Elk River Sediment Remediation and Habitat Rehabilitation Pilot Implementation Project

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California Environmental Quality Act (CEQA)
Draft Initial Study and Mitigated Negative Declaration
State Clearinghouse #2019-xx-xxx

Prepared for:
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CALIFORNIA
Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

Funding for this project has been provided through an agreement with the State Water Resources Control Board

California Trout. Elk River Sediment Removal Implementation Pilot Project—Initial Study/Mitigated Negative Declaration. April 2019. Unincorporated Humboldt County, CA

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Chapter 1

INTRODUCTION

On behalf of the North Coast Regional Water Quality Control Board (RWQCB), California Trout (Project Applicant) has prepared this Initial Study/Mitigated Negative Declaration (IS/MND) to provide the public, responsible agencies, and trustee agencies with information about the potential environmental effects of the proposed **Elk River Sediment Remediation and Habitat Rehabilitation Pilot Implementation Project** (Project, or Proposed Project). The document was prepared pursuant to the requirements of the California Environmental Quality Act (CEQA) of 1970 (as amended) and the State CEQA Guidelines (14 California Code of Regulations 15000 et seq.)

1.1 Introduction

Elk River, the largest tributary to Humboldt Bay and natal stream to four species of anadromous salmonids, is undergoing intensive watershed-wide recovery efforts to remediate impairments associated with excessive channel sedimentation. Chronic high turbidity associates with the elevated sediment supply and reduced channel conveyance capacity resulting from channel sedimentation have impaired domestic and agricultural water supply, degraded aquatic habitat, and increased "nuisance"[1] flooding.

Watershed Setting

The Elk River drains a 58.3 square mile watershed in Humboldt County, California. The basin drains westward across the seaward slope of the outer Coast Range to the coastal plain and into Humboldt Bay, near the City of Eureka.82% of the mountainous upper third of the watershed is zoned as timber production zone. Humboldt Redwood Company (HRC and Green Diamond Resource Company (GDRC) own and manage 75% and 7% of the Upper Elk River watershed, respectively. The remaining portions of the upper Elk River Watershed comprise the Bureau of Land Management (BLM) Headwaters Forest Reserve established in 1999 (13%) and a combination of non-industrial timberlands, private residences, and agricultural land uses (5%). The lower Elk River Watershed is primarily under grazing and rural residential uses. Martin Slough is urbanizing, and additional residential development is anticipated in the coming decades.

[1] California Water Code §13050 defines nuisance to mean anything which meets all of the following requirements:
1. Is injurious to the health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property.
2. Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted in individuals may be unequal.

Occurs during, or as a result of, the treatment or disposal of waste.

Elk River provides critical habitat for several species of historically abundant anadromous salmonids, including coho salmon (Oncorhynchus kisutch), Chinook salmon (O. tshawytscha), steelhead (O. mykiss), and coastal cutthroat trout (O. clarkia). Three species (Chnook, coho) aand steelhead) are currently listed as endangered under the Federal Endangered Species Act (ESA), and coho are also listed under the California Endangered Species Act (CESA). Prior to human disturbances, Elk River supported large numbers of coho salmon (California Department of Fish and Game, 1994) (Weitcamp, 1995) (Humboldt Bay Watershed Advisory Committee (HBWAC), 2005), (National Marine Fisheries Service, 2014). The upper watershed, tributaries, and Mainstem Elk River provide exceptional potential for restoring salmonid spawning and rearing habitat (with some upper reaches within the watershed continuing to provide good quality habitat).

Watershed Condition and Impairment

The Elk River watershed has undergone several extensive anthropogenic disturbances over the last century and a half. Commercial timber harvest operations beginning in the late 1800s severely altered natural hillslope erosional processes and significantly changed sediment supply, transport, and depositional processes in stream channels and on floodplains. Stream channels were historically maintained relatively clean of large wood to facilitate transporting logs downstream. Timber harvesting and consequent management-related sediment loading markedly increased from 1988 to 2000 when Maxxam Corporation (Maxxam) owned and managed Pacific Lumber Company (PALCO). During this time, PALCO adopted more aggressive road building and silvicultural practices, accelerating the annual average harvest rate by approximately five times the previous long-term average (Regional Water Board 2013). During this period of accelerated harvest, Elk River experienced several water years with higher than average rainfall. Significant rainfall events that occurred across the highly erodible and recently disturbed landscape during these years resulted in numerous large landslides, historically unprecedented sediment delivery to the upper Elk River and its tributaries, and significant sedimentation in lower-gradient channel reaches. Elevated sediment loading and channel sedimentation continued through the last decade of the twentieth century. Humboldt Redwood Company is the current owner of these former PALCO lands and is working to mitigate controllable sediment sources.

Changes in floodplain land uses in Lower Elk River, primarily for livestock and dairy operations, have also affected stream channel, riparian vegetation, and salmonid habitat conditions. Estuarine and tidal wetlands were diked and drained to reclaim these lands for agricultural use, reducing the extent and effects of tidal influence in lower reaches of Elk River. Although land development and infrastructure are relatively limited in Elk River, numerous roads and bridges, rural residential developments, and other infrastructure have also altered watershed conditions.

Discharges of sediment and organic debris to watercourses have aggraded stream channels in the low gradient reaches of Elk River, significantly reducing channel capacity. Prior analysis of available North Fork Elk River, South Fork Elk River, and Mainstem Elk River cross-sectional area indicate there is approximately 640,000 cubic yards (yd^3) of excess stored sediment in the Elk River channel, including more than 280,000 yd^3 in the lower North Fork Elk River, nearly 100,000 yd^3 in the lower South Fork Elk River, and nearly 260,000 yd3 in the upper Mainstem Elk River (North Coast Regional Water Quality Control Board (NCRWQCB), 2013). Severe stream channel aggradation has increased the incidence of nuisance flooding, affecting property access and use and increasing the incidence of nuisance flooding, affecting property access and use and increasing the risk to human health and welfare. Fields, roadways, driveways, homes, and septic systems are frequently inundated. Overbank flooding onto roads and private properties in Elk River now occurs several times per year (depending on the frequency, intensity, and duration of storm events within the "impacted reach".[2]

Regulatory Setting

The State Water Resources Control Board (SWRCB) is responsible for the protection of resources which are held in trust for the public, must protect public trust uses whenever feasible, and must consider these public trust values in the balancing of all "beneficial uses" of water. Beneficial uses[3] broadly define the resources, services, and qualities of aquatic systems that are the ultimate goals of protecting and achieving high water quality. Each of the state's nine Regional Water Quality Control Boards (RWQCBs) is responsible for designating beneficial uses and establishing water quality objectives for waters within their region. These beneficial uses are defined in the Water Quality Control Plan, or Basin Plan, for each region. The basin plan designates or establishes: (1) beneficial uses to be protected; (2) water quality objectives; and (3) a program of implementation to achieve the water quality objectives (Water Code §13050).

Beneficial uses of water in the Elk River watershed include:

- Municipal Water Supply (MUN)
- Non-Contact Water Recreation (REC-2)
- Agricultural Supply (AGR)
- Commercial or Sport Fishing (COMM)
- Industrial Service Supply (IND)
- Cold Freshwater Habitat (COLD)
- Industrial Process Supply (PRO)
- Wildlife Habitat (WILD)
- Groundwater Recharge (GWR)
- Rare, Threatened, or Endangered Species (RARE)
- Freshwater Replenishment (FRSH)
- Migration of Aquatic Organisms (MIGR)
- Navigation (NAV)

[2] Defined by the North Coast RWQCB as extending from the confluence of Brown's Gulch on the North Fork Elk River and Tom's Gulch in the South Fork Elk River to Berta Road on the Mainstem Elk River. (North Coast Regional Water Quality Control Board (NCRWQCB), 2016)

[3] Beneficial uses are the cornerstone of water quality protection under the RWQCB Basin Plan for the North Coast region. Designated beneficial uses, plus water quality objectives, form the basis of water quality standards. The federal Clean Water Act and California Water Code mandate the development of water quality standards for all waterbodies within the state, including wetlands

- Spawning, Reproduction, and/or Early Development (SPWN)
- Hydropower Generation (POW)
- Aquaculture (AQUA)
- Water Contact Recreation (REC-1)
- Estuarine Habitat (EST) (applies only to estuarine portion of the watershed)
- Flood Peak Attenuation/Flood Water Storage (FLD)
- Wetland Habitat (WET)
- Water Quality Enhancement (WQE)

Per the Porter-Cologne Water Quality Control Act, "water quality objectives" are defined as the allowable "limits or levels of water quality constituents or characteristics that are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." Elk River channel conditions do not currently meet established water quality objectives for sediment, suspended material, settleable matter, turbidity, and dissolved oxygen. Degraded conditions adversely affect multiple beneficial uses including Municipal Water Supply (MUN), Agricultural Supply (AGR), Cold Freshwater Habitat (COLD), Rare, Threatened, or Endangered Species (RARE), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), and Water Contact Recreation (REC-1).

To address flooding, mechanical removal of in-stream sediment deposits in the middle reach was proposed by residents in 1998. In response, the RWQCB convened a Technical Advisory Committee (TAC) to guide discussion and identify information needed to understand the effectiveness and potential environmental consequences of dredging, among other sediment remediation alternatives. Based on TAC recommendations, the RWQCB concluded that:

1) A better understanding of existing channel conditions and physical processes was necessary to evaluate the potential effects of sediment remediation measures and other direct actions designed to hasten beneficial uses of water in Elk River; and
2) Development of appropriate and effective measures would require an integrated, system-wide, and scientifically-based planning effort informed by predictive modeling of hydraulic and geomorphic response to potential treatment alternatives.

To better understand causative mechanisms associated with sediment impairment, the RWQCB initiated technical studies to evaluate erodible geology, tectonic uplift, and inter-seismic subsidence on past discharge volumes and the relative contribution of each mechanism on the system's ability to transport sediment. For more information, refer to the ***Upper Elk River: Technical Analysis for Sediment*** (TetraTech, 2015) which describes the Elk River's assimilative capacity for sediment and therefore serves as the basis for the TMDL and this report:

https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/elk_river/pdf/151222/03_20151021_Upper_Elk_River_Tech_Analysis_for_Sediment.pdf.

Per the provisions of §Section 303(d) of the Clean Water Act, waterbodies that do not meet their designated beneficial uses are placed on a list of "impaired water bodies"—commonly referred to as the 303(d) list[4]. Elk River was placed on the 303(d) list of impaired waters in 1998, leading to the development of a Total Maximum Daily Load (TMDL) to satisfy the requirements of the CWA and development of a program of implementation to satisfy the requirements of the Porter Cologne Water Quality Control Act. The RWQCB released for public review a staff report for a Sediment TMDL for the Upper Elk River in 2013 (RWQCB, 2013). After additional technical reports and a lengthy public process of amending the Basin Plan, the RWQCB adopted the Action Plan for the Upper Elk River Sediment TMDL in 2016 (TWQCB, 2016). In the subsequent two years, the SWRCB and Office of Administrative Law approved the Basin Plan amendment, and the Upper Elk River Sediment TMDL became state law under California Code of Regulations Section 3909.6. Likewise, US EPA approved the Upper Elk River TMDL pursuant to Clean Water Act section 303(d) and implementing regulations.

The Action Plan associated with the Upper Elk River Sediment TMDL identifies a combination of regulatory and non-regulatory actions that will lead to the attainment of water quality objectives, recover beneficial uses, protect high quality waters, and abate nuisance conditions in the Upper Elk River watershed. Due to continued instability in the watershed and the inherent uncertainty with existing sediment transport processes,

The *Program of Implementation* (sometimes referred to as the Implementation Framework) identifies a combination of regulatory and non-regulatory actions that will lead to the attainment of water quality objectives, recovery of beneficial uses, and prevention of nuisance conditions. The Program of Implementation is an adaptive management approach involving sophisticated watershed modeling, and collaborative watershed stewardship. Its three main components include:

- Waste Discharge Requirements (WDRs) to minimize sediment loads from new and existing sediment sources in the Upper Elk River Watershed.
- Two non-regulatory programs intended to inform the restoration strategy–the **Elk River Recovery Assessment** and the **Elk River Watershed Stewardship Program**, described in more detail in the following section.

Per the Action Plan for the Upper Elk River Sediment TMDL, "pilot remediation projects will be implemented as part of the Elk River Recovery Assessment, including effectiveness monitoring to

[4] For more information on the **Elk River Sediment TMDL** and other related projects and programs, see the North Coast RWQCB's Elk River TMDL home page located at: https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/elk_river/.
For more information on TMDLs, see ***How TMDLs are Adopted: The Basin Planning Process*** fact sheet located here: https://www.waterboards.ca.gov/rwqcb2/water_issues/programs/TMDLs/mainpagegraphics/basin_planning_fs.pdf.

assess which techniques should be brought full-scale." (North Coast Regional Water Quality Control Board (NCRWQCB), 2016)

The Proposed Project has been funded by State Water Resources Control Board (SWRCB) Timber Regulation and Forest Restoration Fund, Agreement No. D1513103. California Trout (CalTrout) is the grant recipient and will serve as permit applicant (landowner Duly Authorized Agent). According to the Grant Agreement, California Trout will implement a pilot sediment remediation project on the North Fork of the Elk River to test key assumptions of the Elk River Recovery Assessment (ERRA), the predictive ability of the Hydrodynamic Sediment Transport (HST) Model, and the success, cost-effectiveness, and permitting requirements associated with mechanical sediment removal.

The Elk River Recovery Assessment

In 2013, in part to address the TAC recommendations described above (e.g., better understanding of existing conditions, and a system-wide planning effort), the RWQCB received funding from the State Water Board Cleanup and Abatement Account to conduct the Elk River Recovery Assessment (Recovery Assessment or ERRA) and Sediment Remediation Pilot Implementation Project. The goal of the Recovery Assessment, completed in October 2018, was to test the response of the system to a suite of direct recovery actions. Identified potential recovery actions include mechanical sediment remediation; new channel construction; on-channel or off-channel detention basins; levee construction or modification; vegetation management; infrastructure improvements; creation of floodplain benches, high flow channels, and placement of in-stream large wood habitat structures. The Recovery Assessment concluded in October 2018 with the release of a Final Report which is intended to satisfy the RWQCB's need for a feasibility study for sediment remediation. The **Elk River Recovery Assessment: Recovery Framework** (California Trout, 2018) analyzes the system-wide fate and transport of sediment deposited in the Elk River Channel since approximately 1988. It evaluates channel conditions following future implementation of the Elk River TMDL Action Plan and associated waste discharge requirements, and the potential of the Elk River to recover beneficial uses under different management scenarios:

https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/elk_river/pdf/181203/ERRA%20Framework%20with%20appendices_181202%20(large).pdf

The Elk River Watershed Stewardship Program

To accompany the Regional Water Board's regulatory program (TMDL Action Plan and Waste Discharge Requirements [WDRs]) and the Recovery Assessment's technical feasibility studies, the RWQCB is also supporting the Elk River Watershed Stewardship Program. The intent of the Stewardship Program is to coordinate private landowner, resource agency, and other stakeholder participation in recovery planning and implementation.

The Stewardship Program will:

1) Coordinate directly with watershed residents, state and federal resource agency staff, and other stakeholders to solicit input and transmit information on recovery program activities that are ongoing throughout the watershed.
2) Provide a broad umbrella under which specific working groups form to coordinate resource management issues in a collaborative and transparent way.
3) Seek to build partnerships, interpret technical studies for stakeholders, landowners, and the public, and identify pilot projects and future remediation actions that are feasible, fundable, and broadly supported by stakeholders.

The outcome of the Stewardship Program will result in an *Action Plan for the Recovery of Beneficial Uses of Water in Elk River.* The action plan will support development of a Programmatic Environmental Impact Report/Environmental Impact Statement required by CEQA and NEPA respectively and during federal Endangered Species Act consultation.

1.2 Project Goals and Objective

The goal of the Proposed Project is to begin to remediate excess fine sediment, nuisance flooding, loss of water quality beneficial uses, and degraded juvenile salmonid rearing habitat uses by excavating approximately 22,000 cubic yards of sediment from the bed and banks of the North Fork Elk River within the Project area to re-create a more natural channel form and salmonid habitat.

Attendant to the Project goal, the objectives of the Elk River Sediment Remediation and Habitat Rehabilitation Pilot Implementation Project are to:

- Reduce the frequency and duration of nuisance flooding by lowering water levels;
- Reconstruct a natural channel morphology of riffle-pool sequences, with deep pools (>3-6 ft deep), fine gravel-bedded riffles, and abundant large wood habitat structures;
- Enhance winter and summer juvenile salmonid habitat by expanding rearing habitat area and increasing winter habitat refugia related to large wood structures and off-channel areas;
- Increase the sediment transport capacity during winter storms;
- Monitor annual rates and volumes of sediment aggradation in re-constructed channels, and the persistence and utilization of rehabilitated habitat features;
- Improve low Dissolved Oxygen (DO) concentrations during the summer low-flow rearing season;
- Maintain existing riparian habitat and enhance riparian understory and canopy species diversity;
- Avoid short-term and long-term impacts to private property and public infrastructure; and

- Determine the regulatory compliance pathways for addressing construction-related impacts from Project implementation, including environmental constraints, CEQA compliance, regulatory permit conditions, sediment disposal options, construction logistics, and cost details.

The results of the Proposed Project will contribute to:

- Evaluating the feasibility of mechanical sediment remediation as a treatment approach along the impacted reaches of the Elk River, including methods, logistics, cost-effectiveness, and outcomes;
- Testing the predictive ability of a Hydrodynamic Sediment Transport (HST) Model developed as part of the Elk River Recovery Assessment (ERRA);
- Planning for a next-phase, large-scale program to address nuisance conditions and restore beneficial uses in the lower Elk River; and
- Demonstrating to the local community the process for project design, regulatory compliance, and implementation that will be required to implement a larger-scale restoration program throughout the entire "impacted reach."

1.3 Project Location

The Elk River drains a 58.3 square mile (mi^2) watershed in Humboldt County, California. The basin drains westward across the seaward slope of the outer Coast Range to the coastal plain and into Humboldt Bay, near the City of Eureka (**Figure 1**). The basin can be divided into four main areas: (1) North Fork Elk River (58.2 km^2), (2) South Fork Elk River (50.4 km^2), (3) Mainstem Elk River downstream of the North Fork Elk River and South Fork Elk River confluence (26.9 km^2), and (4) Martin Slough (15.3 km^2) (**Figure 1**).

The Proposed Project is located in the Lower North Fork Elk River Subbasin within the Upper Elk River waterbody. The Project area is located in the McWhinney Creek and Fields Landing USGS quadrangles (T4N, R1W, Sections 25 and 26). The North Fork Elk River's legal description at the confluence with the Elk River is T04N R01W S26. Its location is 40,7025 degrees north latitude and 124.1511 degrees west longitude, LLID number 1241512407026. The Proposed Project is located on private property (six parcels) along the lower-most 6,200 ft of the North Fork Elk River, in unincorporated Humboldt County, California (Table 1).

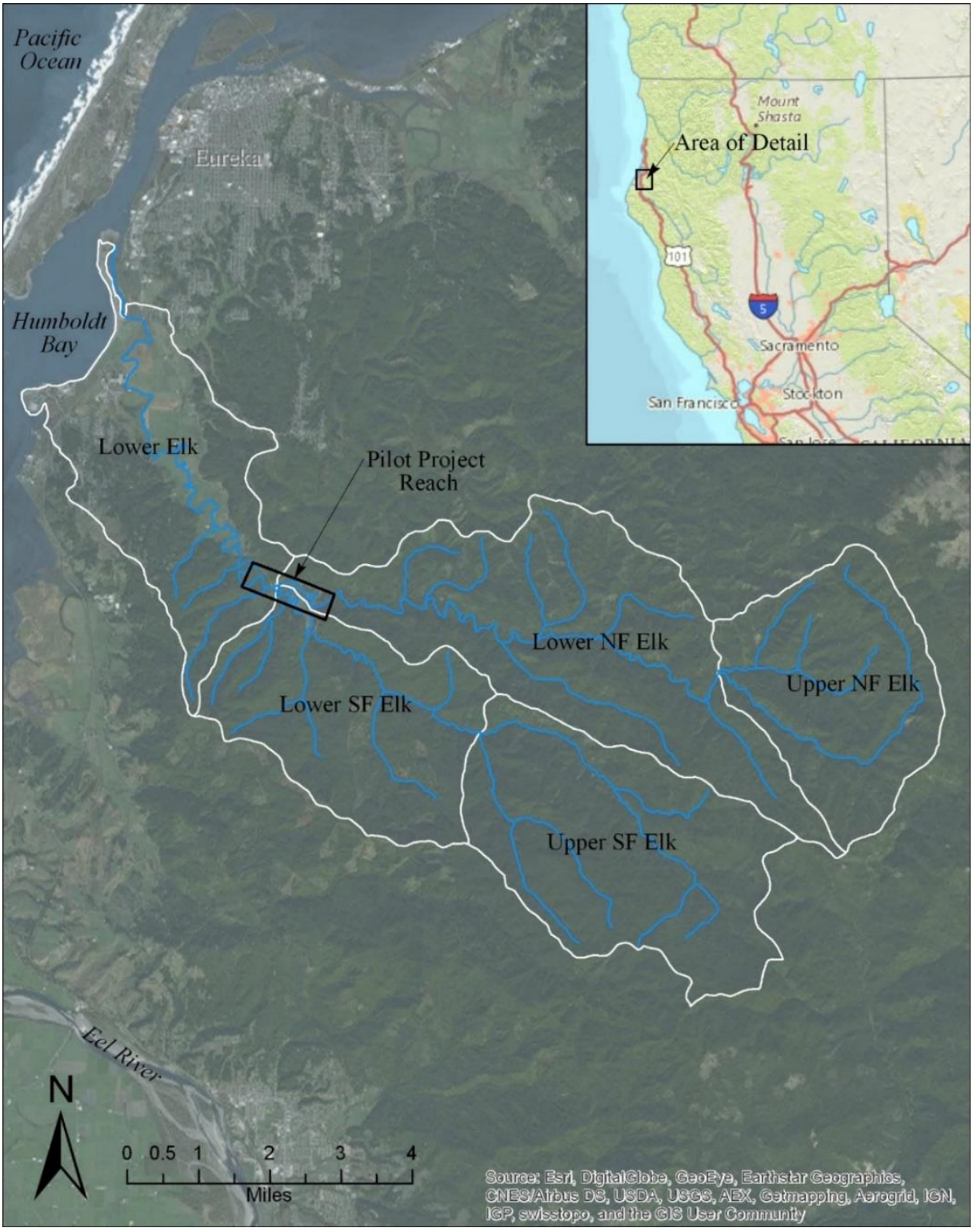

Figure 1. Project location overview map.

Table 1. Summary of property ownership and associated General Plan Land Use Designation and Zoning (Humboldt County, 1995, pp. 33, 34)

Assessor's Parcel Number	(Parcel Center) Latitude Longitude	Zoning (Current General Plan)	Zoning with Combining Zones	Landowner Names	Address
311-041-006	40.6995 +-124.1419	AR-10 (Eureka Community Plan [ECP])	AG-B-5 (10)	Wrigley	2550 Wrigley Road Eureka, CA 95503
311-242-001	40.7016- 124.1462	AR-10 (ECP)	AG-B-5(10)	Nicklas, Philip M & Sharyn E	8094 Elk River Road, Eureka, CA 95503
311-243-002 (access only)	40.7012 +-124.1478	AR-10 (ECP)	AG-B-5 (10)	Nicklas, Philip M & Sharyn E	8094 Elk River Road, Eureka, CA 95503
311-243-001	40.7025 +-124.1488	AR-10 (ECP)	AG-B-5(10)	Keele, Scott and Susan	8080 Elk River Road, Eureka, CA 95503
311-021-013	40.7039 +-124.1555	AR-10 (ECP)	AG-B-5(10)	Wrigley	7968 Elk River Road, Eureka CA 95503
311-041-008	40.6977 +-124.1413	AR-10 (ECP)	AG-B5 (10)	HRC (property across from Wrigley Orchard channel excavation)	No Address (Property line is center of channel per HRC)

The Project proposes sites in FEMA's 100-year flood hazard zone (Figure 2) and Humboldt County's designated Streamside Management Area (Figure 3).

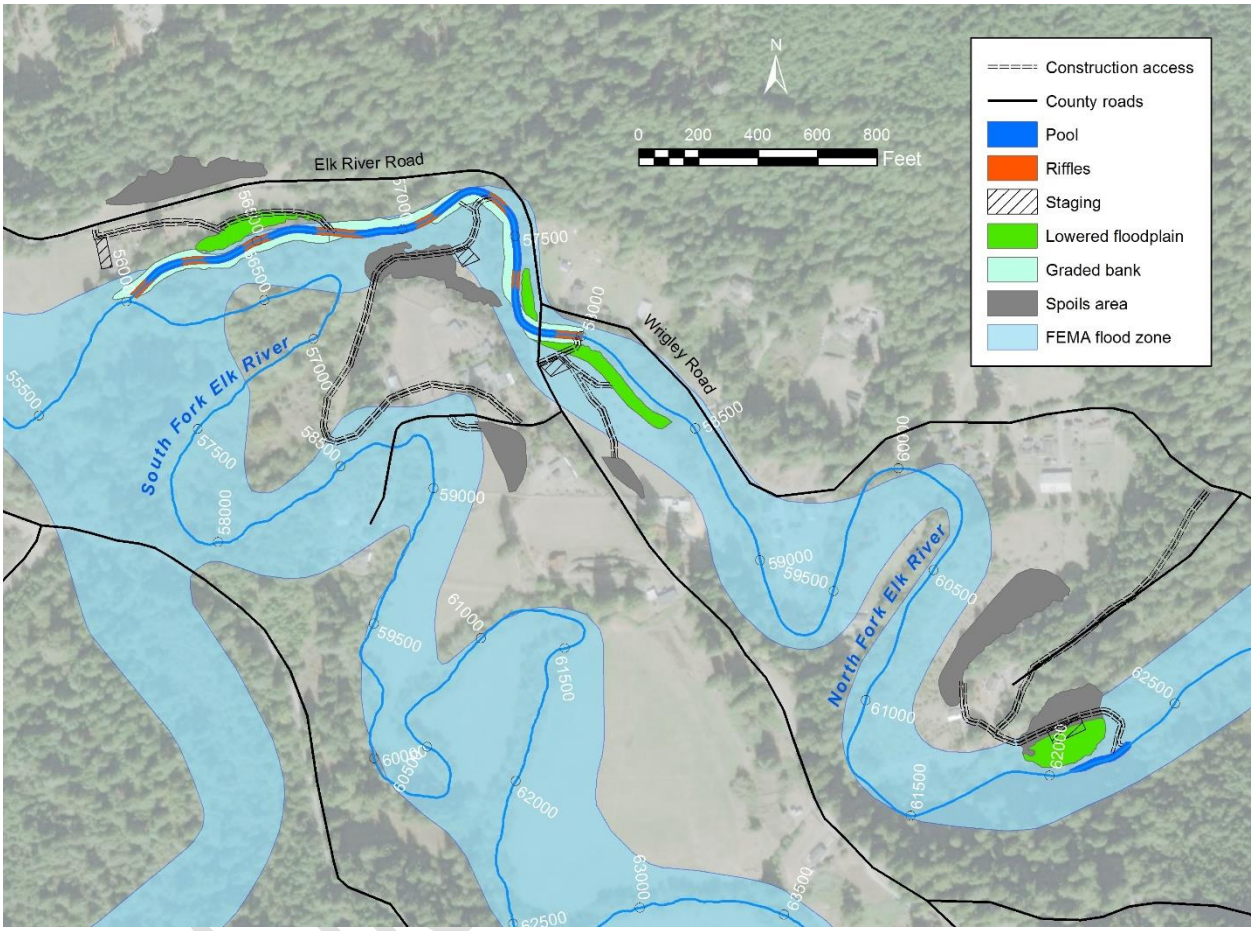

Figure 2. FEMA's 100-Year Flood Zone overlaid on proposed project action areas.

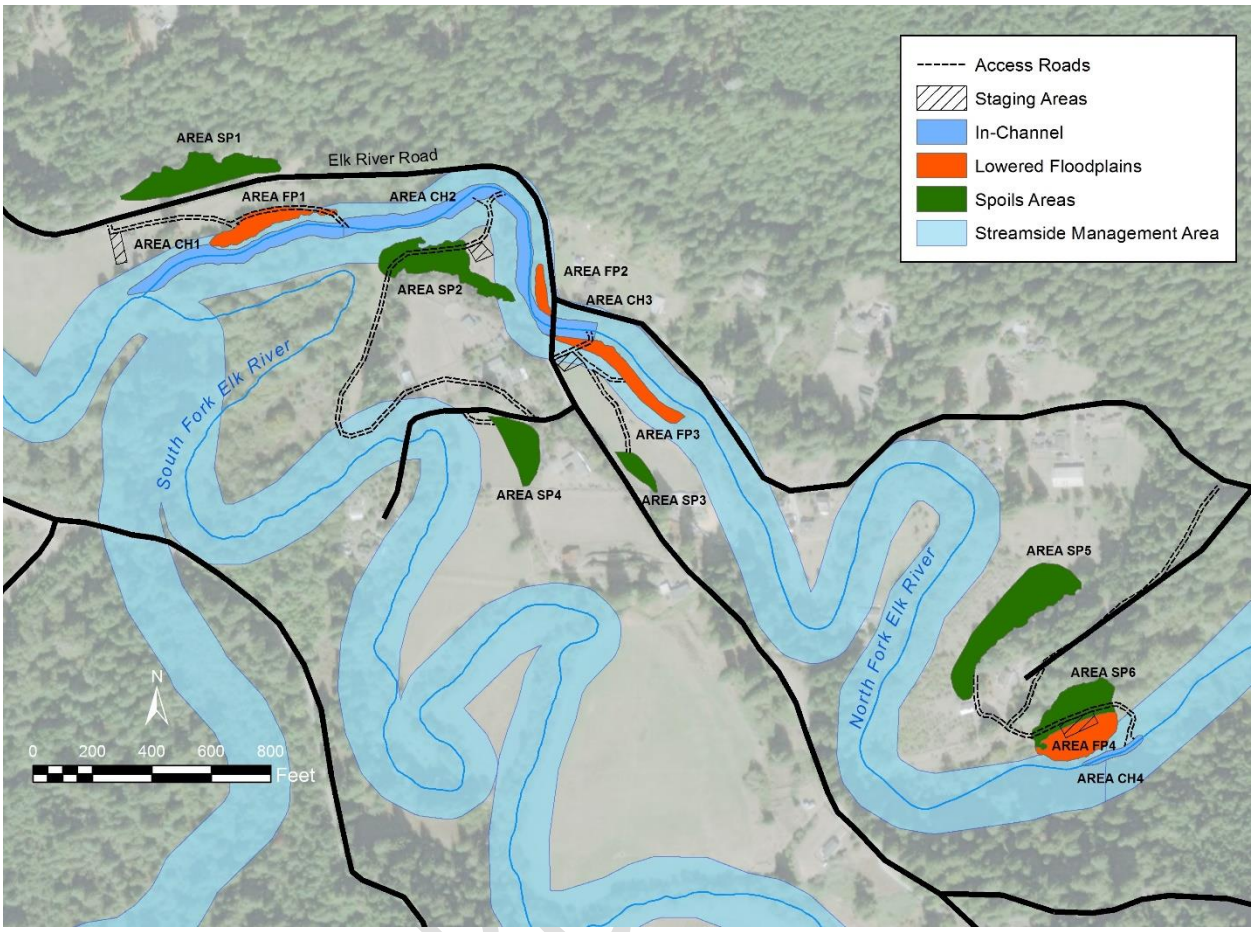

Figure 3. Humboldt County's Streamside Management Area overlaid on proposed project action areas.

The properties are designated Agricultural Rural (AR-10) and are zoned Agricultural General (AG) B-5(10) (Figure 4) with flood hazard (Figure 2) and Streamside Management Area (Figure 3) overlays.

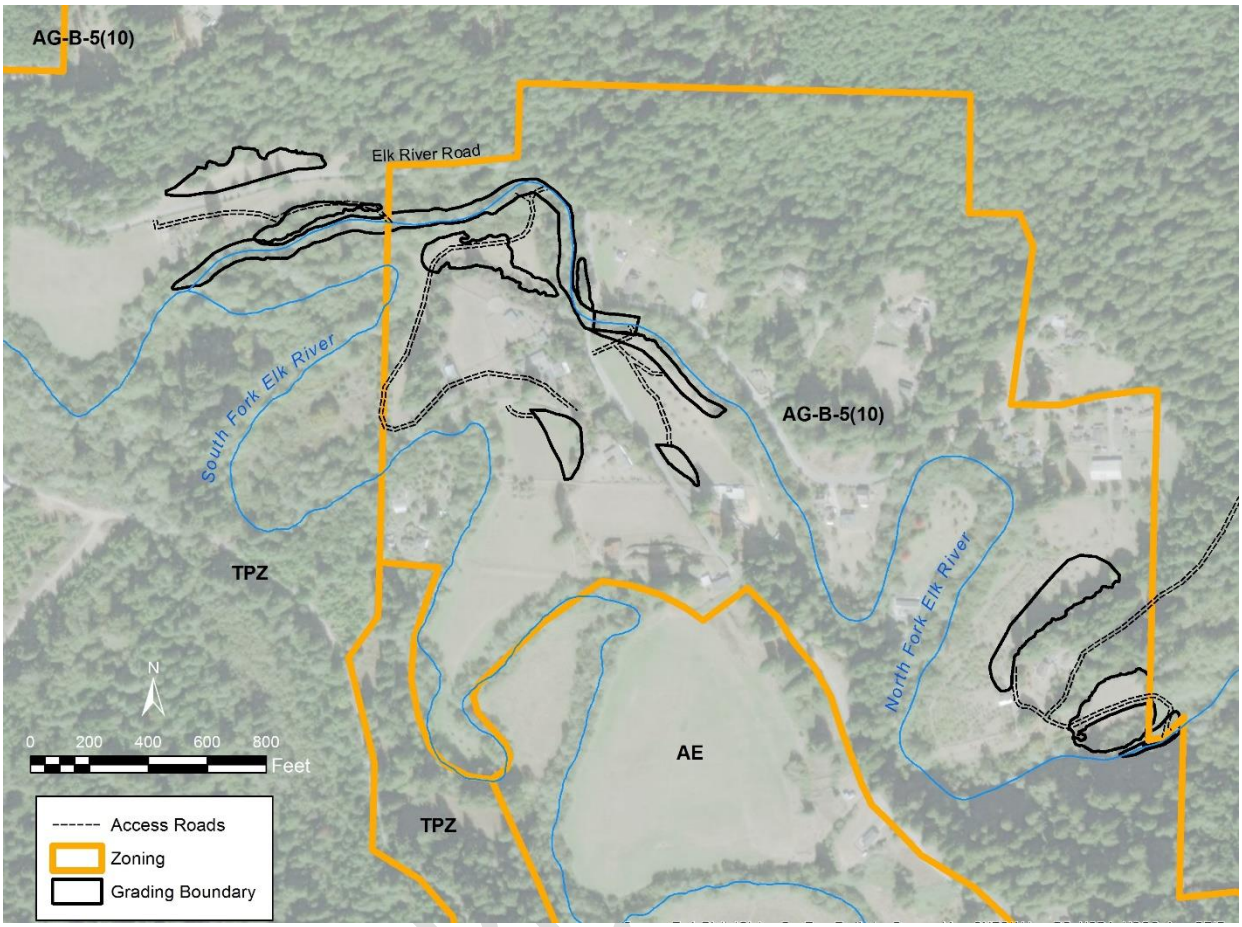

Figure 4. Land Use, zoning and overlay designations within proposed project action areas, consisting of Agricultural Rural (AR) and Agricultural Exclusive (AE).

1.4 Landowner Coordination and Agency Partnerships

All land adjacent to the river channel in the project area is privately owned. California Trout is acting as the landowner liaison for the Proposed Project and will serve as a Duly Authorized Agent for landowners on permit applications. In addition, the Elk River Stewardship Program (see Section 3.19) was re-initiated in early-2019 and will provide an opportunity for stakeholders from the entire Elk River community to participate in the efforts to plan and design activities to reduce nuisance flooding and regain beneficial uses in the lower watershed.

Landowners within the project area have been involved throughout development of the Proposed Project and were consulted at each stage of Project Design (30% and 65% engineering designs). Landowners have already signed access agreements which have allowed California Trout to submit grant applications and access agreements that allow California Trout and its agents to conduct surveys and technical studies on their property in order to advance the Project designs. All project actions will require landowner approval prior to implementation. Once the Project is complete, landowners will be required to sign a five-year Maintenance Access Agreement to allow Project monitoring and conduct maintenance as needed.

1.5 Intent and Scope of this Document

This Initial Study/Mitigated Negative Declaration (IS/MND) has been prepared in accordance with the California Environmental Quality Act (CEQA), under which the Elk River Sediment Remediation and Habitat Rehabilitation Pilot Implementation Project constitutes a "Project." The North Coast RWQCB, as the lead agency under CEQA, will consider the potential environmental impacts of project activities when it considers whether to approve the project. This IS/MND does not recommend approval or denial of the Proposed Project.

The IS/MND describes the Proposed Project and its environmental setting, including the Project Area's existing conditions and applicable regulatory requirements. This IS/MND also evaluates potential environmental impacts from the Proposed Project to the following resources.

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology, Soils, and Seismicity
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality

- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation and Traffic
- Utilities and Service Systems

The Proposed Project incorporates mitigation measures to ensure there would be no significant adverse impacts on the environment. Over the long term, the Project would benefit overall hydrologic functions and water quality, with associated positive impacts on aquatic habitat and other beneficial uses.

1.6 Public Involvement Process

Public disclosure and dialogue are priorities under CEQA. Accordingly, CEQA requires a period during the IS/MND process when interested stakeholders, public agencies, and general public can provide comments on the impacts of the Proposed Project. **Pursuant to Sections 15073.5 and 15105[b] of the CEQA Guidelines, the North Coast RWQCB is now circulating this document for a 30-day public and agency review. All comments received prior to 5:00 p.m. on the date identified for closure of the public comment period in the Notice of Intent to Adopt a Mitigated Negative Declaration (IS/MND) will be considered.**

Input, questions, or comments on the Proposed Project should be directed to:

Chuck Striplen, PhD
Environmental Scientist – Adaptive Watershed Management Unit
North Coast Regional Water Quality Control Board
5550 Skylane Blvd, Ste. A, Santa Rosa, CA 95403
Email: charles.striplen@waterboards.ca.gov

1.7 Organization of this Document

This IS/MND document contains the following elements:

Chapter 1, *Introduction*. This chapter provides a brief project introduction, describes the goals and objectives of the Proposed Project, summarizes the scope and contents of the IS/MND,

provides contact information for commenting on the document, and describes impact terminology used in this document.

Chapter 2, *Project Description*. This chapter summarizes the Proposed Project, including descriptions of the project purpose and goals; the project development process; project elements; project implementation and oversight; avoidance and minimization measures; and related permits and approvals.

Chapter 3, *Environmental Checklist*. This chapter presents the environmental checklist used to evaluate the Proposed Project's potential environmental effects. The checklist is based on the information provided in Appendix G of the state's CEQA guidelines. This chapter includes a brief environmental setting description for each resource topic and describes the Proposed Project's anticipated impacts and environmental benefits.

Chapter 4, *References*. This chapter provides a bibliography of printed references, web sites, and personal communications utilized in the preparation of this IS/MND.

1.8 Impact Terminology

This IS/MND uses the following terminology to describe environmental effects of the Proposed Project:

- A finding of **No Impact** is made when the analysis concludes that the Proposed Project would not affect the particular environmental resource or issue.
- An impact is considered **Less than Significant** if the analysis concludes that her would be no substantial adverse change in the environment and that no mitigation is needed.
- An impact is considered **Significant** if it results in substantial adverse change in the physical conditions of the environment. Significant impacts are identified by using specific significance criteria as a basis of evaluation. Mitigation measures and/or alternatives are identified to reduce these potential effects on the environment.
- This IS/MND identifies mitigation measures that are intended to lessen project impacts. The State CEQA Guidelines (14 CCR 15370) define mitigation as:
    - Avoiding the impact altogether by not taking a certain action or parts of an action;
    - Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
    - Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment;

- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
- Compensating for the impact by providing substitute resources or environments.

Chapter 2

PROJECT DESCRIPTION

2.1 Background and Regulatory Setting

The Elk River is the largest freshwater tributary to Humboldt Bay, and drains a basin area of 56.1 square miles into Entrance Bay south of the City of Eureka near Fields Landing. The Elk River basin is bounded on the west by commercial timberlands and on the east by Humboldt Bay. The coastal hills drain westward through the steep, forested upper watershed into the north and south forks of the Elk River before draining into a broad, flat valley, through which the mainstem (commonly referred to as the Lower Elk River) meanders. The Lower Elk River consists of low-gradient, alluvial channel types which gradually transition to tidally-influenced fresh, brackish, and saline slough channels.

Located in the coastal temperate forest of Humboldt County, rainfall amounts in the Elk basin average 55 inches per year and increase with elevation. The Elk River Basin is particularly steep compared to other coastal watersheds in Humboldt County, with an elevation ranging from 0-2,400 feet from the mouth of Humboldt Bay to the ridgeline. The basin is particularly erosion-prone due to high rainfall, highly erodible geology, and tectonic uplift.

This upper watershed is currently primarily owned by Humboldt Redwood Company (HRC) and is actively managed for industrial timber. HRC lands are the headwaters source for runoff and sediment that accumulate in North Fork, South Fork, and mainstem below. Timber harvest activities are regulated by the California Department of Forestry and Fire under Timber Harvest Plans (THPs), by the Regional Water Quality Control Board under Waste Discharge Requirements (WDRs), and by the California Department of Fish and Wildlife under Habitat Conservation Plans (HCPs).

Following excessive and unsupportable timber harvesting activities conducted in the upper watershed by the previous land owner Pacific Lumber Company (PALCO)[5], the Elk River suffered catastrophic watershed effects as a result of extreme erosion and sediment discharged into the river in the late-1980s and throughout the 90s. The resulting sedimentation overwhelmed the transport capacity of the river, resulting in channel aggradation and widening as the river bed filled in with sediment. The naturally steep stream banks and low terraced floodplains that defined the former bankfull channel have been covered with excessive amounts of very fine sand and silt-sized sediment, resulting in

[5] PALCO filed for bankruptcy in 2007, and in 2008 transferred its holdings to the Mendocino Redwoods Company, later to become Humboldt Redwoods Company (HRC).

increased frequency of overbank flooding events. What were once deep pools and gravel bars have been filled-in and silted over, reducing habitat quality.

The Elk River is the largest tributary to Humboldt Bay, and is aggraded from approximately 10.4 miles upstream of the river mouth and throughout the low gradient channels in what is commonly referred to as the "impacted reach" (Figure 5).

