plants

Road Maintenance, Rehabilitation, and Decommissioning Activities

9. Road Maintenance
10. Road Rehabilitation
11. Road Decommissioning

The removal of nonnative wildlife species would occur opportunistically during project implementation. However, this project does not encompass design criteria for the removal of nonnative wildlife. If bullfrogs, nonnative snails, or any other species known as invasive to Trinity County are encountered during project activities, they would not be salvaged and would be removed opportunistically.

2.1 Project Location and Timing

The proposed activities would occur within a portion of the Trinity River basin (Figure 2-1). Individual restoration actions would take place in the Shasta-Trinity National Forest along the tributaries to the Mainstem Trinity River and within the Mainstem Trinity River (both above and below the Lewiston and Trinity dams) on both private (with permission of the landowner) and public lands (primarily USFS- and BLM-managed). Key Watersheds within the restoration activity area include North Fork Trinity River, South Fork Trinity River, Canyon Creek, and New River. The analysis at the watershed-scale is performed for each of the hydrological unit code 10 (HUC 10) watersheds. Table 2-1 presents watersheds included within the Project activity area.

Table 2-1. Sub-Watersheds within the Trinity River Basin

Subregion (HUC 4)	Basin (HUC 6)	Subbasin (HUC 8)	Watershed (HUC 10)	HUC 10 Number	Acres in Project Activity Area
Klamath-Northern California Coastal 1801	Northern California Coastal 180102	Trinity California 18010211	Big French Creek-Trinity River[1]	1801021111	153,325
			Browns Creek	1801021106	47,110
			Canyon Creek	1801021108	41,033
			Coffee Creek	1801021101	74,835
			East Fork Trinity River	1801021103	74,335
			Horse Linto Creek-Trinity River[2]	1801021112	0
			New River	1801021110	149,597
			North Fork Trinity River	1801021109	97,483
			Stuart Fork	1801021104	88,264
			Swift Creek-Trinity River	1801021105	121,055
			Tangle Blue Creek-Trinity River	1801021102	101,393
			Weaver Creek	1801021107	142,030
		South Fork Trinity 18010212	Lower South Fork Trinity River[3]	1801021205	44,229
			Lower Hayfork Creek	1801021203	142,161
			Upper Hayfork Creek	1801021202	105,697
			Middle South Fork Trinity River	1801021204	145,776
			Upper South Fork Trinity River	1801021201	73,634

1. A portion of Big French Creek is excluded from the Project activity area, namely the Sharber Creek HUC 12 subwatershed, because it is in the Six Rivers National Forest.
2. Horse Linto Creek is located in the Six Rivers National Forest and is not included in the Project activity area and therefore is not analyzed further.
3. A portion of Lower South Fork Trinity River is excluded from the Project activity area, namely Grouse, Mingo, and Old Campbell creeks (HUC 12 subwatersheds), because they are located in the Six Rivers National Forest.

General Protection Measures (GPMs), design guidelines, and CMs have been developed for proposed activities to avoid and minimize effects to fish, freshwater mussels, and terrestrial and aquatic wildlife species. These would be incorporated into the planning, design, and implementation phases of each site-specific project. These have been developed as part of the Project's Endangered Species Act (ESA) Section 7 consultation with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) and collaborative Project planning efforts by TRRP, USFS, and BLM. A detailed list of all GPMs, design guidelines, and CMs by resource is included in Appendix B of the EA.

Project activities within any wetted or flowing channel of the Trinity River below the Trinity and Lewiston dams shall be restricted to the dry season (June 15 to October 15 for tributaries and July 15 to October 15 for the mainstem) before coho begin spawning in tributaries. Revegetation outside of the active channel is typically implemented during the wet season, between October and April. Work in intermittent streams may continue beyond November 1, as long as weather conditions permit, and the stream channel remains dry. Construction and restoration work within intermittent stream channels must be completed before cumulative seasonal rainfall is sufficient to result in surface flow within the channel.

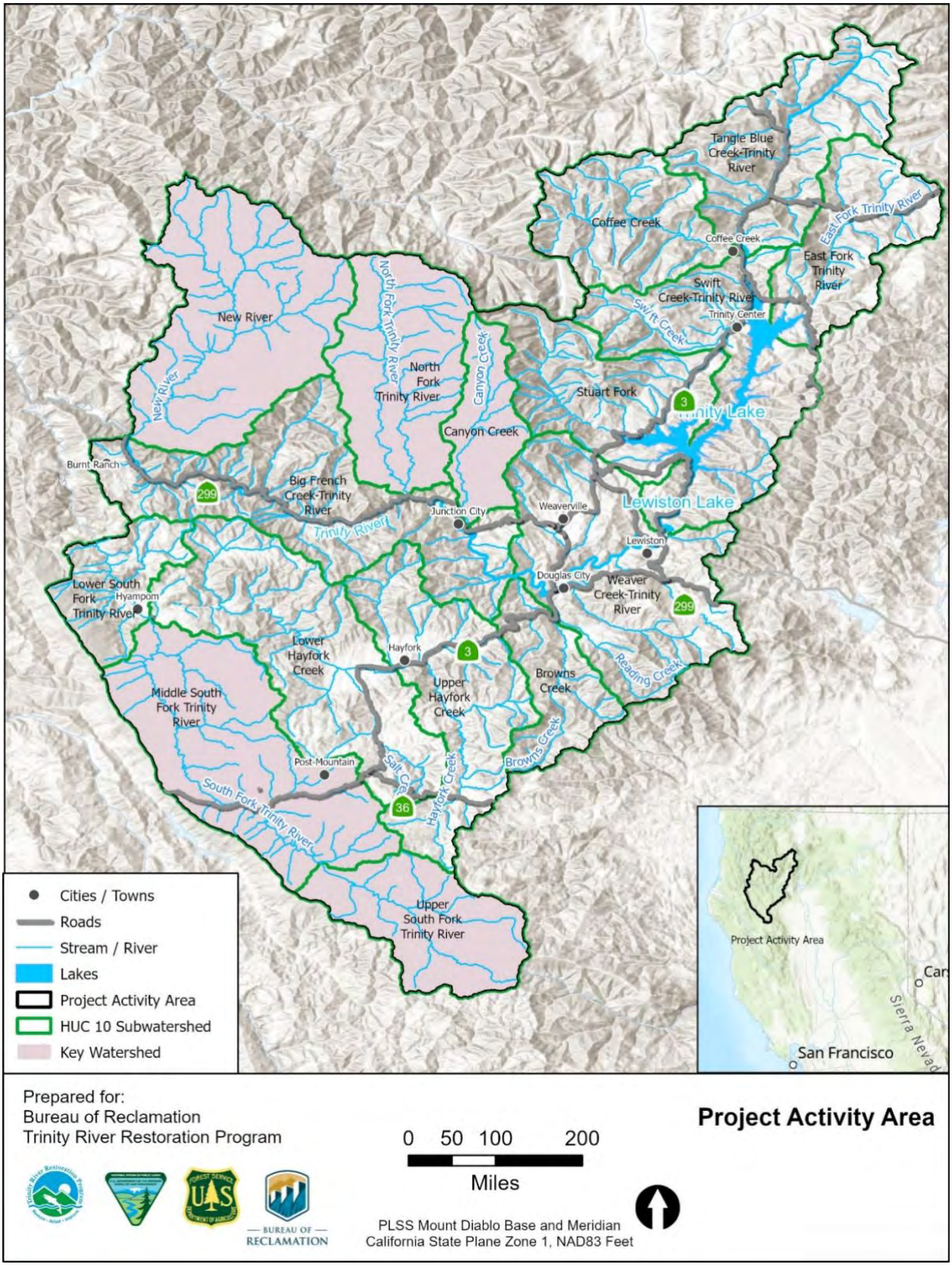

Figure 2-1. Project activity area map.

2.2 Wildlife Avoidance and Minimization

GPMs, CMs, MMs, and design guidelines were developed for the Project to avoid and minimize effects to special status species and other environmental resources. The 2020 NMFS Biological Opinion (NMFS BiOp, NMFS No. WCRO-2019-03827) specifies a suite of GPMs and CMs related to instream construction, water quality, riparian vegetation, and research and fish capture intended to protect federal ESA-listed fish species. The NMFS BiOp is anticipated to undergo reinitiation to better address the suite of activities that are part of the Proposed Action. Also, in 2020 as part of the ESA Section 7 consultation, a partial concurrence letter from USFWS (AFWO-19B0031-20I0203) was provided to TRRP stating an NLAA determination for three wildlife species and their critical habitat (northern spotted owl, marbled murrelet, and gray wolf). However, in 2022 the USFWS California Statewide Programmatic Restoration Effort BiOp (USFWS Statewide Restoration BiOp, FWS Ref. 2022-0005149-S7) was issued. The Statewide BiOp provides ESA coverage for federal ESA-listed wildlife species for restoration activities overlapping with those of the Proposed Action. This BiOp was reinitiated on February 7, 2025, and now includes Reclamation as an Action Agency and ESA coverage for northwestern pond turtle. The USFWS Statewide Restoration BiOp also provides a suite of GPMs, CMs, and design guidelines specific to wildlife species and these are discussed below and included in Appendix B of the EA. These are discussed below and would be incorporated into each individual restoration effort during the planning, design, implementation, post-construction, and monitoring phases. Applicable CMs and MMs are discussed in the context of each special status species in Section 5.

2.2.1 Limits on Proposed Activities Frequency and Location

Due to the large-scale nature of the Project, there are concerns about the potential for physical changes to the environment as a result of implementation at the watershed scale. A key design guideline entails setting annual project limits on the number of projects, which would limit adverse effects to ESA-listed species.

The 2020 TRRP BiOp limits instream watershed restoration projects covered by the BiOp annually to:

- 2 fish passage/dam removal projects;
- 8 channel/floodplain rehabilitation projects (4 mainstem and 4 tributary);
- 2 in-stream habitat enhancement projects;
- 3 streambank stabilization projects; and
- 4 road-related projects with in-water activities (i.e. road decommissioning with culvert removal).

TRRP is in the process of reinitiating consultation with NMFS to include all project activity categories described in the Proposed Action that were not previously analyzed in the 2020 TRRP BiOp. Project limitations will also be reviewed during the reinitiated consultation and are anticipated to change. During meetings with NMFS in regard to the ESA Section 7 consultation for this Project, NMFS recommended setting Project limits to control sedimentation and turbidity that would adversely affect ESA-listed salmonids. Preliminarily, it is being proposed that in addition to utilizing GPMs and CMs, such as erosion and sediment control BMPs, effects of turbidity would be controlled by limiting the number of floodplain reconnection projects that are over 100 acres as well as small dam removals, to one site-specific restoration project (of these specific project types) per HUC-12 watershed, per year. However, the latest applicable BiOp should be referred to, to determine current Project limits during site-specific project implementation.

2.2.2 Wildlife Species Protection Measures

The USFWS Statewide Restoration BiOp and TRRP Master Environmental Impact Report (EIR) (RWQCB and Reclamation 2009) provide wildlife species protection measures that have been incorporated into the Project's CMs included in Appendix B of the EA. These CMs would be followed and implemented during Project restoration activities and include providing qualified biologists and guidance for conducting preconstruction surveys, species capture, handling and translocation, ESA-listed species entrapment prevention, and airborne noise reduction. A qualified biologist would complete a variety of tasks across species prior to and during construction activities. The qualified biologist would need to meet general qualifications including a Bachelor's degree, previous experience with similar habitat types and species, as well as prior construction monitoring experience. A USFWS-Approved Biologist may be required for species handling, relocation, or other activities.

Seasonal restrictions or preconstruction surveys would be implemented based on what species are determined to be present. Clearance surveys may be required for migratory bird species as well as reptile and amphibian species if potential habitat is present within or in proximity to site-specific restoration activity areas. See section 5, Environmental Consequences, for specific protection measures outlined for each species.

Airborne noise reduction would be implemented using noise abatement systems (e.g., mufflers or spark arrester) if there is potential for noise to adversely affect ESA-listed species during site-specific project implementation.

Site-specific protection measures for construction activities to reduce effects to ESA-listed species would be employed. For species-specific CM's provided by the USFWS Statewide Restoration BiOp, see species accounts in Section 5.

3 Methodology

Key considerations for the analysis of potential project effects include the presence of a species or suitable habitat in or near the Project activity area; the scope and nature of the proposed activities; and the potential for these activities to affect habitat suitability, habitat use, or species behavior. This wildlife technical report analyzes the potential for effects to wildlife species and associated habitat by analyzing effects to breeding, foraging, and sheltering activities as well as habitat suitability and population viability.

Wildlife data used in this technical report originate from species and habitat surveys; USFS and State wildlife records and databases, primarily the Natural Resource Information System (NRIS) database managed by USFS and the California Natural Diversity Database (CNDDB) managed by the California Department of Fish and Wildlife (CDFW); literature reviews; personal communications with USFS and BLM personnel; and local wildlife expertise.

3.1 Characterization of Habitat in the Project Activity Area

The Project activity area encompasses a total area of 1,601,525 acres that includes sixteen HUC 10 subwatersheds. Due to the large geographical size and broad scope of the Project, characterizing habitat at a subwatershed-scale provides insights into existing conditions at a smaller, more comprehensive, scale thereby allowing for an accurate effects analysis. Within this technical report, five datasets were used to characterize habitat and therefore analyze potential effects on terrestrial wildlife species: land cover types, Riparian Reserves and Key Watersheds, northern spotted owl (NSO) Critical Habitat, historic wildfire impacts, and habitat connectivity and fragmentation.

Land cover types from the National Land Cover Database provided by the U.S. Geological Survey characterize landscapes at a broad scale for the conterminous U.S. and is incorporated into the technical report to analyze effects by providing the basic characteristics of the land within the Project activity area. Using land cover types as the basis for habitat characterization allows for a detailed analysis when linking other datasets such as habitat connectivity, habitat fragmentation, and wildfire impacts to demonstrate recent changes to the landscape and current environmental conditions that impact terrestrial wildlife species. Riparian Reserves and Key Watersheds are also used as an additional dataset to provide further characterization of riparian habitat and watersheds within the Project activity area. NSO critical habitat and recent wildfire impacts help determine the likelihood of species occurrences that rely on late seral-evergreen forests. See Section 4 for detailed information on the affected environment included in this technical report.

Based on the Project habitat characterization, special status species were analyzed with the potential to occur in each of the sixteen HUC 10 subwatersheds. Determining which wildlife species have the potential to occur at the HUC 10 level would inform the incorporation of appropriate BMPs, CMs, and design guidelines during the project planning, design, and implementation phases for future site-specific restoration activities.

3.2 Methods of Characterizing Effects

Specific to wildlife species, Project effects are associated with implementation of the Proposed Action as described in the EA and considers documented special status wildlife species presence and suitable habitat occurrence for each HUC 10 subwatershed. This analysis looks at short- and long-term effects to wildlife species and their associated habitats. Short-term effects to wildlife as a result of construction activities are commonly related to ground disturbance within the floodplains, disturbance to riparian vegetation, and airborne noise. Long-term effects are caused by the action and are later in time or farther removed in distance. Long-term effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

For the purposes of analysis for this project, the intensity of effects is described using the following terms:

- Negligible/No effect: Effects would not be measurable, with no perceptible consequences.
- Minor: Effects are detectable but are small and localized.
- Moderate: Effects are detectable, can be measured, and cover a larger area (e.g., a tributary stream).
- Major: Effects are easily measured, regional, and at the population-scale.

Effect analyses also consider avoidance and minimization measures that would either avoid causing a particular effect or minimize the effect's intensity. Effect analyses do not consider compensatory mitigation.

3.3 Species Analyzed in Detail

To determine what wildlife species needed to be analyzed for the Project, five special status groups were reviewed: Federal ESA-listed, California ESA-listed, USFS Sensitive, BLM Sensitive, and California Fully Protected species. Table 3-1 below displays those species with special statuses and with the potential to occur within the Project Activity Area according to the CNDDB, BLM sensitive species list provided by the Redding Field Office, USFS sensitive species list within Trinity County, and consultation with local expertise. Table 3-1 includes species and their legal status, potential and known occurrences within each HUC 10, habitat presence or absence and preferred habitat and range information. Species with low or moderate potential for occurrence are not analyzed further as no effects are anticipated for these species.

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Table 3-1. Special Status Species with Potential to Occur within the Project Activity Area

Common Name / Scientific Name	Listing Status	Potential for Occurrence	HUC 10 Watershed Known Occurrences	Suitable Habitat Present	Habitat and Range (CDFW)
American goshawk *Accipiter atricapillus*	BLM-S / USFS-S / SSC	High	Known occurrences within all HUC 10 units except Canyon Creek.	Yes	Occupies mature conifer and deciduous forests that are interspersed with meadows for hunting. Riparian areas are required for this species and nesting habitat includes, but is not limited to north-facing slopes near water. Goshawks nest in the densest parts of tree stands but close to forest openings. Occupies much of Northern California including Shasta, Trinity and Humboldt counties yearlong in the mid to higher elevation ranges.
Golden eagle *Aquila chrysaetos*	BLM-S / BGEPA / CFP / WL	High	Known occurrences within Big French Creek, Browns Creek, Canyon Creek, Coffee Creek, East Fork Trinity River, Lower South Fork Trinity River, Middle South Fork Trinity River, Lower Hayfork Creek, Stuart Fork, Swift Creek, Upper Hayfork Creek, and Weaver Creek	Yes	Occupies large trees, cliffs, and overhanging ledges. Open, rugged habitat with escarpments and canyons used for nesting and soars above ground for prey. Multiple nest sites are maintained, and previous nests are reused. Yearlong range throughout Shasta and Trinity Counties. More common in Central and Southern California

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Common Name / Scientific Name	Listing Status	Potential for Occurrence	HUC 10 Watershed Known Occurrences	Suitable Habitat Present	Habitat and Range (CDFW)
Bald eagle *Haliaeetus leucocephalus*	SE / USFS-S / CFP / BGEPA	High	Year-round range and known occurrences. HUC 10 units: Big French Creek, East Fork Trinity River, Swift Creek, Stuart Fork, Lower South Fork Trinity River, Middle South Fork Trinity River, Lower Hayfork Creek, North Fork Trinity River, Tangle Blue Creek, Upper Hayfork Creek, Upper South Fork Trinity River, ad Weaver Creek.	Yes	Occupies lower montane coniferous forest and old growth forests. Perches in large, stoutly limbed trees, snags, and broken topped trees. Bald eagles require large bodies of water, or free flowing rivers with fish for hunting. They use live large trees for nesting, typically with open branching including ponderosa pines. Permanent resident in Shasta and Trinity counties with winter migrants. About half of the wintering population is in the Klamath Basin.
Bank swallow *Riparia riparia*	ST / BLM-S	Low	No known occurrences within Project activity area.	Potential suitable habitat	Requires cliffs and vertical banks near streams, rivers ponds, lakes, and the oceans. Grassland, shrubland, savannah, and open riparian areas are used for feeding. Digs holes in cliffs and riverbanks for cover. Found primarily in lowland and riparian habitats in California. Colonies persist in Northern California in Shasta County.
Northern spotted owl *Strix occidentalis caurina*	FT / ST	High	Year-round range Known occurrences within all HUC 10 units.	Yes Critical habitat present	Occurs in dense, multi-layered and old-growth mixed-conifer, redwood, and Douglas-fir habitats up to 7,545 feet in elevation. Roosts in dense, multi-layered canopies typically located near a water source. Uses tree cavities or broken topped trees as nest sites. Requires mature forests with permanent water source and suitable nesting trees or snags. Permanent resident in Northern California along the Sierra Nevada and Cascade Range.

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Common Name / Scientific Name	Listing Status	Potential for Occurrence	HUC 10 Watershed Known Occurrences	Suitable Habitat Present	Habitat and Range (CDFW)
Pallid bat *Antrozous pallidus*	BLM-S / SSC / USFS-S	Moderate	Year-round range with known occurrences in Project activity area. HUC 10 unit: Canyon Creek, New River, Upper Hayfork Creek, Upper South Fork Trinity River, and Weaver Creek.	Yes	Occupies a variety of habitats including grasslands, shrublands, woodlands, and forests. More common in open, dry habitats with rocky areas. Roosts in caves, crevices, mines and hollow trees and buildings that protect species from high temperatures. Forages in open habitats. Occurs in the low elevations of California throughout the state.
Ringtail *Bassariscus astutus raptor*	CDFW FP	High	Year-round range with known occurrences. HUC 10 unit: Big French Creek, Lower Hayfork Creek, Middle South Fork Trinity River, Stuart Fork, Swift Creek Trinity River, Upper Hayfork Creek, and Weaver Creek.	Yes	Occurs in riparian habitats and in brush stands of most forest and shrub habitats, and at low to middle elevations. Species uses hollow trees, logs, snags, and cavities in rocky area for cover and nesting. Usually found close to water sources (within 1 km). Distribution and relative abundance is not well known.
Fringed myotis *Myotis thysanodes*	BLM-S / USFS-S	High	Year-round range with known occurrences. HUC 10 unit: Canyon Creek, Lower South Fork Trinity River, Middle South Fork Trinity River, North Fork Trinity River, and Upper Hayfork Creek.	Yes	Occupies pinyon-juniper, valley foothill hardwood and hardwood-conifer up to 9,350 feet in elevation. Roosts in caves, mines, buildings, and crevices and uses open habitats, streams, lakes, and ponds for foraging. Widespread throughout California except the Central Valley and Colorado and Mojave Deserts.

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Common Name / Scientific Name	Listing Status	Potential for Occurrence	HUC 10 Watershed Known Occurrences	Suitable Habitat Present	Habitat and Range (CDFW)
Townsend's big-eared bat *Corynorhinus townsendii*	BLM-S / SSC / USFS-S	High	Year-round range and known occurrences within Shasta and Trinity Counties. HUC 10 units: Swift Creek, Weaver Creek, Lower Hayfork Creek, Upper Hayfork Creek, Middle South Fork Trinity River, Stuart Fork	Yes	Occupies many habitats except alpine and subalpine habitats and is abundant in mesic habitats. Roosts in caves, mines, tunnels, buildings, or other structures. Requires water and gleans from brush or trees or feeds along habitat edges. Widespread throughout California.
North America wolverine *Gulo gulo luscus*	FT / ST / CFP / USFS-S	Low	Scarce resident of the North Coast Mountains and Sierra Nevada. HUC 10 units: Big French Creek, New River, Lower Hayfork Creek	Yes	In northern coastal and north Sierra Nevada areas, habitat includes Douglas-fir and mixed conifer and potentially red fir, lodgepole, subalpine conifer, alpine dwarf-shrub, wet meadow, and montane riparian. Feeds primarily on small mammals and carrion and uses caves, cliffs, hollow logs, cavities in the ground, and rocks as den sites. Yearlong range in Sierra Nevada mountains and North Coast Mountains. This species is not likely to occur within California or the Project.
Pacific/ American marten *Martes caurina*	USFS-S	Moderate	Year-round range in the Project activity area. HUC 10 units: Coffee Creek, East Fork Trinity River, Middle South Fork Trinity River, Stuart Fork, Swift Creek, Tangle Blue Creek, Trinity River, Canyon Creek, and Weaver Creek.	Yes	Optimal habitat includes mixed evergreen forests with greater than 40% canopy closure with large trees and snags typically at higher elevations above 4,500 feet. Red fir, lodgepole pine, subalpine conifer, mixed conifer, Jeffrey pine, and eastside pine are important habitat types. Uses stumps, logs, trees, burrows, caves, and crevices as cover and are mostly carnivorous. Occupies Northern California and Oregon.

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Common Name / Scientific Name	Listing Status	Potential for Occurrence	HUC 10 Watershed Known Occurrences	Suitable Habitat Present	Habitat and Range (CDFW)
Fisher *Pekania pennanti*	BLM-S / SSC / USFS-S	High	Year-round range and known occurrences in all HUC 10 units.	Yes	Habitat types include intermediate to large-tree stages of coniferous forests and deciduous-riparian habitats with a high percent canopy closure. Den sites include large trees, rocks, snags, logs, and slash or brush piles. Feeds on rabbits, hares, and rodents primarily. Mature dense forest stands are preferred habitat. Permanent, uncommon resident of the Sierra Nevada Mountains, Cascades, and Klamath mountains.
Gray Wolf *Canis Lupus*	FE / SE	Low	Not known to occur in Trinity County but have large home ranges and are known to disperse.	Yes	A generalist species that can occur in a wide range of habitats that include temperate forests, mountains, tundra, taiga, and grasslands. Seven known packs in California, including the Whaleback pack in Siskiyou County.
Northwestern pond turtle *Actinemys marmorata*	FPT / BLM-S / SSC / USFS-S	High	Year-round range and known occurrences within Project activity area. HUC 10 units: Canyon Creek, Swift Creek, Stuart Fork, Weaver Creek, Big French Creek, Lower South Fork Trinity River, Middle South Fork Trinity River, Lower Hayfork Creek, Upper Hayfork Creek, Upper South Fork Trinity River, Browns Creek, and Tangle Blue Creek	Yes	Occupies permanent or almost permanent water in habitats including ponds, lakes, streams, irrigation ditches and permanent pools along intermittent streams. Feeds on plants and aquatic invertebrates. Occurs west of the Sierra-Cascade crest and is common in California in suitable aquatic habitats.

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Common Name / Scientific Name	Listing Status	Potential for Occurrence	HUC 10 Watershed Known Occurrences	Suitable Habitat Present	Habitat and Range (CDFW)
California mountain kingsnake *Lampropeltis zonata*	BLM-S	High	Year-round range and known occurrences within Project activity area. HUC 10 units: Coffee Creek, Stuart Fork, Canyon Creek, North Fork Trinity River, Lower South Fork Trinity River, Middle South Fork Trinity River	Yes	Seeks cover in rocks or boulders near streams or lake shores as well as rotting logs and dense shrubs. Found near wet meadows, streams or lakes and occupies valley-foothill hardwood, hardwood conifer, mixed and montane chaparral, valley-foothill riparian, and coniferous forests. Uncommon resident of Sierra, Cascade and Coast Ranges.
Coastal (Pacific) giant salamander *Dicamptodon tenebrosus*	SSC	High	Within range Known occurrences within Weaver Creek, Big French Creek, Canyon Creek, Swift Creek, Tangle Blue Creek, Upper Hayfork Creek, and Browns Creek.	Yes	Occurs in humid coastal forests like Klamath mixed conifer, Douglas-fir, redwood, red fir, and montane and valley-foothill riparian habitats. Preys on snails, slugs, small mice, shrews and potentially reptiles. Uses spaces between rocks in streambeds or surface litter and tunnels for terrestrial cover. Cold flowing water is ideal for egg-laying. Eggs are laid in the spring several feet below the surface of water and beneath rocks and course woody debris. Year-round residents in northwestern California and are known to occur in Shasta, Trinity and Humboldt Counties.
Foothill yellow-legged frog *Rana boylii pop. 1*	BLM-S / SSC / USFS-S	High	Within range and known occurrences within Project activity area. HUC 10 units: All HUC 10 units	Yes	Inhabits rocky streams in a variety of habitats including wet meadow, mixed chapparal, coastal scrub, mixed conifer, ponderosa pine, valley-foothill riparian, valley-foothill hardwood-conifer, and valley-foothill hardwood. Typically encountered near permanent water. Occurs in the Coast Range from the Oregon border south to the Transverse Mountains in Los Angeles County. Found west of the Sierra Nevada and Cascade Range crest.

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Common Name / Scientific Name	Listing Status	Potential for Occurrence	HUC 10 Watershed Known Occurrences	Suitable Habitat Present	Habitat and Range (CDFW)
Cascades frog *Rana cascadae*	SC / SSC / USFS-S	High	Within range and known occurrences within Project activity area. HUC 10 units: Tangle Blue Creek, East Fork Trinity River, Swift Creek, Coffee Creek, Stuart Fork, Canyon Creek, North Fork Trinity River	Yes	Inhabits mountain lakes, small streams, and ponds in meadows up to timber line. Restricted to water and surrounding vegetation. Hibernates in mud at the bottom of ponds and lakes during the winter. Occurs in Siskiyou, Trinity, Shasta, and Tehama Counties in mainly two locations and 2,400-8,200 feet in elevation.
Southern torrent salamander *Rhyacotriton variegatus*	SSC / USFS-S	High	Within range and known occurrences within Project activity area. HUC 10 units: Big French Creek, Lower South Fork Trinity River, Middle South Fork Trinity River	Yes	Inhabits cold, well-shaded permanent streams and spring seepages in redwood, Douglas fir, mixed conifer, montane riparian and montane hardwood-conifer. Typically found among pebbles and rocks within seepages and streams. Terrestrial use within splash zone or on moss-covered rock with trickling water. Ranges from northwestern California to Mendocino County up to 3,940 feet in elevation.
Hooded lancetooth *Ancotrema voyanum*	BLM-S	High	Within range and known occurrences within Project activity area HUC10 units: Canyon Creek, North Fork Trinity River, New River, Big French Creek, Lower South Fork Trinity River, Lower Hayfork Creek, Upper Hayfork Creek, Middle South Fork Trinity River	Yes	Inhabits intermittent stream channels where substrate remains damp. Course woody debris, riparian hardwood trees, deep leaf mold, and a closed forest canopy provides suitable habitat. Occurs in Trinity and Shasta Counties.

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Common Name / Scientific Name	Listing Status	Potential for Occurrence	HUC 10 Watershed Known Occurrences	Suitable Habitat Present	Habitat and Range (CDFW)
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	Low	Within range of species, however no known documented occurrences within Project activity area.	No	Found in the Central Valley and other valley locations throughout California. This species requires specific habitat (vernal pools) that are characterized by filling and drying of pools in areas where surface water becomes trapped on a nearly impermeable layer. No critical habitat for this species occurs within the Project activity areas.
Vernal pool tadpole shrimp *Lepidurus packardi*	FE	Low	Within range of species, however no known documented occurrences within Project activity area	No	Found in the Central Valley and other valley locations throughout California. This species requires specific habitat (vernal pools) that are characterized by filling and drying of pools in areas where surface water becomes trapped on a nearly impermeable layer. No critical habitat for this species occurs within the Project activity areas.
Franklin's bumble bee *Bombus franklini*	FE / SC	Low	One known occurrence along Willow Creek in 1969. HUC 10 unit: Stuart Fork	Yes	Found in southern Oregon/Northern California between the coast and Sierra-Cascade ranges. Not much is known about this species' habitat requirements. This species does not have an obligate host plant and uses a variety of flora found across the western United States. Documented occurrence within the Project area over 50 years ago.

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Common Name / Scientific Name	Listing Status	Potential for Occurrence	HUC 10 Watershed Known Occurrences	Suitable Habitat Present	Habitat and Range (CDFW)
Western bumble bee *Bombus occidentalis*	SC / USFS-S	High	Within range and known occurrences within Project activity area. HUC 10 units: Coffee Creek, East Fork Trinity River, Tangle Blue Creek, Swift Creek, Stuart Fork, North Fork Trinity River, Weaver Creek, New River, and Middle South Fork Trinity River	Yes	Distribution is from southern British Columbia to Central California. Habitat requirements include continuously blooming florals from spring to autumn. This species typically occupies rodent nests 16 to 18 inches below ground for nesting purposes. However, they will also use clumps of grass above ground to nest as well. Bumble bees also require more than isolated habitat patches, as these are not sufficient to fully support this species.
Monarch butterfly *Danaus Plexippus pop. 1*	FPT / USFS-S	High	Within range and known occurrences within Project activity area. HUC 10 units: Tangle Blue Creek, Swift Creek, Stuart Fork, Weaver Creek, Big French Creek, and Lower Hayfork Creek	Yes	This species is distributed throughout 90 countries, islands, and island groups. These butterflies are well known for their phenomenal long-distance migration in the North American populations. Descendants of these migratory monarch populations expanded from North America to other areas of the world where milkweed (their larval host plant) was already present or introduced. Inhabits Trinity and Humboldt Counties.
Klamath (Trinity) shoulderband snail *Helminthoglypta talmadgei*	BLM-S	Low	Within range Known occurrences within Stuart Fork and Big French Creek.	Yes	Inhabits limestone substrates with stable talus and rockslides typically near springs or streams. Shrubs and trees provide shading and food supplies. Trinity and Humboldt Counties and Klamath National Forest.

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Common Name / Scientific Name	Listing Status	Potential for Occurrence	HUC 10 Watershed Known Occurrences	Suitable Habitat Present	Habitat and Range (CDFW)
Trinity bristlesnail *Monadenia infumata setosa*	ST	High	Within range and known occurrences within Project activity area. HUC 10 units: Big French Creek, Upper Hayfork Creek, Lower Hayfork Creek, Middle South Fork Trinity River	Yes	Inhabits riparian corridors and uplands within Klamath mixed-conifer forests with a deciduous hardwood understory. Found in moist, well drained, shaded canyons or streamside benches with at least four-inch leaf layer. Occurs along the Trinity-Humboldt County line east to Forest Glen in Trinity County.
Big Bar hesperian snail *Vespericola pressleyi*	USFS-S	Moderate	Within range and known occurrences within Project activity area. HUC 10 units: Big French Creek, Lower Hayfork Creek, Lower South Fork Trinity River, Middle South Fork Trinity River, and Upper Hayfork Creek	Yes	Inhabits conifer and/or hardwood forests in permanently damp areas close to seeps, springs, and streams. Occurs in Shasta-Trinity National Forest.

NRIS and CNDDB were referenced for occurrences and range for species.

Federal
- FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range
- FPT = Proposed for federal listing as a threatened species
- BCC = Fish and Wildlife Service: Birds of Conservation Concern
- BGEPA = Bald and Golden Eagle Protection Act

State
- SSC = California Species of Special Concern
- CFP = California Fully Protected
- SE = State listed as endangered
- ST = State listed as threatened
- SC = State candidate for listing as endangered or threatened
- WL = State watch list
- CPF = California Protected Furbearing Mammal
- CDFW-FP = California Department of Fish and Wildlife Fully Protected

Bureau of Land Management
- BLM-S = BLM Sensitive

United States Forest Service
- USFS-S = United States Forest Service sensitive species

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3.4 Common Wildlife Species

Common wildlife species (non-special status species) within the Project activity area could be affected by the proposed Project activities. Focused restoration efforts are proposed to occur within or near aquatic, riparian, wetland, and upslope areas. These habitat types are inhabited by common wildlife species that could be impacted during implementation. For detailed information on restoration activities, see Chapter 3 of the EA. Table 3-2 lists some of the common wildlife species that occur within the Trinity River Basin.

Table 3-2. Common Wildlife Species within the Trinity River Basin[1]

Common Name	Scientific Name
Reptiles/Amphibians	
Pacific chorus frog	*Pseudacris regilla*
Western toad	*Anaxyrus boreas*
Aquatic garter snake	*Thamnophis atratus*
Ensatina	*Ensatina eschscholtzii*
North American racer	*Coluber constrictor*
Common garter snake	*Thamnophis sirtalis*
Klamath black salamander	*Aneides klamathensis*
Northern rubber boa	*Charina bottae*
Western skink	*Plestiodon skiltonianus*
California king snake	*Lampropeltis californiae*
Ring-necked snake	*Diadophis punctatus*
Sharp-tailed snake	*Contia tenuis*
Coastal tailed frog	*Ascaphus truei*
Birds	
California scrub-jay	*Aphelocoma californica*
Great blue heron	*Ardea herodias*
Anna's hummingbird	*Calypte anna*
American dipper	*Cinclus mexicanus*
Pileated woodpecker	*Dryocopus pileatus*
Dark-eyed junco	*Junco hyemalis*
Common merganser	*Mergus merganser*
Osprey	*Pandion haliaetus*
Red-breasted sapsucker	*Sphyrapicus ruber*
American robin	*Turdus migratorius*
Mammals	
Golden-mantled ground squirrel	*Callospermophilus latreralis*
American Beaver	*Castor canadensis*
North American river otter	*Lontra canadensis*
American shrewmole	*Neurotichus gibbsii*
American mink	*Neogale vison*
Western gray squirrel	*Sciurus griseus*
Douglas' squirrel	*Tamiasciurus douglasii*

1. Other common species could be affected during project implementation; this is not an exhaustive list of all common species that occur within the Project activity area.

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4 Affected Environment

The Trinity River originates in the rugged Salmon-Trinity Mountains of Northern California in the northeast corner of Trinity County, California. The entire Trinity River watershed is approximately 2,861 square miles in size and is the largest Klamath River tributary. From Lewiston Dam, the Trinity River flows westward for 112 miles until it enters the Klamath River near the town of Weitchpec on the Yurok Reservation. The Trinity River passes through Trinity and Humboldt counties and the Hoopa Valley (Hoopa Tribe) and Yurok Indian Reservations. The Klamath River flows northwesterly for approximately 40 miles from its confluence with the Trinity River before entering the Pacific Ocean.

The Trinity River Watershed offers a variety of habitats that are important to numerous wildlife species. Whether or not wildlife habitat is suitable for any given species is based on factors including latitude, vegetation communities, topography, proximity to water features including wetlands, streams, lakes, oceans, anthropogenic influences, and natural disturbances, including wildfire and climate change. Wildlife habitat in the Project activity area is characterized in this chapter and summarized in Table 4-3.

4.1 Land Cover Types

The National Land Cover Database provides land use data for environmental modelling applications and is used in the technical report to describe baseline landscape conditions throughout the Project activity area. The baseline conditions provide general habitat information in a quantifiable way to analyze potential impacts within the Project activity area. The fifteen land cover classes found within the Project activity area are described in Table 4-1.

In general, forests make up most of the project's landscape at approximately 56%. Scrub and shrub cover types are next common at approximately 25% of the Project activity area. Pastures, grassland and herbaceous cover types follow at approximately 12%. Urban areas account for approximately 5% of the Project activity area. Open, natural land features including barren land, perennial snow and ice, and open water make up approximately 2% of the Project activity area.

Wetlands including emergent herbaceous and woody wetlands cover types make up the smallest amount of cover at approximately 0.4% and the open water land cover type accounts for 0.7%. Collectively, wetlands and open water account for 1.1% and approximately 18,303 acres within the Project activity area. This area typically overlaps with areas mapped as "Riparian Reserves" and "Key Watersheds" and is where many restoration activities are anticipated to be proposed by implementors.

Riparian Reserves, Key Watersheds, NSO modeled habitat, historic wildfire impacts, and habitat connectivity and fragmentation are described in the following sections to further quantify suitable habitat based on national land cover types described in this section.

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Table 4-1. National Land Cover Types within the Project Activity Area

National Land Cover Types	Classification Description	Percentage of the Project Activity Area	Acres within the Project Activity Area
Evergreen Forest	Areas dominated by trees generally greater than 16.5 feet (5 meters) tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.	55.9%	895,805
Shrub/Scrub	Areas dominated by shrubs; less than 16.5 feet (5 meters) tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.	24.1%	385,472
Grassland/Herbaceous	Areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling but can be utilized for grazing.	11.7%	186,657
Developed, Open Space	Areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.	4%	64,856
Mixed Forest	Areas dominated by trees generally greater than 16.5 feet (5 meters) tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.	1.6%	25,965
Open Water	Areas of open water, generally with less than 25% cover of vegetation or soil.	0.7%	11,977
Barren Land	Areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.	0.7%	10,516
Deciduous Forest	Areas dominated by trees generally greater than 16.5 feet (5 meters) tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.	0.3%	4,879
Developed, Low Intensity	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.	0.3%	4,832
Emergent Herbaceous Wetland	Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	0.3%	4,075

National Land Cover Types	Classification Description	Percentage of the Project Activity Area	Acres within the Project Activity Area
Woody Wetlands	Areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	0.1%	2,251
Developed, Medium Intensity	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.	0.1%	1,798
Perennial Snow/Ice	Areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.	0.1%	1,633
Developed, High Intensity	Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.	0%	779
Hay/Pasture	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.	0%	31
Total:		**~100%**	**1,601,525**

4.2 Riparian Reserves and Key Watersheds

Under the Aquatic Conservation Strategy (ACS), which was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on all public lands, Riparian Reserves, otherwise known as Riparian Management Areas, are portions of watersheds where riparian-dependent resources receive primary emphasis and where special standards and guidelines apply. Based on the Project's objectives, Riparian Reserves are an integral part of project planning to implement best practices during restoration activities and to increase or restore function for native wildlife species by focusing on ecological processes and conditions within and contributing to the physical and ecological health, function, and resiliency of these areas.

Riparian Reserves occur at the margins of standing and flowing water, intermittent stream channels, lakes, ponds, springs, and wetlands and the location of Riparian Reserves for the Trinity River Watershed has been estimated based on proximity to water. These areas provide important fish and wildlife habitat functions and estimated Riparian Reserves support the Project by quantifying areas where restoration and enhancement activities are anticipated (and prioritized) to take place. There are 196,983 total acres of Riparian Reserves throughout the Project activity area. For a detailed explanation of Riparian Reserves, see Appendix C of the EA.

Key Watersheds, as described by the ACS, are watersheds that provide refugia and high-quality habitat crucial to at-risk fish species and populations. Key watersheds provide both high quality habitat and degraded habitat. The intent is that if a comprehensive restoration program is implemented, the lower quality habitat areas could become restored to high quality habitat. The Project would enhance habitat in Key Watersheds with a particular

focus on native anadromous fish species. The Key Watersheds that are within the Project Activity Area are the North Fork Trinity River, South Fork Trinity River, Canyon Creek, and New River (Figure 2-1).

4.3 Northern Spotted Owl Critical Habitat

Within the Project there are 458,970 acres of northern spotted owl designated critical habitat which is modeled and updated periodically by the USFWS (Figure 4-1). Critical habitat is defined under section 3(5)(A) of the ESA as specific areas within the geographical area occupied by the species at the time it is listed in accordance with the provisions of Section 4 of the ESA, on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protections; and as specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of Section 4 of the ESA, upon a determination by the Secretary that such areas are essential for the conservation of the species. Under Section 7(a)(2), the ESA requires Federal agencies to ensure that actions they authorize, fund, or carry out are not likely to destroy or adversely modify that habitat (16 U.S.C.1536(a)(2)). NSO critical habitat within the Project activity area encompasses documented NSO Protected Activity Centers, nest sites, and observations of individuals as well as other physical and biological features necessary for the continued existence of the species. See the environmental consequences sections for the analysis of effects to NSO (Section 5.1).

Physical and biological features describe habitat that support NSO which are essential to their continued existence. Physical features that support NSO include old-growth forests typically in the late seral phase with an open understory in which NSO seeks cover and can maneuver and fly beneath the canopy to forage. High canopy layers and snags within late seral forests provide cover and nesting sites for this species, protecting it from inclement weather and predators such as great horned owls. Some biological features for NSO include the presence of small mammals for their diet, large territories for nesting, hunting and reproduction, and predation and competition. For more information on NSO habitat and their behavioral ecology, see Section 5.1.

NSO habitat is closely tied to evergreen forest land cover type as described in Section 4.1. Within the Project Activity Area, evergreen forests make up the greatest land cover type with a total of 895,805 acres. Evergreen forests (taiga/boreal forests) is a biome characterized by coniferous forests consisting of pines, spruces, and firs found in the northern circumpolar forested regions. These regions are also characterized by long winters and moderate to high annual precipitation. Other species that are dependent on evergreen forests and similar habitats to NSO are fishers, American goshawks, Pacific martens, and bald eagles as well as other generalist species that use a multitude of habitat types including species like the gray wolf and North American wolverine. Critical habitat is determined by the USFWS by evaluating occupied areas with the consideration of physical and biological features the species requires for life processes and successful reproduction. There can be unoccupied areas that are designated as critical habitat but only under certain circumstances including where the amount of occupied areas would not be enough to ensure the conservation of the species. It also must be determined that there is reasonable certainty that the area will contribute to the conservation of the species and the areas must contain habitat features that are essential to the conservation of the species (USFWS 2024). NSO designated critical habitat and evergreen forest land cover types provide the greatest potential for NSO occupancy along with other species reliant of this habitat type within the Project activity area (USFWS 2024).

4.4 Historic Wildfire Impacts

Fire serves as an ecosystem process influencing vegetation patterns, wildlife distribution and nutrient cycling. Historically, Sierran mixed conifer and ponderosa pine forests burned at low to moderate intensity many times per century, often burning for months (Skinner and Chang 1996). It is estimated that before 1800, 4.4 million acres burned annually in California (Stephens et al. 2007). After the establishment of the USFS in 1905, fire exclusion policies, logging, livestock grazing and suppression of Native American fire regimes, the structure and function of many forests were altered. Fire suppression has led to higher tree densities, stand homogeneity and greater fuel loads, making forests more susceptible to high severity wildfires (Vaillant and Stephens 2009). Fire severity is typically defined by the loss of organic matter above and below ground. In high severity fire areas, root wads can burn creating unstable soils and heavy white ash deposition, indicating loss of substantial levels of organic matter (Keeley 2009).

Prior to European settlement, forests were open, containing larger trees with timber stands more resilient to fire. These late seral-stage forests contained more old-growth stands with understory brush fuels controlled by fire which frequently burned lightly on the forest floor. Forests today are much denser with early seral-stage forest types that contain fewer fire-resistant species. Dense conifer forests act as continuous fuel loads from the forest floor to tree canopy, thereby increasing the potential for a canopy fire. Canopy fires in modern forests can become stand-replacing events that are extremely difficult to control, thereby impacting wildlife that occupy or use conifer forests as habitat.

In the last two centuries, climate change and land use for human activities have impacted wildfire regimes. Increasing ambient temperature has led to drier air, creating fire seasons that begin earlier and end later in the year. Furthermore, sustained population growth and anthropogenic influence has increased the wildland-urban interface, increasing impacts on people and wildlife affected by wildfire (Nur et al. 2022).

Within Trinity County and the surrounding areas, historical fires have impacted the landscape through large complex fires, and in recent years, smaller scale fires (Table 4-2). According to some studies, recent impacts from fires have the potential to adversely affect NSO when high severity burns impact NSO critical habitat at a large scale that further shrink remnant old growth forests (Ganey et al. 2017). To demonstrate the impact of wildfires on wildlife habitat within the Trinity River Basin, recent high severity fire impacts (occurring within the last two years) were analyzed in relation to designated NSO critical habitat within the Project activity area. A total of 503,919 acres of the Project activity area burned since 2020. Historical fires were mapped since 2008 representing a total of 530,760 acres burned within the Project activity area (Figure 4-1).

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Table 4-2.Wildfire Locations within the Project Activity Area and Total Burn Acreage

Wildfire Name	Total Acreage	Date	Cause	Impacted HUC 10 Subwatersheds
Deep Fire	4,198	August 2023	Unknown	• Stuart Fork
Monument Fire	223,124	July 2021	Lightning	• Canyon Creek • North Fork Trinity River • New River • Upper Hayfork River • Lower Hayfork River • Middle South Fork Trinity River • Big French Creek • Lower South Fork Trinity River
River Complex	199,359	July 2021	Lightning	• Swift Creek • Coffee Creek • Tangle Blue Creek • North Fork Trinity River • New River
McFarland Fire	122,653	July 2021	Lightning	• Middle South Fork Trinity River • Upper South Fork Trinity River • Upper Hayfork Creek • Lower Hayfork Creek
August Complex	1,032,648	August 2020	Lightning	• Upper Hayfork Creek • Middle South Fork Trinity River • Upper South Fork Trinity River
Red Salmon Complex	144,698	July 2020	Lightning	• New River
Carr Fire	229,651	July 2018	Vehicle	• Swift Creek • Weaver Creek

Data obtained from Cal Fire Incidents web page: https://www.fire.ca.gov/incidents

Burn acres include acres burned within and outside of the project activity area.

NSO designated critical habitat is closely associated with the evergreen forest land cover type. Other species such as fishers, American goshawks, Pacific martens, and bald eagles also use evergreen forest habitat, as previously discussed. Therefore, it can be surmised that these species and others have also been similarly affected by recent wildfires in the Trinity River Basin.

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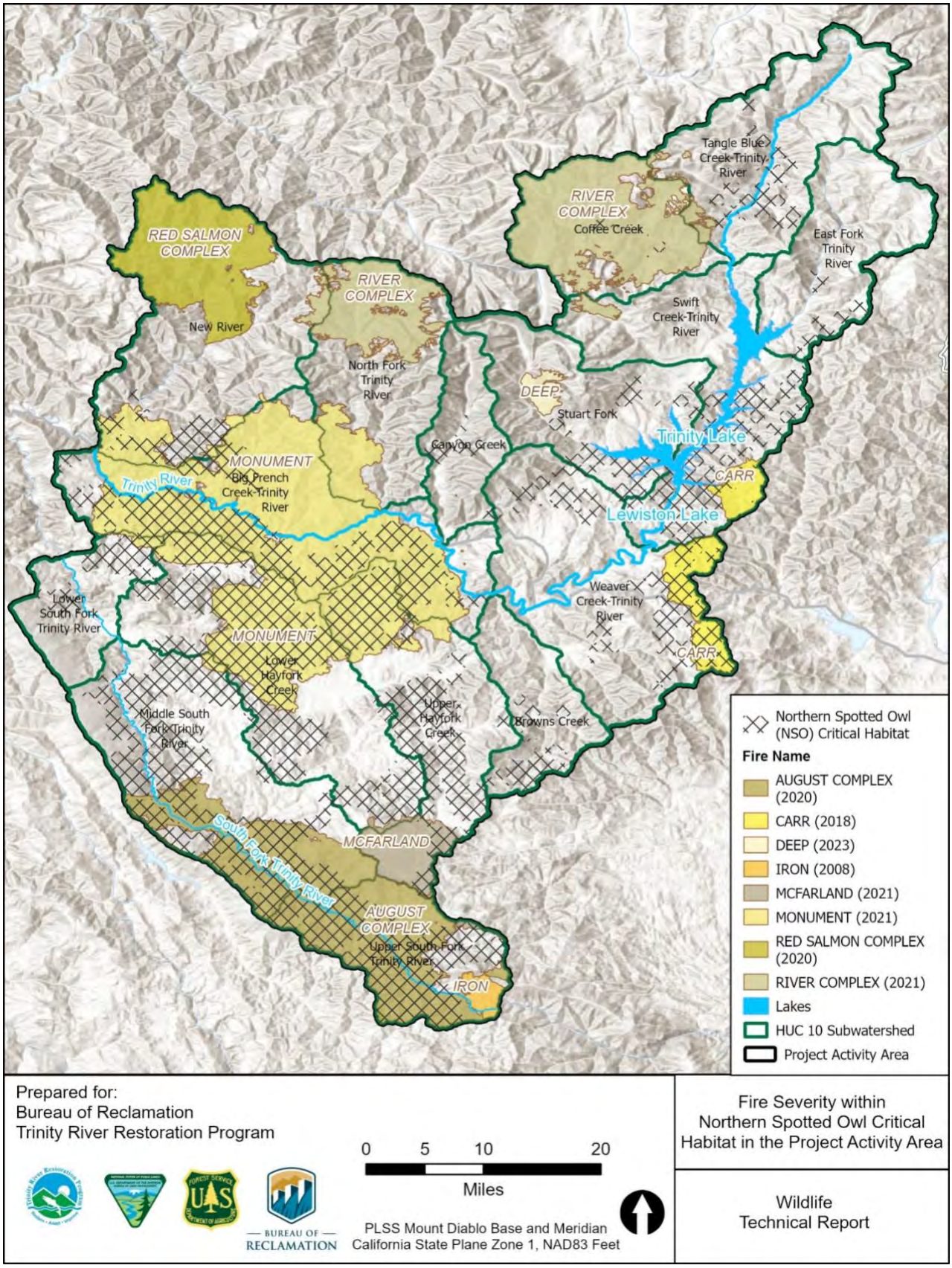

Figure 4-1. Northern Spotted Owl Critical Habitat Overlayed with Historical Wildfires

4.5 Habitat Connectivity and Fragmentation

Terrestrial habitat connectivity has been mapped throughout California and is measured by how well habitats on the landscape are connected to allow for the flow of ecological processes and terrestrial wildlife movement. CDFW has compiled regional linkage models that had been developed to date in California and brought them together with the California Essential Habitat Connectivity project in 2010 to create a current Statewide Terrestrial Connectivity Map (Figure 4-2). The map identifies connectivity attributes in each area across multiple studies (CDFW 2024c).

Habitat linkages can be impeded by anthropogenic barriers. Linear infrastructure such as roads, railways, canals and fences, can act as barriers to wildlife movement through otherwise natural habitats. Barriers contribute to genetic isolation by preventing gene flow between neighboring populations. This can cause long term impacts on populations and can lead to local extinctions. Because of road barriers, roadkill hotspots occur where wildlife frequently attempt to cross roads. In 2022, CDFW identified priority wildlife movement barriers and nearly all known barriers are associated with the State Highway System (CDFW 2022).

The Project includes two barriers identified by CDFW (CDFW 2024c). These barriers are listed as “Barriers” and not as “Priority Barriers” or “Top Priority Barriers.” One is located along California State Route 3 starting north of Coffee Creek and runs south to north of Weaverville. The other is located on California State Route 299 near Phillips Gulch and runs through State Route 3 and Weaverville west on State Route 299 to Oregon Gulch. Barrier priorities for remediation are defined as follows (CDFW 2022):

- Wildlife barriers: locations where infrastructure or incompatible land uses impede wildlife movement or population connectivity between habitat areas;
- Priority wildlife barriers: the ten highest priority barriers for remediation in each of the six terrestrial CDFW Regions; and
- Statewide top priorities: the two barrier segments with the highest priority for remediation in each of the 6 terrestrial CDFW regions (CDFW 2024a).

According to Areas of Conservation Emphasis Terrestrial Connectivity data (CDFW 2024a), the Project activity area contains essential and irreplaceable corridors (rank 5), as well as conservation planning linkages (rank 4), connections with implementation flexibility (rank 3), large natural habitat areas (rank 2), and limited connectivity opportunities (rank 1) (Figure 4-2). In rank 1 areas, the connectivity opportunities are minimal, as land use may limit options for providing connectivity (e.g., agriculture, urban) or no connectivity importance has been identified in models.