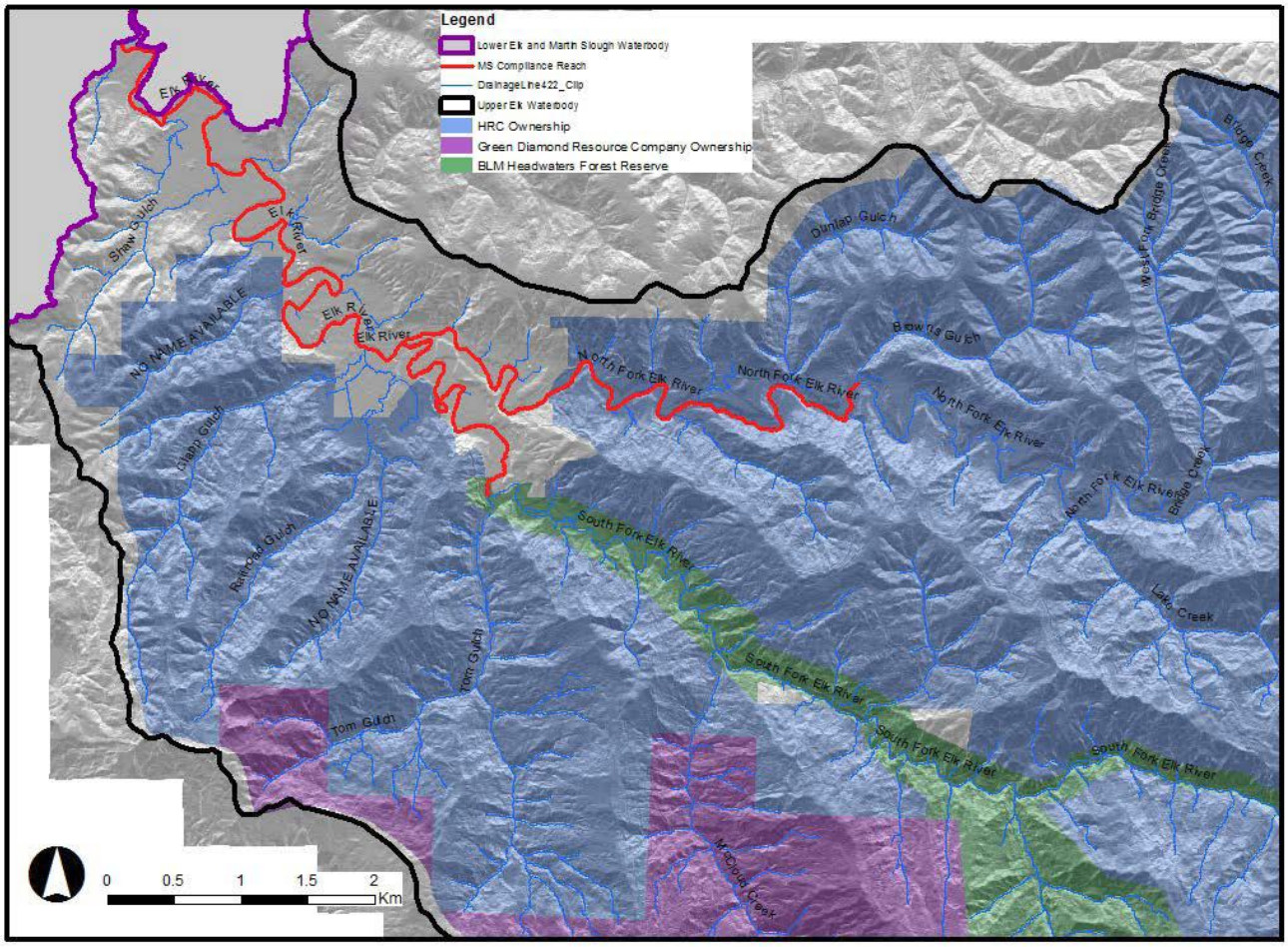

Figure 5. Upper Elk River watershed "impacted reach" (in red)

The impacted reach[6] has been identified as impaired for sediment as a result of three related factors:

1) Excess sediment has been deposited on the bed, banks, and floodplain, reducing channel conveyance;
2) Sediment delivered from the upper watershed is predominated by very fine particles, which can embed gravel; and
3) Deposited material is readily colonized by vegetation, which anchors the material and reduces the potential for remobilization to move sediment out of the system.

The aggradation of the Elk River is a function of sediment volume as well as the composition of the sediment and increased opportunity for vegetation growth. This deposition has caused diminished flow conveyance resulting in frequent, extensive flooding. The flooding poses health and safety risks to residents and constitutes a nuisance condition. In addition, the sedimentation impacts salmon habitat and other water quality beneficial uses (described in the Biological Assessment [Appendix B] and Section 3.9 respectively).

Sediment delivered from the upper watershed is dominated by very fine particles. These fine sediment deposits embed gravel and become anchored in place by vegetation, further slowing floodwaters and causing streams to overtop their banks with increased frequency and magnitude and further reducing the potential for remobilization to move the sediment out of the system (slows flow velocities and allows more residence time for sediment to drop out of the water column). Additional effects include increased peak flows, decreased summer flows, decreased channel complexity, and altered sediment transport and storage (Tetra Tech, 2015, p. 45).

It is estimated that in-stream sediment deposits have reduced channel cross-sectional area by at least 35% in the upper mainstem Elk River. Because the cross-sectional area of the Elk River channel has been significantly reduced by deposits of fine sediment, the broader floodplain is also routinely covered in silty deposits during overbank flooding events.

Within the impacted reach, sediment deposits limit the discharge conveyance capacity, reduce velocities, and limit the stream's ability to pass water and suspended sediment, causing road flooding and impacting properties dependent on the river for their domestic and agricultural water supply.

Since 1997, timber harvesting activities in the upper watershed have been intensely regulated by trustee agencies under federal Habitat Conservation Plans, Incidental Take Permits, Forest

[6] Includes the lower North Fork Elk River downstream of approximately the Bridge Creek confluence, Lower South Fork Elk River downstream of approximately the Tom Gulch confluence, and the mainstem Elk River from the confluence of the north and south forks downstream to approximately Elk River Court.

Stewardship Certification, and SWRCB permits intended to address sensitive watershed issues. However, despite regulatory programs to prevent new sediment sources and control existing sediment loading from the upper watershed (such as RWQCB Waste Discharge Requirements and harvest rate limits), data indicate that the channel, banks, and floodplain within the impacted reach continue to aggrade. While a combination of regulation, altered management, and drier water years was generally effective at reducing sediment sources, large wet weather events did not scour excess stored sediment out of the river channel over time as predicted. An evaluation of cross-sectional data indicates there are over 280,000 cubic yards of instream stored sediment in the lower North Fork, nearly 100,000 cubic yards in the lower South Fork, and nearly 260,000 cubic yards in the upper Mainstem (Tetra Tech, 2015, p. 39) .

While efforts to control sediment sources from the upper watershed are ongoing, the Proposed Project is one of the first efforts to directly restore impaired channel conditions and associated aquatic habitat in the impacted reach.

Sediment Source Analysis

Multiple natural and anthropogenic (human-caused) factors influence the behavior of sediment in the Elk River Watershed. Primary natural factors include: tectonics, geology, topography, geomorphology, climate, and vegetation. Geological features are an especially important factor in sediment production in the upper Elk River, which is dominated by young, fine-grained, erodible geology. Primary anthropogenic or land use-related factors include: timber harvest, yarding[7], road building and use, and legacy practices (e.g. pre-Forest Practice Rules). The interaction between inherent watershed characteristics, types of management practices, and timing of stochastic events such as earthquakes or large storm events, influence the magnitude and timing of sediment production. Increased sediment production results from greater incidence of mass wasting[8], surface and gully erosion, and increases in channel erosion from increased peak flows and higher runoff.

Ongoing sediment loading continues to result in aggradation of fine sediment, encroachment of riparian vegetation, and impairment of beneficial uses. Cross sectional changes observed since 1988 indicate an estimated 640,000 cubic yards of sediment have accumulated in the impacted reaches. An estimated 25% of the annual sediment inflow into the impacted reaches causes aggradation and further worsens nuisance conditions.

[7] Hauling of a log from the stump to a collection point.

[8] Movement in which bed rock, rock debris, or soil moves downslope in bulk, or as a mass, because of the pull of gravity. Landslides is a general term for the slow-to-very rapid descent of rock or soil.

A sediment source analysis conducted as part of the TMDL development process (the TetraTech Technical Analysis for Sediment) identified the key source categories that produce sediment in the Upper Elk River Watershed. Sediment discharges resulting from timber harvest and other land management activities in the most recent analysis period (2004-2011) are (in order of significance): in-channel sources (headward channel incision, bank erosion, and streamside landslides), discharges from existing land use-related sediment discharge sites, other road-related discharges, and harvest-related discharges.

Water Quality Indicators

The Elk River Sediment TMDL Program of Implementation identifies a combination of regulatory and non-regulatory actions that will lead to the attainment of water quality objectives, recovery of beneficial uses, protection of high-quality waters, and prevention of nuisance conditions. Water quality indicators and associated numeric targets are designed to measure progress towards attaining water quality objectives for suspended material, settleable material, turbidity, and sediment. The following instream water quality indicators are designed to help assess the overall effectiveness of the TMDL Program of Implementation and confirm progress toward the attainment of water quality standards.

Table 1. Elk River Instream Water Quality Indicators and Numeric Targets *(Tetra Tech, 2015, p. 34)*

Instream Indicator	Instream Goal	Numeric Target	Associated Area
Bankfull Channel Capacity	FLOOD	▪ Channel cross-sectional area sufficient to contain the historic bankfull discharges. Normal sediment and water transport occurs when 1.5-2 year flood events are contained within the bankfull stream channel. ▪ Upper Mainstem=2,250 cfs (for drainage area of 43 mi^2) ▪ Lower North Fork=1,170 cfs (for drainage area of 22.5 mi^2)	Impacted reaches near the confluence of North and South Forks Elk River, with target discharge scaled to drainage area at measurement location
Chronic Turbidity[9]	SALMON; SUPPLY	Clearing of turbidity between storms to a level sufficient for salmonid feeding and surface water pumping for domestic and agricultural water supplies.	Salmonid feeding: Watershed-wide historic range of salmonids Water supplies: Impacted reaches

Key for Instream Goals:
SALMON: Support salmonids throughout their historical range in Elk River
SUPPLY: Support the use of surface water for domestic drinking water and agricultural water supplies
FLOOD: Contain flood flows within the channel bankfull discharge

[9] The water quality objective for turbidity also applies. The instream water quality indicator target condition focuses specifically on turbidity values between storms.

2.1 Proposed Project

The North Coast Regional Water Quality Control Board (North Coast RWQCB) proposes to implement a pilot sediment-remediation and channel reconfiguration pilot project along the North Fork Elk River. The demonstration project is funded by the State Water Resources Control Board (SWRCB) Timber Regulation and Forest Restoration Fund, Agreement No. D1513103. Per the funding agreement, the pilot projects include project planning and permitting, engineering design, and construction and will treat 2,375 linear feet of the river, removing at least 18,000 cubic yards of sediment[10]. California Trout (CalTrout) is the grant recipient and the project applicant. Northern Hydrology & Engineering (NHE) has prepared 65% engineering designs for the proposed project (Appendix A) and previously completed the *Hydrodynamic and Sediment Transport Pilot Modeling Project* (Northern Hydrology & Engineering, 2013) in partnership with Stillwater Sciences in 2013 under contract with Redwood Community Action Agency (RCAA).

NHE, CalTrout, and Stillwater Sciences recently completed the Elk River Recovery Assessment (ERRA), a system-wide model of hydrodynamics and the fate and transport of sediment in the Elk River, described in more detail in Section 3.19-Mandatory Findings of Significance. The ERRA was funded by the SWRCB under Agreement #13-087-110-2. The proposed Pilot Program will test key assumptions of the ERRA while addressing nuisance flooding and impaired beneficial uses per the Project Goals and Objectives as defined in Section 1.2.

The Elk River is the largest tributary to Humboldt Bay, and the Proposed Project is located approximately 10.4 miles upstream. The project area extends from the mainstem Elk River just below the confluence of the North and South Forks approximately one mile up the North Fork. The project's upper boundary marks the transition from steep timberlands operated by HRC to lower-gradient agricultural lands. The Project area is located in the upper extent of the "impacted reach." The TMDL requires revisions to Waste Discharge Requirements to further control sediment discharges from the upper watershed. As source loading from the upper watershed further decreases, the Project area marks the location where removal of legacy stored sediment would logically begin.

The proposed demonstration project includes two general reaches located along an approximately one-mile segment of Elk River channel (Figure 6). The upstream project location is referred to as "Wrigley Orchard Reach" reach and the downstream project location is referred to as the "Elk River Flood Curve Reach".

[10] Under the funding Agreement (D1513103), a minimum of 18,000 cubic yards of material will be excavated from the Elk River channel.

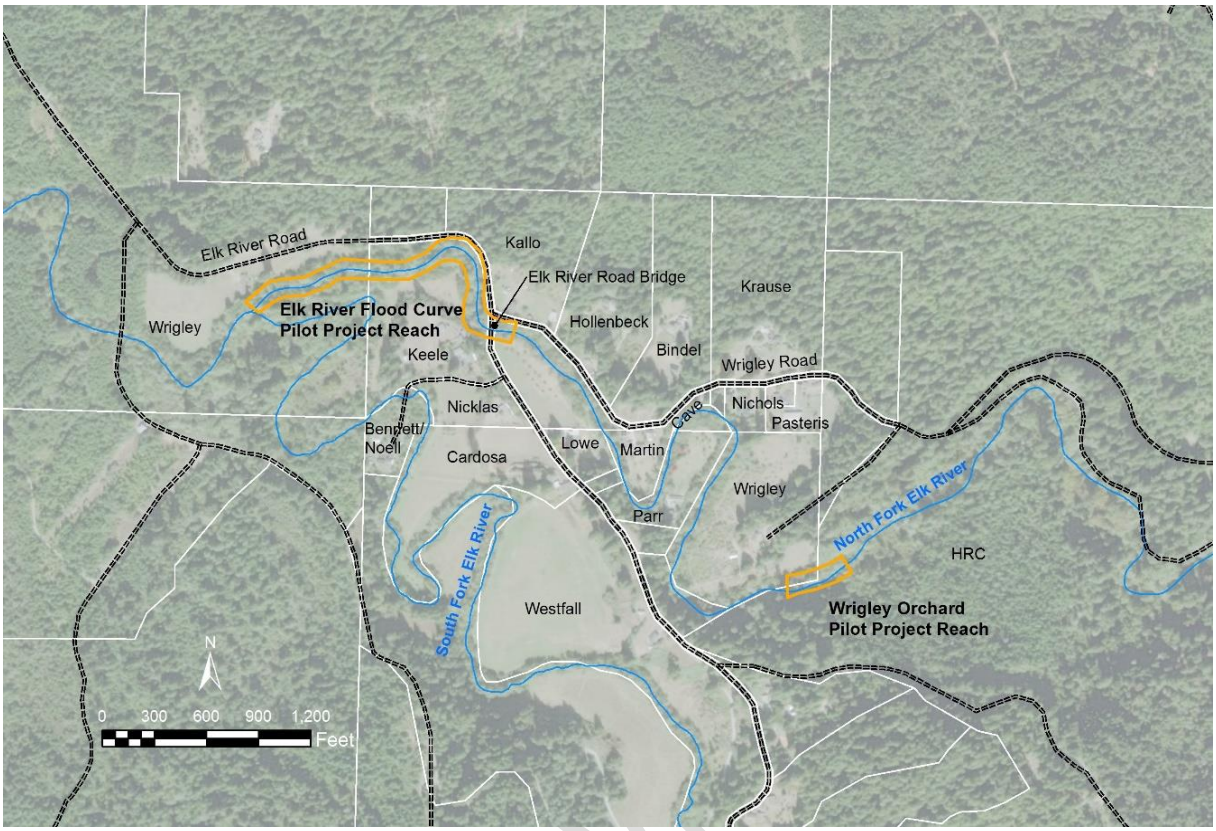

Figure 6. Location of Proposed Project including Wrigley Orchard and Elk River Flood Curve Project reaches

Together, the pilot projects are intended to increase channel capacity by remediating a minimum of 18,000 cubic yards of sediment (per the funding agreement, however the maximum amount of sediment removed will depend on the ability of the construction budget to bear the associated cost after project planning and permitting). As currently proposed in the 65% designs (Appendix A), the action area for the Proposed Project will treat approximately 2,375 linear feet of stream channel (including in-channel, bank, and floodplain excavation areas) extending from River Station 623+75 (upstream extent) to River Station 560+00 (downstream extent). The project areas includes approximately one mile of river channel and is located entirely on privately owned property. The excavated material will be spoiled on private property within the project area, the channel will be reconfigured and re-contoured to re-establish the floodplain and mitigate flooding, habitat features including pool enhancement, gravel augmentation, and large wood habitat structures will be incorporated, and disturbed areas above the wetted channel will be revegetated to restore salmonid habitat conditions.

The demonstration projects are sited along the banks and floodplains of the: 1) Lower North Fork Elk River, and 2) Mainstem Elk River directly downstream of the North Fork/South Fork Elk River confluence. The proposed activities are sited in these locations for a variety of reasons:

- Sediment deposition in these reaches contribute to recurrent flooding of adjacent roadways and homes and are therefore high-priority sediment remediation areas.
- The risk of unanticipated consequences is low.
- Located in the same project area as the *Elk River Hydrodynamic and Sediment Transport Pilot Modeling Project* in order to inform the *Elk River Recovery Assessment* to the maximum extent possible.

In general, the Proposed Project will:

1) Create staging areas on private properties adjacent to the North Fork Elk River channel for material stockpiling and heavy equipment storage/maintenance;
2) Create heavy equipment access to the channel by grading pathways leading to the stream channel that avoid and/or remove riparian vegetation;
3) Install fish exclusion screens and temporary coffer dams at the upstream and downstream boundaries of the project reaches that allow fish removal and relocation to other reaches of the North Fork and South Fork Elk River, and allow the streamflow to be pumped or gravity bypassed around the project reaches to temporarily dewater the channel during construction;
4) Use excavators, dump trucks, and other heavy equipment to remove large wood pieces and live vegetation from the channel bed and banks, then excavate excess sediment from the channel bed and banks to meet engineering design contours (e.g., cross section dimensions, bank slopes, channel gradients, riffle crest elevations) for a recontoured channel, and haul away sediment to designated re-use areas;
5) reconstruct a natural pool and riffle morphology with large wood habitat structures; and
6) Install erosion control features and replant riparian vegetation in floodplain disturbance areas.

Narrative descriptions of the two proposed pilot projects, referred to as the Wrigley Orchard Project Reach and the Elk River Flood Curve Project Reach, are provided in sections 2.2.1 and 2.2.2 respectively.

2.2.1 Wrigley Orchard Project Reach

Figure 7. Wrigley Orchard reach aerial view

The Wrigley Orchard Pilot Project was selected for pilot implementation because of its strategic location at the upstream end of private residential properties located directly downstream of the upper watershed lands owned by HRC. The Wrigley Orchard project reach occurs where North Fork Elk River transitions from a predominantly gravel bed channel within a relatively confined valley to a lower gradient channel with a predominantly fine-grained bed and relatively unconfined valley with broad floodplains. Sediment aggradation and flooding impacts at this location are well documented, including volume and location of aggradation.

The Proposed Wrigley Orchard Project Reach involves two property owners. From the center line of the channel, the right bank side of the property is owned by Kristy Wrigley, and the left bank side of the channel is owned by Humboldt Redwood Company. Construction access to the Wrigley property will be provided through a private driveway off of Wrigley Road, down to the right bank floodplain.

Environmental Setting

The Wrigley Orchard Project reach is a straight channel segment defined predominantly by alternating large sand deposits accreted to the top of channel and bank margins. The sandy bank margin deposits are characteristically convex shaped and support dense sedge and other herbaceous vegetation on their flanks and crest. The average channel gradient through the Wrigley Orchard project reach is 0.0015. Average bankfull channel

width is 58 feet (ranging from approximately 56-59 feet), and average bank toe width is 23 feet (ranging from approximately 22 to 24 feet). Bed material is predominantly fine sand and silty sand with highly localized small sand and gravel deposits (D50 = 4 millimeters [mm]) associated with channel roughness elements (e.g., large wood pieces and jams) and planform channel curvature.

The Wrigley Orchard reach (Figure 7) is heavily aggraded with fine sediment, which constricts the low-flow channel, limits sediment transport capacity, and results in frequent out-of-bank nuisance flooding and occasional damage to private property. Flooding regularly inundates the lower portion of the Wrigley Orchard (which is now defunct, Figure 8) and the Wrigley Orchard driveway. An analysis conducted by Reid (Reid, 1999) indicated that the decrease in channel area due to aggradation increased the stage of what was once the bankfull flow by more than three feet in the Wrigley Orchard reach. A large pump intake for domestic water supply occurs on the right bank (facing downstream) within the Wrigley Orchard Reach but is no longer operational due to aggradation.

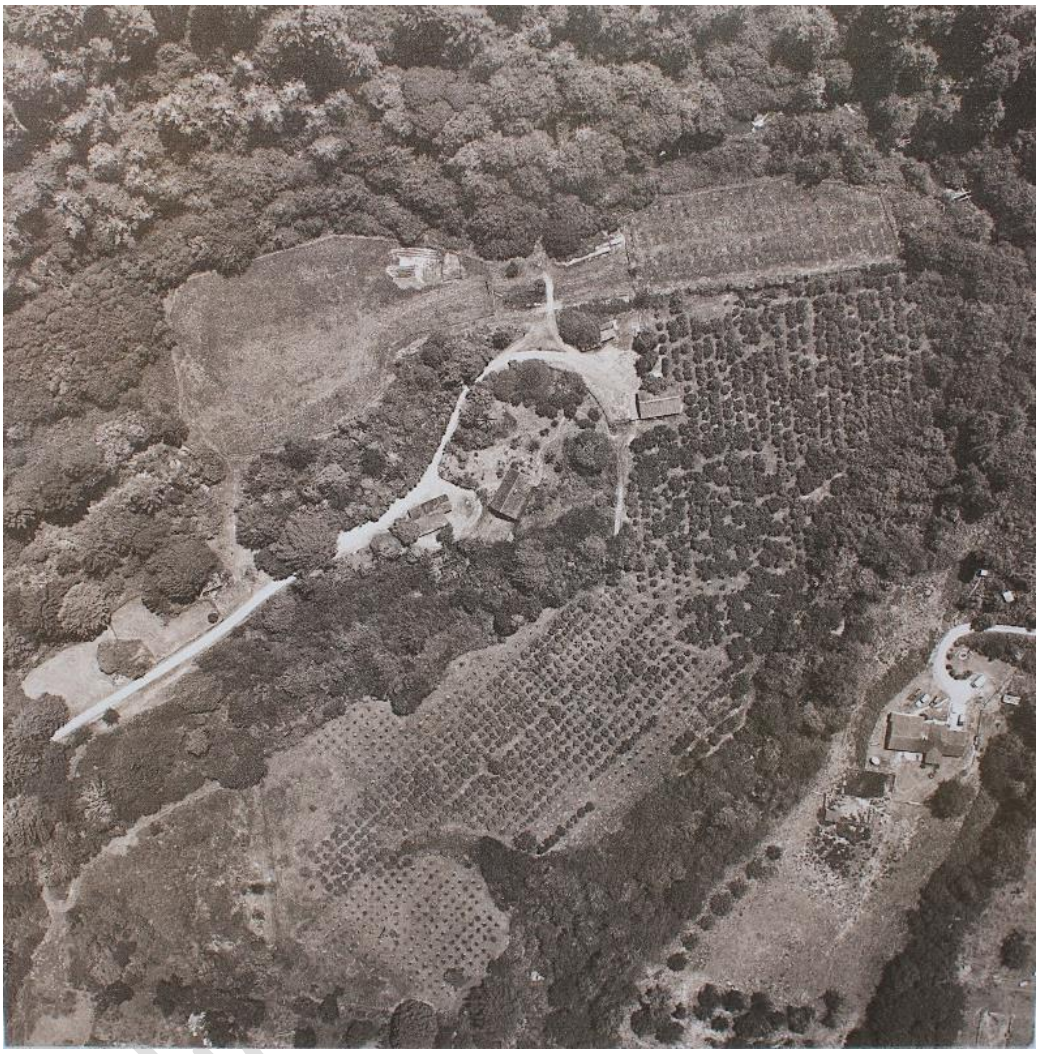

Figure 8. Wrigley Orchard, 1989. Note the lower-left portion of the orchard is defunct due to sediment deposition.

Vegetation along the channel banks and floodplain at the Wrigley Orchard Project site is a narrow approximately 40-foot strip of red alder and arroyo willow riparian forest cover types, with a dense and tangled understory of mixed willow species, blackberries, stinging nettle, and elderberry. No conifer species are present along the channel banks in this reach.

No large wood pieces occur within this reach. Two channel spanning logs (>18 in diameter, 20-25 ft long) are located at the downstream end of this pilot segment, at approximately Stn 620+00, downstream of the construction footprint, and will not be disturbed.

Table 2. Existing large wood pieces from Wrigley Orchard Project Reach. Large wood inventory was conducted in 2017 by Stillwater Sciences.

	Length (ft)				
	3-10 ft	10-25 ft	25-50 ft*	50-75 ft	total
Wrigley Orchard Pilot Reach (375 ft) Live pieces	0	0	0	0	0

* key pieces (NCRWQCB, 2006)

Habitat Quality

Salmonid habitat in the Wrigley Orchard reach is of poor quality. The channel is narrow and confined, with maximum pool depth at winter baseflow of approximately 2-3 ft, and with very low volume of large wood (Table 2) providing winter habitat refugia. Suspended sediment concentrations and turbidity are quite high in this reach in winter. The 12-15 ft wide winter wetted channel shrinks to 3-5 ft wide during the summer low-flow period, leaving exposed sand bars and aggraded riffles that have become heavily overgrown with dense patches of slough sedge. The water surface in summer is colonized by a dense surface film of duckweed and has very little surface water velocity (i.e., stagnant conditions). Dissolved Oxygen[11] concentrations in this reach were very low in September 2018, with diurnal (daily) fluctuations ranging from below 2-3 mg/L during extended periods (days).

Wrigley Reach Objectives

The Wrigley Orchard Reach demonstration project will test sediment remediation approaches including minor dredging (removal of in-channel sediment deposits), vegetation management (removal of brushy vegetation, targeting willows and blackberry), and creation of inset floodplains (lowering terraces and benches along banks) to provide winter high-flow refugia. In addition, the project will integrate large wood habitat features that provide suitable summer and winter rearing habitat for salmonids, primarily targeting coho salmon habitat requirements.

[11] Dissolved Oxygen (DO) is the amount of gaseous oxygen (O2) dissolved in water. Adequate DO is important for good water quality and is necessary to all forms of life. Dissolved oxygen levels that drop below 5.0 mg/L cause stress to aquatic life. Lower concentrations cause greater stress and dissolved oxygen levels that fall below 1-2 mg/L for a few hours may result in large fish kills.

The Pilot Project objectives in the Wrigley Orchard reach include:

- Enhancing winter and summer juvenile salmonid rearing habitat functions by reconstructing one riffle-pool sequence, with a deep pool (>4-5 ft deep) and gravel-bedded riffle, and installing one large wood habitat structure;
- Testing the efficacy of an enlarged channel to transport sediment during winter storms to significantly reduce aggradation rates and to maintain an approximate sediment supply/transport equilibrium in the rehabilitated reach;
- Improving low Dissolved Oxygen (DO) concentrations during the summer low-flow rearing season;
- Monitoring annual rates and volumes of sediment aggradation in re-constructed channels, and the persistence and utilization of rehabilitated habitat features.

2.2.2 Elk River Flood Curve Project Reach

Figure 9. Elk River Flood Curve Reach aerial view

The Elk River Flood Curve Project Reach was selected for pilot implementation based on the severity of flooding in this location and the project's location downstream of the transition from a coarse-bedded channel to a heavily impaired fine-bedded channel. As loads of upstream and upslope sediment from the upper watershed decrease over time (as a result of implementation of the Elk River TMDL and associated waste discharge requirements), large-scale sediment remediation (under a potential future project) would hypothetically include all areas between this location and Humboldt ay, in order to create a stable channel in approximate sediment equilibrium.

The Proposed Flood Curve Project Reach (Figures 9, 10) involves three property owners—Phil and Sharyn Nicklas, Scott and Susan Keele, and Kristy Wrigley. Vehicle access to the Project site is from several locations along the 2,000 foot Project reach: at a cattle-gate entry onto the Nicklas pasture off Elk River Road south of the Concrete Bridge, through the Keele's private driveway off Elk River Road south of Concrete Bridge, and through a private driveway off Elk River Road to Kristy Wrigley's "Red House" on the north side of the North Fork Elk River.

Environmental Setting

The Elk River Flood Curve project reach is a slightly sinuous channel reach, extending under the Elk River Road bridge, curving to the north, then around a gradually sweeping bend to the west and then slightly curving in a straight direction toward the North Fork-South Fork confluence. This segment of channel is defined by alternating large sand deposits accreted to the top of channel and bank margins. The sandy bank margin

deposits are characteristically convex shaped and support dense slough sedge and other herbaceous vegetation on their flanks and crest. The average channel gradient through the Elk River Flood Curve project reach is 0.0015. Average bankfull channel width is 58 feet (ranging from approximately 56-59 feet), and average bank toe width is 23 feet (ranging from approximately 22 to 24 feet). Bed material is predominantly fine sand and silty sand with highly localized small sand and gravel deposits (D50 = 4 millimeters [mm]) associated with channel roughness elements (e.g., large wood pieces and jams) and planform channel curvature. A moderate volume of large wood pieces occur within this reach (Table 5).

The segment upstream of the Elk River Road crossing (approximately RS 580+00 to 588+00) is a straight to slightly sinuous channel with broad adjacent floodplains. There are no large wood jams in the reach. However, individual large wood pieces and live woody riparian vegetation that has become rooted in the banks roughen the channel and collect fine organic debris throughout this segment (Figure 10). Channel morphology is predominantly plane bed, despite the presence of large wood obstructions. There are no pools greater than 3 feet deep within the Elk River Flood Curve Project reach. Several small rotational slumps within the fine sandy and silty bank material occur throughout this reach, as does bank toe erosion from lateral scour.

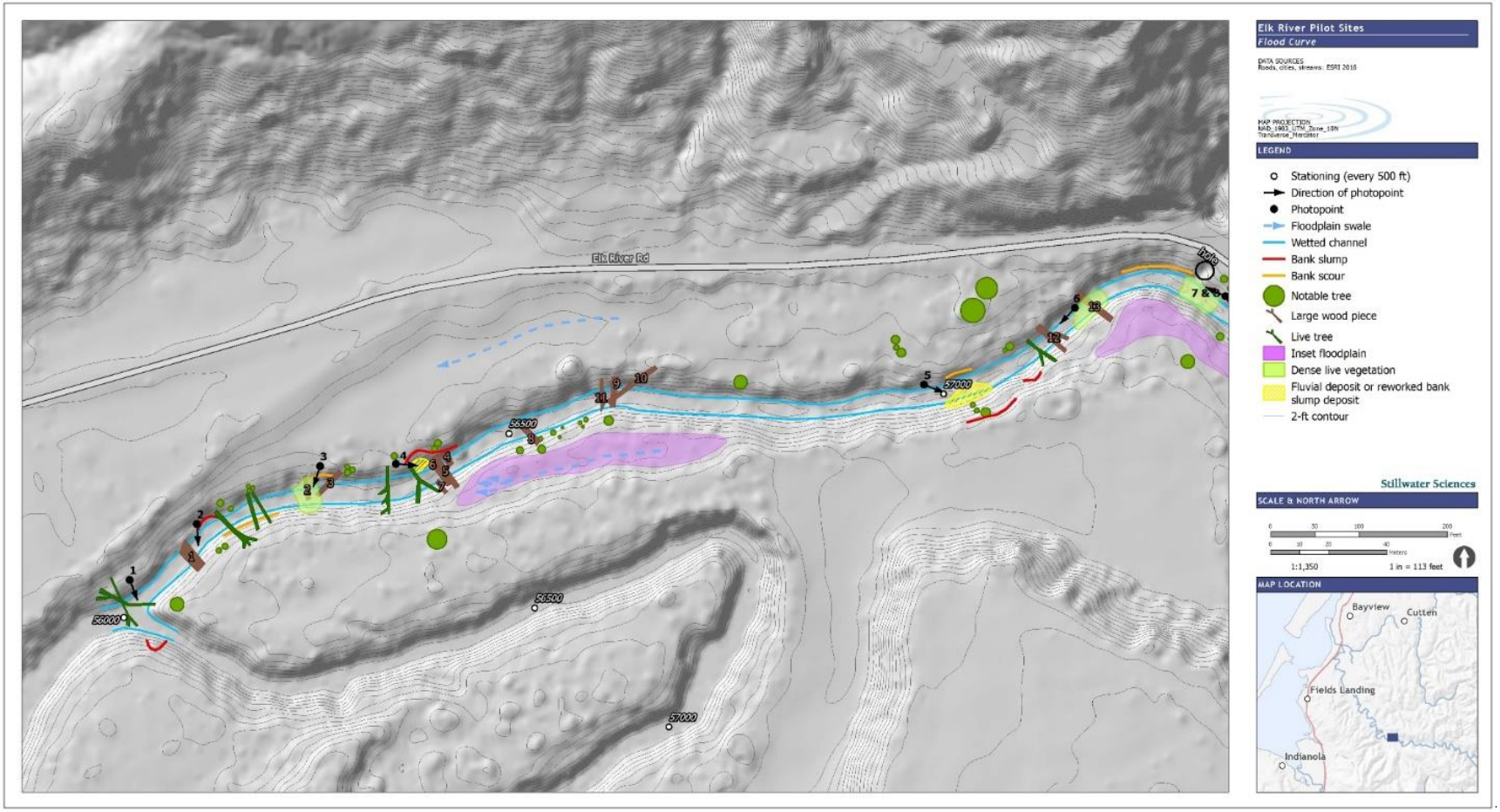

Figure 10. Geomorphic map of the Flood Curve Pilot Project reach, including RS 575-00 to 585-00

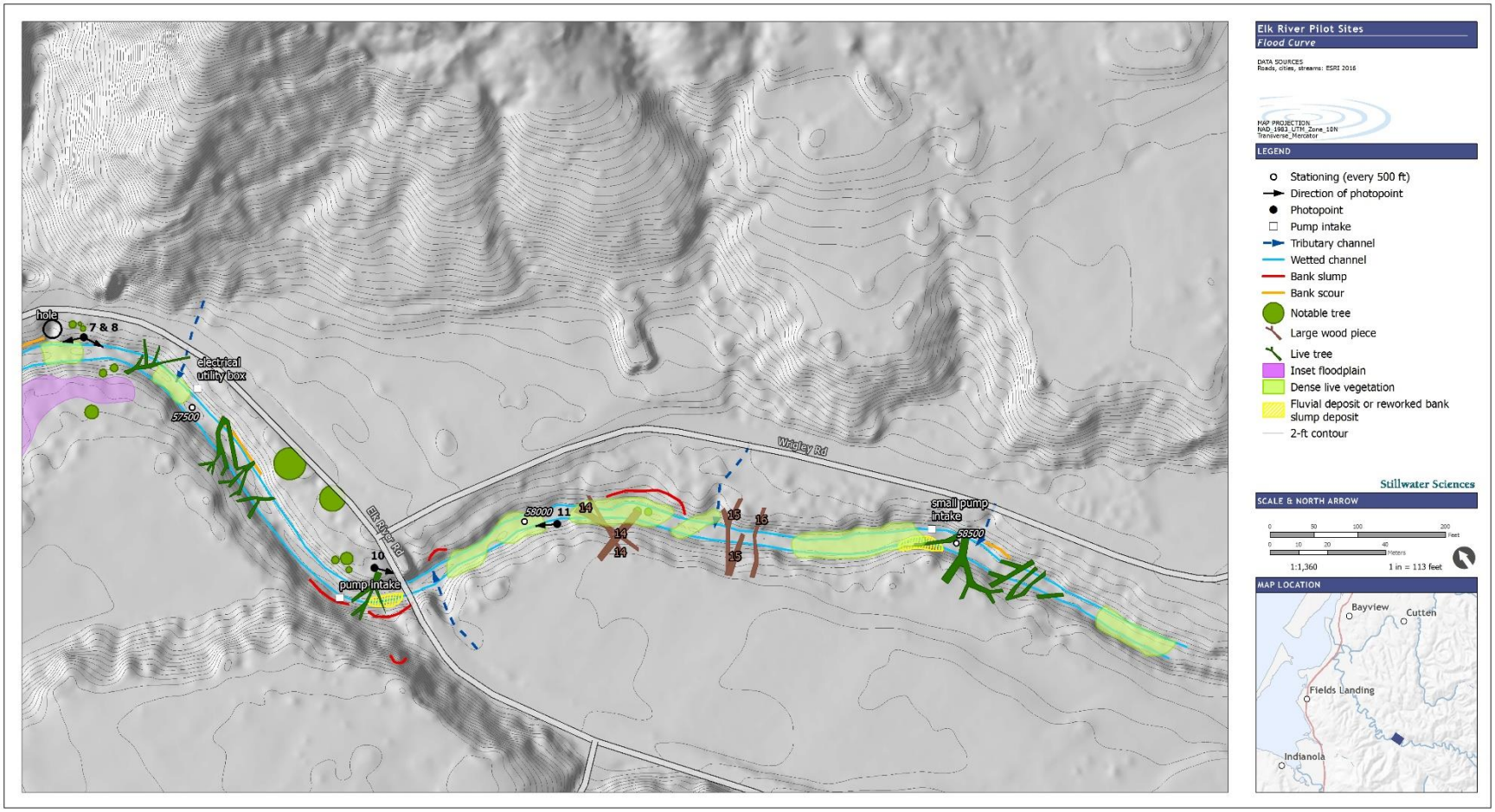

Figure 11. Geomorphic map of the Elk River Flood Curve Pilot Project reach, including RS 580-00 to 620-00

Figure 12. Wood debris and woody riparian vegetation capturing fine organic material in the segment of the Flood Curve Pilot Project reach upstream of the Elk River Road crossing (photo point 11 on Figure 11).

Significant fine deposits occur in the vicinity of the Elk River Road concrete bridge (Figure 13), due in part to channel constriction caused by the bridge piers and by hydraulic control imposed by the increase in planform curvature and left bank confinement immediately downstream, where the channel bends sharply to the north. A large pump intake for domestic water supply occurs on the left bank (facing downstream) just downstream of the bridge.

Figure 13. Fine sediment deposits at the upstream side of the Elk River Road concrete bridge (photo point 10 on Figure 11).

Nuisance Flooding Conditions

The Elk River Flood Curve project reach is heavily aggraded with fine sediment, which constricts the low-flow channel, limits sediment transport capacity, and results in frequent out-of-bank nuisance flooding and occasional damage to private property. The channel capacity under the Elk River Road Concrete Bridge is severely aggraded, with approximately 44% of the cross-sectional area blocked by sediment deposition (California Trout, 2018, p. 38) (Figure 14).

Figure 14. Mainstem Elk River at the location of the Concrete Bridge at the intersection of Elk River Road and Wrigley Road following flooding in December 2014 caused by excessive fine sediment aggradation. Note the proximity of the channel to road infrastructure.

Road flooding typically occurs first, and most often, within the approximate 200-foot section of road within the Elk River Flood Curve project area. The road is located within a few feet from the main channel and flooded approximately 50 times between 2003-2012 (Table 3). Winter flooding occurs between 0-9 times per year (Table 3) with the duration of events with water on the road surface ranging from less than an hour to as long as three days. Flood flows inundate the entire Elk River Road roadway and bridge, and often prevent vehicle traffic into and out of the upstream residential areas. Although not all flooding events in this section of Elk River Road make this section of Elk River Road impassible, this episodic flooding is a nuisance to residents and a safety

concern. The entire Project reach, from ~100 ft upstream of the Elk River Road Concrete Bridge downstream to the confluence of the North Fork and South Fork has lost any semblance of a natural channel morphology: sediment loading in this reach is massive, there are no riffle-pool sequences, riffle crests providing hydraulic control, sediment sorting and storage in bar features, or off-channel low-elevation floodplain benches. Only a few functional large wood structures persist in this reach.

Table 3. Summary of flooding events defined by water on the road surface between 2003-2012

Hydrologic Year	# of flooding events	Number of Rainfall Days			Annual Rainfall (inches)	Maximum Daily Rainfall (inches)
		>3 inches	>2 inches	>1 inches		
2003	8	1	3	12	54.00	6.79
2004	7	0	0	9	37.57	1.89
2005	2	0	0	13	43.45	1.77
2006	9*	0	1	16	58.67	2.04
2007	5	0	1	4	36.86	2.32
2008	4	0	0	9	33.06	1.99
2009	0	0	0	5	30.30	1.74
2010	3	0	0	12	44.96	1.76
2011	4	0	1	10	44.11	2.05
2012	8	0	2	11	39.72	2.26

*HY 2006 was not measured. HY 2006 flooding estimated from exceedance of minimum flow (695 cfs)

The channel capacity within the Elk River Flood Curve is estimated to be approximately 60% of the expected bankfull capacity for a stream of this size, causing flooding events at stream flows in excess of 695 cfs (Dhakal & Sullivan, 2005) . Several factors contribute to increased flood frequency in the Elk River Flood Curve, particularly increased channel roughness in the form of abundant bank vegetation and woody debris accumulation which reduce stream velocity and entrap sediments (as observed at the Elk River Road Concrete Bridge). Reduced bankfull capacity has affected the extended flood plain, as flows that are pushed out of the channel drop sediment and provide a fertile environment for the growth of shrubs, willows, and conifers. This increasing out of channel vegetative roughness affects stream flow velocities and flood plain carrying capacity, resulting in flows being pushed further out from the channel than would otherwise occur if the floodplains were less vegetated.

Channel roughness (and associated aggradation) will continue to increase without proactive channel and stream bank vegetation maintenance (Dhakal & Sullivan, 2005). According to the Elk River Basis of Engineering Designs Report (Northern Hydrology & Engineering, 2019, p. 25), model results indicate that "the Pilot Projects decrease water levels upstream of the confluence. The area of greatest water level change is around and upstream of the Concrete Bridge, where the model results suggest that the greatest lowering of maximum water surface elevations is up to… 0.36 feet." The Proposed Project is "predicted to decrease flood water levels over most flow conditions, which would have a positive effect on nuisance flood conditions in the project area. In addition, water levels will likely be lower than predicted due to the vegetation modifications that are not accounted for in the SR HST model. The effectiveness of the Pilot Projects to reduce nuisance flooding is greatly limited by the inability to remove all aggraded sediment within and downstream of the project teach. Treatment of the full sediment impairment as recommended by the Recovery Framework (California Trout, 2018) could decrease water levels by several feet."

Habitat Quality

Riparian forest biohabitats in the Flood Curve Project reach are diverse and well-developed, especially near the confluence of the North Fork and South Fork Elk River. Red alder and arroyo willow are the most common riparian forest cover types, with mature tree canopies over 50 ft tall. Pacific willow (*Salix lasiandra*) patches were most extensive near the confluence but extended upstream to the concrete bridge. Other riparian forest biohabitats include mixed willow, red alder–elderberry (*Sambucus racemosa*), and red alder–mixed willow. The understory of riparian forest biohabitats is generally dense and tangled with various willow species, blackberries, stinging nettle (*Urtica dioica*), and elderberry.