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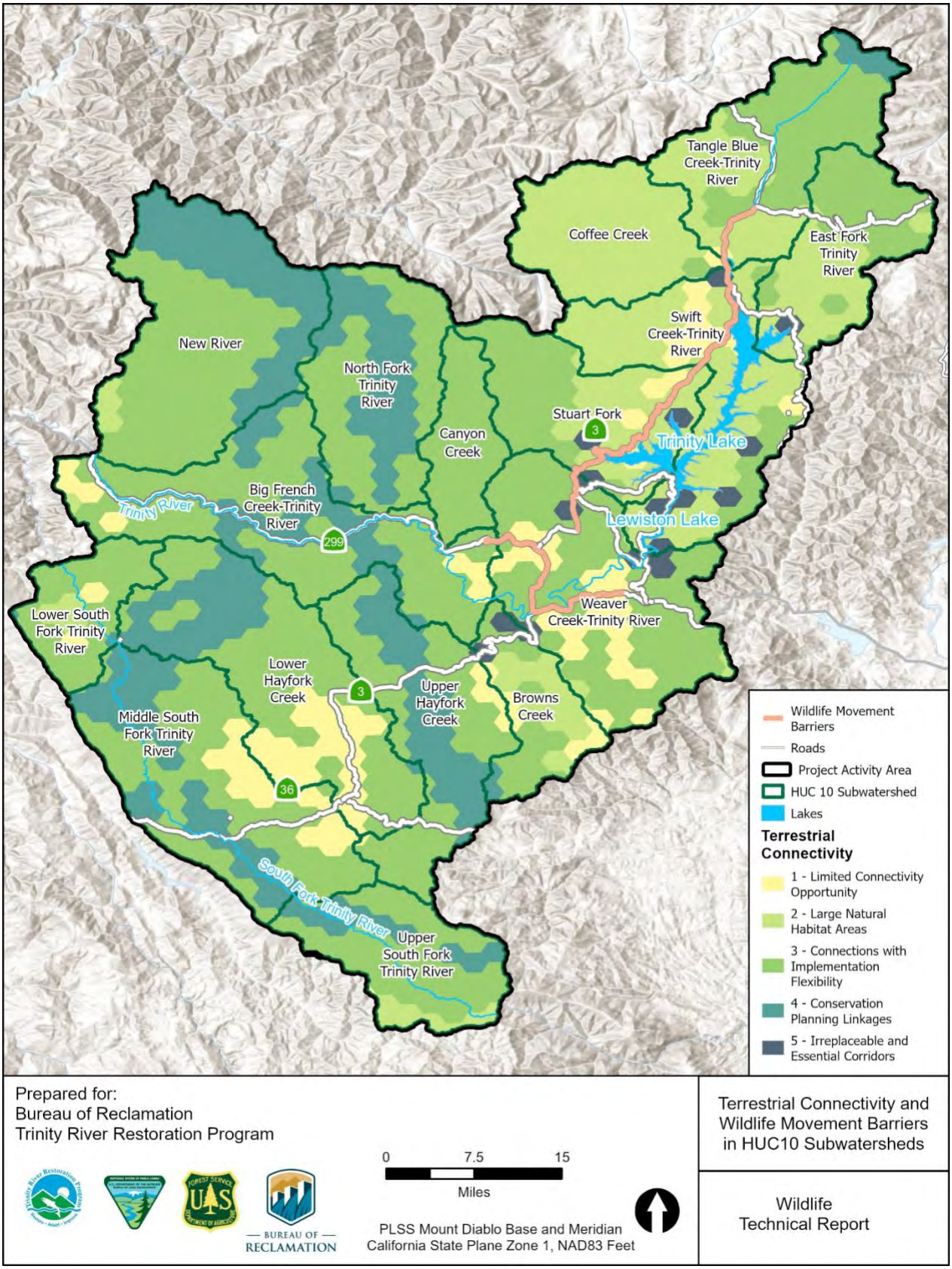

Figure 4-2. Terrestrial Connectivity and Wildlife Barriers within the Project Activity Area

4.6 Summary Table

Table 4-3. HUC 10 Watershed Habitat Characterization

HUC 10	National Land Cover Types	National Land Cover Types (acres) [1]	Riparian Reserves (acres)	Key Watershed	Habitat Fragmentation (Terrestrial Barriers) Present	NSO Critical Habitat (acres)	Documented Occurrences of Special Status Species[2]
Big French Creek-Trinity River	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	223 551 30 501 130 5,077 55 91,949 0 3,482 1,800 341 0 49,127 60	19,010	No	Yes Barrier present from State Highway 299 that travels east/west in the northeastern section of the watershed.	56,654	American goshawk Northern spotted owl Bald eagle Ringtail North American Wolverine Fisher Northwestern pond turtle Southern torrent salamander Hooded lancetooth Trinity bristlesnail Foothill yellow-legged frog Big Bar Hesperian snail
Browns Creek	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	0 474 0 46 5 1,412 0 32,087 0 1,420 1,495 0 0 10,128 28	2,441	No	No	9,063	American goshawk Northern spotted owl Fisher Foothill yellow-legged frog

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HUC 10	National Land Cover Types	National Land Cover Types (acres) [1]	Riparian Reserves (acres)	Key Watershed	Habitat Fragmentation (Terrestrial Barriers) Present	NSO Critical Habitat (acres)	Documented Occurrences of Special Status Species[2]
Canyon Creek	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	1,058 131 3 27.9 16 919 8 21,463 0 7,032 907 56 606 8,789 20	4,905	Yes	No	3,909	Pacific/American marten Fringed myotis Pallid bat Northwestern pond turtle California mountain kingsnake Cascades frog Hooded lancetooth Foothill yellow-legged frog
Coffee Creek	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	320 121 55 276 111 2,070 142 54,572 0 2,719 867 82 4 12,468 1,002	6,821	No	Yes Barrier present from State Highway 3 traveling north/south passing through a small portion of the eastern section of the watershed.	1,336	American goshawk Northern spotted owl Pacific/American marten California mountain kingsnake Cascades frog Foothill yellow-legged frog Western bumble bee

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HUC 10	National Land Cover Types	National Land Cover Types (acres) [1]	Riparian Reserves (acres)	Key Watershed	Habitat Fragmentation (Terrestrial Barriers) Present	NSO Critical Habitat (acres)	Documented Occurrences of Special Status Species[2]
East Fork Trinity River	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	590 9 2 208 32 895 676 53,963 0 6,126 598 586 0 10,515 102	7,325	No	No	4,153	American goshawk Bald eagle Northern spotted owl Pacific/American marten Fisher Cascades frog Foothill yellow-legged frog Western bumble bee
Lower Hayfork Creek	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	4 224 63 522 196 8,771 3 78,762 24 6,550 2,244 46 0 44,715 36	22,370	No	No	87,287	American goshawk Bald eagle Golden eagle Northern spotted owl Burrowing owl Townsend's big-eared bat North American wolverine Fisher Ringtail Northwestern pond turtle Hooded lancetooth Trinity bristlesnail Foothill yellow-legged frog Big Bar Hesperian snail

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HUC 10	National Land Cover Types	National Land Cover Types (acres) [1]	Riparian Reserves (acres)	Key Watershed	Habitat Fragmentation (Terrestrial Barriers) Present	NSO Critical Habitat (acres)	Documented Occurrences of Special Status Species[2]
Lower South Fork Trinity River	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	286 269 22 158 90 2,306 19 17,385 0 5,108 367 149 0 18,071 0	6,545	Yes	No	11,096	American goshawk Bald eagle Northern spotted owl Fringed myotis Fisher Northwestern pond turtle California Mountain kingsnake Southern torrent salamander Hooded lancetooth Foothill yellow-legged frog Big Bar Hesperian snail
Middle South Fork Trinity River	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	26 532 26 491 114 10,555 65 76,288 0 31,129 1,833 178 0 24,513 1	17,521	Yes	No	79,921	American goshawk Bald eagle Northern spotted owl Fringed myotis Townsend's big-eared bat Pacific/American marten Fisher Ringtail Northwestern pond turtle California mountain kingsnake Southern torrent salamander Hooded lancetooth Western bumble bee Trinity bristlesnail Foothill yellow-legged frog Bif Bar Hesperian snail

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HUC 10	National Land Cover Types	National Land Cover Types (acres) [1]	Riparian Reserves (acres)	Key Watershed	Habitat Fragmentation (Terrestrial Barriers) Present	NSO Critical Habitat (acres)	Documented Occurrences of Special Status Species[2]
New River	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	64 33 22 172 82 3,245 1 50,095 0 49,053 248 4 0 46,401 0	18,487	Yes	No	14,180	American goshawk Northern spotted owl Pallid bat North American wolverine Fisher Hooded lancetooth Western bumble bee Foothill yellow-legged frog
North Fork Trinity River	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	786 224 270 146 138 1,307 6 54,965 0 615 1,337 77 376 37,211 13	12,483	Yes	No	19	American goshawk Northern spotted owl Bald eagle Fringed myotis Fisher California mountain kingsnake Cascades frog Hooded lancetooth Western bumble bee Foothill yellow-legged frog

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HUC 10	National Land Cover Types	National Land Cover Types (acres) [1]	Riparian Reserves (acres)	Key Watershed	Habitat Fragmentation (Terrestrial Barriers) Present	NSO Critical Habitat (acres)	Documented Occurrences of Special Status Species[2]
Stuart Fork	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	2,705 633 58 135 71 4,112 949 54,624 0 2,703 2,108 3,128 586 16,436 7	17,088	No	Yes Barrier present from State Highway 3 traveling north/south along Trinity Lake and bisecting the watershed.	12,581	American goshawk Bald eagle Northern spotted owl Pacific/American marten Fisher Ringtail Northwestern pond turtle California mountain kingsnake Cascades frog Western bumble bee Foothill yellow-legged frog
Swift Creek-Trinity River	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	2,457 364 56 593 193 6,547 2,093 70,618 1 7,515 3,665 6,970 59 19,590 310	25,429	No	Yes Barrier present from State Highway 3 traveling north/south along Trinity Lake and bisecting the watershed.	30,750	American Goshawk Bald eagle Northern spotted owl Ringtail Townsend's big-eared bat Pacific/American marten Northwestern pond turtle Cascades frog Western bumble bee Foothill yellow-legged frog

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HUC 10	National Land Cover Types	National Land Cover Types (acres) [1]	Riparian Reserves (acres)	Key Watershed	Habitat Fragmentation (Terrestrial Barriers) Present	NSO Critical Habitat (acres)	Documented Occurrences of Special Status Species[2]
Tangle Blue Creek-Trinity River	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	1,963 33 64 417 166 415 16 81,894 4 1,237 590 152 0 13,958 441	8,075	No	Yes Barrier present from State Highway 3 traveling north/south bisecting southern extent of the watershed.	10,690	American goshawk Northern spotted owl Bald eagle Fisher Northwestern pond turtle Cascades frog Western bumble bee Foothill yellow-legged frog
Upper Hayfork Creek	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	0 229 3 215 33 6,658 0 55,909 3 8,001 1,533 2 0 33,101 11	15,761	No	No	53,245	American goshawk Northern spotted owl Bald eagle Townsend's big-eared bat Pallid bat Fisher Ringtail Northwestern pond turtle Hooded lancetooth Trinity bristlesnail Foothill yellow-legged frog Big Bar Hesperian snail

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HUC 10	National Land Cover Types	National Land Cover Types (acres) [1]	Riparian Reserves (acres)	Key Watershed	Habitat Fragmentation (Terrestrial Barriers) Present	NSO Critical Habitat (acres)	Documented Occurrences of Special Status Species[2]
Upper South Fork Trinity River	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	4 25 3 93 33 4,585 2 20,187 0 43,662 135 6 0 4,862 3	7,632	Yes	No	52,201	American goshawk Northern spotted owl Bald eagle Pallid bat Fisher Northwestern pond turtle Foothill yellow-legged frog
Weaver Creek-Trinity River	Barren Land Deciduous Forest Developed, High Intensity Developed, Low Intensity Developed, Medium Intensity Developed, Open Space Emergent Herbaceous Wetlands Evergreen Forest Hay/Pasture Herbaceous Mixed Forest Open Water Perennial Snow/Ice Shrub/Scrub Woody Wetlands	30 1,029 101 831 388 5,984 42 81,043 0 10,307 6,237 199 1.4 35,590 218	5,089	No	Yes Two barriers present from State Highway 3 and 299 bisecting both eastern and western sections and well as southern and northern sections of the watershed.	31,888	American goshawk Golden eagle Bald eagle Northern spotted owl Pallid bat Fisher Ringtail Townsend's big-eared bat Pacific/American marten Northwestern pond turtle Western bumble bee Foothill yellow-legged frog

1. Based on GIS data from the United States Geological Survey for National Land Cover Types
2. CNDDB and NRIS were referenced for species occurrences as well as open-source platforms including Audubon, eBird, iNaturalist, for range for species. Only "research grade" occurrences are included from iNaturalist

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5 Environmental Consequences

During project implementation and post implementation, proposed activities could have effects to terrestrial and aquatic wildlife species. Project GPMs, CMs, MMs, and design guidelines would be implemented to reduce effects to species and their habitat. This section discusses both general and species-specific short- and long-term effects that could occur as a result of Project activities and CMs and MMs that are recommended to avoid and minimize impacts to wildlife species during implementation. Proposed activities are grouped into three general categories and include instream habitat restoration; upslope habitat restoration; and road maintenance, rehabilitation, and decommissioning activities. Most activities would require the use of heavy equipment and hand tools to complete site-specific projects which would cause ground and noise disturbance, impaired air and water quality, and temporary loss of native vegetation. The table below summarizes the potential construction components or construction impacts by restoration activity category that could affect individual species and their habitat. Effects of particular concern are described in more detail below in Table 5-1.

Construction-related effects to wildlife species could potentially occur during project implementation. These effects are more likely to affect species with relatively small home ranges that are reliant and well adapted to freshwater habitats of the Trinity River and its tributaries including species such as the northwestern pond turtle, foothill yellow-legged frog, and Big Bar hesperian snail. Construction-related effects to wildlife from Project activities could include loss of nesting habitat, potential take of ESA-listed species, harm (injury or death) of individuals, interference with habitat use, interruption to foraging activities, noise disturbance, and reduced air and water quality.

Short-term effects to wildlife as a result of airborne noise could result from activities such as use of heavy construction equipment, pile driving during bridge replacement, large wood placement via helicopters, bedrock fracturing, and instream structure removal. Airborne noise effects would likely affect nesting birds if migratory birds were using habitat in or in the vicinity of the site-specific project areas for nesting and rearing during implementation. Preconstruction surveys would be performed to identify specific wildlife activity areas and applicable seasonal restrictions (SRs) would be applied or noise-generating activities would be deferred until after the nesting season is complete or until a qualified biologist has determined the young have fledged their nest. Noise effects could have adverse effects to wildlife; however, these effects would be temporary and localized and minimized with the implementation of CMs (see Table 4-5 in Appendix B of the EA).

Table 5-1. Construction-related effects on special-status wildlife species per activity category.

Restoration Activity Category	Potential Construction-Related Effects
1. Restoration and Enhancement of In-Channel Habitat	Construction impacts to riparian vegetation, in-channel heavy equipment use, turbidity, incidental chemical contamination, bedrock fracturing hydroacoustic noise, airborne noise, dewatering, nest abandonment, frog and turtle relocation
2. Floodplain Restoration	Construction impacts to riparian vegetation, in-channel heavy equipment use, turbidity, incidental chemical contamination, dewatering, airborne noise, nest abandonment, frog and turtle relocation

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Restoration Activity Category	Potential Construction-Related Effects
3. Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings, and Other In-water Structures	Construction impacts to riparian vegetation, in-channel heavy equipment use, sedimentation, incidental chemical contamination, dewatering, hydroacoustic noise from blasting, airborne noise, nest abandonment, frog and turtle relocation
4. Water Conservation Projects	Turbidity, incidental chemical contamination, potential for dewatering/frog and turtle relocation associated with fish screen installation, airborne noise
5. Salmon Carcass Placement	No adverse short-term effects anticipated
6. Remote Site Incubators	Minor streambed disturbance during install of system and demobilization
7. Bioengineered Bank Stabilization	Construction impacts to riparian vegetation, incidental chemical contamination, sedimentation, airborne noise, nest abandonment and frog and turtle relocation
8. Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement Including Removal of Nonnative Invasive Species and Revegetation with Native Plants	Construction impacts to riparian vegetation, incidental chemical contamination, sedimentation, airborne noise, watershed restoration-related tree removal
9. Road Maintenance	Incidental chemical contamination, sedimentation, airborne noise,
10. Road Rehabilitation	Construction impacts to riparian vegetation, in-channel heavy equipment use, sedimentation, incidental chemical contamination, dewatering, airborne noise, nest abandonment, frog and turtle relocation, hydroacoustic noise from pile driving
11. Road Decommissioning	Incidental chemical contamination, sedimentation, airborne noise

Native and nonnative vegetation removal would occur during site-specific project implementation inducing temporal effects associated with construction activities. Heavy equipment would produce noise that could disturb or deter wildlife species from occupying or using project work areas and surrounding habitat. Heavy equipment would also produce exhaust and dust, affecting air quality and potentially affecting wildlife. Sedimentation from earth-moving activities and project activities within streams and floodplains could increase turbidity within project waterways temporarily and potentially long-term, in turn affecting aquatic wildlife species. To reduce effects to protected species, GPMs, design guidelines, CMs, and MMs would be incorporated into site-specific activities including SRs, preconstruction surveys, species salvage and translocation, and biological monitoring. For a full list of these measures see Appendix B of the EA. Avoidance and minimization measures would ensure that implementation would not lead to long-term adverse effects on wildlife species.

Habitat enhancement and revegetation with native species would take place in aquatic, meadows, wetland, riparian, and upslope areas within the watershed where the vegetative community has been disturbed by past land practices, wildfire, introduction of nonnative species, or construction activities and where habitat functions are impaired. Design guidelines would be implemented to avoid removal of special status plant species by leaving plants in situ, when possible, during project activities reducing the impacts to wildlife species dependent on the presence of native vegetation. ACS objectives would also be implemented to maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank

erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability (Appendix C of the EA).

Long-term benefits to wildlife species and associated habitat as a result of proposed activities may include improved foraging opportunities (with expected increases to fish populations), improved vegetative community with a higher percentage of native species, and improvements to upslope habitats (wetlands, meadows, floodplain areas, etc.). Long-term beneficial effects to wildlife species as a result of the Project also includes improving nutrient cycling within Project waterways, which would increase instream biodiversity. Habitat use by wildlife species is anticipated to return to or exceed pre-project levels post implementation, with potential reduction of nonnative wildlife species. Restoration of rivers and streams creates complex stream morphology and can lead to increased habitat availability for wildlife. Lowering floodplains, restoring and creating wetlands and riparian areas, and restoring stream geomorphic processes can help to improve water temperature and quality by creating conditions that allow for water to be retained in the watershed for longer periods of time. This provides refugia for wildlife species during temperature extremes and wildfire and increases habitat for rearing and spawning amphibian species. Long-term beneficial effects to water quality and wildlife habitat are expected to occur. Long-term negative effects are not anticipated to occur.

ACS objectives would be incorporated into site-specific project designs by ensuring that riparian habitat would be maintained and restored to support well-distributed populations of native plant, invertebrate, and vertebrate species. Coordination with upstream operators to control dam releases or instream flow levels to provide water during plant establishment would occur to ensure revegetation success. Site-specific project size, timing, and duration would ensure reduced effects to wildlife species reoccupying habitat following project implementation with the goal of improving habitat long-term. For a full list of project activities including habitat enhancements, see the Activity Cards in Appendix H of the EA.

The following section analyzes effects to individual special-status wildlife species that may occur within the Project area. Project CMs and MMs are listed for each species and an effect determination is made.

5.1 Northern spotted owl (*Strix occidentalis caurina*)

5.1.1 Species Account

NSO occupy coastal ranges and intervening forested lands from Washington to northern California. In California it ranges from south of Marin County in the coast ranges and across the Klamath Mountains where it meets the range of the California spotted owl (*Strix occidentalis occidentalis*) on the eastern edge of the Cascade Range near the Pit River (USFWS 2025). NSO rely on intact stands of old-growth forests and the particular structures and characteristics within them. This includes high canopy closure, large accumulations of woody debris, snags, and broken topped trees for roosting and nesting cavities (Center for Biological Diversity 2024). Multilayered forests are also strongly associated with this species and provide perching sites, various microclimates, and higher prey diversity. Typical vegetation communities found within NSO habitat include Douglas fir/hardwood, mixed conifer, mixed evergreen forests, and Oregon white oak forests. The species can range in elevation from 70 to 6,600 feet (20-2,010 m) with the majority of individuals and populations occurring within the lower portions of the elevation range (Meyer 2007).

The NSO is a relatively long-lived species and has a reproductive lifespan estimated at 26 years (Center for Biological Diversity 2024); however, they do not breed every year. When they do breed, their breeding cycle begins in early spring with nesting, in summer nestlings fledge and dispersal happens in the fall. A spotted owl clutch size is typically 2 eggs but can vary between 1 and 4 and incubation period lasts approximately 30 days. NSO are also monogamous breeders that will rarely renest after a failed breeding attempt (Meyer 2007). Within California dusky-footed woodrats (*Neotoma fuscipes*) are the main component of their diet (CDFW 2024b) and tend to occur in early successional shrublands. Flying squirrels (*Glaucomys sabrinus*) also make up the NSO diet and are typically found in older growth forests compared to younger stands. Accounts of home range sizes within the scientific literature vary greatly depending on location. The average home range size varies from 1,030 acres to 14,169 acres (Meyer 2007). The estimated mean annual home range of a northern spotted owl pair in the California Klamath Province (where the Shasta-Trinity National Forest is located) is represented by a 1.3-mile radius circle (3,397 acres) (USDI Fish and Wildlife Service 2011).

On June 26, 1990, NSO was first listed as a threatened species under the ESA due to concerns over habitat loss from logging operations in the Pacific Northwest. A petition was filed to increase protection for this species on August 15, 2012, and a five-year review ensued. In 2020, after a 12-month finding on a petition to reclassify NSO from threatened to endangered, the USFWS announced that the reclassification was warranted but precluded by higher priority actions (85 FR 81144). Today, the owl is listed as threatened under the ESA with designated critical habitat.

Within the Project activity area, there are documented occurrences within all HUC 10 units (CDFW 2024d and USFS 2024a). Due to the high probability that NSO nests and protected activity centers would occur in or near a project site, NSO SRs would be implemented and applicable NSO CMs described below would be followed when working within potential NSO habitat.

5.1.2 Effects Analysis

Potential pathways for effects to NSO as a result of Project activities could include the following:

- Death or injury of owls due to felling an active nest tree (incidental take).
- Loss of active nest site due to disturbance from construction noise and human presence during breeding season (adverse effect to reproductive success).
- Disturbance at post-fledging area due to activities associated with construction and human presence (adverse effects to fledgling survival).
- Loss of habitat due to reduction of high canopy cover stands with open understories, large trees, snag habitat, or down log habitat (adverse effects to prey, nesting, roosting and foraging habitat).

5.1.2.1 Avoidance and Minimization Measures

The potential for adverse effects would be limited due to the following CMs (USFWS 2025):

- NSO-1: The local USFS, County, or other biologists would provide northern spotted owl survey, activity center, and habitat suitability data for the project area.
- NSO-2: If surveys are planned, they would be conducted according to the 2012 Northern Spotted Owl Survey Protocol and 2019 guidelines revision following seasonal restrictions for “Surveyed Landscape.” If surveys are not conducted, seasonal restrictions would apply if a site-specific project is within 0.25 miles of nesting/roosting or foraging habitat (as described below).

- NSO-3: In all suitable nesting, roosting, and foraging habitat removal or damage of known and potential nest trees and associated screen trees would be avoided, unless they must be removed to implement the proposed project or are a confirmed safety hazard according to guidance documents from the implementing agency or another agency with jurisdiction in the project area. Removal of large (20 inches DBH or larger) snags would be avoided, unless they must be removed to implement the proposed project or are a confirmed safety hazard.
- NSO-4: Project activities would not result in net loss of habitat or downgrade or remove the function of suitable nesting, roosting, and foraging habitat to the degree that the habitat does not function in the capacity that existed prior to treatment.
- NSO-5: Projects would avoid downgrading or removing suitable foraging habitat function in northern spotted owl core areas (a 0.5-mile radius or 500-acre area around an Activity Center) and in suitable foraging habitat in northern spotted owl home ranges (a 1.3-mile radius, including core, or a 3,398-acre area around an Activity Center).
- NSO-6: Work restrictions would apply in previously surveyed landscapes if a known (active) nest site is present within 0.25 miles (or 1,320 ft).
    - Activities that result in loud and continuous noise (for >=2 hours per day) above ambient levels would not be conducted between February 1 and July 9 within 0.25 miles of a nest site.
    - Activities that modify suitable (nesting/roosting or foraging) habitat or generate smoke would not be conducted between February 1 and September 15 within 0.25 miles of a nest site.
- NSO-7: Work restrictions in non-surveyed landscapes would apply when there is presence of suitable nesting, roosting, or foraging habitat for NSO within 0.25 miles (or 1,320 ft).
    - Activities that result in loud and continuous (for >=2 hours per day) noise above ambient levels would not be conducted between February 1 and July 9 within 0.25 miles of unsurveyed suitable (nesting/roosting/foraging) habitat.
    - Activities that modify suitable (nesting/roosting or foraging) habitat or generate smoke would not be conducted between February 1 and September 15 within 0.25 miles of unsurveyed suitable (nesting/roosting/foraging) habitat.
- NSO-8: When working in designated critical habitat, adhere to all measures described in NSO-5, NSO-6, and NSO-7 for reducing impacts in suitable nesting, roosting, and foraging habitat.

For full details on all avoidance and minimization measures see Appendix B of the EA.

5.1.2.2 Effects Summary

Project activities may cause intermittent disturbance to spotted owls within or near activity areas, and individual owls may move away from work areas temporarily during project implementation due to the presence of humans and equipment. Although some owls may be affected by noise disturbance, the potential to cause mortality, harm, or significant disruption to normal behaviors of owls, especially during their breeding season, is low. The Federal ESA requires protection of this species and other federally listed species by prohibiting harm, harassment, or injury to NSO individuals, and is defined under the ESA as “take.” To this end, SRs would be imposed to avoid potential disturbance or harm during the NSO breeding season (as described in the Section 5.1.2.1 above and in the CMs in Appendix B of the EA). These would apply to activities manipulating NSO habitat or producing loud and continuous noise or smoke that could potentially disturb spotted owls. If NSO surveys are conducted, NSO SRs may be lifted where there is no nesting activity, as described in Appendix B of the EA.

NSO critical habitat is anticipated to be minimally affected by Project activities. Large tree removal is intended to be fairly minimal: some trees large trees or snags may need to be removed from restoration sites if the tree/snag poses a hazard risk during construction operations; some trees may need to be removed for site access; and some tree removal may be necessary in upslope areas for watershed habitat enhancement. Trees removed would be salvaged to support: loose wood placement in both aquatic and upslope habitats; structured log jams (SLJs); and low-tech process-based restoration (LTPBR) techniques. It should be noted that wooded areas with old growth characteristics, where present, would be preserved to the extent possible. Potential effects to NSO critical habitat would be considered during the site-specific analysis and CMs would be incorporated to minimize effects and ensure that effects stay within the limits described in the 2025 USFWS Statewide Restoration BiOp.