Salmonid habitat in the Flood Curve reach is of poor quality. The channel is narrow and confined, with maximum pool depths at winter baseflow of approximately 2-3 feet, with only 3 pools exceeding 3 feet deep. There is a moderate volume of large wood (Table 5) providing some low-quality winter habitat refugia, but most wood pieces are "punky" (rotting and of low value) and suspended above the winter baseflow water surface and thus not accessible to provide functional habitat in-channel. Redwood or other large conifer key pieces are lacking. Suspended sediment concentrations and turbidity are quite high in this reach in winter. The 12-15 ft wide winter wetted channel shrinks to 3-5 feet wide during the summer low-flow period, leaving exposed sand bars and aggraded riffles that become heavily overgrown with dense patches of slough sedge. The water surface in summer is colonized by a dense surface film of duckweed and has very little surface water velocity (i.e., stagnant conditions). Dissolved Oxygen concentrations in

this reach were very low in September 2018 (California Trout, 2018) , with anecdotal measurements ranging below 2-3 mg/L during extended periods (days).

The Elk River Flood Curve project reach has similar geomorphic features and wood loading characteristics (Table 5) throughout its length. The current large wood supply (number of pieces, key pieces, and volume) in the Elk River Flood Curve reach does not meet large wood targets prescribed by the RWQCB (NCRWQCB, 2006) . A wood inventory conducted by Stillwater Sciences found one key piece greater than 24 in diameter and 24 feet long, and 14 total wood pieces greater than 6 inches diameter and 3 feet long (Table 5).

Table 4. Existing large wood pieces at the Elk River Flood Curve Project reach. Large wood inventory was conducted in 2017 by Stillwater Sciences.

	Length (ft)				
	3-10ft	10-25ft	25-50ft*	50-75ft	total
Flood Curve (2,800 ft)	3	10	1	0	14
Flood Curve (2,800 ft) Live Pieces	6	7	0	0	13

* key pieces (NCRWQCB, 2006)

Table 5. Large wood inventory in the Elk River Flood Curve Reach. Refer to Figure 15 for the location and orientation of each wood piece.

Piece ID	L (ft)	D (in)	V (m3)	Key Piece
1	20	28	6.81	N
2	15	12	2.19	N
3	15	14	2.55	N
4	6	28	2.04	N
5	25	24	7.30	N
6	25	18	5.47	N
7	12	12	1.75	N
8	18	20	4.38	N
9	12	24	3.50	N
10	25	24	7.30	N
11	10	18	2.19	N
12	25	24	7.30	N
13	45	28	15.32	Y
14	35	14	5.96	N

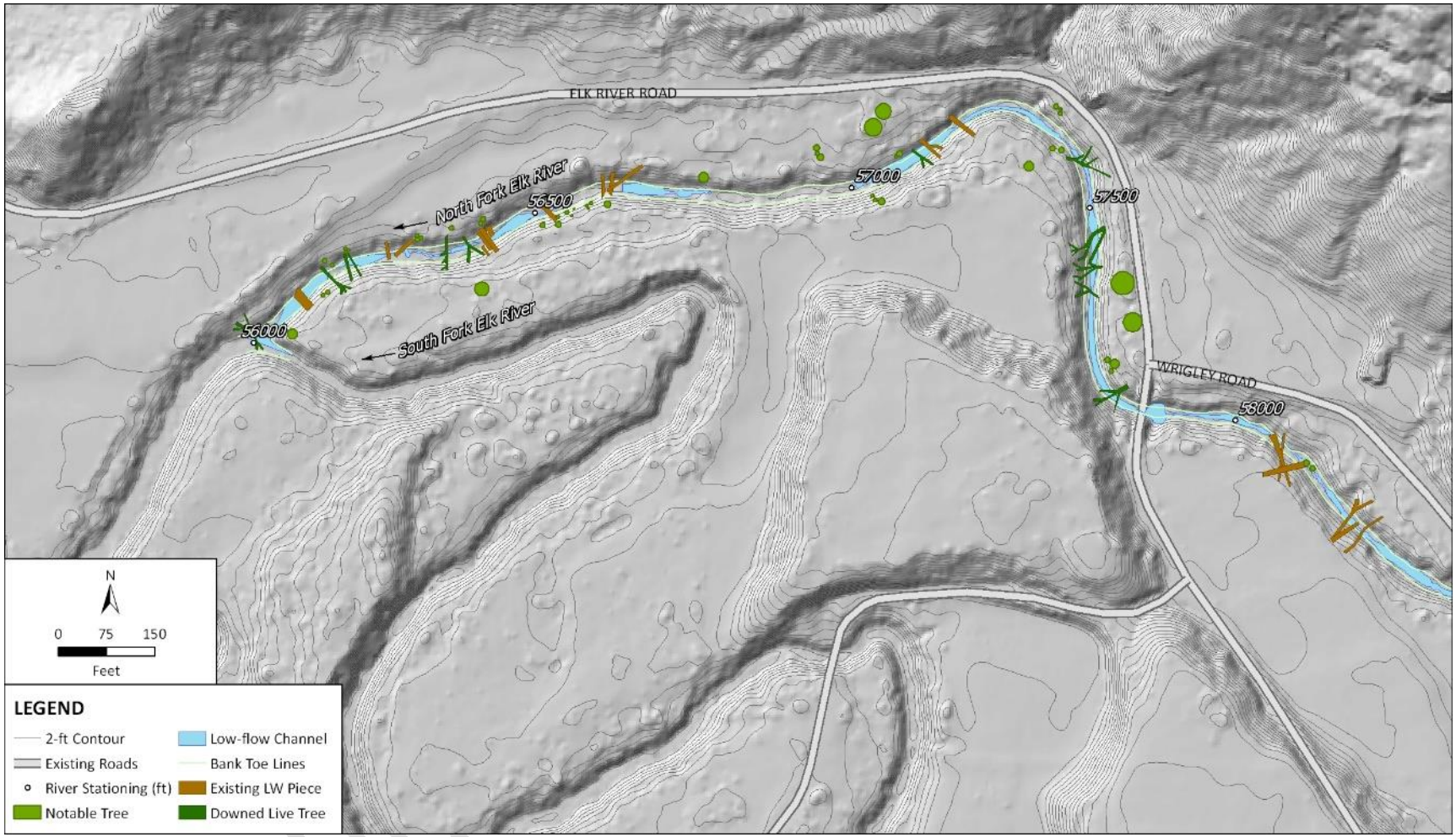

Figure 15. Map of existing vegetation in the Elk River Flood Curve reach.

Elk River Flood Curve Reach Objectives

The Elk River Flood Curve Pilot Project will test sediment remediation approaches including: dredging (channel widening), in-channel sediment detention (detention basin/pool enhancement), vegetation management (removal of brushy vegetation, targeting willows and blackberry), creation of inset floodplains (lowering terraces and benches along banks), and placement of in-stream large wood habitat structures.

The Pilot Project objectives in the Elk River Flood Curve reach include:

- Enhancing winter and summer juvenile salmonid rearing habitat functions by reconstructing seven riffle-pool sequence, each with deep pools (>4-5 ft deep) and gravel-bedded riffles, and installing seven large wood habitat structures targeting low/zero velocity winter refugia habitat for juvenile salmonids;
- Increasing the sediment transport capacity during winter storms, in order to significantly reduce aggradation rates and maintain an approximate sediment supply/transport equilibrium in the rehabilitated reach;
- Reducing the frequency and duration of nuisance flooding by increasing the hydraulic conveyance capacity of the channel in the North Fork Elk River;
- Improving low Dissolved Oxygen (DO) concentrations during the summer low-flow rearing season; and
- Monitoring annual rates and volumes of sediment aggradation in re-constructed channels, and the persistence and utilization of rehabilitated habitat features.

2.3 Project Action Elements

The Proposed Project includes several design elements intended to restore hydrologic, physical, and biologic processes to the lower North Fork Elk River. These actions include channel and floodplain excavation, vegetation removal, and the creation of in-stream habitat features. As previously described, these actions are intended to inform decision-making regarding sediment remediation approaches that may or may not be taken in the future to restore beneficial uses of the Elk River.

The 65% complete project designs for the Proposed Project are included as Appendix A and include target grading elevations at cross-sections based on detailed topographic surveys, hydraulic modeling, and landowner input. **As the Proposed Project proceeds through the final design phases, design elements (such as the placement of large wood features) may be refined based on input and requirements of permitting agencies (mitigations to protect critical habitat, and sensitive aquatic, plant, reptile/amphibian, bird, and wildlife species are included as Section 2.9). However, the footprint of the Proposed Project will not result in any expansion of the Project footprint beyond that which is proposed in this document.**

Together, the pilot projects are intended to increase channel capacity by remediating a minimum of 18,000 cubic yards of sediment (per the funding agreement). As currently proposed in the 65% designs, the Proposed Project will excavate approximately 22,000 cubic yards of fine sediment from the aggraded channel and floodplain, spoil the excavated material on private property in adjacent upland locations, re-contour and reconfigure the channel to re-establish the floodplain and mitigate flooding, install in-channel habitat features (pool enhancement, large wood habitat structures, and riffle reconstruction with gravel augmentation), and revegetate the disturbed riparian corridor to restore salmonid habitat conditions.

The anticipated actions within each project reach are described below. The overall disturbance area or "area of potential effects" associated with the Pilots Program (including all project features, access and staging areas, fish relocation areas) is depicted in Figure 16. General locations of each project action area are depicted in Figures 17 and 18.

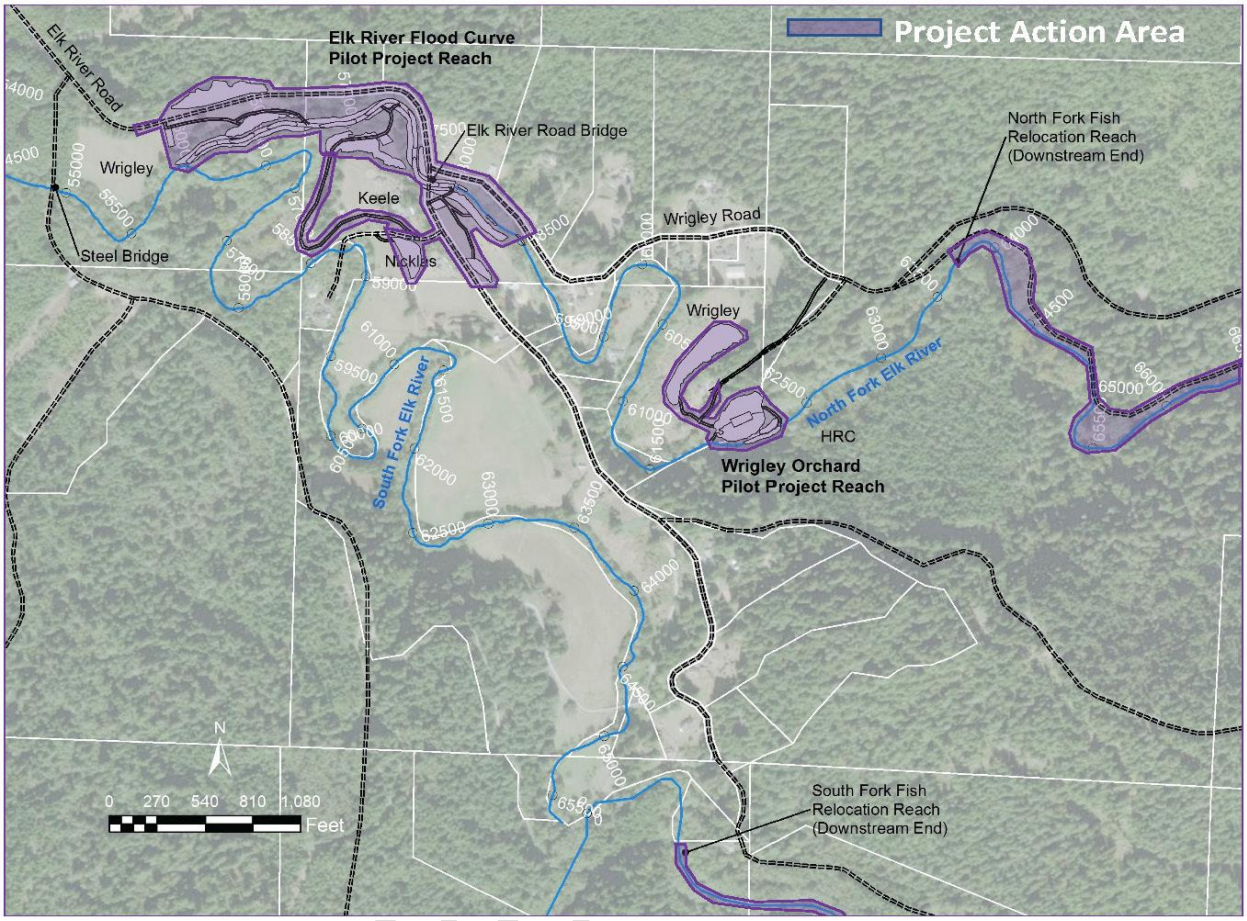

Figure 16. Summary of overall disturbance areas and individual project actions areas, including in-channel excavation areas, floodplain excavation areas, sediment reuse (spoils) areas, access roads, staging, and fish relocation areas.

Proposed Wrigley Orchard Reach Project Improvements

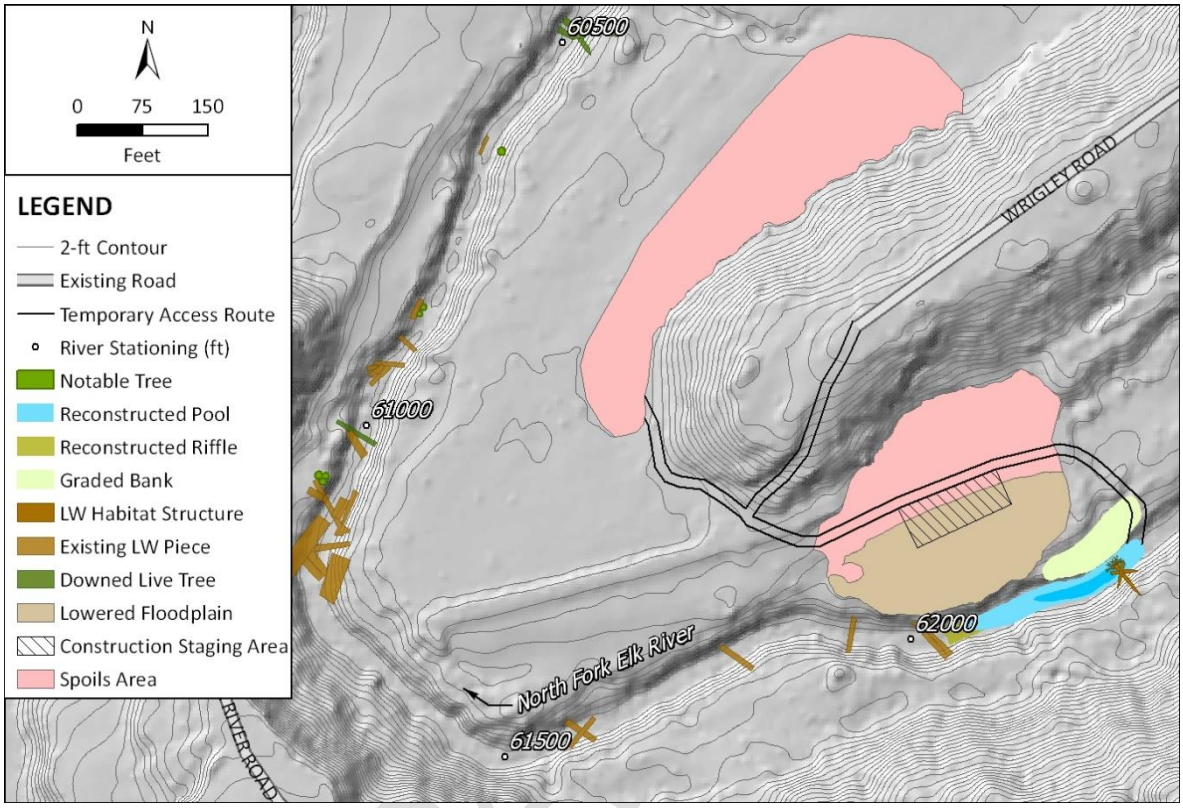

Figure 17. Proposed conceptual remediation and habitat enhancement design for the Wrigley Orchard Project reach. *Note that the lime-colored "graded bank" feature depicted in the figure has been removed from the Project as currently proposed.*

Within the Wrigley Orchard Pilot Project area, 0.7 acres will be graded, removing approximately 2,800 cubic yards of material. The Project proposes to:

- Excavate approximately 700 cubic yards of sediment from 275 linear feet of channel extending from Stn 620+75 to Stn 623+50 (including re-creation of a 200-foot long deep pool).
- Excavate approximately 2,100 cubic yards (yd3) of sediment from 275 feet of the right bank floodplain extending from approximately 619+25 to 622+50.
- Spoil approximately 2,000 cubic yards of spoil material on the back side of the newly excavated right bank floodplain and approximately 10,100 cubic yards of spoil material on the Wrigley Orchard pasture.

In order to construct the improvements, channel bed grading may occur anywhere within a grading boundary of approximately 2.7 acres to accommodate the movement of equipment

upstream and downstream and between excavation and spoils areas, as depicted in Figure 17.

Table 6. Summary of proposed channel excavation, pool habitat enhancement, and sediment spoil areas in the Wrigley Orchard Project reach

Project Reach /Feature	Excavation Area (Acres)	Sediment Volume (CY)
Channel	0.1	700
Floodplains	0.6	2,100
Spoil Sites	2.0	12,100

Specific project features within the Wrigley Orchard reach are described in more detail below.

Channel Excavation and Pool Enhancement

CH4—The Wrigley Orchard reach includes one area where channel excavation will occur and a 200-foot pool will be re-constructed along 275 linear feet of channel from approximately Stn 620+75 to Stn 623+50. The total volume of sediment excavated from the channel site is 700 cubic yards, and the total in-channel disturbance footprint is 0.1 acres (Table 7). Sheet 13 (C10) of the 65% designs (Appendix A) illustrates the stream cross section (xs 21, xs 22, xs 23) showing the potential extent of channel excavation that would occur.

Table 7. Summary of Wrigley Orchard channel excavation areas, including pool enhancement.

Location	Pools	Excavation Area (acres)	Cut (CY)	Length (Ft)
CH4	1	0.1	700	275

Floodplain Excavation Areas

FP4—The Wrigley Orchard reach includes one area where the floodplain would be excavated and graded to recreate the floodplain bench, removing 2,100 cubic yards of sediment and affecting 0.6 acres (Table 8). A stepped inset floodplain will be constructed by lowering the terraces and benches along approximately 275 ft of the north bank of the North Fork Elk River, approximately parallel to station 619+25 to 622+50. Sheet 13 (C10) of the 65% designs (Appendix A) illustrates a cross section (xs 22) showing the extent of floodplain excavation that would occur.

Table 8. Summary of Wrigley Orchard floodplain excavation/grading areas.

Location	Excavation/Grading Area (acres)	Cut (CY)	Length (Ft)
FP4	0.6	2,100	275

Sediment Reuse/Spoils Areas

Within the Wrigley Orchard Reach, a total of 12,100 cubic yards of sediment will be excavated and spoiled in upland sites affecting 2 acres (Table 9). Spoil areas within the Wrigley Orchard reach include an additional 9,300 cubic yards of spoil material imported from the Elk River Flood Curve reach area.

Table 9. Summary of Wrigley Orchard sediment reuse (spoil) sites

Location	Grading Area (acres)	Fill (CY)
SP5	1.3	10,100
SP6	0.7	2,000
Total	2.0	12,100

SP5—Sediment reuse site SP5 has a 1.3-acre footprint and is located on the Wrigley Orchard pasture at the southern edge of the floodplain. Up to 10,000 cubic yards of material will be spoiled at the site (including 9,200-9,300 cubic yards of material imported from the Elk River Flood Curve Project area). SP5 would serve to protect the Wrigley Orchard during high flow events by placing fill at depths up to 7 feet. Sheet 13 (C10) of the 65% designs (Appendix A) includes cross sections (xs19-xs20) showing the depth of fill that would occur. In general, SP5 grades from north to south at a 20% slope from a pasture at an elevation of approximately 65 feet up to a maximum elevation of 72 feet.

SP6—Sediment reuse site SP6 has a 0.7-acre footprint. Up to 2,000 cubic yards of material will be spoiled on the north of the right bank floodplain at the outer edge of the valley at depths up to 5 feet. Sheet 13 (C10) of the Revised 65% designs (Appendix A) includes cross sections (xs21-xs23) showing the depth of fill that would occur. In general, SP6 grades from south to north at a 20% slope from an access road at an elevation of approximately 66 ft up to a maximum elevation of 71 ft.

<u>In-Channel Habitat Enhancement Features</u>

Large Wood Habitat Structures

One large wood habitat structure will be constructed within the low-flow channel in the reconstructed pool, using 4-6 redwood logs, including one base log with intact root-wad and a footer log and pinning logs. A portion of the root-wad log will be buried in the streambank to anchor the structure, and smaller logs will be positioned to pin the larger logs in place. The completed log structure will be enhanced with salvaged competent large wood to recreate more complex structural characteristics. Sheet 14 (C11) of the 65% designs (Appendix A) illustrate the habitat structure plan view and cross section.

Proposed Elk River Flood Curve Project Improvements

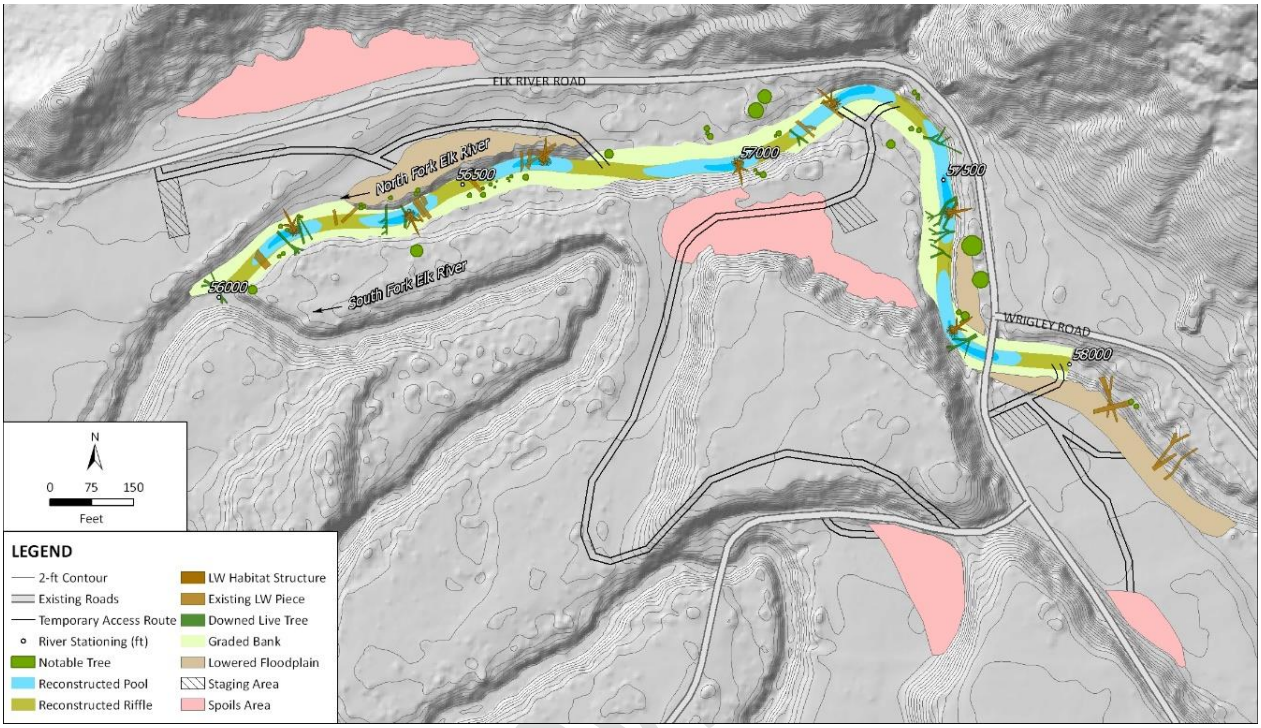

Figure 18. Proposed Conceptual Remediation and Habitat Enhancement design for the Elk River Flood Curve Project reach

Within the Elk River Flood Curve Orchard Pilot Project area, 3.5 acres will be graded, removing approximately 19,200 cubic yards of material. The Project proposes to:

- Excavate approximately 16,000 cubic yards of sediment from approximately 2,000 ft of channel and recreate seven pool-riffle units. The average design pool length is approximately 192 feet and the average riffle length is 93 feet.
- Excavate approximately 3,200 cubic yards (yd3) of sediment from approximately 275 feet of floodplain to re-create three new floodplain areas (Table 12) that will inundate at the annual flood discharge.
- Spoil approximately 9,900 cubic yards of spoil material at four spoil locations as indicated in Figure 19

In order to construct the improvements, channel bed grading may occur anywhere within a grading boundary of approximately 6.1 acres (not including access and staging areas) to accommodate the movement of equipment upstream and downstream and between excavation and spoils areas, as depicted in Figure 18.

Table 10. Summary of proposed channel excavation, pool habitat enhancement, and sediment spoil areas in the Elk River Flood Curve Project reach

Project Reach /Feature	Excavation Area (Acres)	Sediment Volume (CY)
Channel	2.4	16,000
Floodplain	1.1	3,200
Spoil Sites	2.6	9,900

Specific project features within the Elk River Flood Curve reach are described in more detail below.

Channel Excavation Areas

The Elk River Flood Curve reach includes three areas where channel excavation will occur (including pool enhancement). The channel excavation extends approximately 200 linear feet from Stn 560+00 to Stn 580+00. The channel bottom will not be excavated below the historic grade of the river before it was aggraded. The total volume of sediment excavated from the three channel sites is 16,000 cubic yards, and the total in-channel disturbance footprint is 2.4 acres (Table 11). The channel bottom will be widened and deepened in order to achieve the desired 25-foot maximum conveyance width (intended to match the width of the mainstem below) with 1.5:1 side-slopes. Six pools will be excavated in this reach. Sheet C6 of the 65% designs (Appendix A) illustrate stream cross sections for this feature (xs 1-xs 5) showing the potential extent of channel excavation that would occur.

Table 11. Summary of Elk River Flood Curve channel excavation areas, including pool enhancement

Location	Pools	Excavation Area (acres)	Cut (CY)	Stream Length (Ft)
CH1	3	1.0	6,600	750
CH2	3*	1.2	7,300	1,100
CH3	1*	0.2	2,100	150
TOTAL	6	2.4	16,000	2,000

*The upstream-most pool spans CH2 and CH3, so it is counted twice (once in CH2 and once in CH3). The pool at the "flood curve" (located at the large meander bend in CH2) is a compound pool, and could be considered two pools with one riffle crest (but is only quantified as one pool in the table above)

Floodplain Excavation Areas

The Elk River Flood Curve reach includes three areas where floodplain grading will occur, covering 1.1 acres and removing 3,200 cubic yards of sediment (Table 12).

Table 12. Summary of Elk River Flood Curve floodplain excavation areas

Location	Excavation/Grading Area (acres)	Cut (CY)	Length (Ft)

FP1	0.7	2,000	475
FP2	0.03	100	125
FP3	0.4	1,100	500

Area FP1—Area FP1 extends from approximately Stn 562+75 to 567+50 on the Wrigley property. The floodplain will be lowered along approximately 475 linear feet of the right bank of the North Fork Elk River (southeast of Kristy Wrigley's red house) to increase the channel capacity and enable to conveyance of flood flows. Approximately 2,000 cubic yards of in-stream sediment deposits will be excavated and removed from the 0.7-acre floodplain, daylighting the river bank. Sheet 9 (C6) of the 65% designs (Appendix A) illustrate stream cross sections for this feature (xs 3 – xs 4) showing the potential extent of excavation that would occur.

Area FP2—Area FP2 extends from approximately Stn 577+00 to 578+25 on the Keele property. Approximately 125 linear feet of the right bank floodplain will be lowered to increase the channel capacity downstream of the Elk River Road Bridge (Concrete Bridge). Approximately 100 cubic yards of material will be excavated, affecting 0.3 acres. Sheets 6 (C3) and 8 (C5) of the 65% designs (Appendix A) illustrates the extent of floodplain grading that would occur.

Area FP3—Area FP3 extends from approximately Stn 579+00 to 584+00 on the Nicklas property. Approximately 500 linear feet of the left bank floodplain will be lowered to increase the channel capacity upstream of the Concrete Bridge. Approximately 1,100 cubic yards of in-stream sediment deposits will be excavated, affecting 0.4 acres. Sheets 11 (C8) and 12 (C9) of the 65% designs (Appendix A) illustrate stream cross sections for this feature (xs 14 – xs 16) showing the potential extent of excavation that would occur.

Sediment Reuse/Spoils Areas

Within the Elk River Flood Curve, a total of 9,900 cubic yards of sediment will be spoiled in upland sites affecting 2.6 acres. 9,300 cubic yards of sediment excavated from the Elk River Flood Curve reach will be exported to the pasture area (SP5) within the Wrigley Orchard reach pilot project area.

Table 13. Summary of Elk River Flood Curve sediment reuse (spoil) sites

Location	Grading Area (acres)	Fill (CY)
SP1	0.9	1,600
SP2	0.9	3,300
SP3	0.3	1,300
SP4	0.5	3,700

Total	2.6	9,900

Area SP1—Sediment reuse site SP1 has a 0.9-acre footprint and is located across from Wrigley's Red House on the north side of Elk River Road. Up to 1,600 cubic yards of material will be spoiled at the site at depths up to 4 ft. In general, SP1 grades from south to north at a very mild slope of 5-10% from the edge of Elk River Road at an elevation of approximately 60 ft up to a maximum elevation of 64 ft.

Area SP2—Sediment reuse site SP2 has a 0.9-acre footprint and is located on the Keele property on the westerly side of the Concrete Bridge. Up to 3,300 cubic yards of material will be spoiled at the site at depths up to7 ft. SP2 is comprised of a shallow fill (up to 2 ft) across the floodplain and a deep fill that grades from north to south at a 33% slope from the pasture at an elevation of approximately 62 ft up to a maximum elevation of 69 ft.

Area SP3—Sediment reuse site SP3 has a 0.3-acre footprint and is located along the base of the valley wall on the Nicklas property on the east side of Elk River Road, south of the concrete bridge. Up to 1,300 cubic yards of material will be spoiled at the edge of the floodplain at depths up to 6 ft. In general, SP3 grades from east to west at a 20% slope or less from the pasture at an elevation of approximately 64 ft up to a maximum elevation of 70 ft.

Area SP4—Sediment reuse site SP4 has a 0.5-acre footprint and is located along the base of the valley wall on the Nicklas property off a private road accessed from the west side of Elk River Road, south of the concrete bridge. Up to 3,700 cubic yards of material will be spoiled at the site at depths up to 10 ft. In general, SP4 grades from west to east at a 20% slope from the pasture at an elevation of approximately 66 ft up to a maximum elevation of 76 ft. SP4 is designed to tie into the contours of along the edge of the private road.

<u>In-Channel Habitat Enhancement Features</u>

Large Wood Habitat Structures

The project will increase the in-channel supply of large wood pieces and wood volume by maintaining/replacing all existing wood pieces currently within the bankfull channel, and constructing 7 new large wood habitat features, 1 per each re-constructed pool. Each large wood habitat structure will be constructed within the low-flow channel in the reconstructed pool, using 4-6 redwood logs, including one base log with intact root-wad and a footer log and pinning logs. A portion of the root-wad log will be buried in the streambank to anchor the structure, and smaller logs will be positioned to pin the larger logs in place. The completed log structure will be enhanced with salvaged competent wood to recreate more complex structural characteristics. Sheet 14 (C11) of the 65% designs (Appendix A) illustrate the habitat structure plan view and cross section.

2.5 Project Implementation/Construction Methods

Timing of Work

The project is intended to be constructed in one phase including the Wrigley Orchard and the Elk River Flood Curve sites but may be sequenced due to permitting and funding constraints. In this case, the order of final design and construction would be phased with the first phase of the project constructed in year one and subsequent phases constructed in year 2, 3, 4, or 5. The order of final design and construction will be determined by consultation with permitting agencies and the construction contractor but will be organized to limit disturbance. Construction in or near the Elk River channel would occur from August 15 through October 15 (potentially October 31 if no rain is forecast) during low summer flows. In the case that active Willow flycatcher nests are found in the Project area, the construction start date will be delayed until September 1 to avoid disturbance. The Proposed Project is currently funded through final design, CEQA evaluation, project permitting, and construction. The project is expected to be constructed in one phase including the Wrigley Orchard and the Flood Curve sites. The order of final design and construction will be determined by consultation with the construction contractor but will be organized to limit disturbance.

Environmental Commitments

Project construction would include a range of Environmental Commitments, otherwise known as Best Management Practices (BMPs), to avoid and minimize adverse effects on people and the environment. Environmental Commitments are developed to address anticipated effects on particular types of resources from various construction activities. Environmental Commitments are implemented pre-construction, during construction, and post-construction as specified. The Environmental Commitments for the Proposed Project are included at the end of this chapter in Section 2.9 (Table 22).

Construction Access

To initiate construction of the project, site access and construction staging areas will be prepared (Figure 19). Approximately 1,000 feet of temporary access roads and four temporary staging areas not exceeding a total of 1 acre will be constructed. There are four designated construction staging areas, one per each private property (Wrigley, Keele, Nicklas, Wrigley). Each staging area is an approximately 100 x 100 ft polygon located on open, flat pasture surface outside of the riparian zone. Staging areas will be used for heavy equipment and vehicle parking, refueling, and material stockpiling (e.g., erosion control materials, large wood, imported gravel, etc.).

For the Wrigley Orchard site, primary access will be via the driveway of the Wrigley Parcel (APN 311-041-006). For the Elk River Flood Curve (approximate Concrete Bridge location), access will be via the gates to the Nicklas properties to the east (APN 311-242-001) and west (APN 311-243-002) of Elk River Road and via the Keele driveway (APN 311-243-001). For the Wrigley Red House portion of the Elk River Flood Curve Project (approximate North Fork South Fork confluence location), primary access will be via the Wrigley driveway (APN 311-021-013). Additional access roads as depicted in Figure 20 will be required to allow heavy equipment to access the excavation sites and spoil locations. Temporary ramps will be constructed for construction vehicles to access the dewatered channel bed.

In some locations, vegetation clearing and grading will need to occur to construct access roads (approximately 1,000 ft.) to excavation areas. Sediment removed from the channel will be placed in 10- or 20- cubic yard dump trucks and prepared for off-site hauling and disposal. Up to 22,000 cubic yards of sediment will be excavated and trucked varying distances to sediment reuse sites. This activity would require up to 2,200 trips of a 10 (cubic) yard dump truck. Approximately 1.5 miles of Elk River Road will be utilized to haul sediment between excavation areas and sediment reuse locations.

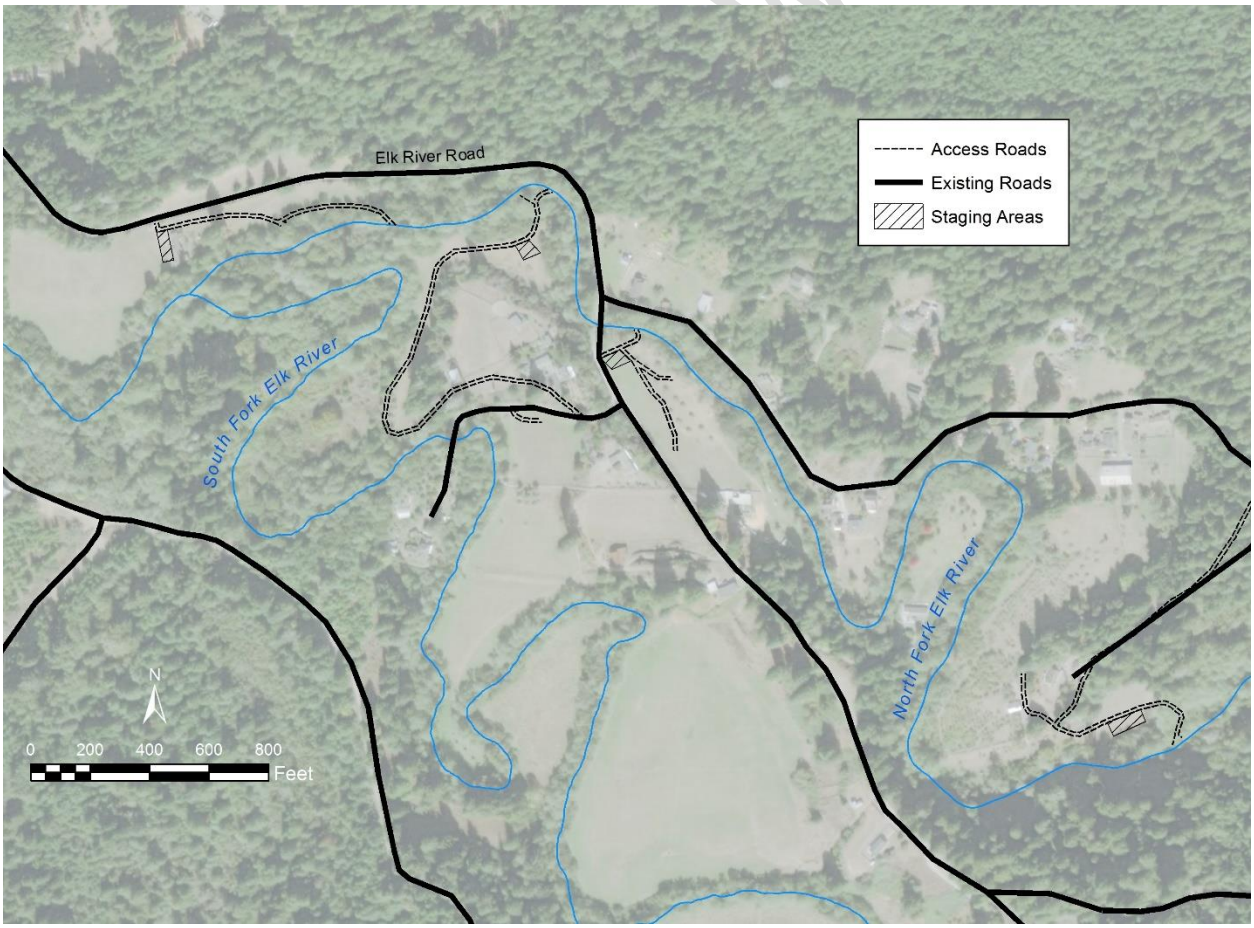

Figure 19. Existing and proposed access roads and staging areas for all project activity areas.

Upon project completion, all portions of temporary access roads that enter a riparian area shall be ripped to a minimum depth of 6 inches and regraded to match adjacent topography. Mulched vegetation will be used as erosion control treatment.

Staging and Stockpiling

Construction staging areas are planned at four separate locations (Figure 19). Staging areas for equipment and materials will be no larger than ¼ acre in size. Stockpile locations will be limited to floodplains within privately-owned property and located adjacent to areas where clearing of riparian vegetation will occur. Sensitive areas that require avoidance will be mapped and flagged with construction fencing to ensure they remain undisturbed. Vegetation cleared from the riparian corridor will be temporarily stockpiled and cut and provided to landowners as firewood or chipped-and used as mulch.

Fish Removal and Relocation and Channel Dewatering and Rewatering

*Note: The exact steps related to dewatering/rewatering and fish removal/relocation are being developed in consultation with NOAA Fisheries/NMFS and CDFW and are the subject of a Draft Biological Assessment (**Appendix B**). For complete details regarding impacts and mitigations associated with fish removal/relocation and channel dewatering/rewatering as well as the approved sequence and timing of activities, refer to the Draft Biological Assessment.*

Fish removal will precede developing equipment access in the channel bed and prior to construction activities in approximately 2,375 feet of channel which would be dewatered under the Proposed Project. Fish relocation will involve the removal of multiple rounds of fish and other aquatic organisms, beginning with the least intrusive methods (minnow trapping, seining), and progressing to more intrusive method (electrofishing, flow diversion).

According to the Draft Biological Assessment (April 2019), fish removal and relocation activities will commence in late-July following a re-construction snorkel survey in early-July, and may include the development of foot access for field crews and small vegetation removal using non-motorized, hand-held equipment.

The work areas will be dewatered and in a dry workable condition before any in-channel work is conducted, including vegetation removal. Dewatering activities will commence upon completion of fish removal activities and will continue until the work area is fully stabilized. Two dewatering segments are anticipated, one in each Pilot Project Reach (note the two Pilot Project reaches are separated by 4000 feet of stream channel which will not be dewatered, extending from the downstream end of the Wrigley Orchard dewatering segment at 620+00 to the upstream end of the Elk River Flood Curve segment at 580+00).

A temporary diversion system will be used to isolate discreet work areas to create dry, workable conditions and prevent sediment transport and downstream turbidity. The temporary diversion system would use upstream and downstream cofferdams to capture and retain water and exclude fish access. Water would be diverted around the project site via gravity system through a flexible pipe to a point downstream of the work area. The inlet/intake of the diversion system would be fenced and screened to prevent the entrainment and impingement of fish or other aquatic species. The pipe would run along the edge of channel opposite of where work would be performed. Pump systems will employ energy dissipation measures and comply with sediment control requirements to avoid mobilization of fine sediment into the downstream reaches during re-watering activities. The removal of cofferdams (re-watering to an in-channel pool) will be one of the last activities associated with in-channel work. For more details, refer to the Draft Biological Assessment (Appendix B) and the Environmental Commitments Table (Section 2.9).

Riparian Understory Clearing and Vegetation and Tree Removal

The Project area has extensive vegetation growth along the channel, which includes many native and non-native species that have become rooted in fine sediments. Throughout the Project area, overly dense strands of vegetation impair the hydraulic function of the channel, disrupt habitat-forming physical processes, impede the establishment of riparian vegetation, and cause sediment to accumulate in the channel.

Vegetation will need to be cleared to provide equipment access to the two channel and two floodplain excavation sites, and to provide access between excavation and sediment reuse areas. Riparian understory clearing would involve the select removal of species rooted in the channel and floodplain within the construction footprint (particularly willow, alder and extensive blackberry strands). Riparian understory clearing would be conducted as part of clearing and grubbing activities and would be completed before grading commences. Pre-construction vegetation removal would be implemented using hand tools including shovels, rakes, and electric hedge trimmers to minimize disturbance to existing resources.

Grading activities will minimize, to the extent practical, the disturbance of existing vegetation within the Project area. Wherever feasible, trees will be left in place to preserve the existing riparian canopy. Large, healthy native old growth trees greater than 36 inches diameter at breast height (DBH) will be preserved to the extent possible. Vegetation and trees that are cleared from the channel and floodplain may be temporarily stockpiled in floodplain clearings before being transported to designated areas where it will be cut up and provided to landowners for firewood or chipped for use as mulch. All stockpiles will be removed by the end of the construction season (October 15 or October 31 if no rain is forecast).