The proposed activities could have short-term construction effects related to noise disturbance or air quality that could potentially affect NSO, particularly individuals, moving through the forest while foraging, nesting or engaging in other activities. However, because there would be SRs on activities during the nesting season, tree removal would be limited, and suitable (nesting/roosting or foraging) habitat would not be removed or downgraded, effects would be minor. No injury or mortality is anticipated to occur and no more than 18 nesting individuals would be harmed from disturbance annually (USFWS 2025).

The implementation of the Project may affect and is likely to adversely affect NSO and its designated critical habitat. Site-specific analysis would be conducted for each restoration effort to ensure that effects are avoided and minimized to the extent possible.

5.2 American goshawk (*Accipiter atricapillus*)

5.2.1 Species Account

The American goshawk (formerly known as the northern goshawk) is a widely distributed predator inhabiting boreal and temperate forests throughout the northern hemisphere (Shuford and Garaldi 2008). In North America, it breeds throughout Alaska and Canada, and the mountains of the eastern and western U.S. (Squires and Kennedy 2006). American goshawks primarily occupy mid- and high-elevation ponderosa pine, mixed-species, and spruce-fir forests, often with little understory vegetation, on flat or moderately sloping terrain. Although they nest in a variety of habitat types, goshawks prefer even-aged mature forests with large trees and open understories. Nest sites tend to be in large trees associated with water and riparian corridors (Squires and Reynolds 1997, Squires and Kennedy 2006, Zeiner et al. 1990). Saunders (1982, in USDI Fish and Wildlife Service 1998) found mean diameter of nest trees on the Shasta-Trinity National Forest was 29 inches. Eggs are typically laid in mid-April to early May and incubation lasts about 30 days. Nestlings remain in the nest for 36-42 days, typically fledging between late June and late July (Squires and Reynolds 1997).

American goshawks forage in an array of habitats, preying primarily on birds and small mammals (Squires and Reynolds 1997; Reynolds et al. 1992). Foraging habitats typically contain abundant large snags and logs for prey habitat and plucking posts (Squires and Reynolds 1997). In the southern Cascades, goshawks prefer to forage in mature and older stands with canopy closure greater than 40 percent. However, early-successional patches and openings also provide foraging opportunities. Reynolds et al. (1992) determined that small and medium sized openings (less than four acres) likely enhance prey availability, whereas larger openings are less favorable for most goshawk prey species. Important prey for goshawks in California include squirrels (chipmunks, Douglas

squirrels (*Tamiasciurus douglasii*), golden-mantled ground squirrels (*Callospermophilus lateralis*), gray squirrels (*Sciurus carolinensis*), northern flying squirrels (*Glaucomys sabrinus*), Steller's jays (*Cyanocitta stelleri*), grouse (ruffed and blue) (*Bonasa umbellus, Dendragapus obscurus*), and northern flickers (*Colaptes auratus*). Squirrels occur in most goshawk diets due to their high abundance and broad distribution (USDI Fish and Wildlife Service 1998). Accounts of home range sizes in the scientific literature for this species vary widely depending on sex and habitat characteristics but are generally between 1,410 to 8,650 acres (Squires and Reynolds 1997).

Within the Project activity area, there are documented occurrences of American goshawk within all HUC 10 units except Canyon Creek (CDFW 2024d and USFS 2024a).

5.2.2 Effects Analysis

Potential pathways for effects to American goshawks as a result of Project activities include the following:

- Death or injury of goshawks due to felling an active nest tree;
- Loss of active nest site due to disturbance from construction noise and human activity during breeding season (negative effect to reproductive success);
- Disturbance at post-fledging area due to activities associated with construction activities and human presence (negative effects to fledgling survival); and
- Loss of habitat due to reduction of high canopy cover stands with open understories, large trees, snag habitat, or down log habitat (negative effects to prey, foraging and nesting habitat).

5.2.2.1 Avoidance and Minimization Measures

The Shasta-Trinity National Forest (STNF) Plan requires protection of known goshawk nest sites (Forest Plan pages 4-30 and 4-44). To this end, a SR would be imposed from February 1 through August 15 within 0.25 mile of any known goshawk nest sites in the project area to avoid potential disturbance during the goshawk breeding season (as described in the CMs below and in Appendix B of the EA). A SR has also been incorporated into the CMs to avoid disturbance to NSO during their breeding season. This would apply to activities manipulating NSO habitat or producing loud and continuous noise or smoke that could potentially disturb AGOS (American goshawks). As a result, where/when the NSO SRs are applied, disturbance to breeding American goshawks would be reduced as their breeding seasons overlap, and in many areas, their habitats overlap. If NSO surveys are conducted, NSO SRs may be lifted where there is no nesting activity, as described in Appendix B of the EA.

The potential for adverse effects would be limited due to the following CMs :

- Within NSO nesting, roosting, and foraging habitat, NSO CMs would be implemented when applicable and goshawk habitat largely overlaps with NSO suitable habitat, thus the CMs would also help reduce disturbances to American goshawk and retain goshawk habitat.
- AGBE-1: SR would be imposed from February 1 through August 15 within 0.25 mile of any known goshawk nest sites in the project area to all activities causing above-ambient loud and continuous noise (for >=2 hours per day) to avoid potential disturbance during the goshawk breeding season (USFS 1995).
    - For smoke producing activities within 0.25 mile of active nests, employ firing techniques that provide good smoke dispersion and ventilation aloft and/or away from active nests.
    - If effects of smoke cannot be avoided or minimized within 0.25 mile of an active nest site, prescribed burning would be conducted outside the seasonal restriction period.

    - Seasonal restrictions may be lifted if surveys determine no nesting activity within 0.25 mile of proposed activities.
- Activities are designed to create ecological conditions that are more resilient over the long-term. Therefore, activities would help protect remaining goshawk habitat and future habitat.

The potential for adverse effects could be limited due to the following MMs (RWQCB and Reclamation 2009):

- AGBE-2: Prior to the start of construction, a qualified biologist would conduct a survey of the project site(s) to determine whether suitable nesting habitat for the species is present.
- AGBE-3: Construction would be scheduled to avoid the nesting season for bald eagles and American goshawks to the extent feasible.
- AGBE-4: Pre-construction surveys for nesting American goshawks would be conducted by a qualified biologist to ensure that no nests would be disturbed during project implementation.
- AGBE-5: If vegetation is to be removed by the project and all necessary approvals have been obtained, potential nesting habitat (i.e., trees) that would be removed by the project would be removed before the onset of the nesting season, if feasible.

5.2.2.2 Effects Summary

Project activities may cause intermittent disturbance to goshawks within or near activity areas, and individual goshawks may move away from activity areas temporarily during project implementation due to the presence of humans and equipment. Effects to goshawk habitat would be limited due to the site-specific project scale, but habitat suitability may be negatively affected by cutting and removal of trees, which would reduce canopy cover and abundance of large trees. These activities would potentially affect habitats beneficial to goshawk prey species and may reduce the availability of perching sites for foraging goshawks. However, tree removal would be minimal and would also open up the understory which may improve goshawk access to prey in overgrown areas.

Large tree removal could affect AGOS habitat, however it is intended to be fairly minimal: some large trees or snags may need to be removed from restoration sites if the tree/snag poses a hazard risk during construction operations; some trees may need to be removed for site access; and some tree removal may be necessary in upslope areas for watershed habitat enhancement. Trees removed would be salvaged to support: loose wood placement in both aquatic and upslope habitats; SLJs; and LTPBR techniques. It should be noted that wooded areas with old growth characteristics, where present, would be preserved to the extent possible. Potential effects to AGOS habitat would be considered during the site-specific analysis and CMs would be incorporated to minimize effects.

The proposed activities could have short-term construction effects related to noise disturbance or air quality that could potentially affect AGOS, particularly individuals, moving through the forest while foraging, nesting or engaging in other activities. However, because there would be SRs on activities for American goshawk and during NSO nesting seasons, and tree removal would be limited, effects are anticipated to be minor. The project may affect individual American goshawks, but potential effects to the reproduction and population demography of this species are limited and insignificant and would not cause a trend toward listing.

5.3 Bald eagle (*Haliaeetus leucocephalus*) & Golden eagle (*Aquila chrysaetos*)

5.3.1 Species Account

Bald eagles typically utilize large trees protected from disturbance for nesting, and late successional and old growth forests close to large rivers or lakes for nesting and winter roosting sites. Their primary food source is fish, which are taken live or as carrion (USDI Fish and Wildlife Service 2013; Anthony et al. 1992; USDI Fish and Wildlife Service 1986). Average home range sizes in Oregon and Washington, respectively, were 1,650 and 1,216 acres (Snyder 1993, Kalasz and Buchanan 2016). In the STNF, many large conifers provide potential nest sites on slopes overlooking Trinity Lake, Lewiston Lake, the Trinity River, and South Fork Trinity River. Other nests are located near major tributaries.

Suitable habitat for nesting and foraging within the project area is concentrated around Trinity Lake, Lewiston Lake, and the mainstem and South Forks of the Trinity River. These areas provide large enough fish-bearing waterbodies for foraging and high-quality habitat for bald eagles. Documented occurrences within the Project's HUC 10s include Big French Creek, East Fork Trinity River, Swift Creek, Stuart Fork, Lower South Fork Trinity River, Middle South Fork Trinity River, Lower Hayfork Creek, North Fork Trinity River, Tangle Blue Creek, Upper Hayfork Creek, Upper South Fork Trinity River, and Weaver Creek and are areas where bald eagles are likely to nest and forage (CDFW 2024d and USFS 2024a).

Golden eagles are an uncommon permanent resident in California and occupy rolling foothills and mountain terrain, wide arid plateaus, open mountain slopes and cliff and rock outcrops (CDFW 2020). Cliffs and rock outcrops with large trees provide protected nesting habitat. This species will tend to build multiple large stick nests within its territory during the breeding season from late January through August. The nesting cycle spans about five months for migratory individuals and as long as twelve months for non-migratory birds. Pairs will raise one to three young per year (Katzner et al. 2020). This species can be found from sea level up to 11,500 feet in elevation with an average territory size of 22 mi^2. Open space is required for foraging activities and golden eagles will prey on lagomorphs and rodents as well as other small mammals, birds, reptiles, and some carrion (CDFW 2020).

Suitable habitat for golden eagles occurs within the Project with known occurrences in Big French Creek, Browns Creek, Canyon Creek, Coffee Creek, East Fork Trinity River, Lower South Fork Trinity River, Middle South Fork Trinity River, Lower Hayfork Creek, Stuart Fork, Swift Creek, Upper Hayfork Creek, and Weaver Creek HUC 10s (CDFW 2024d and USFS 2024a).

5.3.2 Effects Analysis

Potential pathways for effects to bald and golden eagles as a result of Project activities include the following:

- Death or injury of eagles due to felling an active nest tree;
- Loss of active nest site due to disturbance from construction noise and human activity during breeding season (adverse effects to reproductive success);
- Disturbance at post-fledging area due to activities associated with construction activities and human presence (adverse effects to fledgling survival); and
- Loss of habitat due to reduction of high canopy cover stands with large trees (adverse effects to nesting habitat).

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5.3.2.1 Avoidance and Minimization Measures

The TRRP Master EIR requires protection of known bald eagle nest sites (RWQCB and Reclamation 2009). To this end, construction is planned to take place outside of the January 1 through July 31 window within 0.25 miles of any known bald eagle nest sites in the project area to all activities causing above-ambient loud and continuous noise (for >=2 hours per day) to avoid potential disturbance at these sites during the bald and golden eagle breeding season as described below. If work occurs within that window and within 0.25 mile of nesting eagles, MM AGBE-5 would be implemented. A SR has also been incorporated into the CMs to avoid disturbance to NSO during their breeding season. This would apply to activities manipulating NSO habitat or producing loud and continuous noise or smoke that could potentially disturb spotted owls. As a result, where/when the NSO SRs are applied, disturbance to breeding eagles would be reduced as their breeding seasons overlap. However, if NSO surveys are conducted, NSO SRs may be lifted where there is no nesting activity, as described in Appendix B of the EA.

The potential for adverse effects would be limited due to the following CMs:

- MMs could be applied when a known bald and/or golden eagle nest site is within the vicinity of the Project Activity Area and the local USFWS Field Office would be contacted to determine appropriate size and configuration of buffers when appropriate (USFWS 2007).
- AGBE-1: SR would be imposed from January 1 through July 31 within 0.25 mile of any known eagle nest sites in the project area to all activities causing above-ambient loud and continuous noise (for >=2 hours per day) to avoid potential disturbance during the eagle breeding season.
    - For smoke producing activities within 0.25 miles of active nests, employ firing techniques that provide good smoke dispersion and ventilation aloft and/or away from active nests.
    - If effects of smoke cannot be avoided or minimized within 0.25 miles of an active nest site, prescribed burning will be conducted outside the seasonal restriction period.
    - Seasonal restrictions may be lifted if surveys determine no nesting activity within 0.25 miles of proposed activities.
- NSO CMs, including seasonal restrictions would be implemented when applicable and the eagle breeding season largely overlaps with the NSO breeding season, thus the CMs would also help reduce disturbances to eagles.

The potential for adverse effects could be limited due to the following MMs (RWQCB and Reclamation 2009):

- AGBE-2: Prior to the start of construction, a qualified biologist would conduct a survey of the project site(s) to determine whether suitable nesting habitat for the species is present.
- AGBE-3: Construction would be scheduled to avoid the nesting season for eagles to the extent feasible.
- AGBE-4: Pre-construction surveys for nesting eagles will be conducted by a qualified biologist to ensure that no nests would be disturbed during project implementation.
- AGBE-5: If vegetation is to be removed by the project and all necessary approvals have been obtained, potential nesting habitat (i.e., trees) within 0.25 miles of a known eagle nest that would be removed by the project, would be removed before the onset of the nesting season, if feasible.

5.3.2.2 Effects Summary

Project activities may cause intermittent disturbance to bald and golden eagles within or near site-specific activity areas, and individual eagles may move away from activity areas temporarily during project implementation due to the presence of humans and equipment. However, State Route 299 runs along the Trinity River where anthropogenic influences like noise from cars and recreational areas are prevalent. Similarly, known occurrences of bald eagles are documented around Lewiston Lake and Trinity Lake where campgrounds, boat docks, and fishing activities occur throughout the year. Bald and golden eagles are observed in areas of regular human use indicating some habituation to disturbances and although some eagles may be affected by noise disturbance, the potential to cause mortality, harm, or significant disruption to normal behaviors of eagles, especially during their breeding season, is limited due to CMs and MMs. Effects to bald and golden eagles would be minor.

Large tree removal could affect eagle habitat; however it is intended to be fairly minimal: some large trees or snags may need to be removed from restoration sites if the tree/snag poses a hazard risk during construction operations; some trees may need to be removed for site access; and some tree removal may be necessary in upslope areas for watershed habitat enhancement. Trees removed would be salvaged to support: loose wood placement in both aquatic and upslope habitats; SLJs; and LTPBR techniques. It should be noted that wooded areas with old growth characteristics, where present, would be preserved to the extent possible. Potential effects to eagle habitat would be considered during the site-specific analysis and CMs would be incorporated to minimize effects.

Eagles could experience temporary effects during project implementation. However, there are extensive CMs and MMs to minimize long-term effects to these species. Noise disturbance from construction activities is most likely to cause effects, specifically nest failure, if proper CMs and MMs are not implemented. However, with implementation of nest surveys in suitable habitat, buffers, seasonal windows, and the alteration of construction activities when nests are observed within the vicinity of the project, the potential of effects to sensitive nesting raptors would be minimized.

The proposed action may affect individual bald and/or golden eagles, but potential effects to the reproduction and population demography of these species are limited and insignificant and would not cause a trend toward listing.

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5.4 Pallid bat (*Antrozous pallidus*) and Fringed myotis (*Myotis thysanodes*)

5.4.1 Species Account

Pallid bats have a wide distribution throughout the western United States, and can be abundant in many arid, low elevation regions (Sherwin and Rambaldini 2005; California Department of Fish and Wildlife 2020). They occur throughout California except in the high elevation Sierra Nevada from Shasta to Kern counties, and the northwestern corner of the state from Del Norte and western Siskiyou Counties to northern Mendocino County (CDFW 2020). Summer roost sites are in cavities in live trees or snags, deep crevices in rock faces, caves, mines and bridges, and occasionally in open buildings (Baker et al. 2008). This species feeds primarily on the ground, commonly preying on crickets, grasshoppers, beetles and scorpions. They generally forage in open areas with limited ground cover (Rambaldini and Brigham 2011).

Wildlife databases show observations of pallid bats within the Project activity area including Canyon Creek, New River, Upper Hayfork Creek, Upper South Fork Trinity River, and Weaver Creek HUC 10 subwatersheds (CDFW 2024d and USFS 2024a).

Fringed myotis bats range from southern British Columbia south through southern Mexico, with an isolated population in the Black Hills of South Dakota and Wyoming. They are generally found between 3,000 and 5,000 feet in elevation but also inhabit lower elevations near coastal areas. This species is rare in California, but is found throughout the state, from the coast to 5,900 feet or greater in elevation in the Sierra Nevada (Keinath 2003). They occur within a broad range of vegetative types but are mostly reported to occur in pinyon juniper, oak, ponderosa pine, and mixed conifer forest types (Keinath 2004).

This species often forages along small streams (Pierson et al. 2001). Fringed myotis bats living in temperate forests must drink water shortly after emerging from their day roosts each evening and may require up to half their body weight in water each day depending on the type of prey consumed (Christy and West 1993; Keinath 2004). Consequently, they are generally found to roost in areas within close proximity to a water source, though the size and extent of that source can be highly variable. The limited information available on its diet indicates they consume primarily beetles, supplemented by moths and fly larvae captured in the air or on foliage (Keinath 2004). Fringed myotis are morphologically adapted to forage in areas of relatively high vegetative diversity such as interior forests and/or their edges, but not in wide openings such as clear-cuts or meadows where their chief prey taxa (coleopterans) would be less abundant (Pierson et al. 2001).

Fringed myotis will use caves, mines, and buildings as solitary day/night roosts and hibernacula. They may also use bridges and rock crevices as solitary day/night roosts (Christy and West 1993). Weller and Zabel (2001) found that many day and night roosts in northern California were under tree bark and in tree hollows, and medium to large diameter snags provided important day and night roosting sites for this species. However, Lacki and Baker (2007) found that fringed myotis in Oregon and Washington use trees/snags as roosts much less than previously reported and instead favored caves, mines, and buildings as solitary day and night roosts and hibernacula. Roosts in more permanent structures such as bridges and rock crevices elicit high roost fidelity compared to more temporary roosts such as trees and snags (Lewis 1995, Weller and Zabel 2001). Maternity colonies have been documented in caves, mines, abandoned buildings, bridges, and rock crevices, and can range in size from a few dozen bats to several hundred (Keinath 2004, Keinath 2003). Like many cave roosting species, fringed myotis colonies are susceptible to disturbance in hibernacula and maternal colonies. Few hibernacula

have been well documented, but those that have are generally cool and usually in caves or mines with little temperature fluctuation throughout the winter (Keinath 2004, Keinath 2003). Fringed myotis tend to move to lower and more southerly hibernacula in the fall months (Keinath 2003) and may leave the project area entirely by the time these areas are treated.

Wildlife databases show observations of fringed myotis bats within the Project activity area. Records occur within the Canyon Creek, Lower South Fork Trinity River, Middle South Fork Trinity River, North Fork Trinity River, and Upper Hayfork Creek of the HUC 10 subwatersheds (CDFW 2024d and USFS 2024a).

5.4.2 Effects Analysis

Potential pathways for effects to pallid bats and fringed myotis as a result of Project activities include the following:

- Death or injury of bats due to felling roosting or hibernacula trees and/or during bridge replacements.
- Loss of active maternity colonies due to disturbance from construction noise and human activity during breeding season (negative effect to reproductive success).
- Loss of access to drinkable water from construction noise and human activity and reduction in water quality during project implementation (negative effect to behavior).
- Loss of habitat due to reduction of snags and large trees (negative effects to roosting/hibernacula sites).

5.4.2.1 Avoidance and Minimization Measures

Although harm to pallid bats and fringed myotis could potentially result from felling trees and snags and during bridge rehabilitation, CMs are in place to reduce potential harm to these species. CMs specific to caves, mines, bridges, and bats are described in the STNF Forest Plan and are described below and included in Appendix B of the EA. The SR to avoid disturbance to NSO during their breeding season would also reduce potential construction-related effects to bats roosting in trees, as well as noise/smoke disturbance to pallid and fringed myotis bats during their breeding seasons, where/when it is applied.

The potential for adverse effects would be limited due to the following CMs (USFS 1995):

- BAT-1: Surveys would be conducted of crevices in caves, mines, and abandoned wooden bridges and buildings for the presence of roosting bats.
- BAT-2: No noise-generating or habitat-modification activities (including timber harvest) will take place within 250 feet from caves, mines and mine adits to protect known or potential sensitive bat species (Townsend's big-eared bat, pallid bat, and fringed myotis) roost sites. Activities necessary to address safety threats (e.g. hazard trees to the road or operations) will prevail over this measure.
- BAT-3: Options for conducting burning around caves/mines could include the following:
    - Limit burning to outside the breeding season (do not burn March 1 through August 31); or
    - Burn under prevailing wind conditions that disperse smoke away from cave/mine entrances.

The potential for adverse effects could be limited due to the following MMs (RWQCB and Reclamation 2009):

- BAT-4: A pre-construction survey for roosting bats would be conducted prior to the start of construction activities.
- BAT-5: If an active maternity roost or hibernaculum is found, the project would be redesigned to avoid the loss of the tree or structure occupied by the roost, if feasible.

5.4.2.2 Effects Summary

Pallid and fringed myotis bats may use large trees, snags, bridges, caves, or mines in or near the Project activity area. Project activities may cause intermittent disturbance to pallid or fringed myotis bats and individual bats may move away from activity areas temporarily during project implementation due to the presence of humans and equipment. This may increase exposure to predation, but any increase in predation resulting from these activities is likely to be limited and short in duration. Bats may have limited access to water which could impact their survivability searching for water sources beyond their normal territory. However, in-channel activities would occur during the dry season (to correspond with reducing impacts to anadromous salmonids) and when water levels are typically low, reducing the likelihood of impacts to bats due to project activities. Potential disturbance to bats is also limited by the CMs described above and the upper limits on activities to bridges annually. As a result, some bats may be affected by noise disturbance, bridge rehabilitation and in-channel activities, but the potential to cause mortality, harm, or significant disruption to normal behaviors of bats, especially during their breeding season, is limited and minor.

Habitat suitability may be negatively and positively affected by project activities. Cutting trees would remove some potential roost sites, however tree removal would be limited. Although trees and snags would be cut during project activities, they do not have the structure suitable for maternity colonies or hibernation. Therefore, disturbance of these structures may result in temporary displacement of bats to alternative day roost sites but is unlikely to impact breeding or hibernating individuals or breeding habitat. Clearing riparian areas of nonnative vegetation could provide open areas for pallid bats supporting greater foraging opportunities in open landscapes temporarily until native vegetation is planted and reoccupies the project area. CMs for the project include buffering project activities, including timber harvest, near bat hibernacula and maternity colonies reducing effects to bats.

Furthermore, bats are unlikely to be affected during foraging activities due to construction constraints with planned daylight working hours, reducing likelihood that noise or human disturbance would affect bat foraging behavior. Seasonal construction timing (autumn) is also conducive to when bats tend to move to a more southerly hibernacula, reducing likelihood that bat hibernacula and maternity colonies would be affected within the summer months.

The Proposed Action may affect individual pallid and fringed myotis bats, but potential effects to the reproduction and population demography of these species is limited and insignificant and would not cause a trend toward listing.

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

5.5.1 Species Account

This species occurs in the western and southeastern United States and in southern British Columbia, with isolated populations on the Southern Plains and southward to Mexico. It is found throughout California from low desert to mid elevation montane habitats and is most abundant in mesic habitats (Zeiner et al. 1990). It occupies a variety of habitats ranging from coniferous forests and woodlands to deciduous riparian woodlands, semi-desert and montane shrub habitats. Townsend's big-eared bats are strongly correlated with the availability of caves and cave-like roosting habitat, although they occasionally make use of man-made structures such as abandoned buildings and bridges (Zeiner et al. 1990). Townsend's big-eared bats are very sensitive to disturbance at roost sites and may abandon sites following a single disturbance (Zeiner et al. 1990). This species feeds primarily on small moths. It prefers foraging along edges of riparian vegetation where conifers and deciduous riparian species support lepidopteran prey species and tends to avoid foraging in open areas (Fellers and Pierson 2002, Gruver and Keinath 2006).

Townsend's big-eared bat occurs within Trinity County with documented observations in the following HUC 10's: Swift Creek-Trinity River, Weaver Creek-Trinity River, Lower Hayfork Creek, Upper Hayfork Creek, Stuart Fork, and Middle South Fork Trinity River (CDFW 2024d and USFS 2024a).

5.5.2 Effects Analysis

Sensitive bat species within the Project may be affected by project activities and include the potential for death or injury to individuals through removal of hibernacula or maternity colonies if disturbed during project activities. Individuals occupying bridge structures have a high potential for disturbance during bridge replacement activities and harassment or injury of individuals could occur. Bats are sensitive to disturbance and therefore construction noise or human presence could cause a bat to abandon a site reducing future site fidelity, impacting behavior and causing adverse effects. Townsend's big-eared bats are at a greater risk due to their use of riparian habitat for foraging. When restoration activities occur within riparian areas, foraging behavior could be altered leading to inadequate energy intake contributing to reduced survivability.

Potential pathways for effects to Townsend's big-eared bat as a result of Project activities include the following:

- Death or injury of bats due to bridge replacement activities.
- Loss of active maternity colonies due to disturbance from construction noise and human activity during breeding season (negative effect to reproductive success).
- Loss of access to foraging habitat from construction noise and human activity and removal of riparian vegetation during project implementation (negative effect to behavior).

5.5.2.1 Avoidance and Minimization Measures

The potential for adverse effects would be limited due to the following CMs (USFS 1995):

- BAT-1: Surveys would be conducted of crevices in caves, mines, and abandoned wooden bridges and buildings for the presence of roosting bats.

- BAT-2: No noise-generating or habitat-modification activities (including timber harvest) will take place within 250 feet from caves, mines and mine adits to protect known or potential sensitive bat species (Townsend's big-eared bat, pallid bat, and fringed myotis) roost sites. Activities necessary to address safety threats (e.g. hazard trees to the road or operations) will prevail over this measure.
- BAT-3: Options for conducting burning around caves/mines could include the following:
    - Limit burning to outside the breeding season (do not burn March 1 through August 31); or
    - Burn under prevailing wind conditions that disperse smoke away from cave/mine entrances.
- In riparian areas, activities are designed to create ecological conditions that are more resilient over the long-term. Therefore, certain activities would help protect remaining habitat and enhance future habitat.

The potential for adverse effects could be limited by employing the following MMs (RWQCB and Reclamation 2009):

- BAT-4: A pre-construction survey for roosting bats would be conducted prior to the start of construction activities.
- BAT-5: If an active maternity roost or hibernaculum is found, the project would be redesigned to avoid the loss of the tree or structure occupied by the roost, if feasible.

5.5.2.2 Effects Summary

Townsend's big-eared bats may use buildings, bridges, caves, or mines near the Project activity area. All potential adverse effects listed above would be minimized with Project CMs and MMs. Surveys for bats would occur at caves, mines and bridges within 250 feet of project areas prior to construction activities and construction plans would be altered if sensitive bat species were encountered. Furthermore, bats are unlikely to be affected during foraging activities due to construction constraints with planned daylight working hours, reducing likelihood that noise or human disturbance would affect bat foraging behavior. Seasonal construction timing (autumn) is also conducive to when bats tend to move to a more southerly hibernacula, reducing likelihood that bat hibernacula and maternity colonies would be affected within the summer months. In addition, there are extensive CMs for riparian areas, as well as for caves, mines, bridges and bats (Appendix B of the EA). As a result, effects to Townsend's big-eared bats would be minor.

The Proposed Action may affect individual Townsend big-eared bats, but potential effects to the reproduction and population demography of this species is limited and insignificant and would not cause a trend toward listing.

5.6 Pacific/American marten (*Martes caurina;* aka *M. americana*)

5.6.1 Species Account

Martens are closely associated with late-successional conifer forests with closed canopies and abundant, complex physical structure at or near the ground. They tend to use higher elevation forest above 4,500 feet and multi-storied mature and old growth conifers (white fir/red fir). Abundant slash, rotten logs, and stumps that provide cover and den sites are preferred habitats (Buskirk and Zielinski 1997; Krohn et al. 1997; Small et al. 2003). Abundant downed woody material also provides protection from predators, access to the subnivean (under snow) environment for hunting and resting, and thermal protection from heat and cold (Ruggiero et al.

1994). Lower branches of live trees, tree boles of all age/decay classes, coarse woody debris, shrubs and rock fields/talus slopes and caves can all contribute to structural requirements (Buskirk and Zielinski 1997). Late-successional habitat provides marten with rest and den sites they require, as well as higher density of preferred prey species (Kirk 2007). Martens eat primarily small mammals, lagomorphs, and birds, but also insects, fruit, and carrion opportunistically (Powell et al. 2003). Accounts of home range sizes in the scientific literature for this species vary widely (Stone 2010). Home ranges in the Sierra Nevada Mountains in largely unlogged forest landscapes averaged 1.2–1.9 mi^2 for males and 1.2–1.5 mi^2 for females, and similar home range estimates were reported in coastal areas of California and Oregon (USDI Fish and Wildlife Service 2015).

Databases show documented occurrences of Pacific/American martens within the Project activity area in HUC 10 subwatersheds including Coffee Creek, East Fork Trinity River, Middle South Fork Trinity River, Stuart Fork, Swift Creek, Tangle Blue Creek, Trinity River, Canyon Creek, and Weaver Creek (CDFW 2024d and USFS 2024a).

5.6.2 Effects Analysis

Potential pathways for effects to martens as a result of Project activities include the following:

- Death or injury of martens due to vegetation and dead/downed log removal of an active den site.
- Death and injury of martens due to the felling of standing trees.
- Loss of active den site due to disturbance from construction noise and human presence during breeding season (negative effect to reproductive success).
- Reduction in foraging habitat and resting areas due to reduction and removal of large hazard trees or large trees necessary to create course woody debris for restoring aquatic habitats (negative effects to prey and protection from predators).

5.6.2.1 Conservation Measures

A SR has been incorporated into the CMs to avoid disturbance to NSO during their breeding season. These protection measures, when/where they are applied, would also decrease potential construction-related effects to martens during their denning season. If NSO surveys are conducted, NSO SRs may be lifted where there is no nesting activity, as described in Appendix B of the EA.

The potential for adverse effects would be limited due to the following CMs (USFWS 2025):

- Within NSO nesting, roosting, and foraging habitat, NSO CMs would be implemented when applicable. Marten habitat largely overlaps with NSO suitable habitat, thus the CMs would also help reduce disturbances to martens and help retain marten habitat.
- Protection measures, including general wildlife conservation measures (WL-1 through WL-17) as outlined in Appendix B (Environmental Commitments) would minimize effects to martens.
- Activities are designed to create ecological conditions that are more resilient over the long-term. Therefore, certain activities would help protect remaining habitat and enhance future habitat.

5.6.2.2 Effects Summary

If martens do use the higher elevations in the Project activity area, project activities may cause intermittent disturbance to martens within or near work areas, and individual martens may move away from work areas temporarily during project implementation due to the presence of humans and equipment. Intermittent

disturbance may cause some shifting of foraging or resting behavior, but it is unlikely to be sufficiently adverse to lead to disturbances in breeding behavior for this species due to the scale of site-specific projects and the upper limits on proposed activities.

Reduction in habitat is unlikely to occur due to the nature of the restoration project which focuses on enhancing future aquatic and riparian habitat and decommissioning of roads. Furthermore, large tree removal is intended to be fairly minimal: some large trees or snags may need to be removed from restoration sites if the tree/snag poses a hazard risk during construction operations; some trees may need to be removed for site access; and some tree removal may be necessary in upslope areas for watershed habitat enhancement. Trees removed would be salvaged to support: loose wood placement in both aquatic and upslope habitats; SLJs; and LTPBR techniques. It should be noted that wooded areas with old growth characteristics, where present, would be preserved to the extent possible. Potential effects to marten habitat would be considered during the site-specific analysis and CMs would be incorporated to minimize effects. In addition, CMs for NSO limit tree removal and prevent NSO suitable habitat from being removed or downgraded, which would also help retain marten habitat.

The proposed action may affect individual martens, but potential effects to the reproduction and population demography of this species is limited and insignificant and would not cause a trend toward listing.

5.7 Fisher (*Pekania pennanti*) & Ringtail (*Bassariscus astutus*)

5.7.1 Species Account

Fishers in western North America are often associated with complex vertical and horizontal structural elements typical of late-successional forests, including large trees, snags, logs, and dense canopy (Raley et al. 2012). At a landscape scale, fisher typically occupy a mosaic of forest types and seral stages, generally with high proportions of mid- and late-seral forest and low proportions of open or non-forested habitats. They appear to be obligate cavity users for reproduction, relying on cavities to moderate temperature extremes and provide security for kits from potential predators. They use cavities in live trees or snags to give birth and raise their young (Aubry and Raley 2006; USFWS 2016a). There is a strong association with hardwoods, particularly black oaks with large-enough cavities that allow for entry of fisher but preclude predators (Zielinski et al. 2004). Mast-producing black oak and tanoak are important for fisher and their prey, particularly along riparian areas (Yaeger 2005). Fishers are relatively large and opportunistic predators. They forage primarily on small mammals, lagomorphs, and birds, but will also eat insects, fruit, carrion, and other items (Powell et al. 2003).

Fishers are closely associated with drainage bottoms (Yaeger 2005) and riparian areas, usually selecting resting and denning sites within 300 to 500 feet, and rarely more than 1,100 feet, from water (Self and Kerns 2001). Riparian areas provide important rest site elements, such as broken tops, large snags, and large down wood (Seglund 1995). In forest types subject to frequent fires that remove woody structures near the ground, fishers are closely associated with riparian areas (Powell et al. 2003), which typically do not burn as often.

Accounts of home range sizes in the scientific literature for this species are highly variable (USDI Fish and Wildlife Service 2014). Zielinski et al. (2004) found average home range size for female fishers in northern California of 980.5 ha (2,422 ac), while males ranged over larger areas (9,722 ac). As a result, home ranges in the project area are likely to be small compared to those reported in some other parts of this species' range.

Wildlife databases show Pacific fisher observations in all HUC 10 subwatersheds in the Project activity area (CDFW 2024d and USFS 2024a).

Ringtails are found on the lower western slope of the Sierra Nevada as well as the Pacific slopes of the Coast Range from west of mount Shasta south to Ventura County in California (Belluomini 1980). Their range extends from southwestern Oregon throughout the west to eastern Kansas including California, southern Nevada, Utah, Colorado, Arizona, New Mexico, Oklahoma, Texas, Baja California, and northern Mexico (Goldberg 2003). This species occurs in habitats including rocky outcroppings, canyons, or talus slopes. They may utilize chapparal, and riparian areas and are typically found near a consistent water source. They will use the hollows of trees or abandoned wooden structures, rock recesses, logs, snags, abandoned burrows, or woodrat nests as nesting sites. Ringtails can occupy habitat in elevations up to 9,500 feet, however, they typically use elevations up to approximately 4,500 feet (AWD 2024). Their home range size can vary and with males typically using a larger home range than females from 109-1,280 acres (CDFW 2020).

Ringtails have a gestation period of 45-50 days and mate in the spring. The male will procure food for the female during gestation and the female can produce two to four kits in a litter. After one month, the cubs can open their eyes and begin to hunt for themselves around 4 months of age. Sexual maturity comes at ten months (Belluomini 1980).

The ringtail is omnivorous and an opportunistic feeder relying on insects, fruits, and berries in addition to birds and mammals. Seasonal variation occurs within their diet with insects making up the majority of the diet during summer and fall while mammals, birds, and carrion are more common in the winter and spring seasons (Belluomini 1980).

Ringtails are documented within the Project in Big French Creek, Lower Hayfork Creek, Middle South Fork Trinity River, Stuart Fork, Swift Creek Trinity River, Upper Hayfork Creek, and Weaver Creek (CDFW 2024d and USFS 2024a).

5.7.2 Effects Analysis

Fishers and ringtails are closely tied to riparian areas (or permanent water sources [ringtail]) for denning, and resting sites and effects from project restoration activities could result in death or injury of individuals and abandonment of den sites through construction activities, leading to loss of den sites during project implementation. Fishers and ringtails could also lose their den sites through presence of heavy equipment with the removal of rocky outcroppings, downed wood, and human disturbance at a site.

Potential pathways for effects to fishers and ringtails as a result of Project activities include the following:

- Death or injury due to felling a tree or moving/removing a log with an occupied den (adverse effects to reproductive success).
- Death of injury to ringtails due to the removal of rocky outcroppings with an occupied den (adverse effects to reproductive success).
- Loss of an active den or nest site due to construction and noise disturbance of a den tree in the vicinity of a project during breeding season (adverse effects to reproductive success).
- Reduction in denning or nesting habitat and resting areas due to reduction and removal of riparian vegetation and woody debris (adverse effects to behavior and predator avoidance).

5.7.2.1 Avoidance and Minimization Measures

A SR has been incorporated into the project avoidance and MMs to avoid disturbance to NSO during their breeding season. These protection measures, when/where they are applied, would also decrease potential construction-related effects to fishers and ringtails during their denning season. If NSO surveys are conducted, NSO SRs may be lifted where there is no nesting activity, as described in Appendix B of the EA.

The potential for adverse effects would be limited due to the following CMs (USFWS 2025):

- Within NSO nesting, roosting, and foraging habitat, NSO CMs would be implemented when applicable. Fisher and ringtail habitat can overlap with NSO suitable habitat, thus the CMs would also help reduce disturbances to fishers and ringtails and would help retain suitable habitat.
- Activities are designed to create ecological conditions that are more resilient over the long-term. Therefore, certain activities would help protect remaining habitat and enhance future habitat.

The potential for adverse effects to fishers or ringtails could be limited due to the following MMs (RWQCB and Reclamation 2009):

- MRCF-1: A pre-construction survey for ringtails will be conducted prior to the start of construction activities. The survey will be conducted by a qualified biologist. No activities that would result in disturbance to active dens of ringtails will proceed prior to completion of the surveys. If no active dens are found, no further action is needed. If a ringtail den is present, Minimization Measure MRCF-2 will be implemented.
- MRCF-2: If an active ringtail nest is found, the project will be redesigned to avoid the loss of the tree occupied by the nest if feasible. If the project cannot be redesigned to avoid removal of the occupied tree, demolition of that tree will commence outside of the breeding season (February 1 to August 30). If a non-breeding den is found in a tree scheduled to be removed, the individuals will be safely evicted under the direction of a qualified biologist. Trees with dens that need to be removed will first be disturbed at dusk, just prior to removal that same evening, to allow ringtails to escape during the darker hours.

5.7.2.2 Effects Summary

Project activities may cause intermittent disturbance to fishers and ringtails within or near work areas, and individual fishers or ringtails may move away from activity areas temporarily during project implementation due to the presence of humans and equipment. Due to the large home range and foraging habits of these species and the relatively small footprint of the proposed activities, individuals may experience slight changes to their foraging patterns, but project effects are unlikely to negatively impact the ability of fishers or ringtails to successfully forage or disperse across the project area. Intermittent disturbance may cause some shifting of resting behavior, but it is unlikely to be sufficiently adverse or lead to disturbances in breeding behavior for these species.

NSO nesting/roosting habitat would have the highest likelihood of fisher and ringtails use during the reproductive season, as these areas contain the highest canopy closure, highest amounts of snags, large trees, and large downed logs which provide potential areas for denning. Rock outcroppings and cliffs could also provide denning habitat specifically for ringtails. The fisher breeding season in California and Oregon generally occurs from late February through early April. Females typically give birth to kits from early March to early April,

with variations depending on weather and habitat conditions (Lofroth et al. 2010). Young are mobile and capable of normal locomotion by 10-12 weeks of age (Aubry and Raley 2006). Therefore, by early July to early August, kits are old enough to move away from a source of noise or smoke disturbance. Ringtail cubs are often born between May and June and are mobile within one month (CDFW 2020). Therefore, where/when the NSO SRs are applied, most Project activities would occur after fisher and ringtail young are out of the den and mobile.

Habitat suitability could be adversely affected by cutting and removal of large trees, which would reduce canopy cover and abundance of large trees, as well as reducing course woody debris. Trees removed would be salvaged to support: loose wood placement in both aquatic and upslope habitats; SLJs; and LTPBR techniques. It should be noted that wooded areas with old growth characteristics, where present, would be preserved to the extent possible. These activities would potentially affect habitats beneficial to fisher and ringtails and their prey species. However, CMs for NSO limit tree removal and prevent NSO suitable habitat from being removed or downgraded, which would also help retain fisher and ringtail habitat. Furthermore, CMs outlined in the EA state that existing large wood would be retained at a rate of at least five logs/acre ensuring nutrient cycling.

Although some individuals may be affected by noise disturbance, the potential to cause mortality, harm, or significant disruption to normal behaviors of these species, especially during their breeding season, is limited and would be minor due to Project timing and avoidance and minimization measures. The Project may affect individual fishers and ringtails, but potential effects to the population demography of this species are very limited and insignificant and would not cause a trend toward listing.

5.8 Northwestern pond turtle (*Actinemys marmorata*) & California mountain kingsnake (*Lampropeltis zonata*)

5.8.1 Species Accounts

Western pond turtles range from northwestern Baja California, Mexico, north to the Puget Sound in Washington. It is generally restricted to areas west of the Sierra Nevada and Cascade Mountains (Rosenberg et al. 2009). Northwestern pond turtles (NWPT) range diverges from the southwestern pond turtle range along the western edge of southern central valley of California and occupies areas along the coast north of the San Franscisco Bay including portions of Washington, Oregon, Nevada and northern and central California. In California, the range includes areas of the Coast Range from the Oregon-California border down to northern Monterey County, the lower elevation and foothills of the southern Cascades and Sierra Nevada Mountains, and areas within the Sacramento and San Joaquin Valleys (USFWS, 2023). Western pond turtles occur in a variety of habitat types associated with permanent or nearly permanent water. They concentrate in ponds and low flow regions of rivers and creeks such as side channels and backwater areas, and prefer creeks that have deep, still water and sunny banks. Basking sites such as rocks and floating or partially submerged logs are important habitat components. Western pond turtles are omnivorous, but their diet typically consists primarily of insects, crayfish, carrion, and other aquatic invertebrates (Jennings and Hayes 1994, Holland 1994, Wilson et al. 1991).

During the spring or summer females may travel away from ponds to find sites suitable for nesting, although the travel distance to most nest sites is less than 984 feet (300 meters). Dry grassy areas are often used as nest sites. Young emerge the following spring (March-April) and travel from nest sites to watercourses (Jennings and Hayes 1994, Holland 1994). In warm climates they may be active year-round, but in colder areas they hibernate during winter in muddy bottoms or upland areas, including forests. Upland hibernation sites were found up to 1,640

feet (500 meters) from aquatic habitats (Jennings and Hayes 1994, Reese and Welsh 1998). Therefore, the analysis area for this species extends out 1,640 feet (500 meters) from aquatic areas within activity zones.

Western pond turtles were first petitioned for listing by the Center for Biological Diversity on July 11, 2012, with 53 other species. In June 2014, a publication was sent to USFWS by the Center for Biological Diversity recommending that the western pond turtle be split into two separate species. On April 10, 2015, the 90-day findings indicated that the listing may be warranted and on October 3, 2023, USFWS proposed to list the northwestern pond turtle as a threatened species. There has been no designation of critical habitat for this species (88 FR 68370).

In the STNF, NWPTs are known to occur in Trinity Lake, Lewiston Lake, the Trinity River, South Fork Trinity River, Hayfork Creek and other tributaries as well as numerous ponds/lakes. Wildlife databases show occurrences within Canyon Creek, Swift Creek, Stuart Fork, Weaver Creek, Big French Creek, Lower South Fork Trinity River, Middle South Fork Trinity River, Lower Hayfork Creek, Upper Hayfork Creek, Upper South Fork Trinity River, Browns Creek, and Tangle Blue Creek (CDFW 2024d and USFS 2024a).

California mountain kingsnake is designated as a BLM sensitive species and ranges from the southern Sierra Nevada Mountains north to the Coast Ranges north of Monterey Bay, California, north into the Klamath Mountains in Oregon, with a disjunct population occurring along the Columbia Gorge in Washington. It occupies elevations from sea level up to around 8,000 feet or higher in southern mountain ranges and can grow twenty to fifty inches long. This species inhabits a diverse array of ecosystems including coniferous forest, oak-pine woodlands, riparian woodland, chaparral, manzanita, and coastal sage scrub. They tend to be found near streams with rocky outcroppings, talus or rotting logs that have exposure to sunlight (Lockington ex Blainville 1876). California mountain kingsnakes actively forage for their prey and will consume lizards, skinks, mammals, and birds. Juveniles typically feed on lizards and skinks (Greene and Rodriguez-Robles 2003). This species can be crepuscular, nocturnal, or diurnal depending on daytime and nighttime temperatures for thermoregulation (Lockington ex Blainville 1876).

Documented reproduction of the California mountain kingsnake is described to occur during the spring and summer months. Mating occurs between the months of April and May with the laying of three to nine eggs in June and July in loose, well-aerated soils and under rocks or other cover objects like decaying logs (CDFW 2020). Hatching typically takes place in August (Goldberg 1995).

In the Project area, the California mountain kingsnake has documented occurrences within Lower South Fork Trinity River (CDFW 2024d and USFS 2024a).

5.8.2 Effects Analysis

During restoration activities, road decommissioning, or bridge replacements there is the potential to cause death or injury of individuals with the use of heavy machinery working within and near waterways as well as upland areas. Eggs or individuals could be missed during preconstruction surveys and harmed or killed. Potential contamination from spills or heavy machinery could occur affecting individuals. Introduction of sediment into a water system could negatively affect NWPT, however, turbidity caps have been issued to keep sedimentation effects below a level that could potentially reduce survivability of this species within the ecosystem. California mountain kingsnake could be affected by project activities such as road decommissioning and bridge repair.

In terms of hydroacoustic noise, little is known regarding the hearing sensitivity of reptiles and potential for acoustic trauma (hearing loss, ruptured internal organs, modification of behavior, etc.) in NWPT. Recent research shows turtles may experience acoustic or hydroacoustic (below water) exposure to noise greater than 100 dB and construction-related vibration with variations in recovery (Salas et al. 2023). Construction-related activities that generate 100 dB or higher (e.g., pile driving and blasting) or vibration (e.g., installation of large wood structures with a vibratory hammer) would be considered to determine effects to NWPT for site-specific activities. It is expected that construction activities with the potential to produce noise levels that could result in acoustic trauma for NWPT could be subject to additional CMs when the listing status is finalized.

Potential pathways for effects to NWPTs and the California mountain kingsnake as a result of Project activities include the following:

- Injury or mortality of reptiles and their eggs at nest sites from construction activities within Riparian Reserves or upland habitat (negative effect to population abundance and reproduction).
- Disturbance and displacement due to work activities within upland, riparian, wetland, and in-channel areas.
- Temporary habitat degradation and potential exposure of reptiles to chemicals, dewatering, exhaust, and fugitive dust.
- Habitat degradation from increased turbidity within a pond, river, stream, or tributary due to construction activities.
- Injury or mortality of reptiles due to species salvage and translocation (negative effect on population abundance and range).
- Stress, injury, or mortality of reptiles from pile driving and blasting activities in or near waterways.

5.8.2.1 Avoidance and Minimization Measures

Due to the proposed listing of the NWPT, coordination with the USFWS would occur if the species were to be listed under the ESA to develop environmental commitments for projects implemented under this EA. To reduce potential effects to the species, conservation measures are described below and outlined in the USFWS Statewide Restoration BiOp. The CMs described are based on the reissuance of the USFWS Statewide Restoration BiOp on February 7, 2025, and formally include the NWPT. In addition, CMs specific to the effects of hydroacoustic noise may be addressed during future consultation. For full details on CMs for NWPT see Appendix B of the EA. There are no CMs outlined for the California mountain kingsnake in the USFWS Statewide Restoration BiOp, however CMs protecting NWPT could in turn help protect the California mountain kingsnake.

When/where the NSO SRs are applied, they would decrease potential construction-related effects to this species during its breeding seasons as well as to adult and young NWPTs as they disperse from nesting areas. If NSO surveys are conducted, NSO SRs may be lifted where there is no nesting activity, as described in Appendix B of the EA.

The potential for adverse effects would be limited due to the following CMs for the NWPT (USFWS 2025):

- WPT-1: A Qualified Biologist would survey and flag the work area for suitable overwintering habitat (e.g. leaf litter layer under trees and shrubs) or nesting habitat to avoid.
- WPT-2: Before construction activities occur, a Qualified Biologist would search all suitable aquatic habitat in the project area a minimum of three times during appropriate weather conditions (e.g.

sunny periods between 8am to 12pm, and from 3pm until an hour before dusk; air temperatures 55.0-90.0 degrees Fahrenheit; wind speeds less than 12.0 mph).

- WPT-3: For project areas where the northwestern pond turtle is known or assumed to occur, avoid work during the following windows. For project activities that involve in-water/dewatering work, work will be avoided from October 1 to March 31. For all work window stipulations see Appendix B of the EA.
- WPT-4: Fencing and/or monitoring will be used to protect western pond turtles and will be implemented in coordination with a Qualified Biologist. If the project site is suitable for fencing, the USFWS requires an Exclusion Fencing Plan, and Qualified Biologist will determine where environmentally sensitive area fencing will be installed to protect western pond turtle habitat adjacent to the proposed project footprint.
- WPT-5: Western pond turtles will only be captured and relocated when it is the only option to prevent injury or mortality, and after all attempts to avoid interactions with the species have been used.
- WPT-6: Maintain existing basking structures (e.g. logs, rocks, shorelines, emergent vegetation, algal mats, and substrate) adjacent to aquatic habitat whenever possible. Avoid planting trees and shrubs that would shade suitable basking habitat and maintain an open riparian canopy to allow sufficient solar exposure for basking. Install basking structures as necessary for any basking habitat that is removed.
- WPT-7: Avoid planting trees and shrubs that would shade suitable nesting habitat if nesting habitat is limited near the project area.

5.8.2.2 Effects Summary

Project activities may cause disturbance, injury or death to individual NWPTs and California mountain kingsnakes using suitable habitats in or near activity areas. To reduce impacts, the project would incorporate NWPT CMs (WPT-1 – WPT-7) into restoration activity planning, design, and implementation to conserve habitat, individuals, and populations. During the implementation of NWPT CMs, the California mountain kingsnake will likely benefit from survey efforts and if individuals are encountered, they would be avoided. Effects to riparian habitat and environmentally sensitive areas would be minimized by identifying and flagging, in the field, areas to be protected during construction activities reducing the potential for reduction of shaded riverine aquatic habitat and reducing the potential for harm or disturbance to pond turtle nests. Riparian revegetation activities would occur to enhance and maintain functional habitat and would result in no net loss of riparian habitat and jurisdictional wetlands decreasing the likelihood that NWPTs or California mountain kingsnakes would lose suitable habitat. As a result, the potential to cause mortality or significant disruption to normal behavior and suitable habitat of these species would be limited.

Project design guidelines for restoration activities are focused on enhancement of anadromous salmonid habitat. Long-term restoration goals of enhancing salmonid habitat correlates closely with NWPT habitat enhancement including restoring structural features such as cover objects and basking logs and working towards maintaining natural flow regimes to address water temperature, flow velocities, and water depths within the Trinity River (Reese and Welsh 1998). Temporary effects from project activities would be minor and long-term beneficial effects are expected to occur post-project implementation.

The Project may affect, is likely to adversely affect Northwestern pond turtle because many of the proposed activities would occur in habitat suitable for this species. The Project may affect individual California mountain kingsnakes, but potential effects to the population demography of this species are very limited and insignificant and would not cause a trend toward listing.

5.9 Foothill yellow-legged frog (*Rana boylii*), Cascades Frog (*Rana cascadae*), & Coastal giant salamander (*Dicamptodon tenebrosus*)

5.9.1 Species Account

Foothill yellow-legged frogs are found in or near permanent rocky streams in a variety of habitats, including ponderosa pine, mixed conifer, and mixed chaparral. They are highly aquatic, spending most or all of their life in or near streams. They require shallow, flowing water, and display an apparent preference for small to moderate-sized streams with at least some cobble-sized substrate (Jennings and Hayes 1994). They breed in shallow, slow flowing water with partial shading. Insects are likely the primary food source for adults. Adult foothill yellow-legged frogs are often seen breeding in pools on the main stem of the Trinity River in spring and moving to basking and foraging sites in the tributaries in the summer (Wheeler et al. 2014, Jennings and Hayes 1994). Mating and egg-laying occurs exclusively in streams and rivers (not in ponds or lakes) from April until early July, after streams have slowed from winter runoff (Nafis 2000-2016). They are also known to occur in the South Fork Trinity River, Hayfork Creek and other tributaries. Home ranges are typically very small, but movements of up to 165 feet (50 meters) may occur during high water conditions (CDFW 2020).

Wildlife databases show foothill yellow-legged frog occurrences within every HUC 10 subwatershed along waterbodies creating a high likelihood that this species could be impacted as a result of Project activities (CDFW 2024d and USFS 2024a).

Cascades frogs range from Washington within the Cascade Mountains south to California where they occur in the Trinity Alps and to the east in Lassen National Forest. Cascade frogs are a montane aquatic invertebrate that require fresh water including mountain lakes, small streams, and ponds and meadows up to timberline. They are active during the spring and summer months and burrow into muddy bottoms of streams and ponds during the winter months for hibernation (USFWS 2024). During the non-breeding season, adults will use open, sunny areas, often along shorelines for basking and foraging opportunities. This species are generalists, and their diet typically consists of aquatic and terrestrial insects as adults though they have been found to prey on Pacific chorus frogs and conspecifics (Pope et al. 2014).

Reproduction cycle for the Cascade frogs occurs from late-May to mid-August in shallow still waters including stream pools, lake margins and clear mountain ponds. Eggs are laid typically in fish free waters and take eight to twenty days to hatch, with larvae developing over three months to metamorphose by late-August or early-September (CDFW 2020).