Channel and Floodplain Excavation

The construction approach for sediment removal from the aggraded channel and floodplain will employ similar techniques for both the Wrigley Orchard reach and Elk River Flood Curve reach. Channel widening will require both mechanical and hand labor. Mechanized equipment such as loaders, scrapers, rollers, compactors, and excavators would be used where more extensive grading activities are required. Hand grading with trowels, shovels, and other manually operated tools would be employed in sensitive areas to minimize disturbance.

Temporary ramps will be constructed into the channel to facilitate construction equipment access. Excavators will remove and stockpile all salvageable large wood pieces before excavating sediment from the banks and loading into dump trucks. Tracked dump trucks can articulate 180 degrees, and thus will follow excavators up or down the channel, receiving a 10-yard load and driving back out to dump the load for transport to a sediment re-use site. In general, excavators and tracked dump trucks will work their way up the channel in one direction, removing large wood and sediment to attain the approximate "rough dimensions", then reverse direction and work back toward the exit ramp, excavating to the final channel dimensions, and contouring the channel bed and banks while replacing and/or constructing large wood habitat structures.

Preservation of existing flood protection will be documented with the County Floodplain Administrator in compliance with the Humboldt County Flood Control Ordinance prior to project implementation.

Sediment Disposal/Reuse

In total, 22,000 cubic yards of sediment will be excavated from the channel and floodplain and spoiled in upland locations. Spoil sites located closest to in-channel and floodplain excavation sites will be filled to capacity before utilizing spoils areas located further away from primary project features.

Sediment excavated from the channel bed and banks will be hauled out of the channel via track dump truck and placed in upland areas pre-designated for sediment disposal. Sediment disposal areas are flat pasture surfaces with perennial grass cover located in close proximity to the excavation sites and outside of riparian habitat. Sediment excavated from the seven floodplain excavation sites may be temporarily stockpiled within the footprint of each site before being loaded onto a dump truck and hauled to a sediment reuse (spoil) site. Onsite soils are suitable for general fill requirements and will be deposited in designated spoil reuse areas (Figures 18 and 19). If excavated materials are found to be unsuitable for use as fill, haul trucks will be used to export the materials for offsite disposal.

After excavated sediment is placed within designated sediment re-use sites, it will be rough-graded to expose large organic material (wood pieces). Large wood pieces will be removed and stockpiled for later disposal using either a wood chipper or grinder or hauling the material to an appropriate recycling center. Wood materials will not be burned. After large organic material has been removed from the surface of the placed sediment, the area will be fine-graded to achieve the final design contours. The newly contoured spoil areas will be re-seeded with perennial grass at the conclusion of construction activities.

All sediment reuse (spoil) sites are located on private property. Sediment reuse sites are predominantly working agricultural lands, consisting of pastureland on private property located near in-channel and floodplain excavation features. The future use of sediment reuse sites for agricultural production will not be inhibited by project implementation. In all cases, use of spoils sites for agricultural purposes will be enhanced because their elevation will be increased.

Some sediment reuse locations are within the 100-year floodway. As such, review and approval for the placement of fill will be obtained from Humboldt County's Floodplain Administrator prior to Project implementation.

Channel and Floodplain Recontouring

After the pre-designated volume of sediment has been removed from the channel bed and banks, the bed and bank contours will be refined to achieve the desired design dimensions. The following design parameters will be followed:

- Channel banks will conform to side-slopes not exceeding a 1.5:1 ratio.
- The toe of bank cross section width will be at least 25 feet.
- Floodplain benches within the inner channel will be approximately 4-6 feet above the riffle crest elevation, to inundate at the annual flood or lower.
- The average channel gradient will target 0.15% with a total elevation change of approximately 2.52 feet distributed along the entire Flood Curve reach.

In-Channel Habitat Enhancement

The Proposed Project includes instream habitat features to provide immediate habitat benefits and initiate sustainable geomorphic processes including pool enhancement, large wood habitat structures, and riffle reconstruction gravel augmentation.

It should be noted that while effort has been made to incorporate instream habitat enhancements to the extent practicable, the primary objective of the Proposed project is sediment removal in order to improve water quality and put the river on a trajectory toward the recovery of beneficial uses, including sediment

and hydrologic conditions supportive of the long-term development and maintenance of high quality, functioning aquatic habitat. Excavation, grading, and placement of in-stream habitat features in strategic locations will set the stage for a more balanced system to evolve and change over time. However, mechanical habitat enhancements may or may not provide lasting habitat benefits due to sedimentation, which also needs to be fully addressed. Analyzing the response of the system to current sediment loading under altered hydraulic conditions is an objective of the pilot project.

Pool Enhancement

The Proposed Project incorporates the excavation of seven pools. Pools are areas of slow-flowing deep water, generally located on the outside of a bend, that provide refuge for salmonids during dry conditions, protection from predators, and shelter. Pools are designed to be a minimum of 3 feet below downstream riffle crest elevations.

Large Wood Habitat Structures

Large wood habitat structures will be installed in each of the seven reconstructed pools. Wood pieces salvaged from the reach during construction and additional redwood logs obtained for this Project will be used to construct the habitat features. The installation of wood structures will target creation of low/zero velocity winter refugia areas at various flow stages within the re-constructed pools and along the channel margins. Wood will be installed utilizing salvaged wood and during the creation of large wood habitat structures as described below:

Salvaged Wood Pieces

The 14 existing wood pieces enumerated in the Elk River Flood Curve reach larger than 6 inches diameter and 3 feet long (Table 5) and the approximately 13 live trees spanning the channel will be removed from the Elk River Flood Curve reach during the channel excavation phase and stockpiled near the location of their removal for use as salvage wood enhancement. There are no large wood pieces to be removed at the Wrigley Orchard reach. During the channel recontouring phase of construction, the ~27 salvaged logs will be either placed back into the channel (if the wood material is competent) or replaced with redwood logs of comparable size or larger. These logs may be placed individually and anchored naturally into the bank without ballast rocks, or reconstructed as a multiple-log habitat feature, depending on the availability of material. The net result will be the equivalent number of log pieces (or greater) as are found in the existing channel configuration, but with the existing less durable hardwood pieces upgraded to redwood logs.

Installation of Large Wood Habitat Features

New log structures will be placed in the newly excavated pools targeting low/zero velocity winter refugia habitat for juvenile salmonids at a range of flood flows. In addition, large wood structures will initiate long-term channel complexity through the initiation of geomorphic processes including scour, deposition, and sediment sorting. One log structure will be constructed in each of the six enhanced pools at the Elk River Flood Curve, and one pool at the Wrigley Orchard reach, for a total of seven log structures (Figures 17 and 18). The structures will be placed at an appropriate location within the pools to encourage pool scour during high winter flows and to provide suitable water velocities to enhance juvenile salmonid rearing habitat. Each structure will be constructed with one key piece (preferably) with the rootwad placed into the pool, one footer log, two anchor logs, and two optional smaller pinning logs, for a total of 4-6 wood pieces (Table 14). Logs will be anchored naturally into the bank without ballast rocks. The anchor and pinning logs will be used to hold the larger diameter rootwad and footer log in place and will not require artificial anchors (bolts and cables, etc.). The structures will be embedded into the banks within the winter baseflow channel and will not extend more than half-way into the cross section to maintain a low profile and not collect excessive debris. The placement of large wood in relation to the enhanced pools is depicted in Figures 17 and 18. The total volume of wood material to be placed in the channel is approximately 175 cubic feet per structure, or a net increase of 111 cubic yards of permanent fill of wood material (per USACE).

Table 14. Wood material to be used to construct pool habitat structures. Log dimensions are minimum sized and larger materials may be used if available.

No. of Logs	Diameter (in)	Length (ft)	Volume (ft^3)	Type	Description
1	24	20-30	94.2	Key Piece	Base piece with (preferably) or without a root-ball. Embedded 10-20 ft into the bank
1	24	10	31.4	Footer	Large wood underlying base piece at the toe of the channel bank
2	12-18	12-20	37.7	Anchor	Pair of large logs crossed over to anchor base piece. Embedded 5-7 ft into channel bed or bank
0-2	12	15	11.8	Pin	Small wood pieces pinning base piece. Embedded vertically 10 ft into channel bed

Table 15. LWD target values per 328 ft of channel length (100m) for number of key pieces, number of pieces, and total wood volume. The targets in NCRWQCB 2006 use a modified version of LWD reference values from undisturbed forests in Washington State originally published by Fox (2001). Targets from Humboldt Redwood Company are for properly functioning aquatic conditions at the nearest monitoring location to the project area (ATM site 214 on the North Fork Elk River).

LWD type	NCRWQCB (2006) target	HRC (2015) target
Key Piece	4.6 pieces per 328 ft	2.8 pieces per 328 ft
LWD Piece	63 pieces per 328 ft	15.5 pieces per 328 ft
Total Volume	2,540 ft3 per 328 ft	1,361 ft3 per 328 ft

Table 16. Current LWD supply, targets for 375 ft of channel, and estimate of LWD supply after project enhancements are complete for the 375 ft long **Wrigley Orchard** project reach.

LWD criterion	HRC (2015) target	NCRWQCB (2006) target	Wrigley Reach current supply	Wrigley Reach after enhancement
Key Piece (#)	3.2	4.6	0	1
LWD Piece (#)	17.8	72	0	5
Total Volume (m3)	1,556	2,904	0	147

Table 17. Current LWD supply, targets for 2000 ft of channel and estimate of LWD supply after project enhancements are complete for the 2000 ft long Flood Curve project reach. 74* does not include live wood volume, 27** includes 14 dead and 13 live pieces, 1103*** does not include live wood volume.

LWD criterion	HRC (2015) target	NCRWQCB (2006) target	Flood Curve Reach current supply	Flood Curve Reach after enhancement
Key Piece (#)	17	24	1	7
LWD Piece (#)	94.8	384	27**	69
Total Volume (m3)	8,300	15,488	74*	1,103***

Riffle Reconstruction and Enhancement with Gravel Augmentation

Riffles are short segments of the stream where water flow is agitated by rocks. The turbulence caused by riffles increases dissolved oxygen which is essential to a healthy ecosystem. Riffles are at once a food source, a refugia, and a conveyor belt that brings food. Many species of invertebrates reproduce or grow to maturity in riffles and many insects and larger prey items hide in riffle cobble gravels.

The crest of the riffle controls the water surface elevation of the upstream pool and is a critically important feature in the final channel morphology. Riffles will be either left in place as they were prior to construction or reconstructed using on-site sediment material. In the final contouring of the inner channel, riffles and pools will span the low-flow channel width, and micro-topographic contouring will not be attempted. A mix of fine gravel and coarse sand appropriate for the North Fork Elk River reach will be placed on the riffle surface to attain the final riffle crest hydraulic control and water surface elevation. A 6-12 inch layer of gravel will be placed on the portion of the riffle exposed above the summer low-flow water surface (i.e., not

backwatered by the pool). Gravel will be compacted to prevent flow disconnection due to sub-surface flow. This is an experimental component of the design to monitor the persistence of non-embedded gravel facies.

Site Revegetation

In order to calculate the impact of the Proposed Project on vegetation, vegetation mapping of the construction footprint was conducted in October 2017 by McBain Associates. A technical memorandum describing the results of the vegetation mapping is included as Appendix D. Project action areas overlying the vegetation mapping results are depicted in Figure 20.

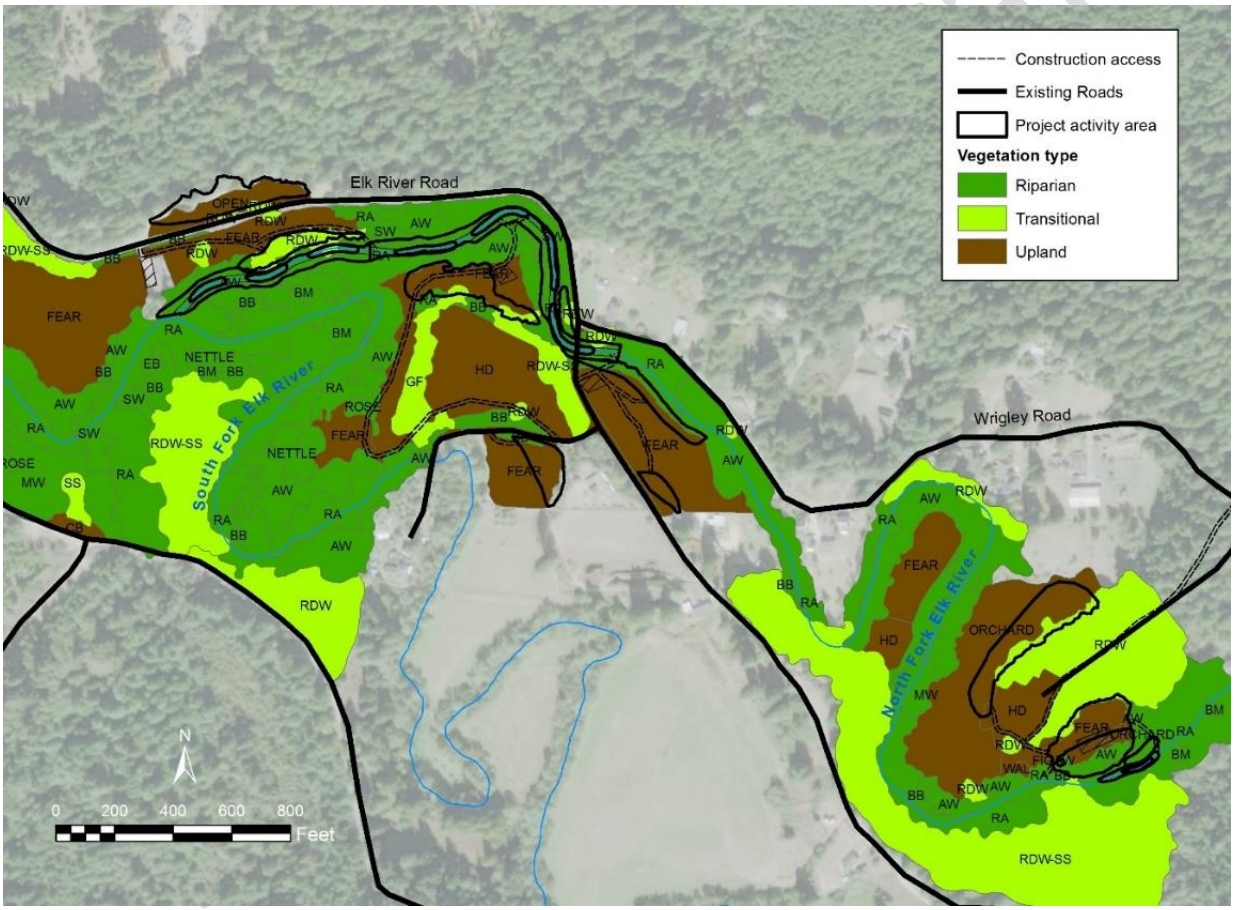

Figure 20. Vegetation mapping results overlaid with project action areas. Incongruities between the Project boundaries and vegetation layer boundaries result from the method of mapping of vegetation boundaries on aerial images, in which the visible canopy is used to delineate vegetation boundaries.

In order to construct the Proposed Project, both temporary and permanent impacts to riparian and transitional vegetation types are anticipated (Table 18). In total, approximately 5.89 acres of vegetated area will be impacted by the Proposed Project. Of this amount, 1.38 acres would be permanently

impacted through the excavation of aggraded channel banks, 1.35 acres would be temporarily impacted through floodplain excavation, and 3.16 acres would be temporarily impacted by the creation of access and staging, most of which (2.76 acres) is currently upland or used as agricultural pasture.

Table 18. Summary of temporary and permanent impacts to riparian and transitional vegetation types

Vegetation Type	**Access and Staging** *(temporary impacts)*	**Floodplains** *(temporary impacts)*	**Graded Banks** *(permanent impacts)*	**TOTAL**
Wrigley Orchard				
Riparian	0.06	0.35	0.10	0.51
Coniferous Forest (Transitional)	0.12	.00	0.0	0.12
Orchard and Agriculture/Upland	1.81	0.21	0.0	2.02
Elk River Flood Curve				
Riparian	0.15	0.38	1.24	1.77
Coniferous Forest (Transitional)	0.07	0.41	0.04	0.52
Agriculture/Upland	0.95	0	0	0.95
Total				
Total Riparian	0.21	0.73	1.34	2.28
Total Coniferous	0.19 (avoid)	0.41	0.04	0.64
Total Orchard/Ag/Upland	2.76	0.45	0	2.97
Grand Total	3.16	1.35	1.38	5.89

A total of 2.92 acres of riparian and coniferous vegetation would be impacted by the Proposed Project. The majority (2.52 acres, shaded values in Table 18) of vegetation impacts are associated with excavation of the channel banks (1.38 acres) and floodplains (1.14 acres). As previously described, channel and floodplain excavation areas within the construction footprint are currently covered by native vegetation such as willows and blackberry which have become rooted in fine sediments accreted to the channel bed and banks. This vegetation contributes to flooding problems by adding roughness, trapping sediment, and slowing water velocity. Newly excavated channel and floodplain surfaces located below OHWM would not be revegetated under the Proposed action as these areas are intended to become part of the wetted channel. Revegetation of these areas would run contrary to the Project objectives of improving channel conveyance and reducing sediment deposition.

Channel and floodplain excavation would also impact some riparian hardwood species, primarily arroyo willow and red alder. All prominent trees, including hardwood and conifer species labeled "Notable Trees" in Figures 10 and 11 will be avoided. To the extent possible, hardwood and conifer

trees larger than 6 inches DBH will be preserved. All trees larger than 6 inches DBH where removal is unavoidable will be replaced at a 3:1 ratio. Replanting will occur within the 1.35 acres of *temporarily* disturbed riparian floodplain areas, as well as within adjacent undisturbed riparian floodplain areas, to enhance tree species diversity within the riparian corridor. To the extent practical, riparian habitat will be replanted with a higher diversity of conifer and riparian hardwood species and will be based on a Master Planting List developed in consultation with CDFW.

Approximately 0.64 acres of coniferous vegetation would be affected by the Proposed action. 0.04 acres of coniferous vegetation would be permanently impacted through excavation of the new channel banks (i.e. would not be replanted). 0.41 acres would be temporarily impacted through floodplain excavation, and 0.19 acres would be temporarily impacted through the creation of access and staging (i.e. would be replanted). All conifer trees located within the lowered floodplain areas and within the construction access and staging areas will be avoided. Coniferous forest within the Project area consists of redwood (*Sequoia sempervirens*), Sitka spruce (*Picea sitchensis*), western red cedar (*Thuja plicata*), and grand fir (*Abies grandis*). Coniferous forest understory consists of sword fern (*Polystichum munitum*), willow (*Salix scouleri*), Himalaya blackberry (*Rubus armeniacus*), twinberry (*Lonicera involucrate*), and salmonberry (*Rubus spectabilis*)]. Impacts to coniferous forest and understory will be replanted at a 3:1 ratio and based on a Master Planting List to be developed in consultation with CDFW.

The Project action will create newly excavated floodplain surfaces above the top of bank which will be replanted with native species appropriate for local conditions (i.e. the low flow channel below OHWM and newly created streambanks will not be revegetated as these areas are intended to become part of the wetted channel under high flow conditions). Native riparian trees and shrubs *above the top of banks* will be replanted at a mitigation ratio of 3:1, with a mix of hardwoods and conifer species to result in a higher diversity of native vegetation. This diverse mix of riparian hardwoods and conifers will ultimately develop into a riparian corridor that is more complex and representative of natural conditions than that which exists currently and will provide better aquatic habitat value including better shading, improvements in water temperature, protection from avian predators, and the contribution of large wood to the channel in the future.

A revegetation plan using a master planting list (Table 20) and based on site specific conditions will be developed in consultation with CDFW concurrently with development of the 100% engineering designs. The revegetation plan will include estimated quantities, type (container size, live cuttings, salvaged plants), spacing, and planting location for each species. All materials would be locally-harvested cuttings or container stock native to the Elk River corridor. Container stock will be obtained from certified native plant nurseries nearby.

The objective of revegetation is to quickly establish canopy cover and an ecologically self-sustaining mosaic of habitats to replace and enhance habitat for fish, birds, amphibians, and other wildlife using terrestrial riparian areas while providing shading, sources of organic matter and coarse woody debris, and water quality benefits to aquatic species. All graded and disturbed areas that are not intended to become part of the wetted channel will be revegetated with species appropriate for the target habitat type for each disturbance site. Reference sites within the excavation area will be used to identify revegetation planning, based on the composition of species identified in Table 20. Revegetated sites will be monitored to ensure that a complex and diverse riparian plant community is established over time, which is similar to the species composition identified at reference sites. Site preparation for planting would rely on hand techniques.

Planting activities will take place at the end of the construction season in late-October 2019, allowing the establishment of new plantings during the subsequent winter. Plantings will be monitored to ensure 80% survivability three years after implementation of the Proposed Project. Because of the naturally moist climate, it is expected that plantings will establish without the need for irrigation.

Table 19. Riparian Replanting Palette

Riparian Species		Coniferous Forest Species	
Salix lasiandra	Pacific willow	*Sequoia sempervirens*	Redwood
Salix lasiolepis	Arroyo willow	*Picea sitchenis*	Sitka spruce
Alnus Rubra	Red Alder	*Abeis grandis*	Grand fir
Myrica Californica	California Wax Myrtle	*Thujaplicata*	Western red cedar
Understory			
Sambucus racemose	Elderberry	*Polystichum munitum*	Sword fern
Rosa californica	California rose	*Salix scouleri*	Scouler's willow
Urtica dioica	Stinging nettle	*Lonicera involucrate*	Twinberry
R. ursinus	CA blackberry	*Rubus spectabilis*	Salmonberry

Non-native Himalaya blackberry (*Rubus armeniacus*) occurs throughout the Project area and will not be replanted

Willow and blackberry species that have become rooted in the channel and serve to trap sediment and impede conveyance will not be replanted within the newly excavated channel. Newly created floodplain slopes (from bank excavation) that are intended to become part of the wetted channel under high flow conditions will be regraded and replanted with locally grown native species at the top of bank. Riparian understory will be replanted with native species as indicated in Table 14 at a density representative of existing conditions. Removal of over-story trees will be avoided whenever feasible but will be replanted at a ratio of 3:1 when removal is unavoidable, replaced with higher-value conifers to the extent possible, and monitored to ensure 80% survivability three years after implementation of the Proposed Project.

Revegetation plans include hydroseed to be placed on 4.5 acres of spoil areas, and chipped mulch to be placed on access roads (approximately 1,000 feet) and staging areas (not exceeding 1 acre).

Erosion Control

Following completion of construction, all disturbed ground surfaces (except newly constructed streambeds intended to become part of the wetted channel) and sediment disposal areas will be treated for immediate erosion control using a native grass seed mix with coverage equivalent to 100 pounds per acre of barley seed and mulched with at least 2-4 inches of certified weed-free straw mulch, wheat or other straw for riparian and wetland areas, and rice straw for upland areas. No annual (Italian) ryegrass (*Lolium multiflorum*) will be used. Areas designated to become riparian vegetation will be replanted at the appropriate season.

Utility Relocation

The proposed project designs have been developed with landowner input to avoid or minimize the impact to existing private utilities at each site. Although the Proposed Project has been designed to avoid impacts, private irrigation lines, pumps, wells, water intakes, or power utilities that are discovered in the course of construction will be relocated if necessary. The construction contractor will be responsible for having Underground Service Alert (USA) mark all utilities in the field prior to construction. If joint pole relocation is required, CalTrout and design engineers will coordinate joint pole relocation with Pacific Gas & Electric (PG&E) and will amend design grading to integrate existing joint poles and provide continued maintenance access. There is a water supply pump intake structure with access on the Wrigley Orchard property and on the Keele property downstream of the Elk River Road Bridge (as depicted in Figure 12) that will need to be considered and protected.

2.6 Post-Project Monitoring and Reporting

Permits for the Proposed Project will require post-project monitoring and reporting to demonstrate that permitting requirements have been met. Performance monitoring will focus on assessing: 1) cross-sectional surveys; 2) long profile surveys; 3) sampling of sediments deposited after construction and following large flood events; and 4) vegetation monitoring, including revegetation survival and any re-colonizing of in-channel vegetation. Monitoring of re-vegetated areas will occur three years after project implementation to ensure survivability of the desired mix of species and densities within the 5-year CDFW requirement.

Immediately following construction, a topographic survey of the Project area will be conducted and an as-built surface prepared. The constructed project area will be monitored for successive winter seasons to observe geomorphic and sediment depositional responses within the reconstructed channel and floodplain areas. Monitoring will consist of approximately two site visits during winter high-flow conditions to observe flow patterns, and one site visit during the subsequent summer low-flow season to conduct more detailed monitoring. Monitoring will consist of photographs; field mapping of habitat, channel and geomorphic conditions (at the same resolution as pre-project mapping); and a topographic survey of the project site to document channel response and depositional patterns. Cross sections established during construction will be resurveyed to document sediment deposition on constructed floodplain surfaces.

Photo monitoring points will be established and photos will be taken at regular intervals during and after the construction to document physical site conditions and changes. It is anticipated that post-project monitoring for salmonids would occur for a minimum of five years, focusing on areas of new or expanded habitat. Pool measurements and photo monitoring will reveal if habitat remains enhanced for summer and/or winter rearing.

Following construction, the RWQCB will submit a post-construction implementation report to NOAA and USACE. The implementation report will also be sent to CDFW. Submittal requirements will include project as-built plans describing post- implementation site conditions and photo documentation of project implementation taken before, during, and after construction utilizing CDFW photo monitoring protocols.

The report will include all data related to fish relocation efforts collected by a qualified fisheries biologist and will include the number of federally-listed salmonids killed or injured during the proposed action, the number and size (in millimeters) of listed salmonids captured and removed, and any effects of the proposed action on listed salmonids not previously considered.

As-Built and Performance Monitoring

As-Built and Performance Monitoring of constructed features will take place for 3-5 years (e.g. monitoring during one winter and one spring period each year) following the completion of construction activities (depending on permit conditions). Monitoring will include post-construction as-built surveys, winter monitoring of water surface elevations and channel cross section responses to winter high flow events, and monitoring of salmonid habitat conditions through the spring recession into the summer low-flow period.

Post-construction As-Built Surveys and Photo Monitoring

Following completion of construction activities, as-built monitoring will be conducted to assess the following project components:

- The constructed channel topography conforms with the engineering design drawings.
- The constructed floodplain topography conforms with the engineering design drawings.
- The BMPs for erosion control were implemented adequately to prevent sediment entrainment and turbidity runoff from the project site.
- The planted riparian vegetation is the correct species and sizes according to the revegetation design specifications.
- The planted riparian vegetation is located and planted in accordance with the revegetation design specifications.
- Photo-monitoring points are monumented adequately to allow relocation for periodic photo-monitoring.

Monitor Geomorphic and Sediment Responses

Monitoring will be conducted for the Project reaches for one winter and spring season following construction, to document the following channel geomorphology and sediment conditions and using monitoring protocols established in the Elk River Recovery Assessment (California Trout, 2018) :

- Longitudinal profile surveys of the entire reconstructed project reaches, capturing riffle crest elevations and maximum pool depths; average point density should be approximately 1 bankfull channel width apart, but may be more or less dense depending on the local complexity in channel morphology;
- Cross section surveys of approximately 8-12 existing cross sections in the Flood Curve reach and 2-3 cross sections in the Wrigley Orchard reach, capturing all breaks in slope, with a minimum of the top of bank, toe of bank, thalweg, and water edge.
- Water surface elevation during 1 or 2 storm events, marking and surveying high water marks along the Project reaches during winter storm events, accompanied with a discharge estimate, and comparison to the hydrodynamic model predicted (design) flood elevations;
- Sediment facies mapping using ocular estimates of sediment size classes, noting initiation of sediment sorting associated with large wood structures;

- Mapping and inventory of wood structures noting stability, persistence through winter storm events, and mobilized pieces (if any).

Monitor Juvenile Salmonid Habitat Conditions and Large Wood Habitat Structures

During a pre-construction site visit in early-2019, we will survey the Project reaches visually, or via snorkel or seining, to observe the relative density of juvenile salmonids (high, medium, low). Water year type and the prior winter's adult abundance will be considered when assessing juvenile salmonid density and overall abundance within the Project reach prior to construction and in subsequent monitoring seasons.

Juvenile salmonid habitat will be monitored during the spring recession and summer low-flow season following construction. We will monitor the following conditions:

- Pool depths relative to as-built conditions to measure aggradation rates
- Water temperature and dissolved oxygen concentrations, emphasizing conditions during July through October low-flow summer rearing;
- Mapping and inventory of each constructed wood structures, noting wood racking, channel scour and habitat quality related to each feature;
- Seining of juvenile salmonids to qualitatively assess rearing abundance and fish condition.

Juvenile salmonid rearing abundance and fish condition will be monitored for two years following construction during the spring recession and summer low-flow season in the seven newly constructed pools. We will monitor juvenile salmonid response to the newly constructed habitat with the following actions:

- Minnow trapping of juvenile salmonids to compare relative juvenile salmonid rearing densities to pre-construction conditions;
- Seining of juvenile salmonids to qualitatively assess rearing abundance and fish condition;
- Consecutive rounds of minor trapping followed by seining for each of the four sampling events (2 years, 2 occasions each year) to confirm use of the new habitat and to investigate fish growth rates.

Riparian Revegetation Monitoring

Under the proposed action, CalTrout will monitor and adaptively manage revegetated areas over a period of five years to ensure 80% survivability per CDFW requirements. Riparian monitoring will guide long-term vegetation and sediment management within the action area.

After field adjusting the construction footprint to avoid vegetation impacts to the extent possible and counting necessary tree removals, CalTrout will finalize the revegetation management plan including the replanting palette in consultation with CDFW by July 1 (prior to in-stream vegetation removal to

be conducted in late-July). The draft work plan will be submitted for review and comment by CDFW and NMFS on or before May 1 with comments expected back from CDFW and NMFS on or before June 1.

Revegetated species will be flagged such that reestablishment success can be independently reviewed by regulatory agency staff. Revegetation monitoring will be conducted in late spring three years after Project construction, to ensure that replanting and reestablishment may occur and be documented within CDFW's required window. A monitoring report will be prepared defining the proposed vegetation management work plan to be conducted in the summer and early fall (such that replanting will be in the ground and benefit from the winter rains). The work plan will incorporate field notes and maps to define the actions that will be carried out in subsequent years. Issues addressed in the work plan will include areas where replantings will occur, densities, including weed and invasive species management if appropriate to achieve reestablishment.

All monitoring data and results will be presented in a Final Project Monitoring Report upon completion of all monitoring tasks.

Monitoring resources are or will be provided by: 1) SWRCB Timber Regulation and Forest Restoration Funds for immediate, post-construction monitoring; 2) the Elk River Watershed Stewardship Program which includes funding to develop a science and monitoring program for the Elk River (including the Pilot Projects area); 3) an anticipated State Coastal Conservancy proposal that includes funding for monitoring of the Pilot Projects; and 4) Project proponents will coordinate with the State's Surface Water Ambient Monitoring Program (SWAMP) for potential inclusion of the Elk River in their next workplan.

2.7 Maintenance

Project elements that are not performing as predicted/intended may require maintenance after construction to restore the originally intended functions. Maintenance will focus on conducting an annual maintenance survey assessing: 1) floodplain deposition after flood events, 2) sediment accumulation in the constructed in-channel pools, and 3) overall revegetation success within the riparian corridor.

RWQCB or partner staff will conduct an annual (once per year) maintenance survey to identify and assess issues of concern relative to the project objectives. Surveys will focus on identifying, mapping, and assessing:

- Actively eroding channel banks, floodplain excavation areas, and effectiveness of stabilization measures.
- Areas of excessive vegetation growth, and/or accumulations of LWD that are contributing to streambank erosion.
- Storm-related damages to streambank stabilization and aquatic habitat enhancement structures.
- Revegetation sites.

Stream maintenance data sheets, aerial photographs, and GPS units will be used to document the nature and extent of issues encountered during surveys, and to identify recommended treatments or remedial actions. Photos will also be taken to document each problem site. The results of the surveys will be compiled into a report and provided to regulatory agencies as dictated by permit requirements for review. To ensure the durability of constructed Project features, it may also be necessary to conduct interim river surveys shortly after large storm events (> 10-yr flood event) to identify areas that may require immediate treatment to prevent failure to protect the Project feature.

2.8 Required Permits and Approvals

The permits and regulatory compliance requirements for the Proposed Project are described in Table 20 by permitting agency. In addition to the requirements summarized below, the project must conform to the policies and standards established in the current Humboldt County General Plan, which is relevant to all resource topics analyzed under CEQA.

Table 20. Permits and Regulatory Requirements Applicable to the Proposed Project

Regulatory Agency	Law/Regulation	Purpose	Permit/Authorization Type
United States Army Corps of Engineers – San Francisco District	Clean Water Act (CWA) Section 404	Regulates placement of dredged and fill materials into waters of the United States.	Individual Permit
	Rivers and Harbors Act Section 10	Regulates work in navigable waters of the United States.	Section 10 Compliance
North Coast Regional Water Quality Control Board (lead CEQA agency)	CWA Section 401	Water quality certification for placement of materials into waters of the United States.	401 Water Quality Certification is required for federal permits.
	CWA Section 402	National Pollutant Discharge Elimination System (NPDES) program regulated discharges of pollutants.	NPDES General Construction Permit notification prior to project construction.
	CWA Section 303	Recognition and remediation of impaired water bodies through establishment of Total Maximum Daily Loads (TMDLs) to tack and reduce pollutants and restore beneficial uses.	Elk River Sediment TMDL
	Porter-Cologne Water Quality Control Act	Regulated discharges of materials to land and protection of beneficial uses of waters of the State.	
California Department of Fish and Wildlife (CDFW) – Northern Region	Fish and Game Code (F&G Code) Section 1600	Applies to activities that will substantially modify a river, stream, or lake. A Streambed Alteration Agreement will be developed that includes reasonable conditions necessary to protect those resources.	Notification of Streambed Alteration (1602 permit)
	California Endangered Species Act (CESA) (F&G Code Section 2081[b])	CESA compliance: Issuance of Consistency Determination or Inconsistent Determination/Incidental Take Agreement(s)	CESA compliance will be completed as directed by CDFW.

US Fish and Wildlife Service (USFWS)/National Marine Fisheries Service (NMFS)	Endangered Species Act (ESA)	USACE must consult with USFWS and NMFS if threatened or endangered species may be affected by the project.	Biological Opinion(s) issues in conjunction with USACE Section 404 compliance.
State Historic Preservation Officer	National Historic Preservation Act (NHPA) Section 106	USACE must consult with State Historic Preservation Officer if historic properties or prehistoric archaeological sites may be affected by the project.	Consultation in conjunction with USACE Section 404 compliance.
Humboldt County	County Code	Grading over 5,000 cubic yards requires a County Grading Permit. Compliance with Humboldt County Flood Damage Prevention Ordinance. Work in the active floodway requires a Floodplain Management Permit from the County.	County Grading and Floodplain Management Permit(s). Conditional Use and Special Use Permits to construct in the Streamside Management Area.
	Federal Code of Regulations Title 44 Emergency Management and Assistance	The Project may affect the hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective Base Flood Elevations, or the Special Flood Hazard Area.	Will send a Memo to the Humboldt County Floodplain Administrator stating the Project will not increase base flood elevations.

2.9 Impacts and Environmental Commitments

Environmental Commitments or Best Management Practices (BMPs) developed to avoid and minimize adverse effects of the Proposed Project are described in Table 21, below.

Table 21. Proposed Project Environmental Commitments Table

Number	Title	Environmental Commitment Description
General Environmental Commitments *These Environmental Commitments will be implemented by the RWQCB, California Trout, and its contractors, as appropriate, for all activities associated with the Proposed Project. These Environmental Commitments are grouped according to use of general construction practices, public safety, and reporting procedures. The majority of these Environmental Commitments are implemented prior to and during construction.*		
GEN-1	Work Windows	All ground-disturbing (e.g. clearing, grubbing, grading, bank stabilization) and in-stream activities (channel and floodplain excavation) will take place between August 15 and October 15 or October 31 if no rain is forecast.
GEN-2	Minimize the Area of Disturbance	To minimize impacts to natural resources, soil disturbance will be kept to the minimum footprint necessary to complete the restoration action.
GEN-3	Erosion and Sediment Control Measures	a) All soils disturbed or exposed during construction activities will be seeded and stabilized following construction using erosion control fabric or hydromulch. The channel bed and areas below the Ordinary High Water Mark (post-project conditions) are exempt from this Environmental Commitment. b) Erosion control fabrics will consist of natural fibers that will biodegrade over time. No plastic or other non-porous material will be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff. c) Erosion control measures will be installed according to manufacturer's specifications. d) Appropriate measures include, but are not limited to, the following: ▪ Silt fences ▪ Straw bale barriers ▪ Brush or rock filters ▪ Storm drain inlet protection ▪ Sediment traps ▪ Sediment basins ▪ Erosion Control blankets and mats ▪ Soil stabilization (i.e., tackified straw with seed, jute or geotextile blankets, broadcast and hydroseeding, etc.) e) All temporary construction-related erosion control methods (e.g., silt fences) shall be removed at the completion of each construction season, or as directed by a certified erosion control specialist.

GEN-4	Staging and Stockpiling of Materials	a) To the extent feasible, staging will occur on access roads or other disturbed areas that are already compacted. Similarly, all maintenance equipment and materials (e.g. road rock, and project spoil materials) will be contained within the existing paved or compacted roads or other pre-determined staging areas. Staging areas for equipment, personnel, vehicle parking, and material storage will be sited as far as possible from roadways. b) Stockpiling of materials, including portable equipment, vehicles and supplies (e.g., chemicals), will be restricted to the designated construction staging areas. c) No runoff from the staging areas may be allowed to enter waterways, including the river channel, tributaries, or drainage ditches, without being subjected to adequate filtration (e.g., vegetated buffer, hay wattles or bales, silt screens). The discharge of decant water to waterways from any on-site temporary sediment stockpile or storage areas is prohibited. d) During the dry season, if stockpiled soils will remain exposed and unworked for more than seven days, then erosion control measures will be utilized. During the wet season, n stockpiled soils will remain exposed, unless surrounded by properly installed and maintained silt fencing or other means of erosion control.
GEN-5	River Access	Construction access points will be developed in a manner that minimizes impacts according to the following guidelines: a) Prior to conducting in-channel work, Humboldt County will identify the limits of the required access routes and encroachment into the stream. The County will restrict access routes and encroachment into the stream to the maximum extent while still allowing for necessary activities to be completed. b) Access points will be constructed as close to the work area as possible to minimize equipment transport. c) Disturbed areas will be compacted and revegetated or seeded to prevent future erosion (except for areas intended to become part of the wetted channel). d) Personnel will use the appropriate equipment for the job that minimizes impacts. Appropriately-tired vehicles, either tracked or wheeled, will be used depending on the site and activity to be conducted.
GEN-6	On-Site Hazardous Materials Management	a) An inventory of all hazardous materials used (and/or expected to be used) at the worksite and the end products that are produced (And/or expected to be produced) after their use will be maintained by the worksite manager. b) As appropriate, containers will be properly labeled with a "Hazardous Waste" label and hazardous waste will be properly recycled or disposed of off-site.

		c) Contact of chemicals with precipitation will be minimized by storing chemicals in watertight containers or in a storage shed (completely enclosed), with appropriate secondary containment to prevent any spillage or leakage. d) Petroleum products, chemicals, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials will not contact soil and not be allowed to enter surface waters or drainage ditches. e) All toxic materials, including waste disposal containers, will be covered when they are not in use, and located as far away as possible from a surface water. f) All trash that is brought to a project site during construction and maintenance activities (e.g., plastic water bottles, plastic bags, cigarettes) will be removed from the site daily.
GEN-7	Existing Hazardous Materials	If hazardous materials are encountered, the construction contractor will carefully remove and dispose of them according to the *Spill Prevention and Response Plan* (see measure EC8-GEN). The construction contractor will wear proper protective gear and store the waste in appropriate hazardous waste containers until it can be disposed of at a hazardous waste facility.
GEN-8	Spill Prevention and Response	The construction contractor will prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels following these measures: a) All field personnel will be appropriately trained in spill prevention, hazardous material control, and cleanup of accidental spills. b) Equipment and materials for cleanup of spills will be available on site and spill s and leaks will be cleaned up immediately and disposed of according to guidelines stated in the *Spill Prevention and Response Plan* (developed by the Contractor and approved by the RWQCB). c) Field personnel will ensure that hazardous materials are properly handled and natural resources are protected by all reasonable means. d) Spill prevention kits will always be in close proximity when using hazardous materials (e.g., at crew trucks and other logical locations). All field personnel will be advised of these locations. e) County staff will routinely inspect the work site to verify that spill prevention and response measures are properly implemented and maintained. <u>Spill Response Measures:</u> For small spills on impervious surfaces, absorbent materials will be used to remove the spill, rather than hosing it down with water. For small spills on pervious surfaces such as soil, the spill will be excavated and properly

		disposed of rather than burying it. Absorbent materials will be collected and disposed of properly and promptly.
GEN-9	Vehicle and Equipment Maintenance	a) All vehicles and equipment will be kept clean. Excessive build-up of oil and grease will not be accepted. b) All equipment used for in-channel work will be inspected for leaks each day prior to initiation of work. Action will be taken to prevent or repair leaks, prior to use. c) Incoming equipment will be checked for leaking oil and fluids. Leaking equipment will not be allowed onsite. d) No heavy equipment will operate in a live channel (see measure ECx-GEN). e) No equipment servicing will be done in the channel or immediate floodplain, unless equipment stationed in these locations cannot be readily relocated (i.e., pumps and generators). f) If necessary, all servicing of equipment done at the job site will be conducted in a designated, protected area to reduce threats to water quality from vehicle fluid spills. Designated areas will not directly connect to the ground, surface water, or the storm drain system. The service area will be clearly designated with berms, sandbags, or other barriers. Secondary containment, such as a drain pan, to catch spills or leaks will be used when removing or changing fluids. Fluids will be stored in appropriate containers with covers, and properly recycled or disposed of offsite. g) If emergency repairs are required in the field, only those repairs necessary to move equipment to a more secure location will be conducted in the channel or floodplain. h) Equipment will be cleaned of any sediment or vegetation before entering the work area to avoid spreading pathogens or exotic/invasive species. i) Vehicle and equipment washing can occur onsite only as needed to prevent the spread of sediment, pathogens, or exotic/invasive species. No runoff from vehicle or equipment washing is allowed to enter water bodies, including the channel and drainage ditches, without being subjected to adequate filtration (e.g., vegetated buffers, straw wattles, hay bales, and silt screens).
GEN-10	Vehicle and Equipment Fueling	a) No fueling will be done in the channel (top-of-bank to top-of-bank) or immediate floodplain unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators). For stationary equipment, secondary containment, such as a drain pan or drop cloth, will be used to prevent accidental spills of fuels from reaching the soil, surface water, or drainage ditches. b) All non-stationary equipment fueling will be done in staging areas equipped with secondary containment and avoid a direct connection to soil, surface water, or the storm drainage system.

GEN-11	Dewatering Measures	<u>Design</u>: a) The channel will be dewatered or streamflow will be diverted around the work area for Project activities that involve in-channel grading on installation of in-stream features. b) Pre-construction surveys for special status amphibians will be conducted at least five days before the start of construction by a CDFW-approved biologist. The CDFW-approved biologist will remain onsite for the entire dewatering period to capture, handle, and relocate special status amphibians, if necessary. After the pre-construction surveys and dewatering is complete, the CDFW-approved biologist will train an Environmental Mentor and the entire construction crew on proper identification procedures for special status amphibians. The environmental monitor will then conduct daily monitoring of the worksite and have the authority to halt work if needed to protect detected species. c) Downstream flows adequate to prevent fish or vertebrate stranding will be maintained at all times during dewatering activities. d) Prior to dewatering, the best means to bypass flow through the work area will be determined to minimize disturbance to the channel and avoid direct mortality of fish and other aquatic vertebrates. The contractor will be required to submit a dewatering plan which will be subject to review and approval by the RWQCB, CDFW, USFWS, and NMFS. e) The area to be dewatered will encompass the minimum area necessary to perform the restoration activity. f) The period of dewatering will extend only for the minimum amount of time needed to perform the necessary construction activity. <u>Construction</u>: a) Where feasible and appropriate, dewatering will occur via gravity driven systems. b) Construction of cofferdams will begin in the upstream area and continue in a downstream direction, and the flow will be diverted only when construction of the dam is completed. c) Coffer dams will be installed both upstream and downstream not more than 100 feet from the extent of the work areas. d) Instream cofferdams will only be built from materials such as sandbags, clean gravel, or rubber bladders which will cause little or no siltation or turbidity. No earthen fill will be used to construct the cofferdam. Plastic sheeting will be placed over sandbags to minimize water seepage into the activity area. The plastic sheets will be firmly anchored to the streambed to minimize water seepage. In necessary, the footing of the cofferdam will be keyed into the channel bed at an appropriate depth

		to capture the majority of the subsurface flow needed to dewater the streambed. e) Stream flows will be allowed to gravity flow around or through the work site using temporary bypass pipes or culverts. Bypass pipe diameter will be sized to accommodate, at a minimum, twice the volume of the summer baseflow. f) When use of gravity-fed dewatering is not feasible and pumping is necessary to dewater a work site, a temporary siltation basin and/or use of silt bags may be required to prevent sediment from re-entering the wetted channel. <u>Implementation</u>: a) A qualified biologist will be present to ensure that state or federally listed fish and other aquatic vertebrates are not stranded during construction and implementation of channel dewatering. Prior to dewatering, the affected area will be surveyed by a qualified biologist, and if necessary, relocation procedures will be implemented to ensure that state and federally listed fish and other aquatic invertebrates are not adversely affected. b) Diverted and stored water will be protected from project activity-related pollutants, such as soils, equipment lubricants and fuels. c) A multi-filter/screen system consisting of a 2.8 mm (3/32 inch) screen inside a 4x4x4 foot box covered with a 6.3 mm (1/4 inch) screen will be installed at pump intakes to prevent impingement/entrainment of fish and amphibians. d) If necessary, discharged water will pass over some form of energy dissipator to prevent erosion of the downstream channel. Silt bags will be equipped to the end of discharge hoses and pipes to remove sediment from discharged water. e) For full channel dewatering, filtration devices or settling basins will be provided as necessary to ensure that the turbidity of discharged water is not visibly more turbid than in the channel upstream of the maintenance site. If increases in turbidity are observed, additional measures will be implemented such as a larger settling basin or additional filtration. If increases in turbidity persist, the RWQCB will be alerted as turbidity measurements may be required. <u>Deconstruction:</u> a) When maintenance is completed, the flow diversion structure will be removed as soon as possible but no more than 48 hours after work is completed. Impounded water will be released at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat. Cofferdams will be removed such that surface elevations of water

		impounded above the cofferdam are lowered at a rate greater than one inch per hour. b) When diversion structures are removed, to the extent practicable, the ponded flows will be directed into the low-flow channel within the work site to minimize downstream water quality impacts. c) The area disturbed by flow bypass mechanisms will be restored at the completion of the project. This may include, but is not limited to, recontouring the area and planting or riparian vegetation.
GEN-12	Dewatering Pump/Generator Operations and Maintenance	When needed to assist in channel dewatering, pumps and generators will be maintained and operated in a manner that minimizes impacts to water quality and aquatic species. a) Pumps and generators will be maintained according to manufacturer's specifications to regulate flows to prevent dryback or washout conditions. b) Pumps will be operated and monitored to prevent low water conditions, which could pump muddy bottom water, or high water conditions, which creates ponding. c) A multi-filter/screen system consisting of 2.289 mm (3.32 inch) screen inside a 4x4x4 foot box covered with a 6.3 mm (1/4 inch) screen will be installed at pump intakes to prevent impingement/entrainment of fish and amphibians. d) Pumping machinery will be placed in a temporary containment structure (plastic basin, plastic-lined pit, etc.) designed to contained accidental hydrocarbon (gasoline, diesel, hydraulic fluid) spills.
GEN-13	Planning for Traffic Flow and Safety Measures	a) Work will be staged and conducted in a manner that maintains two-way traffic flow on public roadways in the vicinity of the work site. If temporary lane closures are necessary, they will be coordinated with the appropriate jurisdictional agency and coordinated with local emergency service providers as necessary to ensure that emergency vehicle access and response is not impeded. Any lane closures will include advance warning signage and flaggers in both directions. b) Access to driveways and private roads will be maintained. If brief periods of project activity would temporarily block access, property owners will be notified prior to the project activity.
GEN-14	Public Safety Measures	The contractor will implement safety measures during construction as follows: a) Signs will be posted on public roadways warning the public of construction work and to exercise caution. b) If needed, a lane of the public roadway may be temporarily closed to allow for trucks to pull into and out of access points to the work site.
GEN-15	Minimize Noise Disturbances to Residential Areas	The contractor will implement practices that minimize disturbances to adjacent residences surrounding work sites.

		a) With the exception of unforeseen emergencies, work will be conducted between the hours of 8 AM and 6 PM. b) Advanced notification will be provided one week prior to the start of construction to properties that are within 400 feet of a proposed construction site where heavy equipment will be used. c) Powered equipment (vehicles, heavy equipment, and hand equipment such as chainsaws) will be equipped with adequate mufflers. d) Excessive idling of vehicles will be prohibited beyond five minutes.
GEN-16	Work Site Housekeeping	▪ The contractor will maintain the work site in neat and orderly condition on a daily basis, and will leave the site in a neat, clean, and orderly condition when work is complete. Slash, sawdust, cuttings, etc. will be removed to clear the site of vegetative debris. As needed, paved access roads will be swept and cleared of any residual vegetation or dirt resulting from the maintenance activity. All lunch trash will be properly disposed of. ▪ Materials or equipment left on the site overnight will be stored as inconspicuously as possible and will be neatly arranged.
Biological Resource Environmental Commitments *These Environmental Commitments will be implemented as appropriate to avoid and minimize impacts on special-status species and other biological resources. These Environmental Commitments may be modified during project permitting and agency approvals of project activities.*		
BIO-17	Avoid and Minimize Impacts to Special-Status Plant Species	a) If special-status plants are identified within a construction area or within a 100-foot radius of the construction zone, the RWQCB will adjust the construction footprint or establish exclusion fencing to avoid impacts to the plants. Locations of special-status plant populations will be clearly identified in the field by staking, flagging, or fencing a minimum 100-foot wide buffer around them prior to the commencement of activities that may cause disturbance. No activity will occur within the buffer area. b) If avoidance is not feasible, then the County will implement measures to minimize the impact to the species. Minimization measures may include transplanting perennial species, seed collection, and dispersal for annual species, and other conservation strategies that will protect the viability of the local population. If minimization measures are implemented, monitoring of plant populations will be conducted annually for five years to assess the mitigation's effectiveness. The performance standard for mitigation will be no net reduction in the size or viability of the local population
BIO-18	Minimize Impacts to Nesting Birds via Work Window, Site Assessments,	a) No riparian or coniferous habitat will be degraded or removed during the general breeding period (February 1 through August 15) for bird species likely to nest in the Project area. b) Hand harvest of vegetation and other minor work that does not require mechanized equipment (e.g., surveying and clearing or dewatering)

	Surveys, and Avoidance Measures	may continue during the nesting period through August 15, but not within 500 feet of any active nest that is identified (see BIO-18E). c) A clearance survey for nesting birds will be conducted by a qualified biologist within one week of the construction start date (August 15th) including the Project area plus a 1000-foot radius buffer to detect late-season nesting birds and special status bird nests with breeding periods that extend into August-October. If a lapse in project-related work of two weeks or longer occurs, another focused survey will be conducted before project work can be re-initiated. d) In addition to nesting bird survey discussed above, a June and June/July survey will be conducted to identify occupied Willow flycatcher nests. The surveys will cover a minimum 500-foot radius around the construction area. e) If nesting birds are found, a buffer will be established around the nest and maintained until the young have fledged. Appropriate buffers are 500 feet for any special-status species or raptor nest, or within 100-feet of any unlisted species nest that is identified. A qualified biologist may identify an alternative buffer based on a site-specific evaluation and in consultation with CDFW. Work will not commence within the buffer until fledglings are fully mobile and no longer reliant upon the nest or parental care for survival. f) If an active nest is identified during pre-construction surveys, and work will be conducted outside of the buffer established above, a qualified biologist may consult with CDFW to see if a reduced buffer can be appropriated, including additional monitoring requirements appropriate for the species types. If monitoring indicated that the birds are stressed by construction activity or could cause the nest to fail or be abandoned, construction will cease until the nest has fledged or failed. g) If a tree with an active nest is proposed for removal, the nest tree slated for removal will be assessed by a qualified biologist and consultation with CDFW will be initiated regarding appropriate mitigation for the tree/nest removal. At a minimum, the assessment will evaluate the importance of preserving the nest tree by evaluating factors such as nest site success, site fidelity, nest integrity, species density/competition, predator pressure, and the tree's structure relative to surrounding habitat. If the biologist determines that removal of the nest tree cannot be sufficiently mitigated, then the CDFW will redesign the Proposed Project to avoid removal of the nest tree. If the biologist determines that the mitigation is feasible, CDFW will implement Mitigation Measure BIO-18H. h) If removal of a special-status bird nest tree is proposed, CDFW will develop a plan to mitigate for the loss of the nest tree. Prior to removing a nest tree, the mitigation plan shall be submitted to CDFW for approval. CDFW will have authority to reject the mitigation plan and

		require that the nest tree be preserved if CDFW finds the mitigation to be inadequate.
BIO-19	Protection of Special-Status Amphibian and Reptile Species	a) Prior to commencing construction, a qualified biologist will conduct one daytime non-protocol level survey for special-status reptiles and amphibians including nests, eggs, and tadpoles. The survey will be conducted no more than 48 hours preceding the onset of construction. If no special-status amphibians or reptile is found within the activity area during the pre-activity survey, the work may proceed. b) If a special-status amphibian or reptile, or the eggs or larvae of a special-status amphibian or reptile, is found within the activity area during a pre-construction survey or during project activities, the following measures will be implemented: 1) If eggs or tadpoles of a special-status species are found, a 100-foot buffer will be established around the location of the eggs/tadpoles and work may proceed outside of the buffer zone. Work within the buffer zone will be rescheduled until the time that eggs have hatched and/or tadpoles have metamorphosed. 2) If an active special-status reptile or amphibian nest is detected within the activity area, a 100-foot buffer around the nest will be established and maintained. The buffer zone will remain in place until the young have left the nest, as determined by a qualified biologist. 3) If adults or juveniles of a special-status species are found, one of the following two procedures will be implemented: a. If, in the opinion of the qualified biologist, the individuals likely to leave the work area on its own volition, and work can be feasibly delayed, a buffer will be established around the location of the individual(s) and work may proceed outside of the buffer zone. No work will occur within the buffer zone until the individual has dispersed. b. If, in the opinion of the qualified biologist, capture and removal of the individual to a safe place outside of the work area is likely to result in less impact than leaving the individuals in place and delaying the work (e.g., if the species could potentially hide and be missed during a follow-up survey), the individual will be captured and relocated by a qualified biologist (with USFWS and/or CDFW approval, depending on the listing status of the species in question), and work may proceed. c) As the time of inspection, all instream exclosures and adjacent cover along isolated banks will be surveyed for the presence of special status

		amphibian and reptile species. A qualified biologist will implement measures under Section B (above) as necessary.
BIO-20	Protection of Bat Colonies	A minimum of one survey will be conducted by a qualified biologist in June-July to determine if any structures such as bridges, buildings, or large diameter trees with basal hollows, exfoliating bark, or woodpecker holes, are occupied by either day roosting bats or potential maternal colonies of bats in or immediately to the construction area footprint. Should any maternal colony sites be located, species-specific seasonal and disturbance distance restrictions will be developed in consultation with CDFW.
BIO-21	Protection of Mammal Dens, Burrows and Nests	a) No less than 5 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities, a qualified biologist will conduct a survey to determine if den, burrow, or nest sites are potentially present in the Project area. If potential den, burrow, or nest sites are found, they will be monitored for activity. If the biologist determines that areas may be active, efforts will be made to preserve the den, burrow, or nest sites and maintain an intact dispersal corridor between the site and undisturbed riparian habitat. b) If an active den, burrow, or nest site cannot be avoided, the entrances to the den, burrow, or nest will be blocked with soil, sticks, and debris for 3-5 days to discourage the use of the dens prior to Project disturbance activities. The entrances will be blocked with to an incrementally greater degree over a 3-5 day period. After the qualified biologist determines that animals have stopped using the active den, burrow, or nest site, it will be hand excavated with a shovel to prevent re-use during construction. No disturbance of active Humboldt marten, Pacific fisher, Humboldt mountain beaver, North American porcupine, or Sonoma tree vole dens, burrows, or nest sites will take place when the sites are occupied, as determined by a qualified biologist.
BIO-22	Protection of fish and other aquatic species during instream construction activities or channel dewatering	Before a work area is dewatered or instream activities commence, state and federally listed fish and aquatic invertebrates will be captured and relocated to avoid injury and mortality and minimize disturbance. The following guidelines will apply. a) Prior to instream construction (i.e. channel and floodplain construction and placement of large wood), fish enclosures will be installed using silt fencing, silt curtains, block nets, or similar material to isolate the work area. For any areas to be dewatered, a coffer dam will be installed. b) During dewatering activities, downstream flows adequate to prevent fish or vertebrate stranding will be maintained at all times during dewatering activities. Pump intakes will be covered by 2.289 mm (3.32 inch) mesh and placed inside a 4.4.4. foot box covered with a 6.3 mm (1/4 inch) screen to prevent entrainment of fish and

		amphibians and will be checked periodically for impingement of fish and amphibians. c) Before instream construction commences or a work area is dewatered, the affected area will be surveyed by a qualified fisheries biologist who has a current CDFW scientific collecting permit and USFWS recovery permit and is experienced with capture and handling protocols for state or federally listed fish and aquatic invertebrates. Any state and federally listed fish and aquatic invertebrates such that are encountered will be captured and relocated to avoid injury and mortality and minimize disturbance. d) During dewatering activities, the channel will be blocked by placing fine-meshed nets or screens above and below the work area to prevent state or federally listed fish and aquatic invertebrates from reentering the work area. To minimize entanglement, mesh diameter will not exceed 1/8 inch. The bottom edge of the net or screen will be secured to the channel bed to minimize impingement. Screens will be checked periodically and cleaned of debris to permit free flow of water. e) Before removal and relocation begins, a qualified fisheries biologist will identify the most appropriate release location(s). Release locations should have water temperatures similar to (.2° C difference) the capture location and offer ample habitat (e.g. depth, velocity, cover, connectivity) for released fish and aquatic invertebrates, and should be selected to minimize the likelihood of reentering the work area or becoming impinged on exclusion nets or screens. f) The means of capture will depend on the nature of the work site and will be selected by a qualified fisheries biologist. Complex stream habitat may require the use of electrofishing equipment, whereas in outlet pools, aquatic invertebrates and invertebrates may be captured by pushing down the pool and then seining or dip netting. Electrofishing will only be sued as a last resort. IF electrofishing is necessary, it will be conducted only by properly trained personnel following the NMFS Guidelines dated June 2000. g) When feasible, initial fish relocation efforts will be performed several days prior to the scheduled start of construction. To the extent feasible, dewatering and species relocation will be performed during morning periods. The fisheries biologist will survey the enclosures or cofferdams throughout the dewatering effort to verify that no state or federally listed fish or aquatic invertebrates are present. Afternoon pumping activities should generally not occur and pumping should be limited to days when ambient air temperatures are not high. Air and water temperatures will be measured periodically and dewatering and species

		relocation activities will be suspended if temperatures exceed the limits allowed by NMFS guidelines. h) Handling of fish and aquatic invertebrates will be minimized. When handling is necessary, personnel will wet hands or nets before touching them. i) Prior to translocation, and state or federally listed species that are collected during surveys will be temporarily held in cool, aerated, shaded water using a 5-gallon container with a lid. Overcrowding in containers will be avoided through limits on the number of fish allowed per container (limits to be determined in consultation with NMFS and CDFW). Aeration will be provided with a battery-powered external bubbler. Fish will be protected from jostling and noise and will not be removed from the container until the time of release. A thermometer will be placed in each holding container and partial water changes will be conducted as necessary to maintain a stable water temperature. Special-status fish and other special-status aquatic species will not be held more than 30 minutes. If water temperature reaches or exceeds NMFS limits, the fish and other aquatic species will be released and relocation operations will cease. j) If state or federally listed fish or aquatic invertebrates are abundant, capture will cease periodically to allow release and minimize the time fish spend in holding containers. k) Fish and aquatic invertebrates will not be anesthetized or measured. However, they will be visually identified to species level, and year classes will be estimated and recorded. l) Reports on fish relocation activities will be submitted to CDFW, USFWS, and NMFS in a timely fashion. m) If mortality during relocation exceeds 5%, relocation will cease and CDFW, USFWS, and NMFS will be contacted immediately or as soon as feasible. n) Relocation sites for any captured fish will be identified prior to initiating removal activities.
BIO-23	Revegetation Plan	A revegetation plan will be prepared and implemented in consultation with CDFW to mitigate for the loss of native riparian vegetation as described in Section 2.5 (Site Revegetation subsection). Plant species selected for revegetation will be based upon the surveys of riparian habitat along the project area and will be replanted with representative species and at appropriate densities to ensure 80% survivability. Revegetation monitoring will be conducted three years after completion of the Proposed Project to ensure 80% survivability within five years per CDFW requirements. The final revegetation plan will include details regarding planting, implementation, maintenance, and monitoring. In addition, the Plan will include agreement regarding locations of off-site riparian revegetation which would result in the

		greatest ecological benefit without impeding the Project's flood conveyance objectives.
Cultural Resources Environmental Commitments *These Environmental Commitments will be implemented as appropriate to minimize potential impacts on Cultural Resources*		
CUL-24	Inadvertent discovery of cultural resources	If cultural resources are encountered during construction activities, all onsite work shall cease in the immediate area within a 50-foot buffer of the discovery location. A qualified archaeologist will be retained to evaluate and assess the significance of the discovery and develop and implement an avoidance or mitigation plan, as appropriate. For discoveries known or likely to be associated with Native American heritage (prehistoric sites and select historic period sites), the Tribal Historic Preservation Officer's (THPO) for the Bear River Band of the Rohnerville Rancheria and the Wiyot Tribe shall also be contacted immediately to evaluate the discovery and, in consultation with the project proponent, the County, and consulting archaeologist, develop a treatment plan in any instance where significant impacts cannot be avoided. Prehistoric materials which could be encountered include obsidian and chert debitage or formal tools, grinding implements (e.g. pesteles, handstones, bowl mortars, slabs), locally darkened midden, deposits of shell, faunal remains, and human burials. Historic archaeological discoveries may include nineteenth century building foundations, structural remains, or concentrations of artifacts made of glass, ceramics, metal, or other materials found in buried pits, well, or privies.
CUL-25	Protect human remains, consistent with California State codes	In the event of discovery of human remains (or the find consists of bones suspected to be human), the field crew supervisor shall take immediate steps to: 1) secure and protect such remains from vandalism during periods when work crews are absent; and 2) Immediately notify the Humboldt County Coroner to verify that the remains are human, and that no investigation into the cause of death is required. If the remains are determined to be from a Prehistoric Native American or determined to be Native American from an ethnographic period, the Coroner shall contact the Native American Heritage Commission (NAHC) within 24 hours of being notified of the remains, per California Public Resources Code section 5097.98. The NAHC then designates and notifies within 24-hours a Most Likely Descendant (MLD). The MLD has 24 hours to consult and provide recommendation for the treatment or disposition, with proper dignity, of the human remains and grave goods.
Geology and Soils Environmental Commitments *This Environmental Commitment will be implemented by the RWQCB, California Trout, and its contractors, as appropriate, for all activities within the Proposed Project.*		
GEO-26	Fill Placement	Immediately prior to fill placement, spoils/sediment reuse sites will be scarified to a depth of 6 inches. All fill will be spread in lifts not exceeding limits established by the Floodplain Administrator and compacted by mechanical means.
Utilities and Service Systems Environmental Commitments		

This Environmental Commitments will be implemented by the RWQCB, California Trout, and its contractors, as appropriate, for all activities within the Proposed Project.		
UTIL-27	Site Preparation	Prior to the start of work, the contractor will locate and mark all active subsurface utilities in the general vicinity of the site. The contractor will protect all utilities that are to remain in and surrounding the site during onsite excavation and construction activities.

Chapter 3

ENVIRONMENTAL CHECKLIST

This chapter describes the principal federal and state environmental regulations, and policies applicable to implementation of the Elk River Sediment Removal Implementation Project. This chapter also summarizes the procedures and strategy to comply with these regulations and policies.

Project Title:	Elk River Sediment Remediation and Habitat Rehabilitation Pilot Implementation Project
Lead Agency Name and Address:	North Coast Regional Water Quality Control Board 5550 Skylane Boulevard, Suite A Santa Rosa, CA 95403-1072
Contact Person, Phone Number and Email:	Chuck Striplen, PhD Environmental Scientist – Adaptive Watershed Management Unit (707) 576-2689 charles.striplen@waterboards.ca.gov
Project Location and APN:	Unincorporated Humboldt County
Property Owner:	Various (See Project Description)
General Plan Designation:	Various (See Project Description)
Zoning:	Various (See Project Description)
Description of Project:	See Project Description
Surrounding Land Uses and Setting:	Agriculture, Rural Residential Agriculture, Timberlands

Other Public Agencies whose Approval or Input may be needed:

- California Department of Fish and Wildlife
- California State Historic Preservation Office
- National Marine Fisheries Service
- Regional Water Quality Control Board (North Coast Region)
- United States Army Corps of Engineers
- United States Fish and Wildlife Service
- Humboldt County

Environmental Factors Potentially Affected

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

❑ Aesthetics	❑ Agricultural Resources	❑ Air Quality
☒ Biological Resources	☒ Cultural Resources	❑ Geology/Soils
❑ Green House Gas Emissions	☒ Hazards/Hazardous Materials	
☒ Hydrology/Water Quality	❑ Land Use/Planning	❑ Mineral Resources
❑ Noise	❑ Population/Housing	❑ Public Services
❑ Recreation	❑ Transportation/Traffic	
☒ Tribal Cultural Resources	❑ Utilities/Service Systems	
❑ Mandatory Findings of Significance		

Determination

On the basis of this initial evaluation:

❑ I find that the proposed project **could not** have a significant effect on the environment, and a **NEGATIVE DECLARATION** will be prepared.

☑ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A **MITIGATED NEGATIVE DECLARATION** will be prepared.

❑ I find that the proposed project **may** have a significant effect on the environment, and an **ENVIRONMENTAL IMPACT REPORT** is required.

❑ I find that the proposed project **may** have a "potentially significant impact" or 'potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An **ENVIRONMENTAL IMPACT REPORT** is required, but it must analyze only those effects that remain to be addressed.

❑ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier **EIR** or **NEGATIVE DECLARATION** pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier **EIR** or **NEGATIVE DECLARATION**, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Matt St. John, Executive Officer
North Coast Regional Water Quality Control Board

Date

Checklist and Evaluation of Environmental Impacts

An explanation for all checklist responses is included, and all answers take into account the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts. The explanation of each question identifies (a) the significance criteria or threshold, if any, used to evaluate each question; and (b) the mitigation measure identified, if any, to reduce the impact to less than significant. For each question, there are four possible answers:

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

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

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

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

3.1 Aesthetics

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

This section describes the aesthetic resources within or adjacent to the Proposed Project footprint. Aesthetic resources are generally the physical characteristics of natural and human-built features of a landscape that can be seen from viewpoints available to the public. Depending on the extent to which a project's presence would alter the perceived visual character and quality of the environment, visual or aesthetic impacts may occur.

Visual or aesthetic resources are generally defined as both the natural and built features of the landscape that contribute to the public's experience and appreciation for the environment

ENVIRONMENTAL SETTING

The Proposed Project is located within the channel and banks of the Elk river (channel and floodplain excavation sites) and in upland areas adjacent floodplain (spoils locations). The banks of the lower North Fork Elk River are covered with riparian trees dominated by red alder and willow, with mature tree canopies over 50 feet tall, and a riparian understory consisting of willows species, blackberries, stinging nettle, and elderberry. The Elk River riparian corridor is visible from Elk River Road however the river channel is not visible except for from road crossings which are typical of a rural environment but are not classified as historic resources.

No highways within Humboldt County are officially designated as California State Scenic Highways, although US 101 along its entire length throughout Humboldt County could be eligible for official designation (Humboldt County General Plan for the Areas Outside the Coastal Zone, 2017). However,

US 101 is located approximately four miles west of the proposed project. There are no scenic vistas or State-designated scenic highways located in or around the Proposed Project footprint.

The proposed project would result in the removal of some trees within the construction footprint to provide construction equipment access (primarily within floodplain excavation areas). While the trees proposed to be removed on a certain parcel will be visible to property owners, a significant riparian canopy surrounded by a coniferous forest which will remain. Therefore, tree removals necessary to provide access will not result in a significant change in the visual environment.

DISCUSSION OF CHECKLIST RESPONSES

a) Would the project have a substantial adverse effect on a scenic vista?

Thresholds of Significance
Long-term intrusion or alteration of a scenic vista that is visible to the public.

Assessment
No Impact. The Proposed Project is not located on or near a scenic vista and would have no effect on a scenic vista. Therefore, no Impact would occur.

b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?

Thresholds of Significance
Permanent adverse change within a State scenic highway to scenic resources' physical, vegetative, or aesthetic elements visible to the public.

Assessment
No impact. There are no designated State scenic highways, trees, rock outcroppings, or other natural heritage sites located within or adjacent to the Proposed Project that could be affected. As previously noted, there are no highways in the County officially designated as California State Scenic Highways, although several are eligible. In addition, the Elk River is not designated as a Wild and Scenic River. Although not a mapped scenic area, natural features associated with the Proposed Project as a result of construction will be restored to as close to their original condition as is feasible. Construction activities will not permanently affect scenic resources. Therefore, there would be no impact.

c) Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

Thresholds of Significance

Long-term alteration or degradation of the existing visible character and quality of a site and its surroundings, which is visible to the public.

Assessment

Less-than-significant impact. The proposed improvements to the channel will be similar in appearance to existing conditions and are expected to improve the visual quality of the river. The river is located on private property and is primarily visible to property owners and from bridges and road crossings. The proposed project would not significantly alter the visual character of the site and its surroundings. Landowners and motorists passing by project areas will be able to view construction activities which will occur during the construction period of August 15–October 15 (or October 31st if no rain is forecast). However, construction activities will be temporary, and there would be no permanent visual disturbance. The visual character of the river channel and banks are expected to be improved by the Proposed Project, and should improve in appearance over time as the riparian corridor re-establishes. The visual character of the channel and its surroundings will not be degraded by the Proposed Project, therefore this impact would be less than significant.

d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?

Thresholds of Significance

Long-term or permanent development that would create a new source of substantial light or glare.

Assessment

No impact. The proposed project would not install or incorporate any new sources of light or glare. No new light or glare would be created during or after the Proposed Project is completed. Construction would take place during daylight hours, and artificial lighting will not be required. No impact would occur.

3.2 Agriculture Resources

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?			✓	
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				✓
c) Conflict with existing zoning for, or cause rezoning of, forest land or timberland?				✓
d) Result in the loss of forest land or conversion of forest land to non-forest use?				✓
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				✓

This section analyzes the potential effects of the Proposed Project on land use and agricultural resources and recommends mitigation as necessary.

ENVIRONMENTAL SETTING

Agricultural Resources

The California Department of Conservation (DOC) administers the Farmland Mapping and Monitoring Program (FMMP), California's statewide agricultural land inventory. Through this mapping effort, the DOC classifies farmland under four categories: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance. Prime Farmlands are those lands with the best combination of physical and chemical features able to sustain long term agricultural production. Farmland of Statewide Importance is similar to Prime Farmland but with major shortcomings, including

greater slopes or less ability to store soil moisture. Unique Farmland has lesser quality soils and are used for production of the State's leading agricultural crops. Farmland of Local Importance are lands important to the local agricultural economy as determined by the county board of supervisors and a local advisory committee (Conservation, 2018).

Agriculture is the predominant land use along Elk River Road and within the project area. Activities within the river channel and banks are protected by Humboldt County's Streamside Management Ordinance. Upland locations proposed to be used as sediment reuse (spoils) areas are generally planted with hay used to graze cows (although adjacent residents have had to purchase hay instead of growing it since difficulties diverting from the river increased). Within the Wrigley Orchard project reach, lands around the footprint of the Proposed Project are planted with mature apple trees and a portion of the Wrigley Orchard is defunct due to the Elk River overtopping its banks and depositing sediment.

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open-space use. In return, landowners receive property tax assessments which are much lower than normal because they are based on farming and open-space uses as opposed to full market value. Local governments receive an annual subvention of forgone property tax revenues from the State via the Open Space Subvention Act of 1971.

Humboldt County administers the Williamson Act contracts near the Proposed Project. Although a landowner could have other activities occur on the land, the program is intended to preserve farmland. These contracts are signed for a minimum of ten years.

By State law, only land located in an agricultural preserve is eligible for a Williamson Act contract. According to the 2002 US Department of Agriculture Census, approximately 27% of Humboldt County land (634,000 acres) is in agricultural use. In 2015-16, Humboldt County has just over 203,631 acres (of the County's total 2,593,420 acres) enrolled in Williamson Act contracts (Conservation D. o., 2017).

The federal government designed a system to provide objective ratings of the agricultural suitability of land in comparison to the demands of non-agricultural uses of land. The system known as the Land Evaluation and Site Assessment (LESA) was adopted as a tool for the federal government, and later by the State of California, to identify and address the potential impacts of changes to agricultural land use by federal and State programs. Proposed projects that may convert farmland to non-agricultural uses must use the LESA to determine the impacts of the proposed project and identify potential mitigation.

Within the proposed project area, there are no acres of private land currently under a Williamson Act contract (ftp://ftp.consrv.ca.gov/pub/dlrp/wa/Humboldt_n_15_16_WA.pdf). The closest Williamson Act contract to the Proposed Project area is the 77-acre Westfall Ranch parcel (APNs 311-041-034 and 311-041-036) which is located on the South Fork of the Elk River downstream of Headwaters Forest Preserve and was recently acquired by Save the Redwoods League. Agricultural operations will continue on the acquired properties under a successor land conservation contract.

All lands within the footprint of the Proposed Project that are currently in agricultural production will remain in agricultural production and will not be converted to other uses. Therefore, activities to determine whether or not the Proposed Project falls within the California LESA's model of "protected resource lands" (lands that have long-term restrictions that are considered to be compatible with or support agricultural uses of land) have not been conducted.

According to the Elk River Basis of Engineering Designs Report ((Northern Hydrology & Engineering, 2019, p. 26)), model results indicate that the proposed "Pilot Projects are predicted to decrease flood water levels over most flow conditions which would have a positive effect on nuisance flood conditions in the Project area." A reduction in nuisance flooding conditions will have a beneficial impact on agricultural operations throughout the Proposed Project area.

Forestry Resources

Humboldt Redwood Company (HRC) owns and manages approximately 22,000 acres of Timber Production Zoned (TPZ) timberlands in the upper Elk River watershed. The Elk River watershed has a basin area of approximately 33,700 acres. 330 miles or 77 percent of the Elk River stream network is located on HRC lands (Crowser, 2018). The northernmost project area includes lands owned by HRC. HRC lands within the project footprint include approximately 750 feet of access road and lands adjacent to project action areas CH5 and CH6 but located on the other side of the river channel. Property ownership boundaries are unclear in these areas. Assessor's Parcel Maps indicate that there are "Historical irreconcilable differences in parcel lines" associated with these APNs. Based on a personal communication with Humboldt Redwood Company, the property line is the center line of the channel and will therefore move as the channel moves.

DISCUSSION OF CHECKLIST RESPONSES

a) **Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?**

Thresholds of Significance

Physical changes that prevent the use of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural uses.

Assessment

Agricultural areas within the Project footprint are limited to the ten proposed sediment reuse (spoils) sites. Ground cover at spoil areas would be covered with excavated materials and replanted when construction activities conclude. In addition, the placement of excavated materials at spoil sites will raise their elevation, enhancing the protection of farmed lands located within the flood zone. Except for during construction, no other farmland will be taken out of production due to the Proposed Project. Therefore, this impact would be less than significant.

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

Thresholds of Significance

Implement land uses that are not allowed and conflict with existing zoning for agricultural use, or a Williamson Act contract.

Assessment

The Proposed Project will not result in the conversion of any agricultural lands to other uses or require rezoning or the cancellation of any Williamson Act Contracts. Participating landowners are supportive of the Proposed Project for it's potential to reduce flooding on their property, including structures and working agricultural lands. Better conveyance of floodwaters is a primary project objective and will have a beneficial impact on nuisance flooding. In addition, spoiling excavated materials in upland areas that are within the floodplain will raise their elevation and lessen the frequency of flooding events. One potential conflict that could occur is due to the fact that the Proposed Project would need to be constructed between August 15 and October 15/31 when there is potential for construction activities to conflict with harvest activities. However, participating property owners will be aware of and support the Proposed Project therefore no conflicts are expected. There would be no impact.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC Section 12220(g)) or timberland (as defined in PRC Section 4526)?

Thresholds of Significance

Implement land uses that are not allowed and conflict with forest or timber land uses or zoning.

Assessment

The Proposed Project is located within the channel, riparian corridor, and floodplain of the lower North Fork of the Elk River. Excavating the channel within the Wrigley Orchard reach will require crossing onto HRC property which has been defined as the center line of the channel. However, the channel excavation area is located in an area where timber harvest activities would not occur because it is too close to the streambank. Because no harvest activities are occurring or expected to occur within the project footprint, there would be no impact.

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

Thresholds of Significance

Physical changes that would result in the loss of forest land or conversions of forest land to non-forest uses.

Assessment

Although a very small percentage of the Project footprint is located on lands zoned Timber Production Zoned (TPZ) which are owned by Humboldt Redwood Company, these lands would not be converted to a different use. Therefore there would be no impact.

e) Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

Thresholds of Significance

Physical changes which could convert adjacent farmlands to non-agricultural use or convert adjacent forest lands to non-forest use.

Assessment

While there is the potential for the Proposed Project to alter hydrology and redirect flood impacts, model results documented in the Basis of Engineering Designs report for the Proposed Project indicate that water surface elevations will decrease over most of the project area, with only small localized increases in water levels near the downstream end of the project area. Furthermore, modeling results indicate that flow field (depth and velocity) changes do not significantly occur

downstream of the project area. Therefore, the Proposed Project would not preclude the continuation of current agricultural land uses after construction activities conclude and would not increase flooding on farmland beyond existing conditions such that conversion of agricultural lands to non-agricultural use. Therefore, there would be no impact.

3.3 Air Quality

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

REGULATORY SETTING

The Clean Air Act is implemented by the US Environmental Protection Agency (USEPA) and sets ambient air limits, the National Ambient Air Quality Standards (NAAQS), for six criteria pollutants: particulate matter, carbon monoxide (CO), nitrogen oxides (NO_x), ground level ozone and lead. Of these criteria pollutants, particulate matter and ground-level ozone pose the greatest threat to human health. The California Air Resources Board (CARB) sets standards for criteria pollutants that are more stringent than NAAQS and includes the following additional contaminants: visibility reducing particles, sulfates, and vinyl chloride.

The Proposed Project is located in the North Coast Air Basin, which includes all of Humboldt, Del Norte, Trinity, and Mendocino Counties, as well as a portion of Sonoma County (Plan, Adopted October 23, 2017). The North Coast Unified Air Quality Management District (NCAQMD) regulates air quality in the Humboldt, Del Norte, and Trinity County portions of the NCAB. Humboldt County is currently in compliance with air quality standards for ozone and $PM_{2.5}$ but is in non-attainment status for the State 24-hour particulate (PM_{10}) standard.

In determining the significance of air quality impacts of a proposed project, planners typically apply their local air district's thresholds of significance to projects in the review process. However, the NCAQMD has not formally adopted significance thresholds and instead utilizes Best Available Control Technology (BACT) emission rates for stationary sources as defined in the NCUAQMD Rule and Regulations, Rule 110 - New Source Review (NSR) And Prevention of Significant Deterioration (PSD), Section 5.1 - BACT (pages 8-9). The NCAQMD does not currently have any thresholds for toxics, but recommends the use of the latest version of the CAPCOA's "Health Risk Assessments for Proposed Land Use Project" as mentioned above, to evaluate and reduce air pollution impacts from new development.

ENVIRONMENTAL SETTING

Air quality in the North Coast Air Basin is predominantly influenced by the climatic regimes of the Pacific. In summer, warm ground surfaces draw cool air in from the coast, creating frequent thick fogs along the coast and making northwesterly winds common. In winter, precipitation is high, surface wind directions are highly variable, and weather is more affected by storm patterns. In the City of Eureka, average temperatures range from 46 degrees Fahrenheit in winter to 60 degrees un the summer, and average monthly precipitation ranges from 1.0" in summer to 8.0" in winter for total annual precipitation of 40" (US Climate Data, 2016). Approximately 90 percent of annual precipitation falls between October and April.

Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to drive the movement and dispersal of air pollutants. Winds control the rate of dispersion of local pollutant emissions. In the NCAB, dominant winds exhibit a seasonal pattern, especially in coastal areas. Wind direction often assumes a daily pattern in the river canyons that empty into the Pacific. In the morning hours, cool air from higher elevations flows down the valleys while later in the day at lower elevations air heats up and this pattern is reversed as airflow heads up the canyon.

A sensitive receptor is generally defined as a facility of land use that houses or attracts members of the population that area particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of sensitive receptors include hospitals, healthcare facilities, parks and wildlife areas, and schools.

The closest educational facilities to the project area are the Boy Scout camp located approximately 1.75 miles from the northernmost project area (Wrigley Orchard), and College of the Redwoods located approximately 1.8 miles from the southernmost project area (approximately Elk River Court). The distance between the northernmost project area and the Headwaters Education Center is approximately 0.75 miles.

The closest hospital facilities to the project area are Redwood Memorial Hospital near Fortuna and various health and elder care facilities in Eureka, all located more than five miles from the proposed construction footprint. The nearest child care facility is Rainbow Junction Children's located in Fortuna more than six miles from the project area.

The Humboldt Bay National Wildlife Refuge is located on the other side of US 101 approximately four miles from the project area. The closest wildlife and recreational facility to the project area are associated with the Headwaters Forest Preserve. The westerly boundary of the Headwaters Forest (and associated trailhead) is located approximately .65 miles from the northernmost project area (Wrigley Orchard).

There are no other medical or child care facilities within an approximately five-mile radius of the Proposed Project area (Google Earth 2017).

DISCUSSION OF CHECKLIST REPONSES

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

Thresholds of Significance
Project generates pollutants that would prevent attainment of the North Coast Unified Air Quality Management District's (NCUAQMD) long-term air quality objectives.

Assessment
A project is deemed consistent with air quality plans if it would result in population and/or employment growth that exceeds growth estimates included in the applicable air quality plan, which, in turn, would generate emissions not accounted for in the applicable air quality plan emissions budget. Therefore, projects need to be evaluated to determine whether they would generate population and employment growth and, if so, whether that growth would exceed the growth rates included in the relevant air plans.

The Proposed Project is entirely focused on sediment removal from the bed and banks of the Elk River and the placement of excavated material in sediment reuse or spoils. The Proposed Project does not involve the construction of any residential., commercial, or industrial structures or infrastructure that would generate population and/or employment growth (see related discussion in the *Population and Housing* section of this CEQA Checklist). Because the Proposed Project would

not generate growth, there would be no impacts related to inconsistency with air quality planning. No mitigation is required.

b) Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Thresholds of Significance
Release of pollutants that violate an air quality standard, or substantially contribute to an existing air quality violation.

Assessment
The NCUAQMD is listed as "attainment" or "unclassified" for all federal and state ambient air quality standards except for the state 24-hour State Particulate Matter Standard (PM10) in Humboldt County only (http://www.ncuaqmd.org/index.php?page=aqplanning.ceqa). PM10 is dust less than 10 microns in diameter. Fugitive dust is a source of particulate matter emissions. Fugitive emissions as a result of vehicular traffic on unpaved roadways is the largest source of particulate matter emissions within the NCUAQMD.

Dust generation during activities to construct the Proposed Project is expected to be minimal, principally because the area tends to stay moist year-round and excavated soils will have a high moisture content due to their proximity to the Elk River. In addition, the Proposed Project is located in a rural, agricultural area and is not located in close proximity to any sensitive receptors. The Proposed Project is therefore not expected to contribute substantially to a violation of state air quality standards for particulate matter (PM10), resulting in a less than significant impact.

While emissions would occur during construction activities, there are no ongoing operational emissions associated with the Proposed Project except for that associated with equipment required to conduct intermittent maintenance activities (such as power tools for vegetation management). Because no excavation or hauling of soil is associated with maintenance activities, emissions associated with operational activities (project maintenance) will be substantially lower than emissions associated with construction activities. Operational emissions are therefore considered to be less than significant.

The following mitigation measures are included to minimize the potential for fugitive dust generation during construction activities:

<u>Mitigation Measure AQ-1</u>

The project specifications will require the contractor to comply with the dust control provisions of the NCUAQMD Rule 110 (New Source Review and Prevention of Significant Deterioration) that regulate fugitive dust emissions (http://www.ncuaqmd.org/files/rules/reg%201/Rule%20110.pdf). Measures to reduce dust emissions may include, but are not limited to: covering trucks hauling dirt; limiting dust-generating activities during periods of high winds (greater than 15 miles per hour); replacing ground cover in disturbed areas as soon as possible; enclosing, covering, watering, or applying soil binders to exposed stock piles; removing earth tracked onto neighboring paved roads or at least once daily; and limiting equipment speed to 10 miles per hour in unpaved areas.

Mitigation Measure AQ-2

The project specifications will require that all construction vehicles and equipment emission levels meet current air quality standards and that idling time for all heavy equipment be minimized to reduce on-site emissions.

c) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?

Thresholds of Significance

Production of pollutants by the project that would result in a cumulatively considerable net increase in pollutants for which the NCAB is in non-attainment.

Assessment

Refer to Item 3.3 (b).

d) Would the project expose sensitive receptors to substantial pollutant concentrations?