Wildlife databases have documented occurrences of Cascades frogs in Tangle Blue Creek, East Fork Trinity River, Swift Creek, Coffee Creek, Stuart Fork, Canyon Creek, and North Fork Trinity River (CDFW 2024d and USFS 2024a).

The **coastal giant salamanders'** range extends along the western coast of North America from southwestern British Columbia, through the Cascade and Coast Ranges, to northern California and Trinity County and occupies elevational ranges from sea level to 7,000 feet. This species can grow up to 13 inches long (Baird and Girard 1852) and some individuals remain aquatic for the entirety of their lifespan while others will transform from larvae into terrestrial adults (Johnston 2004). They spend most of their lives in and adjacent to one stream. They require cool, fast-flowing, and well-oxygenated streams with step-pool morphology with sufficient cover for hiding (i.e. rocks, and debris) and are typically found within fifty meters of a water source. Coastal giant salamander larvae require small, shallow pools with cover and substrate crevices while terrestrial salamanders inhabit moist forested areas with ample cover for hiding.

These salamanders will sit and wait for their prey to come within proximity of reach and will lunge quickly to grab their prey with their mouth. They will consume anything that they can overpower and fit in their mouth including invertebrates such as insects, worms, and snails as well as vertebrate species such as rodents, lizard, snakes, and other salamanders. Larvae will consume aquatic insects, mollusks, crayfish, and small fish (Baird and Girard 1852).

In order to reproduce, adult individuals must move from their terrestrial hiding places to a stream. Courtship takes place in a water-filled nest chamber beneath logs or rocks where the female will then deposit an entire clutch of 135 to 200 eggs within the nest chamber typically in May (Nussbaum et al. 1983). The female protects her eggs for up to seven months. Due to the ample care of eggs and territorial behavior, females only breed once every two or more years (Baird and Girard 1852).

Documented occurrences of coastal giant salamanders occur in Weaver Creek, Big French Creek, Canyon Creek, Swift Creek, Tangle Blue Creek, Upper Hayfork Creek, and Browns Creek HUC 10 subwatersheds.

5.9.2 Effects Analysis

Potential pathways for effects to the coastal giant salamander, foothill yellow-legged and Cascades frogs as a result of Project activities include the following:

- Injury or mortality of amphibians and their eggs at nest sites from construction activities within Riparian Reserves (negative effect to population abundance and reproduction).
- Disturbance and displacement due to work activities within riparian, wetland, and in-channel areas.
- Temporary habitat degradation and potential exposure of amphibians to chemicals, dewatering, exhaust, and fugitive dust.
- Habitat degradation from increased turbidity within a pond, river, stream, or tributary due to construction activities.
- Injury or mortality of amphibians due to species salvage and translocation (negative effect on population abundance and range).
- Stress, injury or mortality of reptiles from pile driving and blasting activities in or near waterways.

5.9.2.1 Avoidance and Minimization Measures

The USFWS Statewide Restoration BiOp has designated CMs for foothill yellow-legged frog populations that are listed as threatened or endangered under the ESA. The North Coast Distinct Population Segment (DPS) that occurs in Trinity County is not listed as an endangered or threatened species. However, general Amphibian

Protection Measures relevant to the project activities could be implemented if the North Coast DPS is listed under the ESA within the life of the EA. CMs including AMP-1 through AMP-9 from the USFWS Statewide Restoration BiOp would minimize the effects to foothill yellow-legged frogs, coastal giant salamander and Cascades frog. For detailed information on amphibian CMs and MMs see Appendix B of the EA.

When/where the NSO SRs are applied, they would decrease potential construction-related effects to this species during its breeding season, as well as to other wildlife species during their breeding season. If NSO surveys are conducted, NSO SRs may be lifted where there is no nesting activity, as described in Appendix B of the EA. Furthermore, to reduce the intensity and effects from pile driving, max dB of 207 dB L_{EAK} and 203 dB $SEL_{CUMULATIVE}$ thresholds (or the most current thresholds accepted by NMFS) have been determined for the project to reduce injury to fish species within waterways. This max threshold will also protect reptiles from injury or mortality from underwater pressure and hydroacoustic effects. Blasting has similar hydroacoustic effects to pile driving and similar avoidance and minimization measures would be implemented to reduce effects to fish, providing protection measures for foothill yellow-legged frogs, Cascades frog, and coastal giant salamander. Avoidance and minimization measures for pile driving and blasting include (Sections 3.6.11 and 3.6.12 of the Fisheries Technical Report):

- Utilize vibratory hammers when considered an appropriate installation method according to site conditions.
- Design channel spanning bridge structures so that in-channel pile driving would not be required.
- Avoid installing 24-inch and larger piles when possible
- Pile driving would be performed during recommended in-water work window.
- TRRP personnel and implementors would coordinate with NMFS when blasting is determined to be unavoidable.
- Blasting would be performed during recommended in-water work windows.
- Accomplish pile driving and blasting in dry conditions utilizing dewatering techniques as necessary and without impeding fish passage to the extent possible.
- Incorporate attenuation methods into blasting activities as directed by NMFS (e.g., bubble curtain, isolation casing, and dewatered cofferdam).

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The potential for adverse effects could be limited due to the following MMs throughout the duration of project implementation (RWQCB and Reclamation 2009):

- FYLF-4: If any construction in the Trinity River Mainstem, South Fork Trinity channels, or tributaries within the project boundary, would occur prior to August 1 of any construction season, a preconstruction survey for yellow-legged frog larvae and/or eggs would be conducted by a qualified biologist.
- FYLF-5: In the event that a yellow-legged frog individuals, larvae, or nests are observed within the construction boundary, the contractor would temporarily halt in-stream construction activities until the species has been moved to a safe location with suitable habitat outside of the construction limits.
- FYLF-6: Mitigation measures for addressing erosion and sedimentation and accidental spills would be fully implemented to mitigate for potential long-term impacts to dispersal habitat for the yellow-legged frog due to sedimentation and accidental spills.
- FYLF-7: The mitigation measure associated with the disturbance to riparian habitat would be fully implemented.

The potential for adverse effects would be limited due to the following CMs, if the North Coast DPS becomes an ESA-listed species within the lifespan of the EA and project implementation (USFWS 2025):

- FYLF-1: In areas where foothill yellow-legged frogs are known or assumed to occur, project activities in upland areas would be confined to August 1 through October 31.
    - For project activities in occupied aquatic breeding habitat that typically dries before the end of the autumn, grading and other disturbance will be confined to May 1 through November 15, and to when the breeding habitat feature (or portion of the feature where work would occur) has been dry for a minimum of 30 days before initiating work.
    - These frogs have a multi-year larval development stage and are present in aquatic breeding habitat year-round. Therefore, project activities in occupied aquatic breeding habitat that does not dry before the end of autumn will be confined to May 1 through November 15 and will require a USFWS-Approved capture and relocation plan prior to initiating grading and other disturbance in the aquatic breeding habitat. Dewatering sites will be located and timed to avoid and minimize adverse effects to instream flows and depletion of pool habitat.
- FYLF-2: Project activities would not result in long-term deleterious changes to water temperatures in occupied or potential habitat.
- FYLF-3: Any borrow sites used would be developed so that the topsoil is removed and piled at the base of the slope to act as a berm catching any sediment that may be transported downslope.

5.9.2.2 Effects Summary

Project activities may cause disturbance to individual foothill yellow-legged frogs, Cascades frogs, and coastal giant salamanders occupying suitable riparian habitats in or near activity areas. To reduce impacts, the project would incorporate foothill yellow-legged frog CMs if the North Coast DPS is listed under the ESA (FYLF-1 – FYLF-3), all MMs described above (FYLF-4 – FYLF-7), and pile driving and blasting avoidance and MMs listed above into restoration activity planning, design, and implementation to conserve habitat, individuals, and populations.

Foothill yellow legged frog CMs and MMs would likely protect Cascades frogs and the coastal giant salamanders minimizing negative effects to these species as well.

Effects to riparian habitat and biologically sensitive areas will be minimized by identifying and flagging in the field areas to be protected during construction activities reducing the potential for reduction of shaded riverine aquatic habitat. Riparian revegetation activities would occur to enhance and maintain functional habitat and would result in no net loss of riparian habitat and jurisdictional wetlands decreasing the likelihood that amphibians would lose suitable habitat. As a result, the potential to cause mortality or significant disruption to normal behavior patterns of these species is limited.

Future positive effects could occur as a result of restoring aquatic systems to a more habitable state for amphibians. Project design guidelines for restoration activities are focused on enhancement of anadromous salmonid habitat. Long-term restoration goals of enhancing salmonid habitat correlates closely with amphibian habitat enhancement including restoring structural features such as cover objects including logs and gravel/rock and working towards maintaining natural flow regimes to address water temperature, flow velocities, and water depths within the Trinity River (Reese and Welsh 1998). Furthermore, providing slow moving pools where frogs and salamanders can breed successfully. Temporary effects from project activities would be minor and long-term beneficial effects are expected to occur post-project implementation.

The Project may affect individual foothill yellow-legged frogs, Cascades frog, and the coastal giant salamander but potential effects to the population demography of these species are very limited and insignificant with implementation of CMs and MMs and would not cause a trend toward listing.

5.10 Big Bar [Pressley] hesperian snail (*Vespericola pressleyi*) & Trinity bristlesnail (*Monadenia infumata setosa*)

5.10.1 Species Account

Big Bar hesperian snails inhabit conifer and/or hardwood forest habitat in permanently damp areas within 656 feet (200 meters) of seeps, springs and stable streams. Herbaceous vegetation and leaf litter are common habitat elements associated with this species. Woody debris and rock refugia near water are used by this species during dry and cold periods. Recommended protection measures include conserving favorable canopy cover, woody debris and herbaceous vegetation in suitable habitats (USDI Bureau of Land Management 1999, Duncan et al. 1999, Roth 1984). This species is known primarily from the Big Bar area of the Trinity River but has also been found in limited locations in HUC 10 subwatersheds outlined below.

Trinity bristlesnails occupy areas along riparian corridors and uplands within Klamath mixed-conifer forests. Deciduous hardwood understory is a typical habitat trait where these snails are found. They also require plenty of leaf litter (depth of four inches), moss covered forest floors, and hard woody debris for cover. This snail can occasionally use dry sites that are not typically considered habitat; however, terrestrial gastropods are susceptible to thermal variances and depend on narrow temperature ranges. They will enter dormancy when their temperatures are too extreme and unfavorable for activity. They also rely heavily on the subterranean environment that provides the right temperature, humidity, and space for dispersing (Sullivan 2022).

Wildlife databases observations of Big Bar Hesperian snails occur within the Project activity area including Big French Creek, Lower Hayfork Creek, Lower South Fork Trinity River, Middle South Fork Trinity River, and Upper

Hayfork Creek HUC 10 subwatersheds. Trinity bristlesnail are documented in Big French Creek, Upper Hayfork Creek, Lower Hayfork Creek, Middle South Fork Trinity River (CDFW 2024d and USFS 2024a).

5.10.2 Effects Analysis

Potential pathways for effects to Big Bar hesperians and Trinity bristlesnail as a result of Project activities include the following:

- Injury or mortality of snails from vegetation removal activities within forested areas (negative effect to population abundance and reproduction).
- Disturbance and displacement due to construction activities within forested areas near seeps and springs.
- Temporary habitat degradation and potential exposure, injury or mortality of snails to chemicals, exhaust, and fugitive dust.
- Habitat degradation from the removal of native vegetation, woody debris and leaf litter.

5.10.2.1 Avoidance and Minimization Measures

The potential for adverse effects would be limited due to the following CMs (RWQCB and Reclamation 2009):

- INV-1: Applicable ACS standards and guidelines outlined in the Master EIR would be followed including felling trees in Riparian Reserves when they pose a safety risk. Keep felled trees on-site when needed to meet coarse woody debris objectives.

The potential for adverse effects could be limited due to the following MMs (RWQCB and Reclamation 2009):

- INV-2: All MMs for vegetation would be implemented during project activities to ensure reclamation and retention of riparian vegetation.

5.10.2.2 Effects Summary

The Big Bar hesperian is known from several sites within the Shasta-Trinity National Forest and it is unlikely, based on Strategic Survey results, that there are additional significant populations (USDA and USDI 2007). Project activities may cause disturbance to individual Big Bar hesperian snails or Trinity bristlesnails within work areas in the HUC 10 subwatersheds mentioned above. However, the potential for habitat alteration/impacts is limited due to the scale of projects that are planned to be implemented and the nature of the project aiming at restoring ecosystem functions and reducing erosion around roads.

Both snails are closely associated with moist or wet forested habitats, and the avoidance and minimization measures incorporated into the technical report will minimize negative effects to these species. Maintenance and restoration activities would enhance species composition and structural diversity of plant communities including upland habitats. As a result, the potential to cause mortality or significant disruption to normal behavior patterns of snails is very limited.

In summary, potential effects to snails would be minor with effects to individuals with the implementation of extensive avoidance and minimization measures for riparian zones and best management practices with the retention of large wood, further reducing potential effects to these species and their habitat (Appendix B of the EA).

The proposed action may affect individual Trinity bristlesnails and Big Bar hesperian snails, but potential effects to the reproduction and population demography of these species is limited and insignificant and would not cause a trend toward listing.

5.11 Western bumble bee (*Bombus occidentalis*), & Monarch butterfly (*Danaus plexippus*)

5.11.1 Species Account

Western bumblebees are generalist foragers on pollen and nectar from a diverse array of plant species. They are commonly found in riparian habitats, meadows, and recently disturbed areas. Nests are often in abandoned rodent burrows, and less frequently in abandoned bird nests or open grassy areas (Evans et al. 2008, Koch et al. 2012, Xerces Society 2013). In studies in the Sierra Nevada, abundance of these bees was influenced positively by the presence and proportion of meadows in surrounding habitat, in addition to meadow wetness (Hatfield and LeBuhn 2007).

This species inhabits the western United States from the Great Plains to the Pacific Coast and from Alaska to Southern California. Populations in west coast states have declined dramatically since the 1990's. The most likely cause of this decline is the spread of pests and diseases from the commercial bee industry (Evans et al. 2008). Other threats include habitat alteration and removal in the form of agricultural intensification, livestock grazing, urban development, and landscape fragmentation, which may reduce pollen and nectar sources and affect potential nest sites. Use of broad-spectrum herbicides may also reduce pollen and nectar sources. Additional reported threats include invasive species, use of insecticides, and climate change. Fire suppression may result in conversion of open meadows to forested habitats, reducing availability of meadow nest sites for this species (Evans et al. 2008, Koch et al. 2012, Xerces Society 2013). Accounts of foraging ranges for bumblebees in scientific literature vary widely (Greenleaf et al. 2007). Within the project area there are some meadows and open areas in forest lands, and some of these areas may support habitats suitable for this species; however, grassland/herbaceous land cover types make up about 11% of the entire Project activity area, limiting available habitat.

The western bumble bee, along with three other bumble bee species, were petitioned for listing under the California Endangered Species Act (CESA) in 2018 and it was determined that listing may be warranted in June 2019. Candidacy was reinstated for the western bumble bee on September 30, 2022, after litigation. This species is afforded the same legal protection to endangered or threatened species under the CESA and Fish and Game Code, §§ 2074.2 and 2085.

According to wildlife databases, the western bumble bee has documented occurrences in the following HUC 10 subwatersheds: Coffee Creek, East Fork Trinity River, Tangle Blue Creek, Swift Creek, Stuart Fork, North Fork Trinity River, Weaver Creek, New River, and Middle South Fork Trinity River (CDFW 2024d and USFS 2024a).

Monarch butterflies can be found throughout the contiguous U.S., and its range extends into southern Canada at least as far north as milkweed can be found. Monarch populations also exist in Hawaii, Central and South America, the Caribbean, Australia, New Zealand, and the Iberian Peninsula, along with several Indo-Pacific island groups; these populations are thought to be anthropogenically assisted but are considered naturalized (since 1800's). In 2020, the USFWS completed the Monarch (*Danaus plexippus*) Species Status Assessment Report,

version 2.1. This report provides extensive information about the monarch's life history, ecology, population trends, and information about their obligate host plant milkweed (primarily *Asclepias* spp.).

During the breeding season, monarchs lay their eggs on milkweed, and larvae emerge after two to five days. Larvae develop through five larval instars (intervals between molts) over a period of 9 to 18 days, feeding on milkweed and sequestering toxic chemicals (cardenolides) as a defense against predators. The larva then pupates into a chrysalis before emerging 6 to 14 days later as an adult butterfly. There are multiple generations of monarchs produced during the breeding season, with most adult butterflies living approximately two to five weeks; overwintering adults enter into reproductive diapause (suspended reproduction) and live six to nine months.

In many regions where monarchs are present, monarchs breed year-round. Individual monarchs in temperate climates, such as eastern and western North America, undergo long-distance migration, and live for an extended period of time. In the fall, in both eastern and western North America, monarchs begin migrating to their respective overwintering sites. This migration can take monarchs distances of over 3,000 km and last for over two months. In early spring (February-March), surviving monarchs break diapause and mate at the overwintering sites before dispersing. The same individuals that undertook the initial southward migration begin flying back through the breeding grounds and their offspring start the cycle of generational migration over again.

Western North American monarchs form a separate adaptive capacity unit (ACU) because they contribute unique variation in migratory behavior, ecology, reproductive behavior, wing morphology, flight performance, and disease/parasite resistance. In addition, along with the eastern North American ACU, the western North American ACU serves as the ancestral origin for the species worldwide (Pierce et al. 2014; Zhan et al. 2014). Like the monarchs in the eastern North American ACU, monarchs in the western North American ACU possess the unique migratory phenotype that is absent in the other six ACUs (Tenger-Trolander et al. 2019). Western North American monarchs also migrate long distances, although their migration is shorter than monarchs in the eastern North American ACU. Whereas eastern monarchs may fly well over 3,000 km to reach the Mexican overwintering sites, western monarchs reach the California coast by flying ~500 km to 1,600 km (Yang et al. 2016). Western monarchs occupy warmer climates throughout the summer to include the farther reaches of their range while they continue to breed in the hotter regions (expand their range). Eastern monarchs, in contrast, follow more of a stepping-stone path into the northern states, vacating areas as they warm and recolonizing their range.

Additionally, western monarchs use ecologically different breeding, migrating, and overwintering habitats (Brower et al. 1995), and the western North American ACU comprises as much as 30% of the area occupied by monarch butterflies in North America (Dilts et al. 2019). Differences in breeding habitat include climate (Zalucki and Rochester 2004) and availability and abundance of native nectar and native milkweed plants (Borders and Lee-Mäder 2015). It is hotter and drier in the west than the east, and the milkweed and nectar resources used by monarchs in west and east differ (Dilts et al. 2019). In the fall, western monarchs migrate from Canada and states west of the Rockies to overwintering groves located primarily along the California coast south into Baja California, Mexico (Jepsen and Black 2015). Roosting tree species used by western monarchs are different than those of the eastern population, and include blue gum eucalyptus, Monterey pine, and Monterey cypress (Griffiths and Villablanca 2015). There are fewer monarchs in the western population, spread out among hundreds of overwintering sites compared to fewer than 20 sites in Mexico for the eastern population (Jepsen and Black 2015; Vidal and Rendón-Salinas 2014).

Thus, in order to maintain representation within the western North American monarch population, it is crucial to conserve the long-distance migratory phenotype in the west for the unique adaptive capacity this behavior and its associated traits may offer.

The monarch butterfly was initially petitioned for listing as a threatened species under the ESA on August 26, 2014, by the Center for Biological Diversity, Center for Food Safety, Xerces Society for Invertebrate Conservation, and Dr. Lincoln Bower. On December 17, 2020, it was determined that listing the species as an endangered or threatened species was warranted but precluded by higher authority actions (85 FR 81813). On December 12, 2024, the monarch butterfly was proposed as threatened. 4,395 acres of critical habitat was also proposed for areas in Alameda, Marin, Monterey, San Luis Obispo, Santa Barbara, Santa Cruz, and Ventura counties (89 FR 10066).

The monarch butterfly has documented occurrences in the following HUC 10 subwatersheds: Tangle Blue Creek, Swift Creek, Stuart Fork, Weaver Creek, Big French Creek, and Lower Hayfork Creek.

5.11.2 Effects Analysis

Potential pathways for effects to western bumble bees and monarch butterflies as a result of Project activities include the following:

- Injury or mortality of bumble bees and butterflies from vegetation removal activities within meadows and areas suitable for milkweed (negative effect to population abundance and reproduction).
- Disturbance and displacement due to construction activities within riparian and wetland areas.
- Temporary habitat degradation and potential exposure of bumble bees and butterflies to chemicals, exhaust, and fugitive dust.
- Habitat degradation from the removal of native vegetation.

5.11.2.1 Avoidance and Minimization Measures

The proposed activities would not result in a significant or long-term reduction in food availability to these species for the following reasons:

- The Western bumble bee is a generalist forager, utilizing a wide variety of flowering species as food sources.
- Activities are likely to have a very limited effect on flowering plants due to native revegetation activities post project implementation.
- This project does not include the use of herbicides or insecticides, so there would be no effects to flowering plants, bumble bees, or butterflies from their use.

The potential for adverse effects would further be limited by the implementation of the following MMs for site-specific projects (RWQCB and Reclamation 2009; SRGO 2022):

- INV-2: A qualified biologist would identify potential construction access routes to ensure that these features avoid and/or minimize to the fullest extent impacts to jurisdictional waters. In addition, the project proponent will clearly identify, and flag in the field, biologically sensitive areas (e.g., jurisdictional waters and riparian habitat) to be protected.

- INV-3: Site restrictions, biological monitoring, environmentally sensitive areas (e.g. milkweed habitat and flowering plants) and dust control measures could be implemented to protect monarch butterfly habitat, individuals and larvae.

5.11.2.2 Effects Summary

If western bumble bees or monarch butterflies use the Project activity area, construction activities may cause disturbance to individuals near activity areas, and individuals may move away from activity areas temporarily during Project implementation due to the presence of humans and equipment. However, a bumble bee's and monarch's greatest threats include habitat alteration and removal in the form of agricultural intensification, livestock grazing, urban development, and landscape fragmentation which would not result from the Project activities. Use of broad-spectrum herbicides and insecticides that could reduce pollen and nectar sources or harm bees or monarchs would not be used at any point during site-specific project implementation.

The potential for habitat alteration/impacts would be very limited because non-native invasive plants would be removed during construction and site-specific project disturbance areas would be planted with native species following construction. This would decrease the likelihood that suitable habitat would be modified in such a way that would affect future populations. CMs specific to protecting existing wetland, meadow, and riparian habitat would prevent potential effects to this species and associated habitat (Appendix B of the EA). As a result, the potential to cause mortality or significant disruption to normal behavior patterns of western bumble bees and monarch butterflies would be very limited. With the removal of invasive species and native species planting, improvements to wetland, meadow, and riparian areas, bumblebees and butterflies could experience improved habitat in the long-term.

In summary, the Project may affect, is likely to adversely affect western monarch butterflies because the Project activity area overlaps with monarch habitat. However, with the implementation of CMs and MMs, and the fact that no insecticides or herbicides would be used, effects would be minor. The Project may affect individual western bumblebees, but potential effects to the population demography of this species are very limited and insignificant and would not cause a trend toward listing.

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6 Regional Effects

Regional effects include the short- and long-term impacts of the Project together with the past, present, and future actions of other projects. This analysis looks at other actions that have affected or could affect the same resources as action alternatives, in this case, watershed resources. The effects of past actions are reflected in the descriptions of current existing conditions. Lands in the vicinity of the Project activity area include USFS-, BLM-, and privately-owned land.

6.1 Cannabis Farming

In 2018, the State of California legalized the recreational use of cannabis, as well as the cultivation and manufacture of cannabis plants and products. In Trinity and Humboldt counties, there are many cannabis farms which collectively reduce flow volume and increase discharge of waste and pollutants in streams which affects water quantity and quality in the Project activity area. Presently, there is no watershed scale evaluation of the effects of cannabis farming on aquatic habitat in the Trinity River or to particular streams from cannabis farms. The operation of cannabis farms throughout the watershed will continue to negatively affect wildlife resources in the Trinity River and tributaries (NMFS 2020).

6.2 Residential Development

Human population growth in the Project activity area is expected to remain relatively stable over the next 10 years as California's economy continues to recover from a long-lasting nationwide recession. The recession has had significant economic impacts at both the statewide and local scales with widespread impacts to residential development and resource industries such as timber and fisheries. However, some development will continue to occur which, on a small-scale, can affect localized aquatic habitat. Once development and associated infrastructure (e.g., roads, drainage, and water development) are established, the effects to aquatic species are expected to be permanent (NMFS 2020).

Anticipated effects to aquatic resources include loss of riparian vegetation, changes to channel morphology and dynamics, altered hydrologic regimes (increased storm runoff), increased sediment loading, and elevated water temperatures where shade-providing canopy is removed (NMFS 2020).

The presence of structures and/or roads near waters may lead to the removal of large wood in order to protect those structures from flood impacts. The anticipated impacts to wildlife from continued residential development are expected to be sustained and locally intense. Commonly, there are also effects of home pesticide use and roadway runoff of automobile pollutants, introductions of invasive species to nearby streams and ponds, attraction of piscivorous animals due to human occupation (e.g., raccoons), increased incidences of poaching, and loss of riparian habitat due to land clearing activities. All of these factors associated with residential development can have negative impacts on wildlife populations broadly. However, population growth rate in Trinity County decreased by about 11% between 2010 and 2019 (U.S. Census Bureau 2020). This may indicate a trend that could ameliorate or reduce the effects of residential development (NMFS 2020).

6.3 Resource Extraction

Resource-based industries are likely to continue to have an influence on environmental conditions within the Project activity area for the indefinite future. Logging continues to be conducted on both public and private lands throughout the tributaries of the Trinity River, except in Canyon Creek (Reclamation 2019). STNF's vegetation management projects include those for forest health/thinning and fuels reduction. Some mining for gravel, aggregate, and minor precious metals occurs on the Trinity River floodplain and a few tributary watersheds. Mining operations can affect coarse sediment supplies and impair water quality via contaminated and sediment-laden runoff from operations. The lack of protective measures in existing regulatory mechanisms, including land management plans (e.g., State Forest Practice Rules), contribute in varying degrees to the decline of ESA-listed wildlife species. Sedimentation and loss of gravels associated with poor forestry practices and roadbuilding are particularly chronic problems that can reduce the productivity of riparian dependent wildlife species as well as affecting all wildlife species at a broader scale through trophic level disruption. However, resource extraction industries have adopted management practices that reduce many of their most harmful impacts, which were unknown or not commonly used until recently (NMFS 2020). The STNF regularly implements forestry projects using resource protection measures and BMPs to reduce sedimentation into streams and otherwise reduce effects to environmental resources.

6.4 Wildland Fire Control

Control of wildland fires may include the removal or modification of vegetation due to the construction of firebreaks or setting of backfires to control the spread of fire. This removal of vegetation can trigger post-fire landslides as well as create chronic sediment erosion that can negatively affect aquatic habitat that is important to wildlife. In addition, the use of fire retardants may adversely affect aquatic habitat if used in a manner that does not sufficiently protect streams, with the potential for aquatic organisms to be exposed to lethal amounts of the retardant (NMFS 2020).

6.5 Aquatic Habitat Restoration

Since 2009, the TRRP has implemented Trinity River mainstem channel rehabilitation projects at all the Phase 1 channel rehabilitation sites named in the 2000 Master EIR and at nine of the Phase 2 sites. The Deep Gulch and Sheridan sites were constructed in 2017. The Bucktail site constructed in 2008 was expanded in 2016 to include additional areas. The Dutch Creek project was constructed in 2020. The Chapman Ranch Phase A site was constructed in 2019 and the Phase B site was completed in 2021. The Oregon Gulch project was completed in 2023. These mainstem projects have improved anadromous fish spawning and rearing habitat throughout the extent of the Trinity River and in turn improve ecosystem functions for wildlife species.

TRRP continues to add sediment within the 40-mile reach downstream of Lewiston Dam. In addition, TRRP-managed flows have been implemented yearly since 2004. Ongoing monitoring efforts by TRRP partners continues to document improvements in aquatic habitat use, alluvial processes, and riparian vegetative communities along the mainstem. Continued sediment and wood augmentation projects are intended to improve anadromous fish spawning and rearing habitat which will contribute to the improved habitat for riparian and freshwater dependent wildlife species in the Trinity River mainstem.

Beyond TRRP's mainstem channel rehabilitation and sediment augmentation projects, there have been several restoration and road sediment reduction projects implemented by various agencies and organizations throughout the Trinity River watershed. While some of these were considered in the 2009 Master EIR, USFS, Five Counties Salmonid Conservation Program, Watershed Research and Training Center, Trinity County Resource Conservation District, Yurok Tribe, Hoopa Valley Tribe, Nor Rel Muk Wintu Nation, and other local nonprofits and governments have been funded for and/or completed additional projects intended to improve watershed conditions, restore aquatic habitat, improve aquatic connectivity, and reduce road-related sediment delivery to streams and rivers. These watershed restoration projects are intended to improve water quantity and quality as well as rearing habitat in the Trinity River watershed.

6.6 Proposed Action

The Proposed Action is a continuation and expansion of the watershed restoration efforts that have already been accomplished to date. The Project is an effort to streamline design and planning processes, including environmental compliance, for proposed restoration actions across the watershed, thereby increasing the number of restoration actions that can be implemented over time. Ultimately, as previously discussed, the Proposed Action intends to improve instream and riparian habitat to accelerate the recovery of north coast salmonid populations (coho salmon, steelhead, and Chinook salmon) and other special status aquatic species through site-specific restoration actions implemented to address the following objectives:

- Restore and improve instream conditions sufficient to support all life stages of salmonids and other aquatic species;
- Restore upstream and downstream fish passage for all life stages of salmonids;
- Restore continuous paths for wood dispersal, nutrient cycling, sediment transport, and movement of other vegetative material essential for productive aquatic habitat;
- Maintain or restore native plant communities and vegetative structure impacted by invasive plants and pathogens, while rehabilitating eroding streambanks to improve water quality, shade conditions, and large wood recruitment;
- Repair, replace, or remove ineffective instream structures;
- Restore and improve riparian and meadow habitat in order to promote healthy conditions for aquatic and terrestrial wildlife populations;
- Improve late summer/fall base flow conditions through process-based restoration, water conservation improvements, and meadow restoration;
- Increase nutrient inputs through salmon carcass placement in the watershed; and
- Stabilize upslope areas around road infrastructure to minimize erosion and sediment discharges within the watershed to bring the sediment impaired watersheds into compliance with sediment reduction TMDLs for the South Fork Trinity and Trinity Mainstem rivers (EPA 1998 & EPA 2001).

Each of the regional activities mentioned are discussed in the context of effects relative to the Proposed Action below.

6.7 Conclusion

Historically, species analyzed in the technical report and present within the STNF have been affected by cannabis farming, residential development, resource extraction, stream alteration, and wildfires. Historical disturbances can have confounding effects to wildlife species and future restoration projects such as this Project are aimed at reducing future ecological degradation and restoring ecosystem functions. Riparian Reserves and aquatic habitats that have been anthropogenically altered in the past would receive primary emphasis for improving quality of habitat and ecosystem functions for salmonids and wildlife species that rely heavily on complex aquatic systems. With future restoration efforts within the Trinity River watershed, wildlife species would benefit from improved habitat for years following implementation of the Project.

Long-term beneficial effects to wildlife species would occur as a result of restoration activities once construction activities are completed. Beneficial regional effects include an increase in habitat diversity; improved water quality and hydrologic regimes; which, in turn, provides refugia from high velocity flows for salmonids while also providing habitats important for thermal regulation for species such as NWPTs and foothill yellow-legged frogs. More basking structures would be installed during project construction with the addition of large wood and SLJs within the channel which provide cover habitat, high velocity flow refugia, and habitat diversity for prey species. Removal of non-native vegetation and planting of native vegetation will improve overall habitat quality including foraging and nesting areas for riparian dependent species. Long-term, restoration activities along with road decommissioning are likely to provide higher quality habitat for NWPT, foothill yellow-legged frog, and Big Bar hesperian snails and would not contribute to species decline.

Beneficial long-term effects to Pacific martens and fishers include providing high quality habitat following implementation. Native revegetation and adding or retaining large wood into the ecosystem would provide future denning opportunities and restore ecosystem functions that would also improve prey availability and foraging opportunities. Fishers would have a net gain of riparian denning and resting habitat through the revegetation management plan within site-specific project areas. A long-term net benefit is predicted for these species.

Bats could benefit from restoration activities long-term with restored riparian habitat. A net gain is anticipated post implementation in riparian habitat and would lead to improved foraging habitat for fringed myotis. Decommissioned roads and bridge replacements could lead to improved habitat for roosting and hibernacula after implementation. Long-term, positive regional effects are anticipated for bat species.

Positive regional effects for sensitive avian species include improved foraging habitat and reduction of anthropogenic disturbances with the decommissioning of roads. Restoration of riparian habitat within tributaries could improve foraging opportunities as well and improve habitat for salmonid species within tributaries in turn providing bald eagles with greater foraging opportunities for fish or carrion. Effects to NSO would be avoided and minimized through CMs incorporated into restoration designs during site-specific project analysis. In addition, the Proposed Action does not include activities that involve large amounts of tree removal and old growth trees would be retained to the extent possible.

Monarch butterflies rely heavily on native milkweed within their summer breeding zone which includes the Project activity area. In regard to western monarch butterfly conservation, the USFWS recommends maintaining and enhancing suitable monarch habitat within their summer breeding zone (USFWS 2023a). With

implementation of the recommended MMs as outlined in Section 5.11.2.1, western monarch habitat would be protected during Project implementation. Regional effects that benefit western monarchs could occur as a result of the Proposed Action if existing habitat is protected effectively and habitat improvements within wetland, meadow, and riparian areas are successful.

Habitat connectivity would not likely be impacted by the Project. Minimal fragmentation (rank 5) and limited connectivity opportunities (rank 1) occur within the Project activity area and there are likely to be negligible impacts to habitat connectivity as a result of the Project. No new permanent roads or urbanization would be implemented within the Project activity area therefore, the project will not contribute to habitat fragmentation. There could be short temporal habitat connectivity effects in localized areas to species with smaller home ranges (less than 3 acres) during implementation. However, overall, the Project would improve habitat connectivity long-term, benefitting wildlife.

Overall, potential effects to wildlife species as a result of the Proposed Action would be limited in intensity (through the use of avoidance and minimization measures during construction activities) and would be limited to the time required for project implementation. In addition, SRs would be incorporated into each site-specific restoration activity to reduce noise disturbance and harm/injury during the breeding season.

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Appendix M: Climate Technical Report

Public Draft

CLIMATE TECHNICAL REPORT

TRINITY RIVER WATERSHED RESTORATION PROJECT

CGB-ED-2025-034

DOI-BLM-CA-N060-2025-0010-EA

PROJECT #63121 (FOREST SERVICE)

MARCH 2025

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U.S. Department of the Interior, Bureau of Land Management
U.S. Department of Agriculture, Forest Service

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Acronyms

ACS	Aquatic Conservation Strategy
AF	acre-feet
BLM	U.S. Bureau of Land Management
BMPs	Best Management Practices
CBM	Condition-based Management
CDFW	California Department of Fish and Wildlife
CVP	Central Valley Project
DOI	U.S. Department of the Interior
EA	Environmental Assessment
EC	Environmental Commitments
EPA	Environmental Protection Agency
ESA	Endangered Species Act
GHG	greenhouse gas
HUC	Hydrologic Unit Code
LRMP	Land and Resource Management Plan
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NWFP	Northwest Forest Plan
NWI	National Wetlands Inventory
Project	Trinity River Watershed Restoration Project
Reclamation	Bureau of Reclamation
Regional Water Board	North Coast Regional Water Quality Control Board
RFO	Redding Field Office
ROD	Record of Decision
RMP	Resource Management Plan

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STNF	Shasta-Trinity National Forest
TRD	Trinity River Division
TRRP	Trinity River Restoration Program
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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1. Introduction and Summary

This technical report analyzes the climate-related effects of proposed restoration activities that are part of the Trinity River Watershed Restoration Project (Project). Adverse effects from early European settlement, roads, mining, logging, climate change, wildfire and a highly-sought-after water supply, have led to the need for restoration activities proposed by this Project. These activities intend to meet certain restoration objectives, which have been developed over time and incorporate state and federal recovery plan goals (NMFS 2014, CDFG 2004, EPA 1998, EPA 2001).

Climate change results from the incremental addition of GHG emissions from millions of individual sources, which collectively have a large impact on a global scale. All climate change impacts are not attributable to any single action but are exacerbated by a series of actions. Thus, this analysis addresses climate change's impacts with that concept in mind.

Table 1-1. Summary of Effects of Climate Stress and Proposed Action

Resource	Climate-Related Effects	Project Effects
Regional Conditions	Northern California temperatures are expected to increase by 5 to 9 degrees Fahrenheit (°F) by the end of the century, reducing soil moisture, decreasing snowpack, shifting species distributions, and altering wildfire behavior.	The proposed project would result in temporary greenhouse gas (GHG) emissions during construction. Long-term benefits would be increased wetlands and riparian areas that may sequester carbon, as well as improved watershed function that would increase wildfire resiliency, provide habitat refugia from climate extremes, and improve habitat conditions for species vulnerable to climate change impacts.
Stream and River Water Temperature	Klamath Basin water temperatures have risen approximately 0.9^0F (0.50C) per decade between 1960 and 2001. 1.2^0F (0.65^0C) per decade between 1995 and 2017. Climate change impacts to water temperatures are likely to continue to increase, resulting in declining habitat conditions for cold water fish and aquatic species.	Water conservation projects that would augment streamflow during high water temperatures and/or low streamflow can enhance likelihood of survival for a few aquatic T&E individuals of which there are already low in numbers. Restoration of rivers and streams creates complex stream morphology and can lead to increased habitat availability for cold water fish species and amphibians. Lowering floodplains, restoring and creating wetlands and riparian areas, and restoring stream geomorphic processes can help to improve temperature and draught conditions that are exacerbated by climate change by creating conditions that allow for water to be retained in the watershed for longer periods of time, sequestering atmospheric carbon in both soils and vegetation, providing refugia for wildlife species during temperature extremes and wildfire, and providing habitat for rearing and spawning cold water fish species.

Resource	Climate-Related Effects	Project Effects
Forested Ecosystems	Warmer air temperatures primarily impact mixed conifer and ponderosa forests by increasing evaporative demand (Restaino et al. 2016), which enhances water stress and associated growth declines and tree mortality and contributes to catastrophic wildfire.	Restoration activities to reduce the spread of invasive plant species would improve native vegetative species survival rates. Measures to promote soil moisture include vegetative community enhancement, water conservation actions, and floodplain reconnection activities.
Riparian Reserves	Riparian areas and the associated microclimate are highly sensitive to environmental changes. Disruptions occur commonly after high flow events or loss due to wildfires that can cause riparian system nutrient accumulations to reach disruptive thresholds that suddenly change the system from a carbon sink to a source	Long-term beneficial effects are expected as a result of: • The Proposed Action would include restorative treatments that would improve health of the riparian and aquatic habitats and the connectivity to neighboring habitats for refuge from inhospitable changes from climate effects. • Removing invasive species/noxious weeds in riparian corridors is highly desirable to prevent further spread that could occur during climate-related flooding.
Wetlands	Compared to all terrestrial ecosystems, wetlands have the highest carbon density, which makes them play an important role in global biogeochemical and carbon cycles and climate change (Kayranli et al. 2010). Climate change is identified as a major threat to wetlands. Warmer air temperature effects will increase evaporation from wetland areas and could promote drying around perimeter of wetland features. More extreme precipitation events (also expected with climate change) along with increased air temperatures are expected to promote photosynthesis that could maintain wetlands as carbon sinks. Decreased precipitation, however, could have the opposite effect and wetlands may become sources of carbon loss.	Process-Based Restoration (PBR) techniques using woody materials, soil, and rock to slow water flows, spread and share flow into areas that may have dried up can successfully promote water retention in a drying stream, spring, or wetland area.

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2. Proposed Action

The Trinity River Restoration Program (TRRP) was established to restore the fisheries of the Trinity River affected by dam construction and related diversions of the Trinity River Division (TRD) of the Central Valley Project (CVP). Administered by the Bureau of Reclamation (Reclamation), TRRP is a partnership of federal and state resource agencies, Tribes, and Trinity County. TRRP works to restore the processes and attributes of a properly functioning river and watershed to support the recovery of diminished salmon and steelhead populations while retaining the Trinity and Lewiston Dams' delivery of water and power to the Trinity River and California's Central Valley.

TRRP is the lead agency and the U.S. Forest Service (USFS) and Bureau of Land Management (BLM) are cooperating agencies for the Project, the purpose of which is to improve instream and riparian habitat at a watershed scale and to accelerate the recovery of north coast salmon populations (coho salmon, steelhead, and Chinook salmon), thereby fulfilling tribal trust responsibilities and obligations to local communities as well as recreational and commercial fishing industries (per the Shasta-Trinity National Forest Land and Resource Management Plan and state and federal recovery plan goals [NMFS 2014; California Department of Fish and Game 2004]).

The following describes the overall objectives of the Proposed Action:

- Restore and improve instream conditions sufficient to support all life stages of salmonids and other aquatic species.
- Restore upstream and downstream fish passage for all life stages of salmonids.
- Restore continuous paths for wood dispersal, nutrient cycling, sediment transport, and movement of other vegetative material essential for productive aquatic habitat.
- Maintain or restore native plant communities and vegetative structure impacted by invasive plants and pathogens, while rehabilitating eroding streambanks to improve water quality, shade conditions, and large wood recruitment.
- Repair, replace, or remove ineffective instream structures.
- Restore and improve riparian and meadow habitat in order to promote healthy conditions for aquatic and terrestrial wildlife populations.
- Improve late summer/fall base flow conditions through process-based restoration, water conservation improvements, and meadow restoration.

The Proposed Action consists of a suite of instream and riparian restoration activities that are designed to meet the objectives described above. Detailed descriptions of each of the proposed activity categories are included in Chapter 3 of the Project's Environmental Assessment (EA) document. Proposed Activities are grouped into three general categories: instream habitat restoration; upslope habitat restoration; and road maintenance, rehabilitation, and decommissioning activities. The activities proposed under each of these categories are summarized below.

1. Instream Habitat Restoration:
    - Restoration and Enhancement of In-Channel Habitat
    - Floodplain Restoration

- Removal or Retrofitting of Fish Passage Barriers, Small Dams, Flood Gates, Pilings and Other In-water Structures
- Water Conservation Projects
- Salmon Carcass Placement
- Remote Site Incubators

2. Upslope Habitat Restoration:

- Bioengineered Bank Stabilization
- Aquatic, Wetland, Riparian, and Upslope Habitat Enhancement

3. Road Maintenance, Rehabilitation, and Decommissioning Activities:

- Road Maintenance
- Road Rehabilitation
- Road Decommissioning

The Proposed Action is designed to comply and help achieve the desired outcome of the Aquatic Conservation Strategy (ACS), which is described Appendix C of the Project Environmental Assessment (EA), and in Appendix B6 of the Northwest Forest Plan (NWFP; Forest Service 1994). The ACS is a framework to guide the restoration and maintenance of the ecological health of watersheds and aquatic ecosystems on public lands within the habitat range of anadromous fish in the Pacific Northwest.

2.1 Project Location and Timing

The proposed activities would occur within a portion of the Trinity River watershed shown in Figure 2-1 below. Individual restoration actions would take place in and along tributaries of and the mainstem Trinity River (both above and below the Lewiston and Trinity dams) on both private (with permission of the landowner) and public lands (primarily managed by the USFS and BLM). The interrelationships between climate change and proposed activities to be implemented in certain areas are described in this technical report.

Key watersheds within the restoration activity area include North Fork Trinity River, South Fork Trinity River, Canyon Creek, and New River. These watersheds are particularly important because of the instream habitat that they provide for aquatic species. Within these watersheds, new roads are prohibited in roadless areas, and a no net increase of roads outside roadless areas is enforced by the USFS with the intent of preventing further habitat degradation.

For the EA, including this technical report, effects analyses were performed generally using the hydrological unit code 10 (HUC 10) watersheds. See Table 2-1 for watersheds included in the Project activity area.

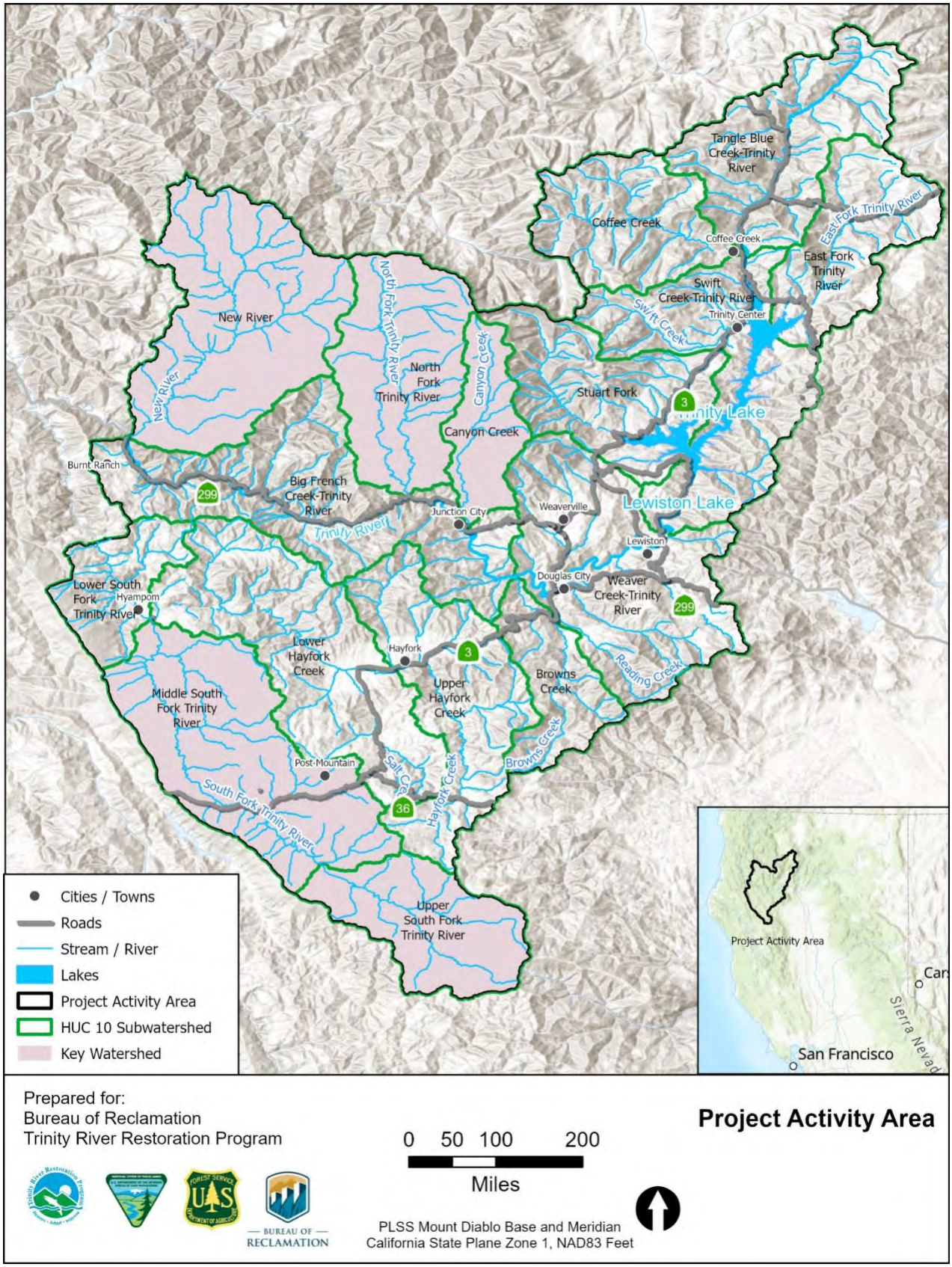

Figure 2-1. Project Activity Area (including Key Watersheds)

Table 2-1. HUC 10 Watersheds within the Trinity River Basin.

Subregion (HUC 4)	Basin (HUC 6)	Subbasin (HUC 8)	Watershed (HUC 10)	HUC 10 Number	Acres in Project Activity Area
Klamath-Northern California Coastal 1801	Northern California Coastal 180102	Trinity California 18010211	Big French Creek-Trinity River[1]	1801021111	153,325
			Browns Creek	1801021106	47,110
			Canyon Creek[4]	1801021108	41,033
			Coffee Creek	1801021101	74,835
			East Fork Trinity River	1801021103	74,335
			Horse Linto Creek-Trinity River[2]	1801021112	0
			New River[4]	1801021110	149,597
			North Fork Trinity River[4]	1801021109	97,483
			Stuart Fork	1801021104	88,264
			Swift Creek-Trinity River	1801021105	121,055
			Tangle Blue Creek-Trinity River	1801021102	101,393
			Weaver Creek	1801021107	142,030
		South Fork Trinity 18010212	Lower South Fork Trinity River[3,4]	1801021205	44,229
			Lower Hayfork Creek	1801021203	142,161
			Upper Hayfork Creek	1801021202	105,697
			Middle South Fork Trinity River[4]	1801021204	145,776
			Upper South Fork Trinity River[4]	1801021201	73,634

1. [1] A portion of Big French Creek is excluded from the Project activity area, namely the Sharber Creek HUC 12 subwatershed, because it is in the Six Rivers National Forest.
2. [2] Horse Linto Creek is located in the Six Rivers National Forest and is not included in the Project activity area.
3. [3] A portion of Lower South Fork Trinity River is excluded from the Project activity area, namely Grouse, Mingo, and Old Campbell Creeks (HUC 12 subwatersheds), because they are located in the Six Rivers National Forest.
4. ACS Key Watersheds

3. Environmental Setting

From its headwaters in the Salmon-Trinity Mountain range, in Trinity County, California, the Trinity River flows westward for 112 miles then enters the Klamath River near the town of Weitchpec, California. The Trinity River passes through Trinity and Humboldt counties and the Hoopa Valley (Hoopa Tribe) and Yurok Indian Reservations. The Klamath River flows northwesterly for approximately 40 miles from its confluence with the Trinity River before entering the Pacific Ocean near Requa, California.

The Trinity River watershed is located within two different geologic provinces: the inland Klamath Mountain and Coast Range provinces. Plate tectonics processes took a relatively thin oceanic plate and collided with a thicker, more buoyant continental crust, uplifting and deforming it to produce today's complex landscape. The Coast Range Province consists primarily of the Franciscan Assemblage and South Fork Mountain Schist, which is composed of generally unstable rocks of sedimentary and volcanic origin. The majority of the Trinity River basin lies within the Klamath Mountain Province to the east, formed by older metamorphic and igneous intrusive or plutonic rocks. Large granitic intrusions exist in the headwaters of Grass Valley Creek and along Rush and Weaver creeks, all originating in the Trinity Alps, which are part of the Salmon-Trinity range. Highly erodible slopes in these tributaries are a chronic source of fine sediment to the Trinity River system.

The Trinity River is an important water source for irrigation, hydroelectricity generation, and critical habitat for threatened and endangered salmonid species. River channels are formed and maintained by the dynamic interaction of three primary components: sediment of various size classes, varying quantities and ages of vegetation, and varying amounts of water. Complex interactions between these three components define the geomorphic environment and provide a diversity of physical structures (Sherer 2007). This complexity provides a variety of riverine and riparian habitats that can be used by different aquatic species under a range of flows.

Historically, the Trinity River functioned as a dynamic river reach that provided quality spawning and rearing habitat for anadromous fish. During the period of heavy gold mining that began in 1849 when gold was discovered in California, the mining practices and water diversions that were constructed wreaked havoc in Northern California, including the Trinity River basin. Roads were built rapidly in order to access gold first. The steep rugged terrain and complex geology of the region did not impede development. Virtually all tributaries have been subjected to hydraulic mining activities that removed streamside vegetation, thereby increasing water temperatures for lack of shade. Within the mainstem Trinity River, the limited distribution of coho salmon can likely be explained, at least in part, by water temperature (Reclamation 2019). The biological productivity and fish carrying capacity of much of the Trinity River basin has been reduced (USFWS and HVT 1999; EPA 2001). In addition, degradation of freshwater habitat has been pervasive in the Lower Klamath River contributing to declines in native fish runs (Gale and Randolph 2000).

The construction of Trinity Dam (California's 3rd largest reservoir holding 2.4 million acre-feet [MAF]) began in 1956 and was finished by 1962 as part of the Central Valley Project (CVP) to provide water for the agricultural farms of the Central Valley and for consumption in Southern California. Lewiston Dam was constructed just a year later as the afterbay of the Trinity Power Plant. Lewiston Dam is now the upper limit of anadromous fish migration on the Trinity River as no fish passage facilities have been built to allow fish to move further upstream. In addition, numerous barriers that deter the passage of aquatic organisms exist throughout the watershed.

At times, 90% of the Trinity River flow had been diverted to the Sacramento River basin, also contributing to the decline of Chinook salmon, coho salmon, and steelhead (NMFS 2014). This caused severe degradation of aquatic habitat of the Trinity River due to loss of deep-water habitats and a limited ability to maintain cool water temperatures required for cold-water fish survival. The minimal flows released were insufficient to maintain the Trinity River below the dams and, much of the mainstem between Lewiston and the North Fork Trinity River confluence became confined to a narrow channel bordered by densely vegetated berms. Today, flow diversion from the Trinity River basin to the Sacramento River basin has been adjusted so that about 50% of flows are kept in the Trinity River system downstream of the dams.

3.1 Northern California Climate Conditions

The climate of Northern California is characterized by cool wet winters and hot dry summers. The Trinity River is predominantly a rain-fed river. Annual precipitation in the watershed averages 57 inches. Precipitation ranges from 37 inches in lowlands around Weaverville and Hayfork, to as high as 85 inches in mountain ranges closer to the coast. The highest Trinity River flows occur between December and April. Large intense Pacific storms frequently strike California's north coast causing rapid runoff events and flooding. The high rainfall rates combined with rugged geography results in extremely fast runoff and a high risk of flooding during winter storms. Large volumes of rock and sediment carried by floods are spread along the streams forming wide alluvial channels. Almost no precipitation occurs in summer (August through October). Very low flow and

warm waters limit available fisheries habitat. The primary source of summer flow is groundwater base flow and snowmelt (when snowfall persists at higher elevations).