Thresholds of Significance

The project would result in a substantial increase of pollutants that are capable of reaching sensitive receptors.

Assessment

Refer to Item III (b).

e) Would the project create objectionable odors affecting a substantial number of people?

Thresholds of Significance

The project would result in a substantial increase of objectionable odors that are capable of reaching substantial number of people.

Assessment

Diesel exhaust from construction activities may generate temporary odors during construction of the Proposed Project. Once construction has been completed, these odors would cease. Maintenance activities have the potential to generate temporary odors, but the odors would be short-lived and would only occur intermittently throughout the project area. Impacts related to potential generation of objectionable odors are this expected to be less than significant. No mitigation is required.

3.4 Biological Resources

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

This section describes the existing habitat conditions within the Project area with the potential to be affected by the Proposed Project, presents the applicable regulatory background, and provides an assessment of potential effects, and, where appropriate, identifies suitable mitigation to reduce potentially significant effects to a less-than-significant level.

REGULATORY SETTING

Federal Endangered Species Act Consultation Summary

The Federal Action associated with the Proposed Project is issuance of a permit by the US Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. The USACE Individual Permit will

require Section 7 consultation between USFWS and NMFS to review the project and assure that it is consistent with their policies to protect and restore habitat. Section 7 of the federal Endangered Species Act (FESA) (16 U.S.C 1531 et seq.) requires the preparation of a Biological Assessment if a federal action (including authorization of a proposed project) is likely to affect any federally-listed endangered or threatened species, or if critical habitat is present in the action area (USFWS/MNFS 1998).

FESA prohibits the "take" of endangered or threatened fish and wildlife species, the take of endangered or threatened plants in areas of federal jurisdiction or in violation of state law, or adverse modification to their critical habitat. Under FESA, the definition of "take" is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The USFWS and NMFS also interpret the definition of "harm" to include significant habitat modification that could result in the take of a species.

If an activity would result in the take of a federally listed species, one of the following is required: an incidental take permit under Section 10(a) of FESA, or an incidental take statement issued pursuant to federal interagency consultation under Section 7 of FESA. Such authorization typically requires various measures to avoid and minimize species take, and to protect the species and avoid jeopardy to the species' continued existence. NMFS administers FESA for marine fish species (including anadromous salmonids) and USFWS administers FESA for non-anadromous and non-marine fish species. Projects for which a federally-listed species is present and likely to be affected by an existing or proposed project must receive authorization from USFWS and NMFS. Authorization may involve a letter or concurrence that the project will not result in the potential take of a listed species or may result in the issuance of a Biological Opinion (BO) that describes measures that must be undertaken to minimize the likelihood of an incidental take of listed species. A project that is determined by NMFS or USFWS to jeopardize the continued existence of a listed species cannot be approved under a BO.

Critical Habitat: Critical habitat designations are specific areas within a geographic region that are occupied by a species and determined to be critical to its survival in accordance with FESA. Federal agencies issuing permits or acting as a lead agency must show that their actions do not negatively affect the critical habitat to the extent that it impeded the recovery of the species. Within designated critical habitat, USFWS and NMFS protect habitat that provides the primary constituent elements (PCEs) for survival of the listed species. PCEs are the physical and biological functions considered essential to species conservation that require special management considerations or protection.

California Endangered Species Act Consultation Summary

The California Endangered Species Act (CESA) generally parallels the main provisions of the federal ESA but extends the take prohibitions to species proposed for listing. Section 2080 and 2081 of the

California Fish & Game Code prohibit the take (defined as hunting, pursuing, catching, capturing, or killing) of listed endangered, threatened, or candidate species unless otherwise authorized by permit. A CESA permit must be obtained if the project has the potential to result in take of plant and animal species listed under CESA, either during construction or over the life of the project. Except for those species listed as fully protected, CESA allows for take incidental to otherwise lawful activities with an appropriate take authorization (e.g. consistency determination or incidental take permit). State lead agencies are required to consult with CDFW to ensure that any action they undertake is not likely to jeopardize the continued existence of any listed or candidate species or result in destruction or adverse modification of essential habitat.

If a species is listed by both the federal Endangered Species Act and CESA, Fish and Game Code section 2080.1 allows an applicant who has obtained a federal incidental take statement (federal Section 7 consultation) or permit (federal Section 10(a)(1)(B)) to request that the Director of CDFW find the federal documents consistent with CESA. If the federal documents are found to be consistent with CESA, a consistency determination (CD) is issued and no further authorization or approval is necessary under CESA. If the Director determines, based on substantial evidence, that the federal statement/permit is not consistent with CESA, an Inconsistent Determination will be issued to the applicant and take may only be authorized pursuant to CESA (i.e., an incidental take permit pursuant to section 2081(b) of the Fish and Game Code).

Some fish and wildlife species in the project area are protected under CESA. For the Proposed Project, CalTrout intends to use the NMFS Biological Opinion to apply to CDFW for a Consistency Determination (or apply for an Incidental Take Permit if an Inconsistent Determination is received).

Fully Protected Species (Fish and Game Code Sections 3511, 4700, 5050, and 5515): Fully protected species may not be taken or possessed at any time, and no licenses or permits may be issued for their take, except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

Protection of Nesting Birds (Fish and Game Code Sections 3503 and 3513): Section 3503.5 states that it is "unlawful to take, possess, or destroy the nests or eggs of any such bird of prey (i.e., species in the orders falconiformes and strigiformes) except as otherwise provided by this code or any other regulation adopted hereto." Section 3515 states that it is also unlawful to take or possess any migratory non-game bird (or part of such migratory non-game bird) as designated in the MBTA. Disturbance that causes nest abandonment and/or reproductive failure is considered a take by CDFW. This stature does not provide for the issuance of an incidental take permit.

Species of Special Concern: CDFW maintains lists for candidate-endangered and candidate-threatened species. California candidate species are afforded the same level of protection as listed species. California also designates species of special concern, which are species of limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value. These species do not have the same legal protection as listed species or fully protected species but may be added to official lists in the future. CDFW intends the species of special concern list to be a management tool for consideration in future land use decisions.

Native Plant Protection Act (Fish and Game Code Section 1900-1913): The Native Plant Protection Act is intended to preserve, protect, and enhance endangered or rare native plants in California. The Act directs CDFW to establish criteria for determining what native plants are rare or endangered. Under Section 1901, a species is endangered when its prospects for survival and reproduction are in immediate jeopardy from one or more causes. A species is rare when, although not threatened with immediate extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens. The Act also directs the California Fish and Game Commission to adopt regulations governing the taking, possessing, propagation, or sale of any endangered or rare native plant.

California Department of Fish and Wildlife §1602 Lake and Streambed Alteration Agreement

The California Department of Fish and Wildlife (CDFW) requires a Streambed Alteration Agreement (SAA) for projects that will divert or obstruct the natural flow of water, change the bed, channel, or bank of any stream, or propose to use any material from a streambed. The SAA is a contract between the applicant and CDFW regarding what will and will not be done in the riparian zone. CDFW may require a permit for any work that occurs anywhere (in, on, over, or under the creek) between the streambed sloping upwards, typically extending to the outer drip line of riparian vegetation.

Habitat Conservation Plans

The operation of timber harvesting activities in the upper Elk River watershed are intensely regulated and monitored. The two industrial timber land owners, Humboldt Redwoods Company and Green Diamond Resource Company, are required to conduct operations in accordance with Timber Harvest Plans, Incidental Take Permits, Federal Habitat Conservation Plans, and RWQCB permits (waste discharge requirements). The Bureau of Land Management administers the Headwaters Forest Preserve, a 7,400-acre reserve about half of which is old growth redwood groves, in accordance with the Headwaters Forest Resource Management Plan.

Humboldt Redwoods Company (previously Pacific Lumber Company)

In order to allow take of listed species associated with ongoing commercial timber logging operations in the upper watershed, Humboldt Redwood Company (HRC) operates under a

Habitat Conservation Plan (HCP) approved in 1999 that covers 211,700 acres of timberland in Humboldt County and arose from the agreement between the federal and state governments to purchase the Headwaters Grove of old-growth redwoods from the Company for $380 million. The agreement committed Pacific Lumber Company to developing an HCP on its remaining lands for its timber harvesting and related activities. The HCP was combined with a sustained yield plan required by the California Department of Forestry and Fire Protection because many of the requirements overlapped. The HCP does not evaluate in-stream restoration work. However, the HCP is part of the CEQA requirements for Fish and Game Code 1602 and 1605 (g) Master Timber Harvesting Operation (MATO) Lake and Streambed Alteration Agreement (MATO No. 1600-2009-0279-R1) which was approved in 2011 and includes provisions on channel excavation and bank stabilization.

The HCP includes a two-tiered approach to species protection. The first includes terrestrial and aquatic conservation measures for six focus species: northern spotted owl, marbled murrelet, coho salmon, Chinook salmon, cutthroat trout, and steelhead. The second tier includes measures addressing ecological requirements of the remaining 11 covered species: bald eagle, American peregrine falcon, western snowy plover, bank swallow, pacific fisher, red tree vole, northern red-legged frog, foothill yellow-legged frog, tailed frog, southern torrent salamander, western pond turtle, as well as special-status plants. The HCP categorizes areas of habitat within HRC property and allows for the phased release of different areas of land to harvest in certain strands. The release of acreage must comply with a process for phasing timber harvest within different types of suitable habitat. Covered activities under the HCP include timber management; maintenance, improvement, construction and closure of roads and landings; and operation of commercial rock quarries. Mitigation and minimization measures within the HCP focus mainly on habitat conservation and monitoring. Requests for phased releases of acres are regulated by the US Department of Interior, US Fish and Wildlife Service, Arcata Branch Office.

Green Diamond Resource Company

Shortly after the northern spotted owl was listed by USFWS in 1990, Green Diamond Resource Company (GDRC) developed a Habitat Conservation Plan (HCP) under Section 10 of the Endangered Species Act, 16 U.S.C. § 1539(a)(1). In 1992, USFWS approved a 30-year HCP for the Northern Spotted Owl on the California timberlands of Simpson Timber Company[12] (the NSO HCP). The NHO HCP will expire in 2022 and GDRC is currently applying for a 50-year incidental

[12]Green Diamond Resource Company is an affiliate of Simpson Investment Company and successor to historic Simpson affiliated entities such as Simpson Timber Company, which transferred its timberlands and associated permits and obligations to Green Diamond Resource Company in 2001.

take permit covering four species including the northern spotted owl, fisher, Sonoma tree vole, and red tree vole.)

In 2007, USFWS and NMFS approved GDRC's Aquatic HCP and Candidate Conservation Agreement with Assurances (AHCP) for conservation of listed and unlisted aquatic species on over 350,000 acres of timberland in Northern California which includes an Aquatic Habitat Conservation Plan and Safe Harbor Agreements for the Northern spotted owl, Humboldt marten, and Foothill yellow-legged frog.

GDRC operates under Forest Management Waste Discharge Requirements (WDRs) which include specific conditions (WDRs) for ongoing commercial logging operations in the South Fork Elk River. All Timber Harvest Plans in the South Fork Elk river must comply with the South Fork Elk River Management Plan (SFERMP). The SFERMP includes a South Fork Elk River Sediment Reduction Plan and is likely to be revised pending approval of waste discharge requirements associated with the Action Plan for the Upper South Fork Elk River TMDL.

ENVIRONMENTAL SETTING

The following discussion primarily addresses the habitat requirements, presence, and status of aquatic and terrestrial species that occur or have the potential to occur within the Project area, where construction and operations-related impacts on special-status species and their habitat could result. In the case of anadromous (migratory) species, habitat conditions upstream and downstream of the Project reach are provided for context.

Watershed Setting, Channel Morphology, and Geomorphic Setting

The North Fork Elk River is a second order stream and has approximately 12.1 miles of blue line stream according to the USGS McWhinney Creek 7.5-minute quadrangle. The North Fork Elk River drains a watershed of approximately 22.6 square miles. Elevations range from about 40 feet at the mouth of the river (at Humboldt Bay) to approximately 600 feet in the headwaters areas. Redwood forest dominates the watershed, which is primarily privately owned by HRC, and is managed for timber production.

The North Fork Elk River within the Project area is a narrow alluvial[13] channel and a B5 channel type for the first 4,972 above the North Fork/South Fork confluence. Channel morphology[14] is predominantly plane bed, typical of a moderate- to low-gradient (2-4% slope), unconfined channel. The bed and bank

[13] An alluvial river is a river in which the bed and banks are made up of mobile sediment and soil. The river's shape and size are determined by the river itself through the processes of erosion, sediment transport, sedimentation, and resuspension. Alluvial rivers are free to adjust section, pattern, and profile in response to hydraulic changes.

[14] The dimension (width, depth), shape and pattern (sinuous, meandering, straight) of a stream channel.

of the channel is made up of fine sand and silt associated with the predominant Wildcat Group geology. Wildcat alluvium is very fine-grained, non-cohesive, and highly erosive. Streamflow is year-round throughout the Project area and is approximately 3 CFS in the summer months (when construction would occur).

Water quality and fisheries beneficial uses in the Project reach has been substantially degraded from discharge of sediment associated with industrial harvest of redwood trees in the upper watershed. The accumulation of fine sediment has had significant adverse impacts on stream morphology, with associated impacts on water quality and salmonid habitat. The river bed and banks are accreted with fine grained sediment, silt, and sandy deposits. The channel includes very few bar forms, an absence of deep pools, and little variability or gravel. Extensive amounts of vegetation has become rooted in the accreted river banks, a condition which adds to channel aggradation.

Figure 21. South Fork Elk River near the Tom's Gulch tributary confluence, showing excessive fine sediment accumulation.

Sediment is a limiting factor for salmonids in Elk River, whose habitat requirements include: Clear, cold, well-oxygenated water; unimpaired migratory access to spawning grounds; clean, un-embedded gravels for spawning; and food, pools, and places to hide from predators for juvenile rearing.

Salmonid habitat has been adversely affected by increased sediment loading related to anthropogenic activities. This impact is seen in watershed data indicating high suspended sediment loads, degraded

habitat, channel filling, and instream conditions. Additionally, water quality objectives (including fisheries-related beneficial uses) are not met.

Throughout the Project reach, fine sediment has severely degraded salmonid habitat by filling pools and burying spawning gravel and large wood. Stream substrate is very fine, potential spawning gravels are significantly embedded, pool depths and stream channel depths have been decreased by sediment filling (thus reducing salmonid ability to rear, avoid predators, and migrate during low-flow periods), and high suspended concentrations and durations affect feeding and rearing behavior (Tetra Tech, 2015, p. 38).

Newcombe and Jensen (1996) developed a *Severity of Ill Effects Index which* describes the effects associated with excess suspended sediment. Data analyzed from nine Upper Elk River monitoring stations between 2003-2007 indicate the potential for a range of sublethal effects including reduction in feeding, increased respiration, and habitat degradation occurring from 0-90 percent of the time. "In addition, the California Department of Fish and Wildlife (CDFW; 2014) points out that pool depths continue to decline and fine sediment targets are still being exceeded more than 15 years after Habitat Conservation Plan (HCP) Implementation. (Tetra Tech, 2015, p. 38)"

Spawning within the Proposed Project reach is limited by excessive fine sediment coupled with insufficient spawning gravels to support the egg life history stage (Wallace 2016, personal communication). The lower North Fork Elk River is marked by a change from gravel substrate above the confluence to deposited fine sediment below. This transition from gravel to fine substrate also marks the downstream extent of salmonid spawning habitat. Because of the lack of spawning gravels present, CDFW spawning surveys do not sample below the North Fork – South Fork confluence (Ward et al. 2015). Historical observations of sediment substrate size are limited below the North Fork–South Fork confluence. Interviews with Elk River residents are the sole source of information regarding pre-disturbance stream substrate information below the confluence and indicate at least some gravels present (RCAA 2013). Based on these interviews, and on observations of a coarse sediment supply in the upper reaches, the Proposed Project reach may have been historically used for spawning on a limited basis, but currently provides no spawning habitat. Spawning gravels are present, concentrated at steeper riffles and tributary confluences (e.g., Railroad Gulch, Clapp Gulch) indicating that the reach likely once provided limited spawning habitat.

Other limiting factors for salmonids in the Elk River basin include lack of winter refugia, large wood, and migratory access. The Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon (NOAA, 2014) . The SONCC coho salmon recovery plan indicates "key limiting stresses are 'Impaired Estuary/Mainstem Function' and 'Lack of Floodplain and Channel Structure'"…and the key limiting future threats as 'channelization/diking' and 'roads'.

Per the Final Recovery Plan for SONCC coho Salmon, the highest priority recovery actions for the Humboldt Bay Tributaries Population include:

- Increasing large woody debris (LWD), boulders, or other instream structure;
- Constructing off channel habitats, alcoves, backwater habitat, and old stream oxbows;
- Removing or replace tide gates;
- Removing, setting back, or reconfiguring levees and dikes;
- Improving grazing practices; and
- Restoring tidally influenced zones.

Salmonid Species Status and Recovery Potential

The upper watershed, tributaries, and mainstem Elk River provide enormous recovery potential for the recovery of extensive salmonid spawning and rearing habitat, and small reaches within the watershed continue to maintain good quality habitat. Juvenile salmonids utilize tidally-influenced freshwater habitat while smolts utilize fresh and brackish water habitat in the estuary (Wallace, 2011) . Wallace (Wallace M. , 2008, p. 22) reports non-natal rearing of coho salmon juveniles in the lower Elk River and Martin Slough, and observed that age 1+ coho salmon smolts from nearby Freshwater Creek used the lower Elk River during rearing and out-migration through Humboldt Bay en route to the Pacific Ocean. Elk River and Freshwater Creek provide proportionally more salmonid spawning habitat than other, smaller Humboldt Bay watersheds. However, as with many other salmonid populations in the region, the current status of Elk River salmonids is hampered by a paucity of information (National Marine Fisheries Service, 2014) (National Marine Fisheries Service, 2016) . There are no downstream trapping efforts on the Elk River. Although tidal marsh areas in the lower Elk River were historically diked and converted to pasture, and much of the tidal prism into lower Elk River has been blocked by tide gates, restoration efforts are underway in the lower watershed (see discussion of Cumulative Effects, Section 3.19) and some of the land in the lower watershed is publicly owned, representing a restoration opportunity.

EXISTING CONDITIONS

The Project Area supports a range of aquatic (i.e. riverine habitat associated with the Elk River) and terrestrial habitats that are potentially affected by activities associated with the Proposed Project. General descriptions of these habitat types, and the species that commonly utilize them, are provided in this section. The Project area (Figure 17) is the area that the proposed project actions may directly or indirectly effect and includes channel and floodplain excavation areas, spoils sites, access roads and staging areas. The Project construction footprint area consists of approximately 8.8 acres and was assessed to determine potential affects to federal and state listed species with potential to occur in the Project area.

Riparian Habitat

The Project area provides a continuous strip of riparian habitat that is utilized by a variety of wildlife species. Dense vegetation supports nesting habitat for riparian bird species. The riparian habitat along the Project area also connects to the riparian habitat upriver on the North Fork Elk and downstream on the mainstem Elk River. The continuous nature of the riparian vegetation provides important habitat for wildlife utilizing the wildlife corridor for food, water, shade, shelter, movement, and a favorable microclimate. In-stream woody debris from riparian trees and shrubs also provides important habitat elements, forming scour pools and logjams used by insects, amphibians, and fish. Riparian forests are particularly important for landbird species, providing breeding habitat, over-wintering grounds, migration stopover spots, and movement corridors for species with limited mobility. Finally, riparian habitats stabilize banks and provide erosion control, preventing loss of adjacent land. Multilayered, structurally complex vegetation enhances the quality of riparian habitat.

Riparian forest is the most abundant biohabitat in the Project Area. Riparian habitats within the Project Area are diverse and well developed, especially near the North and South forks. Red alder and arroyo willow are the most abundant vegetation community along the river, with mature tree canopy's over 50 feet tall. Extensive Pacific willow (*Salix lasiandra*) occur between the confluence of the North and South forks upstream to the concrete bridge. Other riparian trees include mixed willow, red alder-elderberry (*Sambucus racemose*), and red-alder-mixed willow. The riparian understory is a dense mix of strands of willow species, blackberry, stinging nettle (*Urtica dioica*), and elderberry.

Riparian scrub adjacent to the river include elderberry, mixed willow, California rose (*Rosa californica*), and stinging nettle. A coastal scrub strand consisting of native California blackberry (*R. ursinus*), non-native Himalaya berry (*Rubus armeniacus*), and coyote brush (*Baccharis pilularis*) is located along the logging road downstream of the Red House, and rose brambles are located upstream of the steel Bridge and downstream of the concrete bridge.

Coniferous Forest

Within the Project area, the Mediterranean climate supports a coniferous forest community dominated by redwood (*Sequoia sempervirens*) and redwood-Sitka spruce (*Picea sitchenis*) forest, with a smaller area of grand fir (*Abeis grandis*) forest located on the upper slopes adjacent to the riparian corridor. Coniferous forest is the second most abundant biohabitat in the Project Area. The tall tree canopy is dominated by redwood, Sitka spruce, western red cedar (*Thuja plicata*), and grand fir. The coniferous forest understory is dominated by sword fern (*Polystichum munitum*) in some locations and is a thick shrub consisting of Scouler's Willow (*Salix scouleri*), Himalaya blackberry (*Rubus armeniacus*), twinberry (*Lonicera involucrate*) and salmonberry (*Rubus spectabilis*).

Pasture Habitat

Pasture areas are the third most abundant biohabitat in the Project area. Proposed spoils areas consist of tall fescue (*Festuca arundinacea*), velvet grass (*Holcus lanatus*), narrowleaf plantain (*Plantago lanceolate*), oxeye daisy (*Leucanthemum occidentalis*), Queen Anne's lace (*Daucus carota*), dandelion (*Taraxacum officinale*), and self-heal (*Prunella vulgaris*) and one open biohabitat (unvegetated ground) near the Red House.

Orchard

Apple orchards occur in the upstream project area within the Wrigley Orchard Project reach.

Special Status Species

The Elk River provides critical habitat for three species of historically abundant anadromous salmonids—Southern Oregon/Northern California Coast coho salmon (*Oncorhynchus kisutch*), California Coastal Chinook salmon (*Oncorhynchus tshawytscha*), and Northern California steelhead (*Oncorhynchus mykiss*). All three species are currently listed as threatened under the Federal Endangered Species Act (FESA), and coho salmon are listed as threatened under the California Endangered Species Act (CESA). In addition, the Project area includes critical habitat for SONCC coho salmon (64 FR 24049, May 5, 1999), California Coastal Chinook salmon (70 CFR 52488, September 2, 2005), and Northern California steelhead (70 CFR 52488, September 2, 2005) in the stream channel up to the bankfull elevation (50 CFR Part 226.211). The Proposed Project has the potential to directly impact all listed aquatic species and their critical habitat and would directly impact rearing SONCC coho and Northern California Steelhead during the construction period. Chinook salmon are assumed to have out-migrated by the construction period but could also be adversely affected by modification of critical habitat. Dewatering and fish removal/relocation activities have the greatest potential to "take" SONCC coho and Northern California Steelhead likely to be present during the construction period due to their heavy reliance on summer rearing locations within the channel excavation areas, despite the fact that existing aquatic habitat is low-quality due to aggradation and low dissolved oxygen. ***For more information on the impact of the Proposed Project of federally-listed salmonid species, refer to the Draft Biological Assessment (Appendix B) prepared per federal Endangered Species Act requirements (16 U.S.C 1531 et seq.).***

The Project area provides suitable habitat for many special status bird, mammal, amphibian, and reptile species. The presence of special-status species or other special habitats occurring within the project area was determined in large part by evaluation of the California Natural Diversity Database (CNDDB[15]) Eureka, California quadrangle. In addition, consultation with resource agency personnel and field surveys were conducted.

[15] The CNDDB is a database that consists of historical observations of special-status plant, fish, and wildlife species, and special plant communities. The CNDDB is only composed of reported sightings and is not a comprehensive list of plant, fish, and wildlife species for the

A special status plant and natural community survey was conducted for the Project area was performed on July 1, 2015, April 2, 2016, and June 6, 2017 based on the seasonally-appropriate flowering seasons of plants identified in the CNDDB and California native Plant Society (CNPS) scoping list. Special-status plant species are defined as vascular plants that are: (1) designated as rare, threatened, or endangered by the State or Federal governments; (2) proposed for rare, threatened, or endangered status; (3) State or federal candidate species; (4) listed as Species of Concern; or (5) included on the CNPS List 1A, 1B, and 2 (North State Resources Inc., 1999).

Table 22 provides a list of special status plants that could potentially occur in the Project area as identified in the CNDDB and the CNPS Inventory of Rare and Endangered Plants as well as other species for which the site supports suitable habitat if the site is within or near the known range of the species. No special status plants or natural communities were encountered within the Project area (Kalt, 2017). Special status plant communities documented within the assessment area include Coastal Terrace Prairie, Northern California Salt Marsh, and Sitka Spruce Forest, none of which were encountered during the field survey.

Table 22. CNDDB special status plant species occurrences in the Project area

Scientific Name	CRPR	Blooming Season
Abronia umbellata var. *breviflora*	List 1B.1	June-October
Astragalus pycnostachyus var. *pycnostachyus*	List 1B.2	April-October
Bryoria spiralifera	List 1B.1	
Cardamine angulata	List 2B.1	(January), March-July
Carex arcta	List 2B.2	June-September
Carex leptalea	List 2B.2	March-July
Carex lyngbyei	List 2B.2	April-August
Carex praticola	List 2B.2	May-July
Castilleja litoralis	List 2B.2	June
Chloropyron maritimum ssp. *palustre*	List 1B.2	June-October
Clarkia amoena ssp. *whitneyi*	List 1B.1	June-August
Collinsia corymbosa	List 1B.2	April-June
Epilobium oreganum	List 1B.2	June-September
Erysimum menziesii	List 1B.1	March-September
Erythronium oregonum	List 2B.2	March-June (July)
Erythronium revolutum	List 2B.2	March-July (August)
Fissidens pauperculus	List 1B.2	
Gilia capitata ssp. *pacifica*	List 1B.2	April-August
Gilia millefoliata	List 1B.2	April-July

area.

Hesperevax sparsiflora var. *brevifolia*	List 1B.2	March-June
Hesperolinon adenophyllum	List 1B.2	May-August
Lasthenia californica ssp. *macrantha*	List 1B.2	January-November
Lathyrus japonicus	List 2B.1	May-August
Lathyrus palustris	List 2B.2	March-August
Layia carnosa	List 1B.1	March-July
Lilium occidentale	List 1B.1	June-July
Monotropa uniflora	List 2B.2	June-August (September)
Montia howellii	List 2B.2	(February), March-May
Noccaea fendleri ssp. *californica*	List 1B.1	May-June
Oenothera wolfii	List 1B.1	May-October
Packera bolanderi var. *bolanderi*	List 2B.2	(January), (February), (April), May-July (August)
Piperia candida	List 1B.2	(March), May-September
Polemonium carneum	List 2B.2	April-September
Puccinellia pumila	List 2B.2	July
Sidalcea malviflora ssp. *patula*	List 1B.2	May-August
Sidalcea oregana ssp. *eximia*	List 1B.2	June-August
Spergularia canadensis var. *occidentalis*	List 2B.1	June-August
Viola palustris	List 2B.2	March-August

A wildlife survey of the Project area was performed on December 15, 2017 by Slauson Wildlife. Special-status species are defined as taxa that are: (1) designated as threatened or endangered by the State or Federal governments (i.e., listed species); (2) proposed or petitioned for federal threatened or endangered status; (3) state or federal candidates for threatened or endangered status; (4) identified by USFWS as Species of Concern; or (5) identified by CDFW as Species of Special Concern. Table 23 provides a list of special status species as identified in the CNDDB and therefore with potential to utilize the Elk River corridor. Bird species detected during the field survey that were not included in the CNDDB search results included Red-tailed hawk and American kestrel both of which are protected by Fish and Game Code 3503.5.

Table 23. CNDDB bird, mammal, amphibian, and reptile occurrences in the Project area *(California Department of Fish and Wildlife, 2018)*

Common Name	Scientific Name	Status	Potential to Occur
BIRDS			
Bryant's savannah sparrow	*Passerculus sandwichensis alaudinus*	State/CDFW Species of Special Concern	Present
Ruffed Grouse	*Bonasa umbrellus*	State/CDFW Watch List	Low
California brown pelican	*Pelacanus occidentalis californicus*	State/CDFW Fully Protected	Low

Double-crested cormorant	*Phalacrocorax auratus*	State/CDFW Watch List	Low
Great egret	*Adrea alba*	CDFW Sensitive Species	Low
Great blue heron	*Ardea Herodias*	State/CDFW Sensitive Species	Low
Cooper's hawk	*Accipiter cooperii*	State/CDFW Watch List	Moderate
Sharp-shinned hawk	*Accipiter striatus*	State/CDFW Watch List	Moderate
Northern harrier	*Circus cyaneus*	State/CDFW Species of Special Concern	Low
White-tailed kite	*Elanus leucurus*	State/CDFW Fully-Protected Species	Low
Golden eagle	*Aquila chrysaetos*	State/CDFW Fully-Protected Species	Low
Bald eagle	*Haliaeetus leucocephalus*	State/CDFW Fully-Protected Species	Low
Osprey	*Pandion haliaetus*	State/CDFW Watch List	Low
Merlin	*Falco columbarius*	State/CDFW Watch List	Low
American peregrine falcon	*Falco peregrinus anatum*	State/CDFW Fully-Protected Species	Low
Yellow rail	*Coturnicops noveboracensis*	State/CDFW Species of Special Concern	Low
California Ridgway's rail	*Rallus obsoletus obseletus*	State/CDFW Fully Protected Species	None (Extirpated from area since 1932)
Western snowy plover	*Charadrius alexandrinus nivosus*	Federal Threatened State/CDFW Species of Special Concern	Low
Mountain plover	*Charadrius montanus*	State/CDFW Species of Special Concern	Low
Long-billed curlew	*Numenius anericanus*	State/CDFW Watch List	Low
Marbled murrelet	*Brachyramphus marmoratus*	Federal Threatened State/CDFW Endangered Species	Moderate
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Federal Threatened State/CDFW Endangered Species	Low
Short-eared owl	*Asio flammeus*	State/CDFW Species of Special Concern	Low
Northern spotted owl	*Strix occidentalis caurina*	Federal Threatened State/CDFW Threatened Species	Low
Vaux's swift	*Chaetura vauxi*	State/CDFW Species of Special Concern	Low
Olive-sided flycatcher	*Contopus cooperi*	State/CDFW Species of Special Concern	Moderate

Little willow flycatcher	*Empidonax traillii*	State/CDFW Endangered Species	High
Purple martin	*Progne subis*	State/CDFW Species of Special Concern	Moderate
Bank swallow	*Riparia riparia*	State/CDFW Threatened Species	Low
Black-capped chickadee	*Poecile atricapillus*	State/CDFW Watch List	High
Yellow-breasted chat	*Icteria virens*	State/CDFW Species of Special Concern	Moderate
Yellow warbler	*Setophaga petechia*	State/CDFW Species of Special Concern	High
Grasshopper sparrow	*Ammodramus savannarum*	State/CDFW Species of Special Concern	Low
Tricolored blackbird	*Agelaius tricolor*	State/CDFW Candidate Endangered Species	Low
MAMMALS			
Pallid bat	*Antrozous pallidus*	State/CDFW Species of Special Concern	Low
Silver-haired bat	*Lasionycteris noctivagans*	Western Bat Working Group-Moderate	Low
Hoary bat	*Lasiurus cinereus*	Western Bat Working Group-Moderate	Low
Fringed myotis	*Myotis thysanodes*	Western Bat Working Group-High	Moderate
Long-eared myotis	*Myotis evotis*	Western Bat Working Group-Moderate	Moderate
Yuma myotis	*Myotis yumanensis*	Western Bat Working Group- Low, Moderate	Moderate
Humboldt marten	*Marts caurina humboldtensis*	State/CDFW Candidate Endangered Species	Low
Pacific fisher (West Coast DPS)	*Pekania pennant pacifica*	State/CDFW Candidate Species	Low
Humboldt mountain beaver	*Aplodontia rufa humboldtiana*	G5TNR (Global rank) SNR (State rank)[16]	Low
North American porcupine	*Erethizon dorsatum*	G5 (Global rank) S3 (State rank)[17]	Low
Sonoma tree vole	*Arborimus pamo*	State/CDFW Species of Special Concern	Low

[16] Globally Ranked as 'Secure', common, widespread at the species level (G5). Subspecies Rank (T) is 'not ranked'.

[17] G5=Globally Ranked as 'Secure', common, widespread at the species level. S3 = 'Vulnerable' in the state, due to restricted range, few populations, recent declines, or other factors making it vulnerable to extirpation from the state.

AMPHIBIANS			
Pacific tailed-frog	*Ascaphus truei*	State/CDFW Species of Special Concern	Low
Northern red-legged frog	*Rana aurora*	State/CDFW Species of Special Concern	High
Foothill yellow-legged frog	*Rana boylii*	State/CDFW Candidate Threatened Species	Low
Southern torrent salamander	*Rhyacotriton variegatus*	State/CDFW Species of Special Concern	Low
REPTILES			
Western pond turtle	*Emys marmorata*	State/CDFW Species of Special Concern	Low

DISCUSSION OF CHECKLIST REPONSES

a) **Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?**

Threshold of Significance

Direct impacts on individuals of any protected species or species of concern or substantial adverse impacts to their habitat functions or values.

Assessment

For the purposes of this assessment, special-status species are those that are listed as rare, species of concern, candidate, threatened or endangered by the US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), California Department of Fish and Wildlife[18] (CDFW), and local experts. Special-status plant and animal species with the potential to occur in the project area were identified through a review of the following resources:

- US Fish and Wildlife Service (USFWS) List of Federal Endangered and Threatened Species that may be affected.
- California Natural Diversity Database (CNDDB) Database Query within a 5-mile radius (USGS McWhinney Creek 7.5-minute quadrangle) (Tables 24 and 25).
- California Native Plant Society (CNPS) Rare Plant Inventory Database Query within a 9-quadrangle area for the McWhinney Creek and Fields Landing USGS quadrangles.

[18] Includes California Rare Plant Rank (CRPR) listed species.

Tables 22 and 23 list the protected species known to occur within the vicinity of the project area. The potential for special-status species to occur in areas affected by Project activities was evaluated according to the following criteria:

- **No potential**: Project activities would not occur in habitat that supports the species.
- **Low**: Few of the habitat components meeting the species requirements are present in areas that may be impacted by Project activities. In these instances, the species is not likely to be impacted.
- **Moderate**: Some of the habitat components meeting the species requirements are present in areas that may be impacted by Project activities.
- **High**: All of the habitat components meeting the species requirements are present in areas that may be impacted by Project activities.

A discussion of the Proposed Project's potential effects on special-status species and the resultant level of impacts are provided below. Compared to channel excavation, floodplain excavation is generally expected to involve greater impacts to riparian vegetation, cultural resources, and adjacent lands, whereas channel excavation would generally involve greater impacts to aquatic resources.

Plants

No special status plants or natural communities were encountered within the Project area (Kalt, 2017) therefore there would be no impact and no mitigation is proposed.

Birds

Numerous bird species utilize the riparian corridor of the Elk River for roosting and have a moderate potential to occur in the Project area during the construction period, including Cooper's hawk, Sharp-shinned hawk, Marbled murrelet (highly unlikely per CDFW), Barn owl, Northern saw-whet owl, Olive-sided flycatcher, Purple martin, and Yellow-breasted chat. Various raptor and owl species have a high potential to occur in the Project area during the construction period, including the Red-shouldered hawk, Great horned owl, Barred owl (present), Western screech owl, and Northern pygmy owl. Other bird species with high potential to occur are the Red-breasted sapsucker, Little willow-flycatcher, Black-capped chickadee, Bryant's Savannah Sparrow, and Yellow warbler.

If present, construction activities could generate noise and visual distractions that would disturb special status bird species and potentially cause the failure of a nest. Disturbance or failure of a nest would be considered a significant impact and a "take" under Fish and Game Code if the nest belongs to any native bird. Removal of nest trees related to any native bird would constitute a take under Fish and Game Code and will be disallowed.

The Proposed Project incorporates measures to avoid and minimize impacts to nesting birds. **Mitigation Measure BIO-18A** in the Environmental Commitments table (Section 2.9) establishes a work restriction between February 1 and August 15 during which there will be no riparian or coniferous forest habitat removal or noise disturbance above background levels. Per **Mitigation Measure BIO-18B**, hand harvest of vegetation before August 15 would be allowed so long as it is not conducted within 500 feet of any active nest.

Based on the established work window, the breeding season for most special status birds with a moderate to high likelihood to occur in the Project area (Table 24) would be avoided. However, the construction period overlaps with the breeding period for Sharp-shinned hawk, Marbled murrelet, Great-horned owl, Northern spotted owl, Barred owl, and Little willow flycatcher.

Table 24. Breeding period and habitat requirements for special status bird species with a moderate to high potential to occur in the Project area over the construction period (Slauson, 2017)

Common Name	Status	Breeding Period	Habitat
Sharp-shinned hawk	State/CDFW Watch List	April - August	Prefers coniferous or mixed forests for nesting. Prefers riparian areas. Require north-facing slopes with plucking perches. Nesting typically occurs within 275 feet of water. Suitable foraging habitat present within the Project area.
Marbled murrelet	Federal/Threatened State/CDFW Endangered Species	March - October	Nests in old-growth redwood-dominated forests, typically not more than six miles inland, often in Douglas fir. Species breeds in the Headwaters Forest and likely uses the Project area for commuting between nest sites and ocean foraging areas, rather than nesting in the Project area.
Great-horned owl	State/CDFW Fully-Protected Species	May - September	Occurs in a variety of forest habitats with meadows and other openings including mixed coniferous forest. Commonly forages and reeds in riparian and coniferous forest. High potential to occur as species breeds in the area and roosting and foraging habitat is present.
Northern spotted owl	Federal/Threatened State/CDFW Threatened Species	February - August	Old growth forests or mixed strands of old-growth and mature trees. Occasionally inhabits younger forests with patches of big trees. Nearest habitat is 0.6 miles away. Unlikely to establish a nest adjacent to human development.
Barred owl	State/CDFW Fully-Protected Species	December - September	Inhabits coniferous and mixed deciduous forest and competes with Northern spotted owl for habitat where they co-occur.

Little willow flycatcher	State/CDFW Endangered Species	May - August	Nesting habitat is deciduous thickets, especially willows and often near water. Nesting habitat appears to be riparian habitat adjacent to slow moving or stagnant water sources, such as off-channel pools or human created analogs such as stagnant ponds. Suitable nesting habitat occurs within the Project area.

Because construction activities would occur during the breeding period for some listed species and because some passerine birds can build nests in as few as three days, **Mitigation Measures BIO-18C** includes a pre-construction clearance survey for potentially nesting birds conducted by a qualified CDFW-approved biologist within one week of construction start. This pre-construction survey would include the construction footprint plus a 100-foot buffer to address the potential for double-brooding, late-nesting birds that could have an active nest beyond August 15 including Willow flycatchers, Sharp-shinned hawk, Marbled murrelet, Great-horned owl, Northern spotted owl, and Barred owl (Keith Slauson, 2018) .

Willow flycatchers are late nesters so CDFW typically recommend two protocol level surveys (with playback) in early-June and late-June to determine whether they are nesting onsite. Per **Mitigation Measures BIO-18C,** if willow flycatchers are found to be nesting onsite during the pre-construction surveys, construction will be delayed until August 31 to avoid impacts to nests. If no nests are present, construction may proceed beginning August 15 as the other special status birds would have finished nesting by then.

Also per **Mitigation Measure BIO-18C**, if a lapse in project-related work of two weeks or longer occurs, another focused survey will be conducted before project work can be re-initiated.

Per **Mitigation Measure BIO-18D**, the pre-construction survey will be informed by a June and June-July survey to detect any occupied nests, including the construction area plus a 500-foot radius.

In the event that any active nests are found during the pre-construction surveys noted above, **Mitigation Measure BIO-18E** establishes that a no work buffer area based on the nest type be established around the active nest until the young have fledged or the nest becomes inactive. **Mitigation Measure BIO-18F** provides for monitoring periods for nest sites found within established buffer areas. These measures would minimize impacts to nesting birds to a level that is less than significant. However, impacts could remain potentially significant if it is necessary to remove a known nest tree. Implementation of **Mitigation Measure BIO-18G** would reduce impacts to a level that is less than significant by assessing the impacts of nest tree removal in consultation with CDFW and mitigating these impacts accordingly **Mitigation Measure BIO-18H**.

Mitigation Measure BIO-18A: Work restrictions for riparian or coniferous forest habitat removal and noise disturbance above background levels.

No coniferous or riparian forest habitat will be degraded or removed and no Project activities resulting in noise disturbance greater than current ambient levels will be conducted during the general breeding period for birds (February 1 through August 15th).

Mitigation Measure BIO-18B: Clearance survey and allowance of hand harvest of vegetation and use of other non-mechanized equipment prior to August 15.

Hand harvest of vegetation and other minor work that does not require mechanized equipment (e.g. surveying, use of hand tools including electric trimmers, dewatering and fish removal) may be conducted prior to August 15, but not within 500-feet of any special-status species or raptor nest or within 100-feet of any unlisted species nest that is identified. In order to identify active nests, a survey by a qualified biologist will be conducted within one week of vegetation removal activities to detect any nesting birds. In the event that any active nests are found, Mitigation Measures BIO-18H and BIO-18I will be implemented.

Mitigation Measure BIO-18C: Survey for occupied Willow flycatcher nests

In early-June and late-June, two protocol level surveys (with playback) will be conducted by a qualified biologist per the protocols established in "A Willow Flycatcher Survey Protocol for California (Helen L. Bombay, 2003) to determine if Willow flycatchers are nesting onsite. If willow flycatchers are found to be nesting, construction will be delayed until August 31 to avoid impacts to nests. If no willow flycatchers nests are present, construction may proceed beginning August 15 as all other special status birds are expected to have finished nesting by then. In the event that any active nests are found, Mitigation Measures BIO-18E and BIO-18F will be implemented.

Mitigation Measure BIO-18D: Clearance surveys of Project area including a 1000-foot buffer prior to construction start.

Within one week of the construction start date, a clearance survey for potentially nesting birds will be conducted by a qualified biologist to survey habitat that would be directly impacted by Project activities, plus a 500-foot radius buffer to detect late-season nesting birds and special status birds with breeding periods that extend into August-October. In the event that any active nests are found, Mitigation Measures BIO-18E and BIO-18F will be implemented. If a lapse in construction of two weeks or longer occurs, another focused survey will be conducted before Project work can be reinitiated.

Mitigation Measure BIO-18E: Establish Buffers Around Active Nest Sites

If nesting birds are found, a buffer will be established around the nest and maintained until the young have fledged. Appropriate buffers are 100 feet for non-listed species, and 500 feet for special-status species and raptors. A qualified biologist may identify an alternative buffer based on a site-specific evaluation and in consultation with CDFW. Work will not commence within the buffer until fledglings are fully mobile and no longer reliant upon the nest or parental care for survival.

Mitigation Measure BIO-18F: Pre-Construction and Construction Monitoring of Active Birds Nests within Established Avoidance Buffers

If an active nest is identified during pre-construction surveys, and work is proposed to be conducted within the buffer for an active nest established per Mitigation Measure BIO-18E, a qualified biologist may consult with CDFW to see if a reduced buffer can be appropriated, including additional monitoring requirements appropriate for the species type. If monitoring indicates that the birds are stressed by construction activity or could cause the nest to fail or be abandoned, construction will cease until the nest has fledged or failed.

Mitigation Measure BIO-18G: Assess Impacts of Removing Special Status Nest Trees

If a known nest tree of a special-status bird (i.e. all species listed in Table 23) is located within a project area and is planned for removal, a qualified CDFW-approved biologist will conduct an assessment of the nest tree. The assessment will evaluate the importance of preserving the nest tree by evaluating factors such as nest site success, site fidelity, nest integrity, species density/competition, predator pressure, and the tree's structure relative to surrounding habitat. If the biologist determines that removal of the nest tree cannot be sufficiently mitigated, then the Project footprint will be field adjusted to avoid removal of the nest tree. If the biologist determines that the mitigation is feasible, Mitigation Measure BIO-18H will be implemented.

Mitigation Measure BIO-18H Develop and Implement a Mitigation Plan for Removal of Special-Status Nest Trees

If removal of a special-status bird nest tree is proposed (such as a substantial wildlife tree with a raptor nest or other persistent nest structure), a plan to mitigate for the loss of the nest tree will be developed. Prior to removing a nest tree, the mitigation plan shall be submitted to CDFW for approval. CDFW will have authority to reject the mitigation plan and require that the nest tree be preserved if CDFW finds the mitigation to be inadequate.

Amphibian and Reptile Species

Special-status reptiles and amphibians with the potential to occur in the project area are listed in Table 23 and described in more detail below.

Pacific tailed frog, northern red-legged frog, foothill yellow-legged frog, southern torrent salamander, and western pond turtle are known to occur along the Elk River and have a high potential to occur in the Proposed Project area. The foothill yellow-legged frog is designated by CDFW as a "Candidate Threatened Species." Pacific tailed frog, northern red-legged frog, southern torrent salamander, and western pond turtle are designated by CDFW as "Species of Special Concern."

The Northern red-legged frog is the most likely to utilize the aquatic habitats of the Project Area. Northern red-legged frogs do not typically breed in streams and their breeding season coincides with high flows and flood events in the Elk River that would make the site unusable, given the lack of slow moving, off channel habitat (Jennifer Olson, Personal Communication, 2019). However, non-breeding adults and young of year could occur in upland areas, off-channel habitat, and in the margins of slow-moving streams. Each of the other amphibian species has a low potential to occur due to lack of suitable river substrate (for attaching egg masses or larvae).

The only amphibian with an egg-laying period that coincides with the construction period is the Western Pond Turtle, although the extent to which Western Pond Turtle would be nesting in or adjacent to the Project site is unclear. There are two CNDDB occurrences of Western Pond Turtle near the Project area and one CNDDB occurrence directly adjacent to the Project site (Jennifer Olson, Personal Communication, 2019). Although the western pond turtle is known to occur in nearby river systems, occurrence in the Project area is unlikely due to a lack of suitable basking sites (due to dense riparian overstory), lack of escapement habitat (due to low channel depth in the summer/fall), and a thermoregulatory range that exceeds the species requirements (Keith Slauson, 2018) .

Construction activities such as channel and floodplain excavation have the potential to result in adverse impacts to Pacific tailed frog, northern red-legged frog, foothill yellow-legged frog, southern torrent salamander, and western pond turtle, if present. These species typically nest in upland areas outside the floodplain between January and May. Because the construction period is August-October, the breeding season for reptiles and amphibians would be avoided. However, the construction period overlaps with the metamorphosis period (June-September). **Mitigation Measure BIO-19A** includes pre-construction surveys for larvae and/or eggs of potentially affected species by a qualified biologist within two weeks of construction start. Per **Mitigation Measure BIO-19B,** if larvae or eggs are found, they will be relocated to a pre-determined relocation site outside of the Project area. Following dewatering activities but prior to Project construction (within 1-3 days or if construction halts for more than two days), all floodplain and channel excavation areas will be surveyed and a 100-foot buffer will be established around the location of

any nests identified until the young have left the nest, as determined by a qualified CDFW-approved biologist.

Although nesting sites are often difficult to find (detection dogs are one of the only survey protocol), the surveys would minimize the potential for nest sites to be disturbed. With these measures in place, impacts would be reduced to the extent feasible and are expected to be less than significant. No additional mitigation is required.

Mitigation Measure BIO-19A: Prior to beginning construction, a qualified biologist will conduct one daytime visual encounter survey for special-status reptiles and amphibians including nests, eggs, and tadpoles.

The survey will be conducted no more than 48 hours preceding the onset of construction. At the time of inspection, all instream exclosures and adjacent cover along isolated banks will be surveyed for the presence of special status amphibian and reptile species. If no special-status amphibians or reptile is found within the activity area during the pre-activity survey, the work may proceed. If a special status species is located, a qualified biologist will implement measures under Section B (below) as necessary.

Mitigation Measure BIO-19B: Establish buffers and develop a mitigation plan if a special-status amphibian or reptile, or the eggs or larvae of a special-status amphibian or reptile, is found within the activity area during a pre-construction survey or project construction activities.

The following measures will be implemented:

a. If eggs or tadpoles of a special-status species are found, a 100-foot buffer will be established around the location of the eggs/tadpoles and work may proceed outside of the buffer zone. Work within the buffer zone will be rescheduled until the time that eggs have hatched and/or tadpoles have metamorphosed.
b. There is no breeding habitat for Pacific-tailed frog or Southern torrent salamander onsite. If an active Northern red-legged frog, Foothill yellow-legged frog, or Western pond turtle "nest" is detected within the activity area, a 100-foot buffer around the nest will be established and maintained. The buffer zone will remain in place until the young have left the nest, as determined by a qualified biologist.
c. If adults or juveniles of a special-status species are found, one of the following two procedures will be implemented:

    i. If, in the opinion of the qualified biologist, the individuals likely to leave the work area on its own volition, and work can be feasibly delayed, a buffer will be established around the location of the individual(s) and work may proceed outside

of the buffer zone. No work will occur within the buffer zone until the individual has dispersed.

ii. If, in the opinion of the qualified biologist, capture and removal of the individual to a safe place outside of the work area is likely to result in less impact than leaving the individuals in place and delaying the work (e.g., if the species could potentially hide and be missed during a follow-up survey), the individual will be captured and relocated by a qualified biologist (with CDFW approval), and work may proceed.

Potential impacts of the Proposed Project on amphibians and reptiles is not expected to be significant. The potential for benefits to amphibians has not been quantified, although he creation of off channel habitat would potentially benefit the Northern Red-legged Frog.

Mammals

Special-status mammals with the potential to occur in the project area are listed in Table 23 and described in more detail below.

Special-status mammal species associated with habitats in the Project Area that have a low potential to occur in the Project area during the construction period include Humboldt marten, Pacific fisher, Humboldt mountain beaver, North American porcupine, and Sonoma tree vole. A variety of bat species including Pallid bat, Silver-haired bat, and Hoary bat also have a low potential to occur in the Project area due to a lack of suitable roosting habitat. Yuma myotis, Long-eared myotis, and Fringed myotis have a moderate potential to occur although suitable roosting and colony sites are unlikely to be located in the Project area.

Although the potential for special status mammal species to occur in the Project area during the construction period is low or moderate, the removal of understory or trees or disruption of species present would be considered a significant impact if any species is present. **Mitigation Measure BIO-20A** includes pre-construction surveys for mammal dens, burrows, and nest sites and specifies measures monitoring of the presence of special status species. If a special status mammal species is identified, **Mitigation Measure BIO-20B** would avoid or minimize impacts to special-status mammal species to a less than significant level.

Mitigation Measure BIO-20A: Survey for den, burrow, or nest sites and monitor sites for activity.
No less than 5 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities, a qualified biologist will conduct a survey to determine if den, burrow, or nest sites are potentially present in the Project area. If potential den, burrow, or nest sites are found, they will be monitored for activity. If the biologist determines that areas may be

active, efforts will be made to preserve the den, burrow, or nest sites and maintain an intact dispersal corridor between the site and undisturbed riparian habitat. If a special status species is located, a qualified biologist will implement measures under Section B (below) as necessary.

Mitigation Measure BIO-20B: Discourage use of active den, burrow, and nest sites prior to construction activities and deconstruct dormant nests

If an active den, burrow, or nest sites cannot be avoided, the entrances to the den, burrow, or nest will be blocked with soil, sticks, and debris for 3-5 days to discourage the use of the dens prior to Project disturbance activities. The entrances will be blocked with to an incrementally greater degree over a 3-5 day period. After the qualified biologist determines that animals have stopped using the active den, burrow, or nest site, it will be hand excavated with a shovel to prevent re-use during construction. No disturbance of active Humboldt marten, Pacific fisher, Humboldt mountain beaver, North American porcupine, or Sonoma tree vole dens, burrows, or nest sites will take place when the sites are occupied, as determined by a qualified biologist.

Several bat species have the potential to occur within the Project area (Slauson, 2017). **Mitigation Measure BIO-21** includes one pre-construction surveys for conducted in June-July to determine if any structures such as bridges, buildings, or large diameter trees within the construction footprint are occupied by special-status bat species. Should any maternal colony sites be located, species-specific seasonal and distance restrictions will be developed in consultation with CDFW.

Mitigation Measure BIO-21: Protection of bat colonies

A minimum of one survey will be conducted by a qualified biologist in June-July to determine if any structures such as bridges, buildings, or large diameter trees with basal hollows, exfoliating ark, or woodpecker holes, are occupied by either day roosting bats or potential maternal colonies of bats in or immediately to the construction area footprint. Should any maternal colony sites be located, species-specific seasonal and disturbance distance restrictions will be developed in consultation with CDFW.

Fish

The RWQCB has determined that the Proposed Project has the potential to adversely affect listed aquatic species including Southern Oregon/Northern California Coho Salmon (*Oncorhynchus kisutch*), California Coastal Chinook salmon (*Oncorhynchus tshawytscha*), and Northern California steelhead (Oncorhynchus *mykiss*). As previously noted, the project applicant must initiate consultation with USFWS and/or NMFS (for fish species) when a project has the potential to affect a federally listed species and/or adversely modify designated critical habitat. *Formal Section 7 consultation with NMFS under FESA for the Proposed Project will begin in approximately April 2019 with the submission of a Biological Assessment (Appendix B).* The Biological Assessment finds that

there are federally-listed threatened fish species and critical habitat present within the action area including Southern Oregon/Northern California Coast coho salmon (*Oncorhynchus kisutch*), California Coastal Chinook salmon (*Oncorhynchus tshawytscha*), and Northern California steelhead (Oncorhynchus *mykiss*). All three species are currently listed as threatened under FESA, and coho salmon are listed under the California Endangered Species Act (CESA). *For more information on the impacts of the Proposed Project on federally-listed salmonids, reefer to the Draft Biological Assessment (Appendix B). All See* ***Mitigation Measure BIO-22*** *in the Environmental Commitments Table (Section 2.9).*

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Thresholds of Significance

A net reduction in area or ecological functions or values in riparian habitat or other sensitive natural communities.

Assessment

A narrow and continuous strip of riparian habitat occurs within the construction footprint including 0.64 acres of coniferous vegetation and 2.52 acres of riparian vegetation. The USACE considers temporary impacts to be impacts less than one year in length. Because it will require more than one year following revegetation for riparian vegetation to recover, all impacts to the riparian corridor are considered to be permanent (LK Sirkin, Personal Communication).

Of the 0.64 acres of coniferous vegetation within the construction footprint, 0.12 acres would be impacted within the Wrigley Orchard reach, and 0.52 acres within the Elk River Flood Curve reach. Coniferous Forest impacts within the Wrigley Orchard reach are strictly related to access and staging and could likely be avoided through adjusting the engineering polygons during construction staking. Within the Elk River Flood Curve, 0.7 acres of coniferous impacts are associated with access and staging and could likely be avoided through field adjustments. 0.45 acres of coniferous habitat in channel bank and floodplain excavation areas has the potential to be impacted by the Proposed Project. It is possible that a significant amount of this impact can be avoided by field adjusting the construction footprint between 65% and 90% design and through mitigation measures to preserve existing vegetation. All conifer trees within the construction footprint will be avoided to the extent practicable. Impacts to coniferous habitat that cannot be avoided will be mitigated at a 3:1 ratio following the revegetation plan described in Section 2.5 (Site Revegetation subsection). Because newly excavated channel banks would not be revegetated

under the Proposed action, all revegetation would occur within the 1.1-acre floodplain disturbance footprint within the Elk River Flood Curve reach, potentially extending into adjacent undisturbed riparian floodplain areas as necessary to meet the 3:1 mitigation requirement. Revegetation details including planting locations and species density and composition would be worked out in consultation with CDFW per **Mitigation Measure BIO-23).**

Of the 2.28 acres of riparian vegetation within the construction footprint, 0.51 acres are located in the Wrigley Orchard Reach and 1.77 acres are located within the Elk River Flood Curve Reach. Vegetation impacts associated with access and staging could impact up to 0.27 acres, floodplain excavation could impact up to 0.73 acres, and channel excavation could impact up to 1.34 acres.

Impacts to riparian corridor within the construction footprint will be avoided to the extent practicable. It is likely that a significant amount of riparian impacts may be avoided by field adjusting the engineering designs between the 65% and 90% design stages. Impacts to coniferous habitat that cannot be avoided will be mitigated at a 3:1 ratio following the revegetation plan described in Section 2.5 (Site Revegetation subsection). Because newly excavated channel banks would not be revegetated under the Proposed action, all revegetation would occur within the floodplain disturbance footprint, potentially extending into adjacent undisturbed riparian floodplain areas as necessary to meet the 3:1 mitigation requirement. The floodplain area available for replanting within the Wrigley Orchard reach is 0.6 acres and the floodplain area available for replanting within Elk River Flood Curve is 1.1 acres. Revegetation details including planting locations and species density and composition would be worked out in consultation with CDFW per **Mitigation Measure BIO-23).**

Considering coniferous and riparian habitat impacts together, up to 0.41 acres of potential coniferous habitat impacts and up to 0.73 acres of potential riparian habitat impacts (up to 1.14 acres total) would be replanted at a 3:1 mitigation ratio within a floodplain disturbance area consisting of 1.7 acres (potentially extending into adjacent undisturbed floodplain areas) in order to create a patchwork of alder- and conifer-dominated vegetation,favoring conifers over alders and willows to the extent possible. Revegetation details will be defined in consultation with CDFW per **Mitigation Measure BIO-23** to ensure that re-planting would result in the greatest ecological benefit without impeding the Project's flood conveyance objectives.

The Elk River provides critical habitat for three species of historically abundant anadromous salmonids including Southern Oregon/Northern California Coast coho salmon (*Oncorhynchus kisutch*), California Coastal Chinook salmon (*Oncorhynchus tshawytscha*), and Northern California steelhead (*Oncorhynchus mykiss*). Critical habitat occurs within the Project region for three federally listed bird species, including western snowy plover (re-designated June 12, 2012; USFWS

2012a) marbled murrelet (designated May 24, 1996 and revised Aug 4, 2016; USFWS 2016), and northern spotted owl (revised Dec 4, 2012b; USFWS 2008). Of these species, only the Marbled murrelet is likely (moderate potential) to occur in the Project area based on the availability of habitat and a breeding season which overlaps the construction period. However, alteration of critical habitat has the potential to affect designated critical habitat for all three species between construction activities and the reestablishment of vegetation. *Critical habitat for federally-listed salmonid and bird species is discussed in the Biological Assessment for the Proposed Project, provided as Appendix B.*

The following components of the Project Description and Revegetation Plan in addition to **Mitigation Measure BIO-21** will be implemented to reduce impacts on riparian and critical habitat to a level that is less than significant. No additional mitigation is required.

- Coniferous and riparian habitat that is impacted by the Proposed action will be replanted at a 3:1 ratio and monitored to ensure 80% survivability.
- Habitat will be replanted with an improved diversity (such as more hardwoods to encourage wood recruitment to the channel) and based on a Master Planting List to be developed in consultation with CDFW.
- All prominent trees, including hardwood and conifer species labeled "Notable Trees" Figure 9 (Wrigley Orchard) and Figure 11 (Elk River Flood Curve) will be avoided.
- Trees larger than 6 inches DBH will be avoided to the extent practicable.

Mitigation Measure BIO-23: Prepare Site-Specific Revegetation Plan in Consultation with CDFW

The RWQCB will prepare and implement a revegetation plan to mitigate for the loss of native riparian vegetation as described in Section 2.5 (Site Revegetation subsection). Plant species selected for revegetation will be based upon the surveys of riparian habitat along the project area and will be replanted with representative species and at appropriate densities to ensure 80% survivability three years after completion of the Proposed Project. The final revegetation plan will include details regarding planting, implementation, maintenance, and monitoring.

c) Would the project have a substantial adverse effect on Federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Thresholds of Significance

Adversely affect wetlands or waters of the state and U.S., resulting in a net reduction of area, functions, or values.

Assessment

The proposed project does not require mitigation for impacts to wetlands, as no jurisdictional wetlands are located within the project area. No substantial adverse effects to wetlands or other waters of the United States are anticipated to result from the Proposed Project.

According to 1978 mapping of wetlands made available by US Fish and Wildlife Service (FWS, 2012) delineating the location, areal extent, and types of wetlands and surface waters, estuarine, palustrine, and riverine wetlands exist in the Lower Elk River subwatershed, downstream of the confluence of the North Fork Elk and South Fork Elk rivers. This is outside of the action area for the Proposed Project, therefore there would be no impact and no mitigation is required.

The Proposed Project is a restoration project intended to improve water quality and aquatic habitat conditions within the Project area. For work proposed within the Elk River channel, the RWQCB will apply for an Individual Permit from the USACE under Section 404 of the Clean Water Act, a water quality certification from the North Coast Regional Water Quality Control Board under Section 401 of the Clean Water Act, and a Streambed Alteration Permit from the California Department of Fish and Wildlife under Section 1600 of the California Fish and Game Code.

The total amount of existing USACE jurisdictional area within the Project area is 2.5 acres (open water, channel excavation area). Total permanent fill per USACE (e.g. waters of the US) associated with large wood habitat structures being placed into the channel is approximately 0.32 acres (1,400 cubic feet total or 175 cubic feet per structure). In addition, the Project would require temporary fill from cofferdams and permanent fill from gravel augmentation within USACE jurisdictional areas. In sum, the habitat enhancement elements of the Proposed Project would result in a net increase in total USACE jurisdictional area by increasing the amount of open water habitat. Refer to the Biological Assessment (Appendix B) for more information.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Thresholds of Significance

Long-term disruption of any native resident or migratory fish or wildlife species or established native resident or migratory wildlife corridors or impeding the use of native wildlife nursery sites.

This includes physical alterations to topography, hydrology or vegetation that fragment contiguous habitat areas.

Assessment

Construction activities would temporarily restrict fish movements into the project area. Cofferdams would be constructed at the upstream and downstream ends of the project site that would restrict fish passage into the project area. Steelhead and Chinook and SONCC coho salmon have the potential to be present in the project area during the construction period (August 15-October 15 (or 31st if no rain is forecast). Chinook coho are determined to have out-migrated by June 15th (Seth Ricker, Personal Communication). Therefore, the instream construction work will temporarily restrict the movement of Steelhead and juvenile coho salmon and affect summer rearing habitat. This impact is considered to be less than significant because the restriction is temporary (would only occur between August 15 and October 15/31) and fish would be relocated to alternative habitat and corridors during construction activities. The impact would be less than significant with the incorporation of Mitigation Measures (See Section 2.9 and the Biological Assessment/Appendix B for more information). No additional mitigation beyond that specified in the Biological Assessment is required.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Threshold of Significance

Conflicts with a local policy or ordinance protecting biological resources.

Assessment

The Proposed Project would not conflict with any local policies or ordinances protecting biological resources.

The project is consistent with natural resource related goals of the Humboldt County General Plan, including:

- Section 3360: To maintain or enhance the quality of the County's water resources and fish and wildlife habitat utilizing those natural resources.
- Section 3361.12: Support the development of fisheries enhancement project on small Humboldt County Streams.
- Section 3362.7.A: Efforts designed to improve the anadromous fishery resources of Humboldt County streams. Specifically, the assessment of the natural capacities of the streams and identifications of factors limiting production of anadromous fish.

Portions of the project area located in Streamside Management Areas. As such, the project will require a special permit from Humboldt County and planning review and approval of proposed project activity within the Streamside Management Zones. As described in Section 3432.6.A. and 3432.6.G of the Humboldt County General Plan, allowable development activities within Streamside Management Areas include both fishery, wildlife, and aquaculture enhancement and restoration projects, as well as new fencing, so long as it would not impede the natural drainage or would not adversely affect the stream environment or wildlife. As described in Section 3.10 (*Land Use and Planning*), the Proposed Project will require a Conditional Use and a Special Permit for development in the Streamside Management area.

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?

Thresholds of Significance

Obstruct or prevent the recovery of any listed species covered in an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan.

Assessment

There is no impact. One hundred percent of Proposed Project actions are located on private property, including HRC property extending from the center line of the channel opposite the Wrigley Orchard project reach, that is covered under their HCP and MATO. The HCP and MATO do not prohibit other activities from occurring on the property so long as the activities have their own environmental clearance and permit coverage. The Proposed Project would have a net positive effect on the biological criteria set forth in the HCP, as documented in the Biological Assessment (Appendix B) and associated technical reports.

Because the Proposed Project will remove sediment that is degrading water quality and impairing aquatic habitat value, the Proposed Project would further the goals of multiple plans to protect and restore natural resources in the Region including the Humboldt Bay Salmon and Steelhead Conservation Plan (HBWAC 2005) and the California Department of Fish and Wildlife's Recovery Strategy for California Coho Salmon (CDFW 2004), particularly Policy EP-HU-05 for the Eureka Plain Hydrologic Unit which states "Assess sources of sediment input, prioritize and implement remediation projects."

In addition, the Proposed action is in accordance with the following NMFS FESA recovery plans which generally support implementation of the TMDL, enhancing floodplain connectivity, increasing channel complexity, and creating refugia and rearing habitats.

Coho Recovery Plan – Humboldt Bay Section
SONCC-HBT.10.2.18 Reduce pollutants by completing TMDLs for Elk River (page 25-33).
SONCC-HBT.2.2.60-Floodplain and channel structure. Reconnect the channel to the floodplain. Create refugia and rearing habitats.
SONCC-HBT.2.1.59-Increase channel complexity. Increase LWD, boulders or other instream structures.

NC Steelhead Recovery Plan – Humboldt Bay Section
HumbB-NCSW-2.1.1 Rehabilitate and enhance floodplain connectivity.
HumbB-NCSW-28.1.1 (Sediment) Improve gravel quantity and distribution for macroinvertebrate productivity (food).

CCC Recovery Plan – Humboldt Bay Section
HumB-CCCh-2.1.1.1 Rehabilitate and enhance floodplain connectivity.
HumB-CCCh-8.1.1 Improve instream gravel quality to reduce embeddedness.

3.6 Cultural Resources

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

REGULATORY SETTING

Cultural and paleontological resources are protected by the National Historic Preservation Act, the California Environmental Quality Act, and the California Public Resources Code. The Humboldt County General Plan also contains goals and policies to protect the County's archaeological resources.

ETHNOGRAPHIC SETTING

The following is an abbreviated discussion of the information contained the Cultural Resources Investigation for the Elk River Sediment Removal Pilot Implementation Project prepared by William Rich, MA., RPA of William Rich & Associates and included as Appendix G.

Native American Period

Ethnographic and historical research identified the project area within the traditional territory of the Wiyot Tribe. Numerous ancestral Wiyot village sites are located along the historical margins of nearby Humboldt Bay however fewer are known for the Elk River Valley. The closest known ethnographic village was Chwanochkok which was located along Elk River near the site of Elk River School about two miles northwest of the project area and was used "as a camping place where salmon, caught in the river, were dried". Approximately 0.2 miles north of the westernmost project area boundary is the beginning of a Wiyot travel corridor which began at "the head of canoe navigation" and continued up the ridge north of the North Fork Elk River to Kneeland Prairie.

Historically, the project area was settled upon by Euro-Americans by 1860. In 1860, the land at the forks of Elk River was owned by William B. Hagans, one of the leaders in the plot to massacre the inhabitants of more than a dozen Wiyot villages (including Dulawat at Indian Island) and was used by the pack train trail to the Humboldt County interior by ranchers. The Hagans Ranch was subsequently attacked and looted in 1964 (Rohde 2012:25).

Euro-American Period

Little specific information exists about the North Fork Elk River during the early-years following the arrival of Euro-Americans. An 1855 government survey map of the area shows the "Eureka and Trinity Trail" following a northerly course from the vicinity of the river confluence, beginning at Eureka and passing along a ridge east of the Elk River to Kneeland's Prairie (Surveyor General 1855). The trail has many names including the "Old Humboldt Trail" and was apparently built by the merchants of Humboldt City, who cut a trail from Humboldt Bay to the Trinity mines.

In 1882, the Elk River Mill and Lumber Company and the Elk River Rail Road (ERRR) were incorporated by Noah Falk and several associates to transport timber from their holdings in the Elk River valley (Carrance and Sorensen 1988). The following year the California Redwood Company and the Dolbeer & Carson Lumber Company were incorporated. Following logistical trouble, the two companies reorganized the ERRR as the Bucksport and Elk River Railroad Company, and the standard -gauge railroad was built from Bucksport up the river to the confluence and into the South Fork. In 1931, the railroad was extended 2.5 miles up the North Fork. After approximately 80 years, the railroad was decommissioned and abandoned in 1952, marking the transition of railroad to truck transportation.

A 1911 County map and 1922 County atlas show the former Dolbeer & Carson lands in the ownership of Hanify and Hooper who secured a four-square mile area of Elk River timberlands over a period of years. Hanify acquired the California Redwood Company and the Elk River Mill and Lumber Company around that time. By 1922, the southeast and northeast lands around the confluence are indicated as owned by Mazzucchi and Wrigley, respectively. George Wrigley's farm was described by Leigh Levine in 1915 as cultivating "many varieties of apples, such as Duchess, Wealthy, Red Astrachan, Gravenstein, King, and Greenings. Winfield Wrigley built the house on the north side of the river adjacent to the project area around 1950 and constructed a berm to protect the house from the North Fork Elk River in 1954. The berm protected the house from a flood in 1955 but flooding worsened in following years as logging operations intensified. The house was flooded in 1964, 1997 and in other years.

In 1949, the Hanify & Hooper property at the confluence was transferred to the Elk River Mill and Lumber Company, which was c1950, Winfield Wrigley bought the youngest of George Wrigley's sons Irving Wrigley took over the farm in 1949, which is currently run by his daughter Kristi Wrigley.

EXISTING CONDITIONS

Cultural Resources

A request was made for a Sacred Lands Inventory for the Project Area from the Native American Heritage Commission (NAHC) in Sacramento on October 5, 2017. A reply was received on October 10, 2017, indicating that no known Native American resources were on file with the NAHC. Consultation letters were sent to the following tribes: Wiyot Tribe, Bear River Band of the Rohnerville Rancheria, and Blue Lake Rancheria. Responses from the Wiyot Tribe and the Bear River Band of the Rohnerville Rancheria indicated no concerns and a request for information without findings, respectively. The response from the Blue Lake Rancheria indicated that the Elk River is outside of the Rancheria's mapped area of concern.

Historical Resources

Almost the entirety of the project area is within the flood plain of the North Fork Elk River. Historical resources from the early 20th century are present in the proposed project area, however there appears to be few potential impacts. With implementation of avoidance measures outlined in Section 2.9, the proposed project will not cause a significant impact. Historical sites within the project area include:

- A new segment of the previously recorded (P-12-00055) 1930s-era Dolbeer & Carson Lumber Company Railroad Grade, one of two historic-period railroad lines which runs throughout and in the vicinity of the project area. It is recommended that the section of the Dolbeer & Carson Lumber Company Railroad grade, identified in a portion of this project area, not be considered individually eligible to the California Register of Historical Resources (CRHR). This grade feature, would however, have the potential to contribute to a larger, as-yet unrecorded, district of Dolbeer & Carson railroad features in the Elk River Valley and should be avoided for this reason.
- The early 20th-centuryranch and apple farm of George and Irving Wrigley. The George and Irving Wrigley Ranch, containing buildings, orchards, roads, and other small-scale elements, appears to retain requisite integrity to qualify as an historical resource for the purposes of CEQA, for its local association with early-20th century apple production and the associated small-scale, family-run commercial business operations of the Elk River Valley. The site elements that contribute to its significance should be avoided during project implementation. The Winfield Wrigley home, located immediately adjacent to the project area does not appear to be an historical resource for the purposes of CEQA.

Paleontological Resources

The term "paleontological resources" refers to the fossilized remains of vertebrate and invertebrate organisms, fossil tracks and trackways, and plant fossils. The paleontological sensitivity of the Project Area was evaluated using the criteria of the Society of Vertebrate Paleontology (SVP). The SVP's Conformable Impact Mitigation Guidelines Committee developed guidelines (SVP 1995) in response to a recognized need for standardized methods to assess and mitigate impacts on paleontological resources. Because the majority of fossilized materials are buried in subsurface geologic units rather than exposed at the ground surface, assessment and mitigation strategies for paleontological resources are based on probabilities of discovery. Based on the anticipated sensitivity of a particular project location, general strategies supporting adaptive management are developed. Table 26 defines the SVP's sensitivity categories for paleontological resources.

Table 25. Society of Vertebrate Paleontology Sensitivity Criteria

Sensitivity Level	Definition
High	Geologic units from which vertebrate or significant fossils or suites of plant fossils have been recovered.
Undetermined	Geologic units for which little information is available.
Low	Geologic units that are not known to have produced a substantial body of significant paleontologic material

Source: SVP 1995

As used in the table above, the term significant refers to paleontological resources that fulfill one or more of the following criteria (SVP 1995):

- Provides important information shedding light on evolutionary trends and helps to relate living organisms to extinct organisms;
- Provides important information regarding the development of biological communities;
- Demonstrates unusual circumstances in the history of life;
- Represents a rare taxon of a rare or unique occurrence; is in short supply and in danger of being destroyed or depleted;
- Has a special and particular quality, such as being the oldest of its type or the best available example of its type; and
- Provides important information used to correlate strata for which it may be difficult to obtain other types of age dates.

Vertebrate fossils are typically considered significant and other types of materials (invertebrates, plants, trace fossils) may also qualify (SVP 1995).

All earthwork associated with the Proposed Project is expected to be confined to the ribbon of Holocene alluvium deposits along the Elk River corridor. Although exceptions are made for materials of particular scientific importance, biological remains younger than 10,000 years are not typically considered paleontologically significant. Because of their geologic youth, the Holocene deposits of the Elk River are evaluated as having low sensitivity for paleontological resources.

DISCUSSION OF CHECKLIST RESPONSES

a) **Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?**

As described in the previous Ethnographic Setting section, the Elk River has an extensive Native American and Euro-American history. As documented in the Cultural Resources Investigation Report for the Proposed Project prepared by William Rich and Associates (Appendix G), the project area includes historical resources from the early 20th century including a new segment of a historic-period railroad line which runs throughout the project area and the Wrigley Ranch and Apple Farm (including its buildings, orchards, roads, and other elements).

Previous record searches, a field survey, and a record search were performed for the Proposed Project area. Based on these findings and the updated records search, no recorded prehistoric or *significant* historic archaeological sites or historic structures would be affected by the Proposed Project. These findings make the potential for unearthing unrecorded historic or archaeological resources unlikely. However, due to the long period of occupation of the project area, there is some potential for construction activities to disturb previously unknown cultural, archaeological, and/or paleontological resources, including human remains. Any disturbance of these resources would constitute a significant impact. Impacts could be reduced to a less than significant level through implementation of Mitigation Measure CUL-1, described below. No additional mitigation is required.

Mitigation Measure CUL-24: Inadvertent Discovery of Cultural Resources

If cultural resources are encountered during construction activities, all onsite work shall cease in the immediate area within a 50-foot buffer of the discovery location. A qualified archaeologist will be retained to evaluate and assess the significance of the discovery and develop and implement an avoidance or mitigation plan, as appropriate. For discoveries known or likely to be associated with Native American heritage (prehistoric sites and select historic period sites), the Tribal Historic Preservation Officer's (THPO) for the Bear River Band

of the Rohnerville Rancheria and the Wiyot Tribe shall also be contacted immediately to evaluate the discovery and, in consultation with the project proponent, the County, and consulting archaeologist, develop a treatment plan in any instance where significant impacts cannot be avoided. Prehistoric materials which could be encountered include obsidian and chert debitage or formal tools, grinding implements (e.g. pesteles, handstones, bowl mortars, slabs), locally darkened midden, deposits of shell, faunal remains, and human burials. Historic archaeological discoveries may include nineteenth century building foundations, structural remains, or concentrations of artifacts made of glass, ceramics, metal, or other materials found in buried pits, well, or privies.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Refer to Item 3.5 (a).

c) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

No impact. The term "paleontological resources" refers to the fossilized remains of vertebrate and invertebrate organisms., fossil tracks and trackways, and plant fossils. The majority of fossilized materials are buried in subsurface geologic units rather than exposed on the ground surface. All of the proposed ground-disturbing activities associated with the Proposed Project's construction and maintenance will occur on aggraded sediments that are young in age and considered to be a "low" sensitivity level for paleontological resources. Therefore, no impact on paleontological resources in anticipated, and no mitigation is required.

d) Would the project disturb any human remains, including those interred outside of formal cemeteries?

Less than significant with mitigation. Impacts to human burials or remains are not expected to result from project-related construction. However, the subsurface excavation required for construction of the project could potentially disturb or destroy human remains, including those interred outside of formal cemeteries. This is considered a potentially significant impact that would be reduced to a less than significant impact by implementing the following mitigation.

Mitigation Measure CUL-25: Protect Human Remains, Consistent with California State Codes

In the event of discovery of human remains (or the find consists of bones suspected to be human), the field crew supervisor shall take immediate steps to:

1. Secure and protect such remains from vandalism during periods when work crews are absent.
2. Immediately notify the Humboldt County Coroner to verify that the remains are human, and that no investigation into the cause of death is required. If the remains are determined to be from a Prehistoric Native American or determined to be Native American from an ethnographic period, the Coroner shall contact the Native American Heritage Commission (NAHC) within 24 hours of being notified of the remains, per California Public Resources Code section 5097.98. The NAHC then designates and notifies within 24-hours a Most Likely Descendant (MLD). The MLD has 24 hours to consult and provide recommendation for the treatment or disposition, with proper dignity, of the human remains and grave goods.

3.7 Geology and Soils

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.			✓	
ii) Strong seismic ground shaking?			✓	
iii) Seismic-related ground failure, including liquefaction?			✓	
iv) Landslides?				✓
b) Result in substantial soil erosion or the loss of topsoil?			✓	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			✓	
d) Be located on expansive soil, as defined by the California Building Code (2007), creating substantial risks to life or property?			✓	
a) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				✓

The geologic setting for the Proposed Project is based on the Basis of Engineering Design Report (Northern Hydrology & Engineering, 2019) , HRC Class 1 Stream Aquatic Habitat Trends Monitoring 2014 Annual Report (Humoldt Redwood Company, 2015) , HRC Elk River/Salmon Creek Watershed Analysis Revisited (Humboldt Redwood Company, 2014), and the TetraTech Technical Analysis for Sediment Report (Tetra Tech, 2015).

ENVIRONMENTAL SETTING

The North Coast Region is characterized by sedimentary geology with inclusions of metamorphic, granitic, and volcanic rock. The presence of northwest-southeast trending faults and geologic structures largely defines the river systems located in the Coast Ranges of the North Coast Region.

The 56.1 square mile Elk River watershed is located within the Coast Ranges geomorphic province[19], which trends northwest to southeast and is bounded on the west by the Pacific Ocean and on the east by the Great Valley geomorphic province. Within the Elk River basin, and as illustrated in Figure 23, the Elk River watershed is underlain by four lithologic units. The geology is predominantly comprised of cretaceous-aged Franciscan Central Belt, cretaceous-aged Yager terrane (Coastal belt of the Franciscan Complex), Wildcat Group geologic groups, and the Quaternary aged Hookton Formation (Ogle 1953; McLaughlin et al. 2000; Marshall and Mendes 2005). Hookton Formation sediments are restricted to upland areas in McCloud, Shaw, Clapp, and Railroad Gulches, which are all tributaries to the lower section of the South Fork Elk River (Stephen D. Ellen, 2007, p. 337).

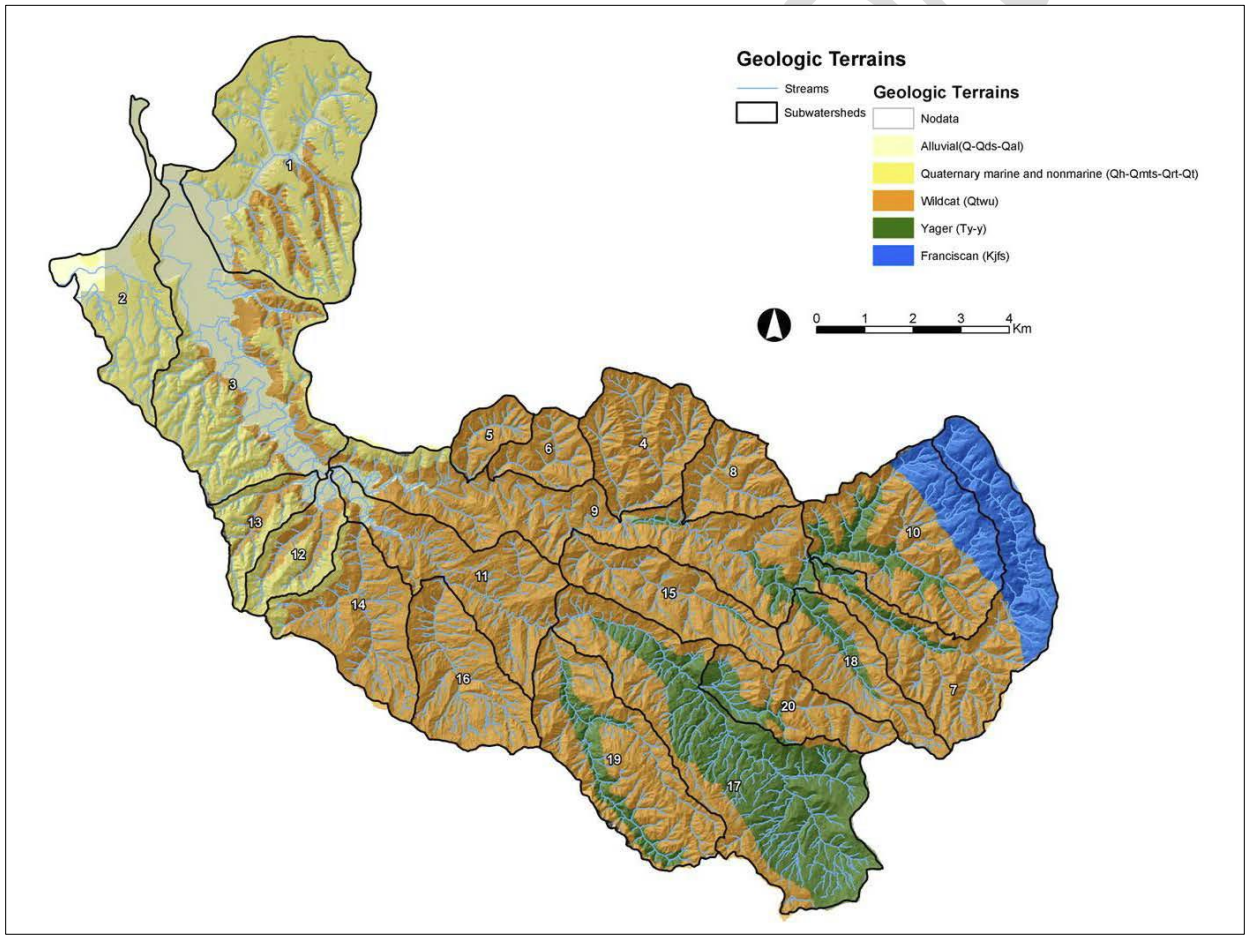

Figure 22. Geologic formations in the Elk River watershed

[19] A geologic or geomorphic province is a spatial entity with common geologic or geomorphic attributes. A province may include a single dominant structural element such as a basin or a fold belt, or a number of contiguous related elements.

The easterly/inland portion of the Coast Ranges Geomorphic Province is comprised mainly of the late Jurassic to Late Cretaceous Franciscan complex. The Franciscan complex in this area includes three major units—Central belt, Yager terrane, and Coastal terrane—and are the oldest metamorphic rocks in the Humboldt Bay Region. Franciscan Complex materials, including Yager terrane, are generally situated east of the Freshwater Fault in upper portions of the watershed.

Clayey soil units associated with the Franciscan group are consistent with soil having relatively low unit weights, low friction angles, and relatively high cohesion. The Franciscan Group is classified as a "consolidated geology" for the purposes of watershed analysis. Rock units of the Late Cretaceous Yager terrane appear in the upper watershed (including the Upper and lower North Fork Elk River) and in valleys where the channels have cut down through the rock units of the Wildcat to expose the underlying Yager.

The Yager terrane consists of dark gray indurated (i.e., well consolidated) mudstones, shales, graywackes, siltstones, and conglomerates, with interbedded limey siltstones. Rocks from the Yager terrane are much more resistant to weathering than are the Wildcat and generate larger clasts of gravel- and cobble-sized materials. For the purposes of watershed analysis, Yager terrane is classified as a "consolidated geology" for the purposes of watershed analysis.

Wildcat Group sediments are more extensive and underlie a majority of the middle and lower reaches of the North and South Fork Elk River basins. The Wildcat formation incorporates undifferentiated rocks composed of soft siltstones, clay stones and fine sandstones which, because of their lack of strength and durability, are prone to erosion when exposed. This fine grain material becomes easily mobilized and has a high erosion potential. Soil associated with the Wildcat group generally is consistent with material having moderate to high moist unit weights, moderate friction angles, and moderate cohesion. Due to the tendency of these rocks to break down quickly to fine materials, the Wildcat Group is classified as an "unconsolidated geology" for the purposes of watershed analysis. ftp://ftp.consrv.ca.gov/pub/dmg/thp/maps/elk/elk_color.pdf

Within the Project area, the main geologic units are the Quaternary/Tertiary Wildcat Group underlain by the Yager Formation. (NHE 2017). Table 27 presents the lithology of the lower North Fork Elk River as a percentage of the entire sub-basin area.

Table 26. *Lithology of the South Branch North Fork Elk River Sub Basin (Buffleben, 2009).*

South Branch North Fork Elk River (Project Area) Percent area in Lithology	
QTw (Wildcat)	83%
Ty (Yager)	17%
Area (square miles)	1.89

Bedrock in the lower North Fork Elk River and near the confluence of the North and South forks (in the vicinity of the project area) is covered with a variably think veneer of Holocene age alluvium (Marshall and Mendez 1995). This package of material includes present-day, in-channel alluvial sediments and older stream terrace deposits. Holocene alluvium deposits are commonly associated with low channel gradients (≤0.1%) and that reach of the Elk River identified as the "deposition zone" or "impacted reach."