The TRRP continues to add sediment (gravel) within the 40-mile reach downstream of the Lewiston Dam and fine sediment impairment in the Grass Valley Creek area has been remediated (e.g., from the Hamilton ponds). In addition, TRRP-managed flows have been implemented yearly since 2004. Ongoing monitoring efforts by TRRP partners continue to document improvements in aquatic habitat use, alluvial processes, and riparian vegetative communities along the mainstem. Continued sediment augmentation projects are intended to improve anadromous fish spawning and rearing habitat in the Trinity River mainstem.

With climate change, air temperatures are rising and snowmelt is occurring much more rapidly. Significant increases in average mean annual temperatures between +1.66 to +2.76°F have been recorded at all the local weather stations (Butz et al. 2022). In recent years, the Trinity River watershed has been in a state of moderate to extreme drought with record high temperatures attributed to climate change. Warmer temperatures associated with climate change reduces the snowpack and alters the seasonality and runoff volumes of the hydrograph; the result of which is larger runoff events occurring earlier in the year due to a shift in precipitation falling as rain rather than snow (OEHHA 2023). The altered hydrograph patterns strain the ability of reservoir water managers (in this case, Reclamation) to provide cold-water releases for salmonids because of reduced cold water storage. Anadromous salmonids are dependent on cold-water to support their life cycle; therefore, the lack of cold water further stresses these vulnerable fish populations. Simultaneously, human demands for water are increasing at a time when streams are at all-time low-flow levels. Water warms more rapidly in shallow streams that have been depleted from water use demands, reducing and sometimes eliminating suitable cold-water aquatic habitat that is critical for fish survival.

Asarian et al. (2023) completed a review and synthesis of Trinity River mainstem and tributary water temperature data, and concluded the following about climate change impacts:

> *Climate change severity is affected by the amount of greenhouse gas buildup in the Earth's atmosphere. Snowpack is likely to decline substantially as air temperatures rise (Micheli et al. 2018). For example, under a high-emissions scenario, average snow water equivalent in areas above 3,000 ft elevation is predicted to decline from 11.6 inches in 1981–2010 to 4.3 inches in 2040–2069 and 1.6 inches in 2070–2099 (Micheli et al. 2018). The combination of more rain, less snow, and earlier snowmelt will cause earlier runoff and lower flows in spring and summer (CDWR and USBR 2016, Mote et al. 2014)... The date by which 50% of annual runoff has occurred is predicted to shift 9–42 days (varies by site scenario) earlier in the 2070s (USBR 2016). In the mainstem Trinity River, but not the tributaries, these changes will be somewhat ameliorated by capturing runoff in Trinity Reservoir.*
>
> *Water temperatures in the Trinity River and its tributaries are highly affected by river flow in the spring and summer… so are likely to rise substantially. Based solely on rising air temperatures, not including hydrologic effects (which as noted in the previous sentence are likely to be strong), water temperatures at several sites in the Trinity River Basin are predicted to increase 0.6–1.3°C (Flint and Flint 2012). In the adjacent Salmon River watershed, mean daily maximum August stream temperatures are predicted to be warmer than the 1990–2017 baseline by 0.9–2.0°C under the reduced-emission RCP4.5 scenario or 1.7–3.3°C under the high-emission RCP8.5 scenario, depending on the reach, with larger rivers warming more than small streams (Asarian et al. 2019).*

> *Storage in Trinity Reservoir is expected to be substantially impacted by climate change in the future with both lower end of September storage volumes… and warmer release temperatures...*

3.2 Trinity River Watershed Temperatures

Water temperatures in Trinity River tributaries vary on a seasonal cycle and typically range between 68^0 to 84^0F (20^0 to 29^0C) in the summer (July – August) and temperatures at or below freezing in the winter (December – February). Asarian et al. (2023) describe the watershed temperatures:

> *Mid-summer temperatures tend to be higher at sites with larger drainage areas, although there are many exceptions to this trend (i.e., high temperatures at Rush Creek and low temperatures at Horse Linto Creek). At most sites, water year type appears to exert a strong influence on temperatures during spring runoff (April–July), with much cooler temperatures in wetter years than drier years.*

The temperature of the Trinity and Lewiston reservoirs is affected by the temperature of the un-dammed tributaries above the dams; and mainstem Trinity River temperatures are influenced both by the timing and temperature of dam releases and by the temperature and timing of runoff from watershed tributaries that enter the river below the dams (Watercourse Engineering 2002, cited in Asarian et al. 2023). The temperature of reservoir water at depth, which is released into the mainstem, is typically cold but increases when the reservoir is drawn down. Temperature increases are most notable during periods of prolonged draught when the Trinity Reservoir has been drawn down to very low levels (Asarian et al. 2023). In a synthesis of 87 years of temperature data for the Trinity Watershed, Asarian et al. (2023) found that previous studies indicate that water elevations below 750,000 acre-feet (AF) tend to increase the occurrence of thermally problematic conditions for cold water fish. Overall, water temperatures at release depths from the Trinity Dam have been approximately 1.8^0F (1^0C) warmer during the period between 1998 and 2019, when compared to previous periods. Air temperature increases have risen in the region, consistent with the effects of climate change as discussed above; and likely have an impact on both the temperature of the Trinity Reservoir as well as the tributaries above and below the dam.

Asarian et al. (2023) note that it is difficult to quantify response of water temperatures to climate change and that current predictions likely underestimate the magnitude of the increases that are likely to occur. In their review of stream temperature studies, they found that water temperatures in the Klamath Basin watersheds, including the Trinity Watershed, increased approximately 0.9^0F (0.5^0C) per decade between 1960 and 2001. Temperatures within streams in the Klamath Basin increased 1.2^0F (0.65^0C) per decade between 1995 and 2017. These increases indicate that regional and Trinity River watershed stream temperatures have increased and that increases are becoming greater in magnitude, over the past 55 years, in conjunction with climate change trends. The degradation of ecological conditions of the Trinity River mainstem below Lewiston Dam, and its tributaries is identified in Asarian et al.'s (2023) review as an exacerbating factor to stream temperature characteristics:

> *[T]hermal heterogeneity allows ectothermic organisms like juvenile salmonids to choose water temperatures that maximize digestion rates and growth given their food intake (Brewitt and Danner 2014; Brewitt et al. 2017) or to seek refuge from warm summer temperatures where cold water pools (Nielsen et al. 1994; Brewitt and Danner 2014; and others)…historical land use (i.e., mining) and damming and diversion have severely limited the range of temperatures present in the unrestored channel during spring when flows are elevated but cannot spread out on*

floodplains.

3.3 Vegetation, Ecosystems and Wildfire

3.3.1 Forested Ecosystems

Years of wildfire exclusion has led to crowded overstocked conifer tree stands competing for space, water, and sun. This leaves forests more prone to insects, disease, and wildfire. Ecosystem damage is inevitable when wildfires occur under these conditions. The amount of live forest land in the Shasta-Trinity National Forest (STNF) decreased from 1990 to 2020 by about 57,884 acres. Roughly 98,500 acres burned at moderate and high burn severities (82% and 18%, respectively) in the Trinity River watershed over the last 15 years (2008-2023). This averages 0.5% (6,566 acres) of the watershed burned per year. Roughly half of the moderate burn severity areas are assumed to retain live vegetation.

The 2020 August Complex wildfire burned more than 1.3 million acres on multiple national forests and was the second largest fire in the Trinity River watershed, burning 36,000 acres. Eighty percent of the lands burned in the Trinity River watershed over the last 15 years had the most damage during the fires that occurred in 2015 and 2020. Salvage of dead trees occurred on most of the private lands, but little salvage occurred on federal lands due to dead trees deteriorating more rapidly than it takes to complete the NEPA process and salvage effort.

The forests in the Trinity River watershed are primarily evergreen forests, consisting of ponderosa pine (*Pinus* ponderosa) and Douglas-fir (*Psuedotsuga menziesii*). Stand ages are mostly over 80 years old with fewer young stands. Total ecosystem carbon stocks or pools, which is the amount of carbon stored in a forest ecosystem system, decreased by 0.4% in the Trinity River watershed from 1991 to 2020, and the primary disturbance influencing carbon uptake and storage, excluding soil carbon, was timber harvest. Carbon stocks, excluding soil carbon, the Trinity watershed would have been approximately 0.2% higher in 2011 if timber harvest had not occurred since 1990 and another 0.4% higher in 2020 if wildfires had not occurred. Soil biogenic carbon values, also known as carbon sequestration or storage, have high uncertainty because of data and modeling limitations and are likely underestimated. Forest stand development dynamics, a myriad of disturbances, climatic patterns, and environmental fluctuations have impacted ecosystem carbon uptake and storage in the watershed.

Disturbances such as wildfires, insects, and disease are likely to increase as a result of climate change, with consequent effects on forest carbon. Carbon uptake and storage in the watershed may be increasingly vulnerable to numerous threats related to climate change and its interactions with forest patterns and processes.

3.3.2 Wetlands and Aquatic Habitats

The highest aerial cover of emergent herbaceous wetlands occurs in the Swift Creek (2,093 acres), Stuart Fork (949 acres), East Fork Trinity River (676 acres), and Coffee Creek (142 acres) HUC 10 watersheds. Other HUC 10 watersheds, including Big French Creek, Middle South fork Trinity River, and Weaver Creek, have less than 100 acres of emergent herbaceous wetlands, while Canyon Creek, Lower Hayfork, New River, North Fork Trinity River, and Upper South Fork Trinity River have less than 10 acres of emergent herbaceous wetlands. The highest aerial cover of woody wetlands occurs in Coffee Creek (1,002 acres), Tangle Blue Creek (441 acres), Swift Creek

(310 acres), and Weaver Creek (218 acres). The remaining watersheds have less than 100 acres of woody wetlands.

The Swift Creek Trinity River has the highest aerial cover of open water with 6,970 acres. Stuart Creek has 3,128 acres of open water, East Fork Trinity River has 586 acres, and Big French Trinity River has 241 acres of open water. The remaining watersheds have between zero and about 200 acres of open water. Big French Creek Trinity River, Middle south Fork Trinity River, and Stuart Fork have the highest acreage of deciduous forest.

Wetland and aquatic habitats will experience increased use and pressures as many wildlife species are seeking water sources in wetland and aquatic areas that are subject to physical shrinkage and water quality impacts as a result of climate effects, such as air and water temperature increases.

3.3.3 Riparian Reserves

The riparian zone is an extremely dynamic area connecting aquatic and terrestrial ecosystems. It is one of the most diverse, complex, and active transitional habitats on Earth, supporting very high biodiversity (Naiman and Decamps 1997; Tockner and Stanford 2002). Riparian areas and the associated microclimate are highly sensitive to environmental changes. Disruptions occur commonly after high flow events or loss due to wildfires that can cause riparian system nutrient accumulations to reach disruptive thresholds that suddenly change the system from a carbon sink to a source (Naiman and Decamps 1997).

Instream large wood that is provided to streams and rivers from trees within the riparian zone has an important role in fluvial and biological processes. Accumulations of wood typically have at least one large wood piece upon which debris jams form. Instream wood piles dissipate stream energy, trap moving materials, and form instream habitat. Depending on size, position in the channel, and geometry, they can resist and redirect water currents, causing the erosive power of water to become spatially heterogeneous, thereby creating a mosaic of aquatic habitats. Maintaining and promoting continuity of healthy functioning riparian zones is key to providing refuge for aquatic and terrestrial wildlife species during transitional climatic stress.

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4. Environmental Consequences

The focus of the following effects analysis is on existing and projected future climate effects to processes and conditions in the Trinity River basin that would be affected by the Proposed Action alternative or without implementation of the Project restoration activities (No Action alternative).

4.1 Climate Change Effects

4.1.1 GHG Emissions

The Road Construction Emissions Model Version 9.0.0 was used to estimate GHG emissions for combustible fuel using assumptions of how many and what types of vehicles and machinery would be used to complete construction of project activities (CAPCOA 2024). Several projects ranging from minor culvert replacements to complex construction of wetland and stream habitat would be implemented each year throughout the watershed. Minor and complex projects would likely require hauling and transporting materials, excavation, and grading, which would generate GHG emissions from diesel- and gasoline-powered vehicles and equipment. More complex projects would also involve grubbing and land clearing, lowering of floodplains, creation of side channels and new channel alignments, excavation of ponds, removal of trees and vegetation, installation of upland and in-channel features, and extensive revegetation and monitoring. Medium and large size projects may also include road decommissioning and rehabilitation.

To determine the effect of the Proposed Action, a “carbon footprint” was developed based on the project activities potential generation of GHGs (primarily carbon dioxide [CO_2]). Project activities that would offset potential impacts were weighed into the equation. For minor projects, the calculation is based on up to 1 week of construction and one piece of equipment. Medium-sized projects would require up to a month of construction, and large projects would be extensive restoration efforts that would take up to a year. The calculation is based on up to 50 projects of varying sizes and complexity being completed in a year. Table 4-1 outlines the maximum GHG that is estimated to be produced by a single project and cumulatively during a year.

Based on the calculations in Table 4-1, annual GHG emissions associated with the use of heavy equipment would be measurable with the range of project activities. Emissions would be limited to the project construction period and GHG emissions and any effects on climate change would be at least partially offset in the long-term by the benefits from restoration activities that increase the amount of riparian and upland vegetation.

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Table 4-1. Estimated Maximum GHG, Measured as CO_2, by Project Size, per Year.

Size	Description	Estimated CO_2 per Site (tons)	Potential Number of Projects per year	Estimated Maximum CO_2 (tons)
Small	May take up to a week to complete not including restoration and monitoring; smaller than 1 acre; example: culvert replacement, remote site incubator installation, road maintenance activities	2.7	35	94.5
Medium	May take up to a month to complete not including restoration and monitoring; smaller than 10 acres; road decommissioning, road rehabilitation, small instream or upslope habitat restoration projects	22.1	10	221.0
Large	May take up to six months to complete not including restoration and monitoring; larger than 10 acres; large tributary or mainstem in-stream or upslope restoration project	304.2	5	1,521.0
All			**50**	**1,836.5**

4.1.2 Avoidance and Minimization for GHG Emissions

Due to the high fire hazard and history of equipment-caused fires in Trinity County, construction contractors would be required to follow BLM's applicable regulations as well as California PRC 4428–4442 during dry periods to minimize the potential for the initiation and spread of fire from the work site. Compliance with these federal and state requirements would reduce the potential for emissions due to wildland fire.

Environmental commitments listed in Appendix B are incorporated into the Proposed Action to reduce effects on GHG emissions. The following measures would be used to enhance the awareness of climate change when implementing project activities:

- Provide project contractors with educational material about fuel efficiency and incentives.
- Promote incentives for contractors to initiate ride-sharing programs.
- Promote the use of energy-efficient and alternative fuel construction equipment and transportation fleets through contract incentives.
- Require contractors to provide recycling bins for onsite waste materials.
- Provide incentives for contractors to use reusable water containers rather than plastic-bottled water.
- Provide incentives for contractors to hire locally to reduce travel time.
- Require reusable batteries for equipment that can use them.

4.2 Trinity River Watershed Temperatures

The Proposed Action would have a potential beneficial effect on stream and river temperatures that are being adversely impacted by climate change. Restoration of rivers and streams creates complex stream morphology and can lead to increased habitat availability for cold water fish species and amphibians. Lowering floodplains, restoring and creating wetlands and riparian areas, and restoring stream geomorphic processes can help to improve temperature and draught conditions that are exacerbated by climate change by creating conditions

that allow for water to be retained in the watershed for longer periods of time, sequestering atmospheric carbon in both soils and vegetation, providing refugia for wildlife species during temperature extremes and wildfire, and providing habitat for rearing and spawning cold water fish species.

In addition to in-channel and upslope restoration, proposed water conservation activities would augment streamflow during high water temperatures and/or low streamflow can enhance likelihood of survival for a few aquatic T&E individuals of which there are already low in numbers.

The No Action alternative would result in no beneficial effect that would reduce or offset climate change impacts in the watershed.

4.3 Vegetation, Ecosystems, and Wildfire

4.3.1 Forested Ecosystems

The Middle South Fork Trinity River and Big French Creek watersheds have the most forested land of all of the HUC 10 watersheds in the Trinity River basin. Long-term effects as a result of increased air temperatures are anticipated. The snowpack is less likely to fully develop when air temperatures are higher; and when it does develop, increased temperatures could cause early and rapid runoff, sometimes in the form of rain on snow events. High temperatures cause increased water evaporation and temperature of surface waters, which decreases surface and subsurface water storage and degrades water quality. Increased air temperatures also depletes soil moisture. Decreases in both soil moisture and water availability causes a reduction in forest growth rates and decreased carbon over the landscape. In addition to suppressed forest growth, the potential for wildfire has also increased. Wildfires are also likely to cause significant carbon storage losses, not only within the Trinity River basin but within the entire region.

These effects would continue under the No Action alternative while the Proposed Action would address these effects in the Project activity area to some extent. Restoration activities to reduce the spread of invasive plant species would improve native vegetative species survival rates. Measures to promote soil moisture include vegetative community enhancement, water conservation actions, and floodplain reconnection activities.

4.3.2 Wetland and Aquatic Habitats

If the Proposed Action alternative is implemented, measures would be taken to decrease water loss and enhance water storage such as the mechanical and process-based restoration techniques that include using native materials, wood, rocks to plug and slow down water movement and to promote activation of the floodplain, improve stream morphology, and establish wetland and aquatic habitat. These activities would promote resilience within these aquatic ecosystems. The Swift Creek and Stuart Fork HUC 10 watersheds include the largest overall area classified as wetlands and water (see the EA Appendix J, Vegetation, Botany and Wetlands Technical Report). Restoration activities to reduce the spreading of invasive plant species would improve native wetland vegetative species survival rates. Measures to promote wetland soil moisture would include vegetative community enhancement, in-stream and upslope restoration techniques, water conservation actions, and floodplain reconnection activities.

4.3.3 Riparian Reserves

The proposed Watershed Restoration Project has been designed to assist TRRP, BLM, USFS, and partner organizations in achieving these nine ACS objectives for the Trinity River watershed. The Trinity Watershed-riparian reserves are discussed in the EA Appendix C, ACS Compliance; and in the EA Appendix J, Vegetation, Botany and Wetlands Technical Report).

With ongoing disruptions within the riparian zone as a result of flood events anticipated as a result of climate change effects and a decrease in large wood recruitment due to wildfires, the No Action alternative would continue the trend of riparian ecosystem functions becoming increasingly limited within the Trinity River basin.

With the Proposed Action, 16 HUC 10 watersheds would be targeted for restoration activities focused on riparian reserves. The Proposed Action would include restorative treatments that would improve health of the riparian and aquatic habitats and the connectivity to neighboring habitats for refuge from inhospitable changes from climate effects. Long-term beneficial effects are expected as a result of restoration within the riparian reserves that enhance floodplains and develop or restore access to diverse aquatic habitats would provide some of the most desirable long-term effects that enhance riparian and aquatic habitat and floodplain connectivity. In addition, removing invasive species/noxious weeds in riparian corridors is highly desirable to prevent further spread that could occur during climate-related flooding.

The Project was developed using the ACS objectives that would benefit populations of native cold-water fishes throughout their life cycles and would help maintain the diverse mosaic of habitat types on the landscape that are essential for population resilience (Beechie et al. 2013). The Project focuses on riparian vegetation and instream habitat improvements that increase channel complexity and instream habitats. Removing and improving roads is intended to not only restore fluvial processes while also improving water quality by reducing erosion and instream sedimentation; but also to remove barriers that have prevented access to upstream aquatic habitats upstream that are presently inaccessible.

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5. Regional Effects

Regional effects include the short- and long-term impacts of a project together with the past, present, and future actions of other projects that may or have been occurring in the Trinity Watershed region. The analysis considered other actions that have affected or could affect climate as the Proposed Action alternative. The effects of past actions are reflected in the descriptions of existing conditions. Lands in the vicinity of the Project activity area include USFS-, BLM-, and privately-owned land.

Climate change will likely exacerbate the incremental and regional effects from past, present, and future actions, including cannabis farming, residential development, resources extraction, wildland fire control, fuels reduction, and aquatic habitat restoration, when taken together with the Proposed Action and the No Action alternative.

5.1 Cannabis Farming

In 2018, the State of California legalized the recreational use of cannabis, as well as the cultivation and manufacture of cannabis plants and products. In Trinity and Humboldt counties, there are many cannabis farms which collectively reduce flow volume and increase discharge of waste and pollutants in streams which affects water quantity and quality in the Project activity area. Presently, there is no watershed scale evaluation of the effects of cannabis farming on aquatic habitat in the Trinity River or to particular streams from cannabis farms and illegal cannabis cultivation on public lands The operation of cannabis farms throughout the watershed will continue to negatively affect aquatic resources in the Trinity River and tributaries that are being taxed by climate change (NMFS 2020). The Proposed Action would help to improve watershed health that is being impacted by cannabis farming and further exacerbated by climate change.

5.2 Residential Development

Human population growth in the Project activity area is expected to remain relatively stable over the next 10 years as California's economy continues to recover from a long-lasting nationwide recession. The recession has had significant economic impacts at both the statewide and local scales with widespread impacts to residential development and resource industries such as timber and fisheries. However, some development will continue to occur which, on a small-scale, can affect localized aquatic habitat resources that are impacted by climate change. Once development and associated infrastructure (e.g., roads, drainage, and water development) are established, the effects to aquatic species are expected to be permanent (NMFS 2020). Anticipated effects to aquatic resources include loss of riparian vegetation, changes to channel morphology and dynamics, altered hydrologic regimes (increased storm runoff), increased sediment loading, and elevated water temperatures where shade-providing canopy is removed (NMFS 2020). The project would improve the overall aquatic habitat resilience and function that is affected by both residential development and by climate change.

The presence of structures and/or roads near waters may lead to the removal of large wood to protect those structures from flood impacts, which may be more frequent under climate change conditions. The anticipated effects on vegetation resources from continued residential development are expected to be sustained and locally intense. Commonly, there are also effects of home pesticide use and roadway runoff of automobile pollutants, introductions of invasive species to nearby streams and ponds, and loss of riparian and upland

habitat due to land clearing activities. All these factors associated with residential development can have negative effects on vegetation resources by impacting vegetation communities and habitat for special status species. However, population growth rate in Trinity County decreased by about 11% between 2010 and 2019 (U.S. Census Bureau 2020). This may indicate a trend that could ameliorate or reduce the effects of residential development (NMFS 2020). Improved watershed conditions may result in greater flood and climate change resiliency for residential properties and communities in the region by reducing catastrophic consequences of flooding, draught, and wildlife.

5.3 Resource Extraction

Resource-based industries are likely to continue to have an influence on environmental conditions within the Project activity area for the indefinite future. Logging continues to be conducted throughout the HUC 10 watersheds. Some mining for gravel, aggregate, and minor precious metals occurs on the Trinity River floodplain and a few tributary watersheds. If flow is decreased by mining operations, riparian vegetation could be affected. The lack of protective measures in existing regulatory mechanisms, including land management plans (e.g., State Forest Practice Rules), contributes in varying degrees to stress on forest resources. However, resource extraction industries have adopted management practices that reduce many of their most harmful impacts, which were unknown or not commonly used until recently (NMFS 2020).

The proposed project may result in improved watershed conditions through in-channel and upslope restoration; culvert replacement, road maintenance, and rehabilitation of roads that may be used for extraction activities; and decommissioning of roads that contribute to diminished watershed health. Restoration activities would result in increased ecosystem function and health, including providing habitat and resilience for vegetation communities that may be impacted by resource extraction.

5.4 Wildland Fire Control and Fuels Reduction

The Klamath River watershed which includes the Trinity River watershed is completely within a “Priority Landscape” designated to address the Wildfire Crisis Strategy. This work is to reduce and control the spread of wildland fires. It frequently includes the removal or modification of vegetation and construction of firebreaks to prevent fire progression, but also through backfires that also control the spread of fire. Fuels reduction is often employed by BLM and USFS to proactively prevent wildfires or to slow the spread of fire, especially near human structures. The BLM has initiated the Statewide Wildland Urban Interface Fuels Treatments (SWFT) program (BLM 2023). Fuels reduction treatments are intended to reduce fire by modifying the vegetation structure, density, and fuel loads by removing live and dead vegetation.

Fuels reduction is proposed more often in and adjacent to the Wildland Urban Interface. Streams and wetlands create a natural fire break, and most fuels reduction treatments would not affect streams or riparian habitat. Because Project restoration activities would improve and increase native vegetation, increase and activate larger floodplain areas, reconnect aquatic habitat and stream habitat, increase habitat for native vegetation the Proposed Action would offset some of the loss of vegetation from fuels reduction and would not add incrementally to regional effects. The Proposed Action would also result in increased refugia during wildfire and improved resiliency in the watershed.

5.5 Aquatic Habitat Restoration

Since 2009, the TRRP has implemented Trinity River mainstem projects at all the Phase 1 channel rehabilitation sites named in the 2000 Master EIR and at nine of the Phase 2 sites. The Deep Gulch and Sheridan sites were constructed in 2017. The Bucktail site constructed in 2008 was expanded in 2016 to include additional areas. The Dutch Creek project was constructed in 2020. The Chapman Ranch Phase A site was constructed in 2019 and the Phase B site was completed in 2021. The Oregon Gulch project was completed 2023. Sky Ranch, Upper Conner Creek, and Sawmill are proposed to be completed in the next few years. These mainstem projects are anticipated to restore riparian vegetation by creating a greater diversity of wetland and riparian habitat within the Trinity River floodplain.

The TRRP continues to add sediment (gravel) within the 40-mile reach downstream of Lewiston Dam and fine sediment impairment in the Grass Valley Creek area has been remediated (e.g., from the Hamilton ponds). In addition, TRRP-managed flows have been implemented yearly since 2004. Ongoing monitoring efforts by TRRP partners continue to document improvements in aquatic habitat use, alluvial processes, and riparian vegetative communities along the mainstem.

Beyond TRRP's mainstem channel rehabilitation and sediment augmentation projects, there have been several restoration and road sediment reduction projects implemented by various agencies and organizations throughout the Trinity River watershed. While some of these were considered in the 2009 Master EIR, USFS, Five Counties Salmonid Conservation Program, Watershed Research and Training Center, and Trinity County Resource Conservation District have been funded for and/or completed additional projects intended to improve watershed conditions, restore aquatic habitat, improve aquatic connectivity, and reduce road-related sediment delivery to streams and rivers. These watershed restoration projects are intended to improve water quantity and quality as well as rearing habitat in the Trinity River watershed. Watershed and mainstem aquatic restoration activities would have a beneficial effect on natural resources impacted by climate change.

5.6 Conclusion

The Proposed Action would have an overall long-term benefit on the Trinity Watershed including the evergreen mixed conifer forests and wetlands, but specifically in the rivers, tributary streams and riparian reserves. Climate change has and will continue to negatively impact the regional and Trinity Watershed temperature and water quality, upland, riparian, and wetland ecology. This project proposes long term benefits to aquatic, riparian and watershed resources, with relatively minor short-term adverse effects. There are no adverse regional effects as a result of the implementation of the Proposed Action.

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