Because the geologic formations in the North Fork Elk River are relatively recent, unconsolidated deposits compared to the formations present in the upper watershed, the patterns of erosion are different. Bedrock in the Elk River watershed is commonly separated into two distinct separate groups: "hard" (all Franciscan Complex bedrock) and "soft" (Wildcat Group and Hookton Formation sediments). Group differentiation is based on bedrock/soil properties such as hardness, texture, structure, permeability, and erodibility. The response of these properties to mechanical/chemical weathering can and does influence topographic relief, erosion rates, vegetation, mass-wasting, sediment supply, and geomorphological processes of the fluvial systems within the Elk watershed. Consequently, there is often a recognizable difference in sediment transport, channel hydraulics, and slope evolution between the landscapes underlain by "hard" and "soft" substrates. For example, drainage underlain by "soft" substrate sediments are commonly associated with low to moderate relief, high erosion and slope instability rates, and springs, while "hard" terranes are steep and less prone to mass movements, and surface erosion (Humoldt Redwood Company, 2015, p. 23).

The Elk River is the principal drainage for numerous tributary streams that drain its flanking ridge systems. The stream channels in the North Fork Elk River have cut down through the overlying soft, erosion-prone Wildcat Formation to expose the harder, more erosion resistant Yager Formation, with its associated cobble and gravel component. The weak geologic formations that underlie the watershed produce the primarily fine-grained silt, sands, and other alluvial deposits that extend to the coast. The lower elevations of the watershed are typically mantled with relatively thick, undifferentiated, Pleistocene/Holocene (Quaternary) river terrace (Qt) deposits comprised of poorly indurated, inter-fingering lenses of gravel, sand, silt, and clay. These deposits are frequently exposed along the margins of the Elk River and its tributaries (McLaughlin et al. 2000). The terrace deposits overlie a sandstone subunit (Hookton Formation) of the Wildcat that has a relatively high susceptibility to surface erosion and landsliding. The Hookton and terrace deposits are classified as an Unconsolidated Geology for the purpose of watershed analysis.

Soil

Two different types of soil data are available for the Elk River watershed. The first type of soil data was developed by the USDA Natural Resource Conservation Service (NRCS; formerly the US Soil

Conservation Service) as part of county-wide soil mapping and study. This effort produced a soil map with units that are based on agricultural needs. The second type of soil data was collected by Hart Crowser as part of a study of engineering soil index properties and strength parameters. These data include information on soil texture, soil depth, unit weight, gradation, and plasticity, and are useful for slope stability assessments. These two sources of soil information and map units do not always directly correlate with each other or mapped geologic units. The NRCS classification is typically used as an index for the work done in estimating surface erosion. The engineering characteristics are typically used with empirical correlations for estimates of soil strength parameters important in slope stability analyses.

NRCS Soil Mapping. Soil mapped by the NRCS indicates Larabee soil developed in areas of Wildcat Formation and Hugo and small areas of other soil on Franciscan rocks. Bottomland and Farmland soil developed on the Quaternary alluvium in the lower mainstem.

Soil Engineering Data

Soil samples that overlie the different geologic units in the watershed were taken as part of a previous study by Hart Crowser. Soil engineering characteristics are described in relation to the soil developed on different geologic units (e.g., Wildcat, Franciscan, Hookton).

Sediment and Sediment Budget

One watershed process that can be cumulatively affected by management practices is the input and transport of sediment. Sediment plays an important function in the stream ecosystem, forming the stream bed, affecting the shape of the channel, and providing substrate for the organisms that live and reproduce in the stream. Input of more sediment than a stream can transport can result in aggradation and subsequent fining of stream bed substrate; too little sediment input can lead to downcutting, channel incision, and coarsening of the stream bed.

Hillslope Gradient

The Elk River basin is particularly steep when compared other Humboldt Bay watersheds, with an elevation ranging from 0-2,400 feet from mouth to ridgeline. Figure 24 depicts hillslope gradients in the Elk River Watershed. Gradient (or percent slope) is an important parameter in developing sediment delivery rates.

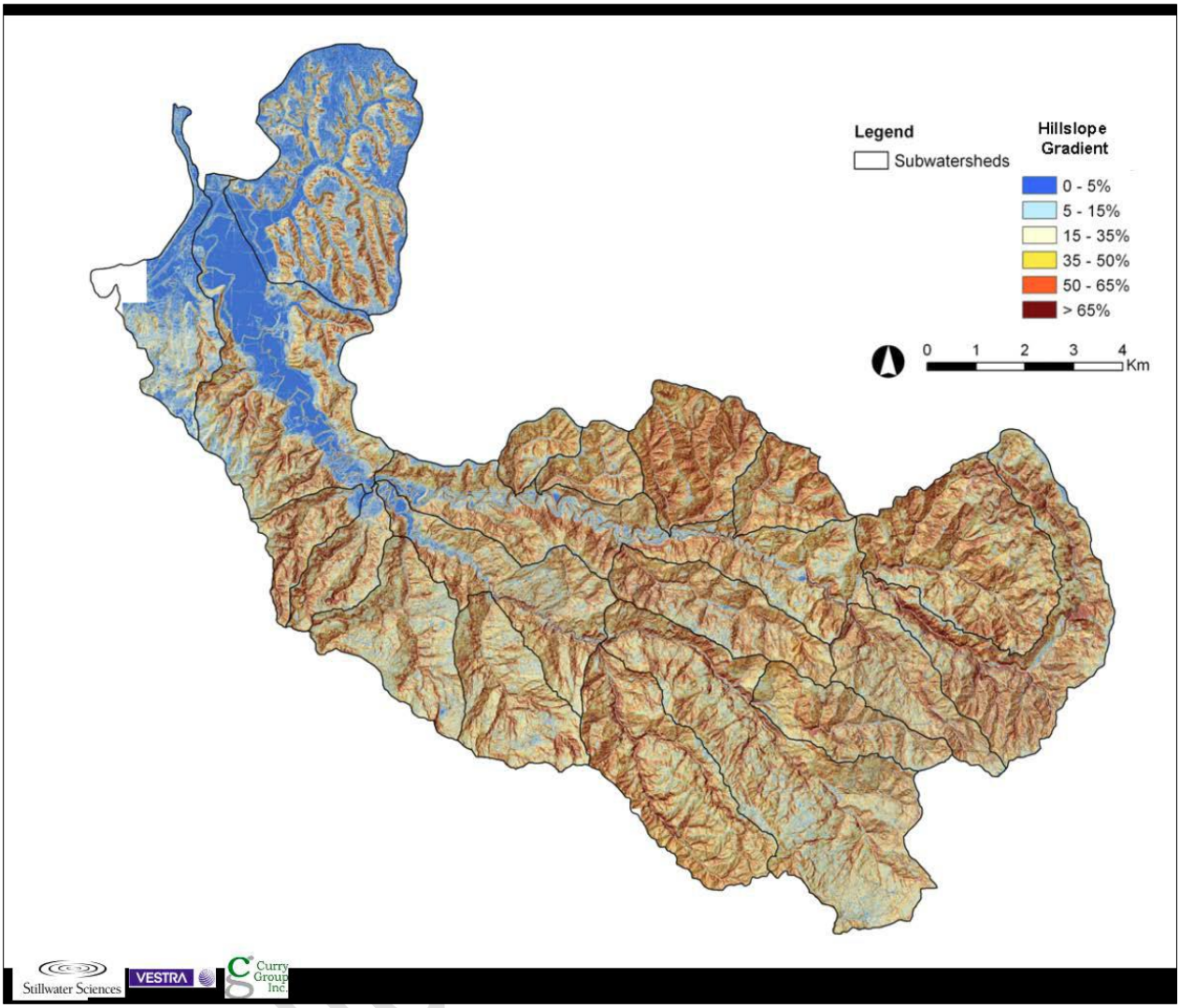

Figure 23. Slope gradients of the Elk river watershed Geologic formations in the Elk River watershed (derived from LiDAR-based 1-meter digital elevation model (Stillwater 2007)

This Lower Elk portion of the watershed includes the majority (76%) of lands with less than five percent hillslope gradient and a little less than half (42%) of the streams with less than one percent gradient. This steep slope followed by a flat gradient makes it particularly hard for the river to discharge sediment or transport it downstream.

Nearby Faults and Seismicity

The regional geology of the coastal area of Northern California is shaped and influenced by a relatively active tectonic regime. Three plates join at the Mendocino Triple Junction offshore to the southwest of Humboldt Bay, and the coastal area is subject to combinations of transverse-right lateral motion along one plate boundary and subduction/uplift acting in regional compression to the northeast along the other boundary.

The Elk River watershed is tectonically active, with areas of localized uplift (Figure 25) from holds and faults resulting in channel incision.

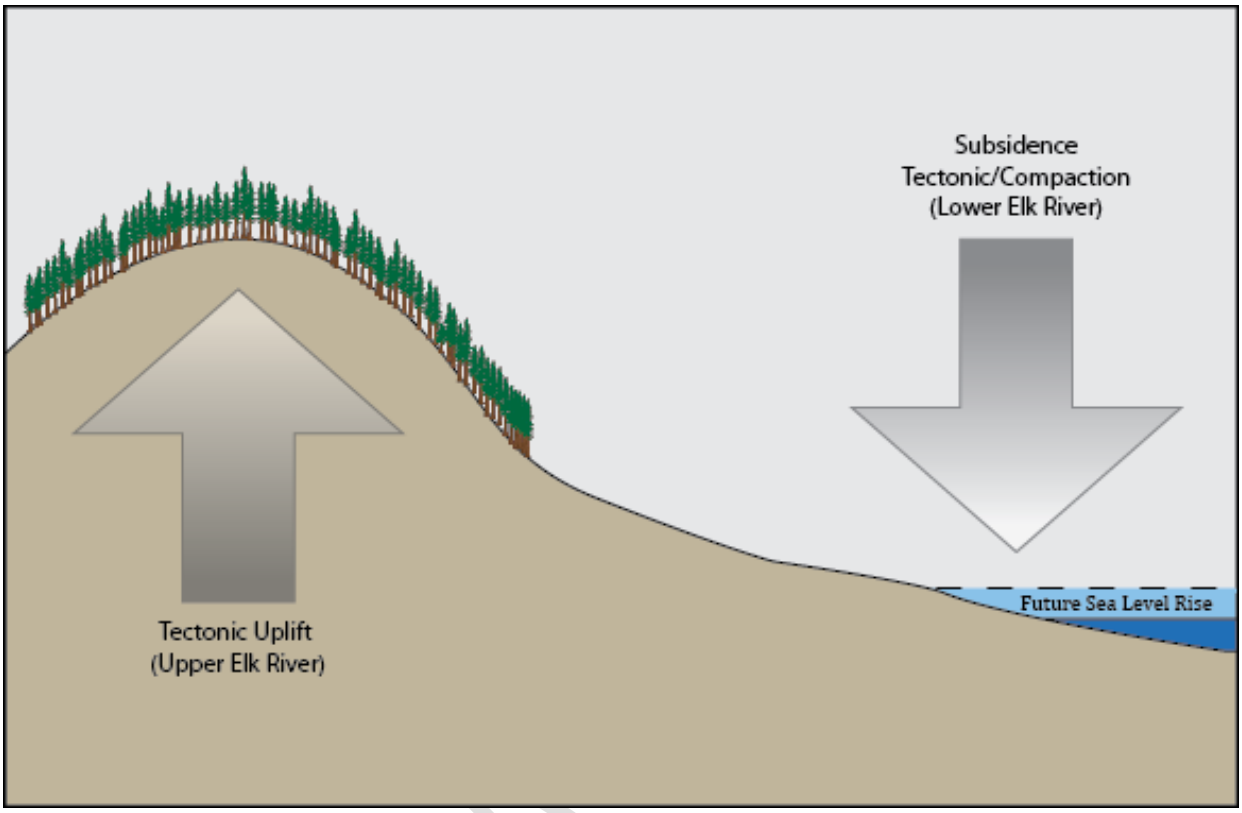

Figure 24. Relationship of tectonic uplift and subsidence

Relatively high rates of uplift on the order of 0.24 to 0.40 inch per year (Carver and Burke, 1992) have resulted in relatively extensive folding, faulting, and associated seismic activity. This activity has pushed the geologic units up at relatively high angles and, therefore, induces dip angles and dip directions that shape the generally northeast- and southwest-facing slopes of the Elk River basin.

The closest major active faults to the Project area include the Freshwater Fault, the Mad River Fault Zone, and the Little Salmon Fault. The Freshwater Fault is mapped within the watershed along the eastern boundary and exhibits no known evidence of activity since the late Quaternary (Falls 1999). Located north of the Elk River Watershed, the active Mad River Fault Zone is comprised of five principal thrust faults (Trinidad, Blue Lake, McKinleyville, Mad River, and Fickle Hill faults) and numerous minor thrust faults (Kelsey and Carver 1988). Kelsey and Carver (1988) propose a net slip rate along the Mad River Fault Zone of at least 0.25 inch/year (measured horizontally) since the late Pleistocene. The Little Salmon Fault is located within the watershed along the southwest boundary where traces are mapped

near the College of the Redwoods, in Holocene terrace deposits, and east of Tompkins Hill. The Little Salmon Fault has produced a minimum of three seismic events within the last 2,000 years (Dengler et. al. 1992). The Little Salmon Fault is an active constituent of the Goose Lake Fault Zone. Measurements of trench observations reported in Wills (1990) indicate the main strand accumulated slip is about 0.22 inch/year.

The Project area is within two miles of an Alquist-Priolo Earthquake Fault Zone as designated by the State of California for active faults as the above active faults have been mapped in the vicinity of the Project area (California Resources Agency Department of Conservation, 1991).

Tsumami and Seichi Risk

Due to the protection of Humboldt Bay and the up-valley distance between Humboldt Bay and the project area, tsunamis pose little risk to the project area. There would be no risk for seiche because the Elk River channel would not create a standing wave during a seismic event.

Rainfall

Mean surface air temperature at the coast fluctuates from 48° F (9 °C) in January to 55° F (13 °C) in June, with summer temperature moderated by fog. Winter rainfall intensity and storm runoff are highly variable due to orographic lifting of moisture-laden, frontal air masses as they encounter the outer Coast Range. Rainfall amounts increase with elevation from an average of 39 inches per year at Eureka to 60 inches per year near Kneeland, located 2,657 feet above sea level and approximately 12 miles inland. Within the project area, the average rainfall rate is approximately 55 inches per year. Roughly 90 percent of the annual precipitation occurs as rainfall between October and April.

Intense rainfall over steep topography composed of erodible parent materials results in high sediment yields. Storm events with rainfall intensity exceeding 3 to 4 inches a day are considered capable of initiating landslides (PALCO 2004). Rainfall exceeding 5 inches per day occurred three times between 1941 and 1998 (water years 1950, 1959, and 1997). The 24-hour rainfall total of 6.8 inches on December 27, 2002 caused widespread landslides and flooding (Tetra Tech 2015).

Landslides

As previously described, the Elk River watershed has steep upland topography (managed primarily for private industrial timber harvesting), high rainfall, erodible geologic formations, and a restricted, low gradient river mouth. These environmental factors all contribute to landslides (natural and management-related) and the potential for erosion in the upper watershed to lead to sediment deposition in the lower watershed.

As previously described, the North Coast is seismically active and the seismic hazard for Humboldt County is considered high (OES 1975). The shaking (cyclic loading) that occurs during earthquakes has the potential to initiate or accelerate landsliding. Water pressure in the soil can increase significantly under cyclic loading such as that induced during an earthquake. These pressure increases can, depending on many physical parameters, provide a potential mechanism for loss of shear strength in earth materials leading to landsliding. Several seismic events and resulting effects are well documented in the region, including stream flow and turbidity increasing after earthquake-induced liquefaction of stream sediments in the region. Therefore, earthquakes may serve as a sediment source. Earthquakes in the vicinity have likely caused transient entrainment and movement of otherwise stable sediment deposits in and near streams over the years. Recent Humboldt County earthquakes of 1980, 1992, and 1994 caused significant damage effects in the surrounding area (Dengler 1997) and may have caused pulses in sediment movement in the watershed (Humboldt Redwood Company, 2014).

Within the project area, some localized erosion occurs as shearing and slumping features along the streambanks of the Elk River. While these streambank features may cause local erosion, they are not considered as a high-risk geologic hazard. Larger hillslope mass movements are associated with the steep, upper watershed (historically and actively managed for industrial timber).

DISCUSSION OF CHECKLIST RESPONSES

a) Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

- Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42)
- Strong seismic ground shaking?
- Seismic-related ground failure, including liquefaction?
- Landslides?

Thresholds of Significance

Project is located in a known active earthquake fault zone.

Assessment

No Impact. The proposed project does not involve the construction of any habitable structure and therefore would not expose people to risk of loss, injury, or death involving: rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, or landslides.

b) Would the project result in substantial soil erosion or the loss of topsoil?

Thresholds of Significance
Substantial acceleration of the rate of soil erosion at the Project site or the loss of top soil.

Assessment
The Proposed Project would excavate excess sediment from the bed and banks of the Elk River channel to create a wider bank slope and deposit it in adjacent sediment spoil areas in upland locations or at the edge of the floodplain. The Proposed action would create a more stable width to depth ratio which would be expected to reduce the risk of bank failure and associated sediment inputs to the river system. In this respect the Proposed action is beneficial in terms of bank stabilization.

The material being excavated from the channel bed and banks is a fine sediment that has a low bulk density and is expected to be relatively erosion resistant and therefore relatively unlikely to be resuspended (note the newly excavated channel banks and floodplain areas are intended to become part of the wetted channel under different flow conditions). Although there are no unusual risks related to geologic or soil instability, Mitigation Measure GEO-27 is incorporated to avoid and minimize potential impacts.

- **Mitigation Measure GEN-3**: Erosion and Sediment Control Measures (describes).

- **Mitigation Measure GEO-27**: Fill Placement: physical parameters such as depth and compaction rates for reusing and placing fill. Immediately prior to fill placement, spoils/sediment reuse sites will be scarified to a depth of 6 inches. All fill will be spread in lifts and compacted by mechanical means. The number of feet the lifts should not exceed will be based on Floodplain Administrator requirements.

All Project activities including vegetation removal, heavy equipment operation, grading, truck traffic, and dewatering/rewatering have the potential to increase turbidity if not properly controlled, resulting in mortality, illness, or injury of SONCC coho salmon and Northern California steelhead juveniles likely to be present in the Project area during construction.

Erosion and sedimentation will be minimized by scheduling earthwork activities during the low-flow, summer construction season (August 15 through October 15, or October 31 if no rain is forecast) and through the implementation of BMPs as described in Mitigation Measure GEN-3 Erosion and Sediment Control Measures (See Section 2.9) related to the many activities that will occur to prepare the site for construction activities.

In addition, Humboldt County requires a grading permit for all grading in excess of 5,000 CY. Compliance with the grading permit will help ensure that grading activities will not pose a risk of soil erosion or top soil loss by establishing criteria for cut/fill slopes, setbacks, drainage, on-site soil management, and other parameters. The Proposed Project will also be required to obtain a water quality certification from the North Coast Regional Water Quality Control Board, which will include stormwater provisions and further protect Waters of the State from potential soil erosion impacts.

These mitigations and regulatory requirements (Grading Ordinance, RWQCB w401 Water Quality Certification) would reasonably reduce temporary erosion and sedimentation associated with Project implementation to a level that is less than significant. No additional mitigation is required.

c) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Thresholds of Significance
Substantially de-stabilize an otherwise stable soil or geologic unit.

Assessment
As identified in Item A4 above, severe aggradation within the Elk River channel and floodplain within the Project area make the area highly susceptible to bank erosion and failure. As described in Item 4b, Proposed Project improvements would excavate excess sediment from the channel bed and banks to create a wider bank slope. Creation of a more stable width to depth ratio is a beneficial impact in terms of stabilization and is expected to reduce bank failure and associated sediment inputs to the river system.

d) Would the project be located on expansive soil, as defined by the California Building Code (2007), creating substantial risks to life or property?

Thresholds of Significance

Located on expansive soils.

Assessment

Shrink-swell behavior/potential correlates with the presence of particular clay minerals in fine sediments. The Proposed Project involves excavation of accreted sediments in the channel and floodplain of the Elk River, and placement of excavated soils in upland locations within the floodplain. If expansive materials are present beneath the excavated areas, there is the potential or shrink-swell behavior to change or degrade Project features over time. The potential for expansive soils to be located beneath the constructed Project features is considered to be insignificant. Therefore, the impacts of the Proposed Project as a result of expansive soils would be less than significant. No mitigation is required.

e) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

Thresholds of Significance

Located on underlying soils that are not capable of adequately filtering wastewater or alternative waste water disposal systems.

Assessment

The Proposed Project does not include any uses, features, or facilities that would generate wastewater. The Proposed Project does not propose to construct any septic or wastewater disposal systems. Consequently, there would be no impact related to location on unsuitable substrate materials. No mitigation is required.

3.8 Greenhouse Gas Emissions

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

REGULATORY SETTING

This section describes the federal, state, and local regulations related to greenhouse gas (GHG) emissions and climate change. At the federal level, the US EPA has developed regulations to reduce GHG emissions from motor vehicles and has developed permitting requirements for large stationary emitters of GHGs. On April 1, 2010, EPA and the National Highway Traffic Safety Administration established a program to reduce GHG emissions and improve fuel economy standards for new model year 2012-2016 cars and light trucks. On August 9, 2011, EPA and the NHTSA announced standards to reduce GHG emissions and improve fuel efficiency for heavy-duty trucks and busses.

California has recently enacted a number of policies and plans to address GHG emissions and climate change. In 2006, AB 32, the Global Warming Solutions Act was passed, which set the overall goals for reducing California's GHG emissions. The goals are to reduce GHG emissions to 2000 GHG emissions levels by2010, to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. The California Air Resources Board (CARB) is in the process of completing rulemakings to implement GHG emission reduction regulations, with the goal of adopting legally enforceable GHG rules and market mechanisms by January 1, 2012.

In 2008, the Redwood Coast Energy Authority (RCEA) prepared a GHG emissions inventory to determine the sources and quantity of GHG emissions in the County and prepared a Climate Action Plan (CAP) to reduce emissions in unincorporated Humboldt County as required for compliance with the Global Warming Solutions Act. The RCEA reports that Humboldt County's total GHG emissions in 2006 was 1,309,993 tonnes of CO_2 equivalents. The largest sources of emissions were from

transportation (54%), followed by industrial (21%), commercial (10%), residential (8%), other (6%), and waste (1%).

The 2017 Humboldt County General Plan includes policies aimed at reducing local contributions to global climate change. These policies include supporting efforts to reduce GHG emissions and participating in programs related to global climate change. To comply with AB 32 and SB 32, the County will adopt county-wide GHG emissions targets for the years 2020 and 2030 (and possibly also 2040) as part of a Climate Action Plan that will incorporate an updated 1990 GHG Inventory, to be prepared in accordance with policy AQ-P9 and implementation measure AQ-IM3[20].

ENVIRONMENTAL SETTING

Scientists have concluded that climate change ("global warming") is a regional as well as a global concern that is likely caused primarily by human activity. Greenhouse gas (GHG) emissions, primarily carbon dioxide (CO_2) from fossil fuel combustion and vegetation removal are increasing atmospheric concentrations of GHGs and are believed to be the primary cause of contemporary global warming. GHGs from human activities are shown to trap more of the sun's heat in the earth's atmosphere, resulting in warming. Nitrous oxide (N_2O) and methane (CH_4) also contribute to global warming.

Anthropogenic emissions of GHGs are widely accepted in the scientific community as contributing to global climate change. Temperature rises associated with climate change are expected to negatively impact plant and animal species, cause ocean acidification and se level rise, affect water supplies, impact agriculture, and harm public health.

DISCUSSION OF CHECKLIST RESPONSES

a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Thresholds of Significance

Substantial generation of GHG emissions due to project implementation.

Assessment

The Proposed Project would result in direct emissions of greenhouse gasses during construction and potentially during maintenance activities and would have a minimal indirect

[20] https://humboldtgov.org/DocumentCenter/Home/View/58842

effect on carbon sequestration as a result of vegetation clearing prior to construction. The Proposed Project would not generate a long-term source of GHG emissions.

For the purposes of CEQA, potential impacts to air quality and GHG emissions are analyzed utilizing the California Emissions Estimator Model® (CalEEMod) Version 2016.3.1 (www.CalEEMod.com). CalEEMod is a statewide land use emissions calculator that quantifies potential criteria pollutant and greenhouse gas emissions associated with both construction and operational activities. Because the amount of material to be excavated and the construction methods to be employed are similar to those required to construct Phase 1 of the Elk River Estuary/Inter-Tidal Wetlands Enhancement Program[21] (which will excavate, move, and grade 20,000 cubic yards of material over one 67-day construction season), GHG calculations developed for Phase 1 of the Elk River Estuary/Inter-Tidal Wetlands Enhancement Program have been applied to the Proposed Project, which would excavate a maximum of 22,000 cubic yards over a 62 (minimum) to 78 day (maximum) construction season.

As addressed herein, the primary GHG contributions from the project are short terms and temporary, resulting from construction. Maintenance of the project could result in a slight increase in GHG emissions over baseline but would not be significant. Project-related GHG emissions would result primarily from construction using diesel-powered construction equipment. There would be no net long-term emissions (permanent sources) of GHG from the project. The combustion of diesel fuel in off-road construction equipment and on-road vehicles (trucks, etc.) would emit GHGs consisting mainly of carbon dioxide (CO_2), along with small amounts of methane (CH_4) and nitrous oxide (N_2O).

The emissions-based carbon footprint for the construction of the project was estimated using:

- Estimated construction equipment needed, their fuel consumption, and total hours of operation; and
- Estimated number of days for construction,

To excavate, move, and grade approximately 20,000 cubic yards of material, the following equivalent days and fuel consumption has been estimated:

- 13.3 excavator days (2,000 gallons of diesel)
- bulldozer days (2,000 gallons)
- 20 dump truck days (1,000 gallons)
- Assuming 7 working days for the dewatering pump (70 gallons of gasoline)

[21] http://scc.ca.gov/webmaster/ftp/pdf/sccbb/2017/1711/20171130Board03C_Elk_River_Estuary_Planning_Ex3.pdf

The CalEEMod analysis for the Elk River Estuary/Inter-Tidal Wetlands Enhancement Program associated 101.97 of CO_2 equivalents with the excavation, moving, and grading of 145,000 cubic yards of material. Because the Proposed Project would excavate, move, and grade a maximum of 22,000 cubic yards of material (15% of the material associated with the Elk River Estuary/Inter-Tidal Wetlands Enhancement Project), the estimate for construction-related emissions associated with the Proposed Project is estimated to be 15.3 of CO_2 equivalent (per year, during construction).

The NCARB does not have a construction-phase threshold for CO2 emissions. Because vegetation that is removed will be replaced with a similar species mix at comparable densities, the carbon sequestration value of vegetation clearing will only be temporary. Impacts related to GMG emissions would be less than significant, no mitigation is required.

Although no mitigation is required, the project will implement BMPs to minimize construction-related GHGs, which may include the following:

- Use emission control devices at least as effective as the original factory-installed equipment,
- Maintain all diesel-powered equipment in a manner to minimize possible soot emissions, and
- Minimize unnecessary idling time through a "common sense" approach to vehicle use, so that idling is reduced as far as possible below the maximum of five consecutive minutes required by California law.

b) Would the project conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

Thresholds of Significance

Project results in a cumulatively considerable net increase in GHG emissions for which California pursuant to Assembly Bill (AB) 32 desires to reduce California's GHG emissions to 1990 levels by 2020.

Assessment

The Proposed Project would have a less than significant impact with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gasses. The County has set a goal of reducing both long term annual GHG emissions of the unincorporated County by 31,658 tons. This reduction would meet the goal of AB 32 of reducing GHG emissions to 1990 levels by 2025. Humboldt County's plan seeks to achieve this reduction

primarily by reducing vehicle miles travelled through more compact, higher density urban development.

Project implementation is expected to result in a short-term increase in GHG emissions during construction. Short-term construction related emissions for project implementation will not interfere in the County's efforts to achieve reductions in GHG emissions by reducing vehicle miles travelled through more compact development. Therefore, the Project would not create a new source of GHG emissions and would therefore not conflict with any plans or policies adopted to reduce GHG emissions, therefore there would be no impact. No mitigation is required.

3.9 Hazards and Hazardous Materials

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

REGULATORY SETTING

Hazardous substances and contaminated sites are regulated under the federal and state laws, including the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the Superfund Amendment and Reauthorization Act (SARA). The majority of these laws are administered and enforced by state agencies such as the California Department of Toxic Substances Control (DTSC) and the State Water Resources Control Board (SWRCB).

ENVIRONMENTAL SETTING

Contaminated Sites

According to the SWRCB's GeoTracker Database, there are no sites within the Project area or within the vicinity of the Project Area with the potential to be contaminated with hazardous waste (SWRCB GeoTracker database: https://geotracker.waterboards.ca.gov/)

Timber harvesting has been conducted in the Elk River watershed since the mid 1800's, and agricultural practices have been conducted adjacent to the river since at least the early 1900's. As such, there is potential for unknown contamination to exist within the project area.

Airports

The California Redwood Coast – Humboldt County Airport (Arcata-Eureka) located in McKinleyville is Humboldt County's only commercial airport. Other airports within the county include the Dinsmore Airport, Samoa Field Airport, Garberville Airport, Hoopa Airport, Kneeland Airport, Murray Field Airport, Rohnerville Airport, and Shelter Cover Airport. The Samoa Field Airport and Murray Field Airport are the closest airports to the Project area but are located more than six miles away.

Wildfire Hazards

The project area is located within a High Fire Hazard Severity Zone within a State Responsibility Area.

DISCUSSION OF CHECKLIST RESPONSES

a) **Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?**

Thresholds of Significance

Storage or use of large quantities of hazardous materials that could be released into the environment.

Assessment

Project construction (floodplain and channel excavation, upland spoiling) is not expected to create a hazard to the public through the routine use of hazardous materials. Hazardous materials present at the construction sites would include substances such as fuels, oils, and lubricants needed to operate construction equipment. As described in Section 2. 9 (Table 22), the selected contractor would be required to implement Environmental Commitments including erosion control measures so that water quality is protected during construction. Environmental commitments DEN-6 and GEN-7 include provisions for appropriate handling of any hazardous materials used in the project area. Environmental Commitment GEN-8 includes specific provisions that would minimize the potential for, and effects from, spills occurring during project construction and would require the preparation of a Spill Prevention and Response Plan (SPRP). The SPRP will describe transport, storage, and disposal procedures; construction site housekeeping practices; and monitoring and spill response protocols. California Trout will be responsible for ensuring that the Environmental Commitments for water quality protection, hazardous materials control measures, and the SPRP are appropriately implemented by all contractors.

With these procedures in place, potential impacts related to the transport, use, and disposal of hazardous materials associated with project construction and maintenance are expected to be less than significant, and no mitigation is required.

b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Thresholds of Significance

Project involves the use of large quantities of hazardous materials.

Assessment

See response to 3.8 (b) above.

c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Thresholds of Significance

Project is located within one-quarter of mile of a school and involves the use of large quantities of hazardous materials.

Assessment

There are no schools located within 0.25 miles of the Project Area, so the principal concern related to hazardous materials is the hauling of small quantities of fuels, lubricants, herbicides, etc. to the project area. The nearest school is Koinonia Academy (7540 Elk River Road), located off of Elk River Road approximately 4,000 feet from the Project area. Arterial routes to the school will not be utilized by haul traffic associated with the Proposed Project. In addition, the transport of hazardous materials will comply with all applicable Humboldt County and other regulations. Because activities associated with the Proposed Project would comply with all applicable regulations related to the transport, handling, use, and disposal of hazardous waste, any impacts related to hazardous waste are less than significant. No mitigation is required.

d) Would the project be located on a site which is included on a list of hazardous materials sites complied pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Thresholds of Significance

The project is located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

Assessment

No hazardous waste or hazardous sites are known to occur within the Project Area. However, timber harvesting has been conducted in the Elk River watershed since the mid 1800's, and agricultural practices have been conducted adjacent to the river since at least the early 1900's. It is possible that there may be some areas of previously unknown contamination related to historic timber harvest or agricultural practices. As a result, construction of the Proposed Project may encounter contamination. The soil to be excavated has not been tested to verify that the land is not contaminated by residual chemicals. As described in Section 2.9 (Environmental Commitment GEN-7), in the event that contamination or hazardous materials are encountered during construction, all construction and maintenance activities in the area of the contamination will cease work until a hazardous materials investigation is conducted to identify and delineate the extent and nature of the contamination. If clean-up or remediation is required, any hazardous waste materials removed during construction will be handled, transported, and disposed of according to federal, state, and local requirements. With these procedures in place, impacts

related to the discovery of unknown hazardous waste or hazardous sites within the project area are expected to be less than significant. No mitigation is required.

e) If applicable, would the project be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

Thresholds of Significance

Project is located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport.

Assessment

The project area is not located within two miles of any public or private airport or airstrip. The Samoa Field Airport and Murray Field Airport are the closest airports to the Project area but are located more than six miles away. Consequently, the Proposed Project would not conflict with any airport land use plan or operation of nearby airports and would not pose any airport-related safety hazard to people working in the project area. Therefore, there would be no impact. No mitigation is required.

f) If applicable, would the project be located within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

Thresholds of Significance

Project is located within the vicinity of a private airstrip.

Assessment

See response to 3.8 (e) above

g) Would the project impair implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Thresholds of Significance

Project would prevent alerting and warning citizens, conducting evacuations, short-term feeding and sheltering, conducting search and rescue operations or using emergency evacuation routes.

Assessment

The Proposed Project would not interfere with any existing emergency response or evacuation plan. As described in Section 2.9, Environmental Commitments GEN-13 include measures to ensure the contractor maintain adequate traffic flow. No construction-related impacts on emergency response or evacuation are anticipated. No mitigation is required.

h) Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized area or where residences are intermixed with wildlands?

Thresholds of Significance

Project is located in an area shown on a map used to identify wildland fire hazard areas. Potential exists for a significant risk of loss, injury or death involving wildland fires.

Assessment

The Proposed Project is located in an area identified as having a very low fire risk hazard. The use of some type of construction equipment, including equipment with internal combustion engine and gasoline-powered hand tools, could pose a risk of wildfire ignition. However, the construction contractor would be required to comply with existing legal requirements under the California Public Resources Code to minimize wildfire risk during construction (see Section 2.9, Environmental Commitments). With these measures in place, impacts related to increased wildfire risks associated with project construction are expected to be less than significant. No mitigation is required.

3.9 Hydrology and Water Quality

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

REGULATORY SETTING

Work in rivers in California is regulated by several public agencies, including the US Army Corps of Engineers (USACE) under §404 of the federal Clean Water Act, the Regional Water Quality Control

Boards (RWQCB) under §401 of the federal Clean Water Act, and the state's Porter-Cologne Water Quality Control Act, as well as by the city or county where the project takes place.

For purposes of Section 404 of the Clean Water Act, Ordinary High Water Mark (OHWM) is used to define the lateral limits of federal jurisdiction over non-tidal water bodies and the geographical extent of USACE and USEPA regulatory programs. Federal regulations (33 CFR 328.3(e)) define the OHWM as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." Due to aggradation of the Elk River channel, OHWM characteristics caused by fluvial processes are indiscernible within the project area under current conditions. Given the highly altered conditions of the project area, effectively all cut of channel excavation and floodplain excavation sites will be conducted below the OHWM elevation and are assumed to be within USACE jurisdiction.

ENVIRONMENTAL SETTING

Climate and Precipitation

The Mediterranean climate of the Elk River Basin is characterized by mild, wet winters with high rainfall and a prolonged dry summer season. Rainfall amounts increase with elevation from an average of 39 inches per year at Eureka to 60 inches per year at the headwaters. The Elk River watershed is much steeper than other watersheds in Humboldt Bay with an elevation that ranges from 0-2,400 feet from mouth to ridgeline.

Surface Water Hydrology

The Elk River watershed includes hydrologic unit code's (HUCs) 110.00201, 202, 301, 302, 401, and 402 and is located in the SWRCB Eureka Plain Hydrologic Unit, which encompasses Humboldt Bay and all of the watersheds that drain into it including the Elk River, Jacoby Creek, Freshwater Creek, and Salmon Creek.

Winter and Summer Baseflows

Winter (December 1 through April 30) and summer (August 1 through September 30) flow duration curves were developed with limited gage data spanning WY 1958 through WY 1967 (26,27), which includes streamflow for both the North Fork and South Fork Elk River. During both winter (Figure 26) and summer (Figure 27) baseflow periods for the ten-year gaged record, streamflows of 2 cfs or less were common. More than 95% of observed streamflows during the summer baseflow period were less than 3 cfs. Observed streamflows of 1 cfs or less were observed in all but one of the ten gaged water years. Because the majority of the Project

area is located in the North Fork, baseflows for the majority of the Project area are even lower than those presented in Figure 26 and 27. A lack of continuous streamflow has been observed during summer periods when baseflows are at their minimum (Figure 27).

Figure 25. Winter baseflow 1-day flow duration curve, December 1 through April 30.

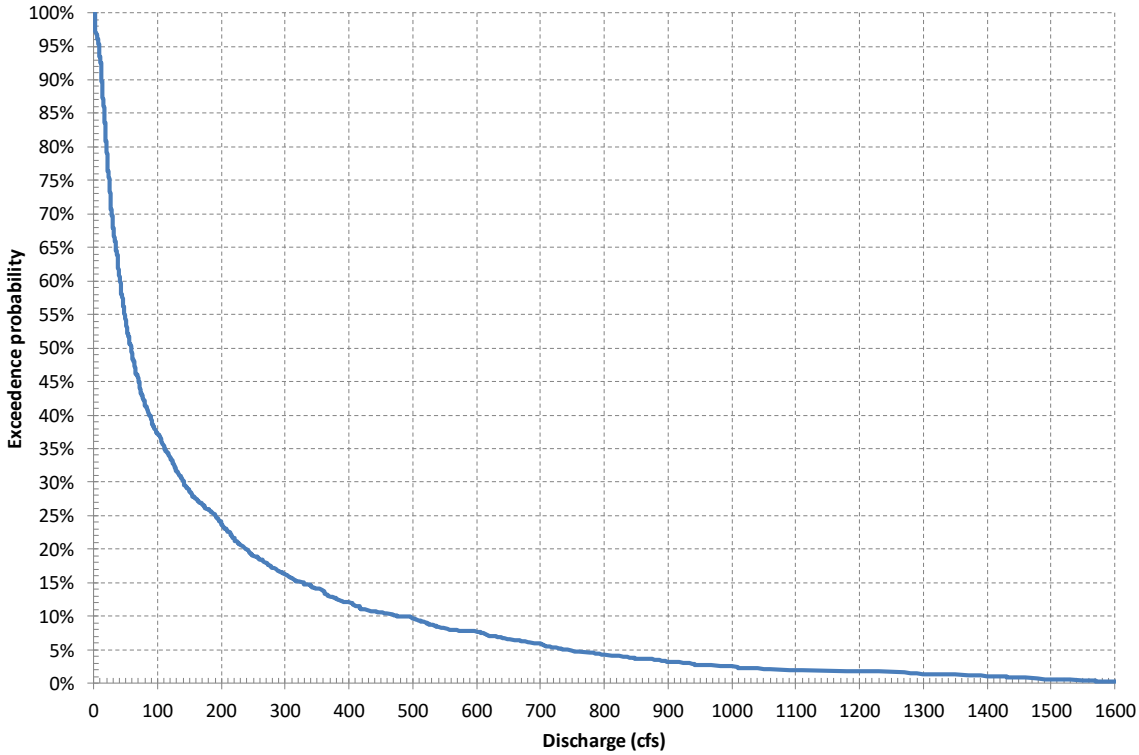

Figure 26. Summer baseflow 1-day flow duration curve, August 1 through September 30.

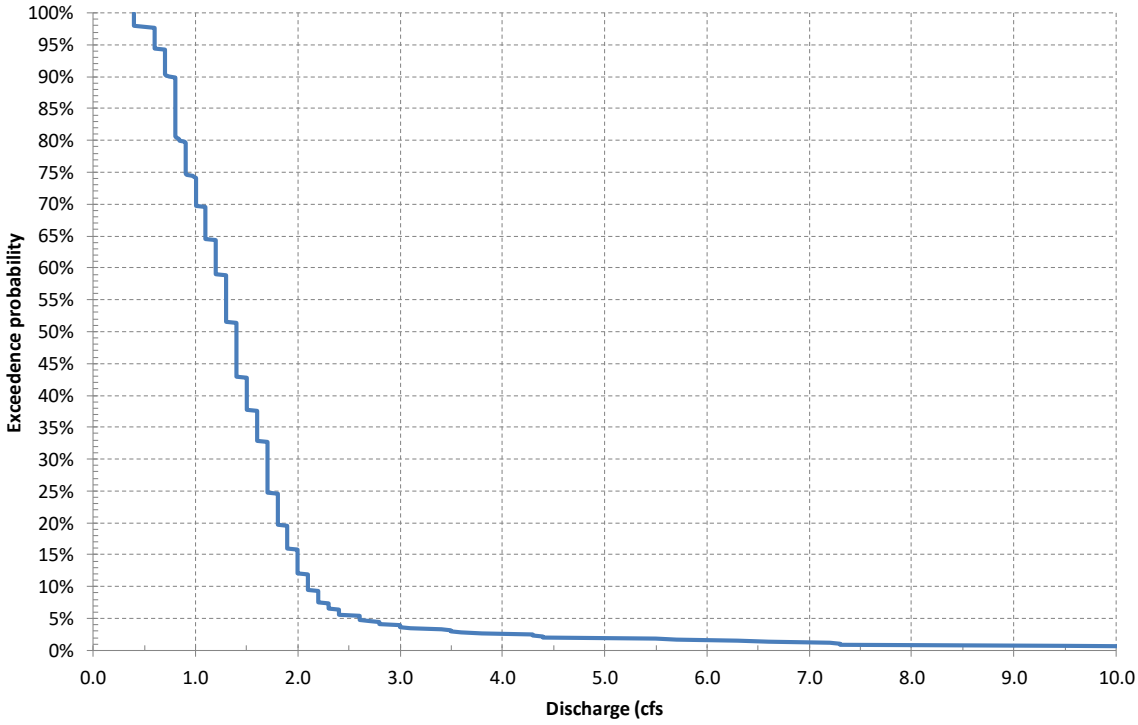

Figure 27. Dry channel bed of the North Fork Elk River in August 2014.

Peak Flows

Peak flow estimates within the Project area range from 2,500 cfs to nearly 3,800 cfs for recurrence intervals spanning 1.5-year to 25-year return periods (Table 27). These peak flow estimates were developed by Tetra Tech (2015) to support the NCRWQCB's TMDL-related analyses using ten years of historic gaging data. The 100-year flood threshold developed at USGS Station 11-479700 (a former USGS station located near the downstream end of the Project area) is 4,119 cfs (Patenaude, 2004) .

Table 27. Summary of Recurrence Intervals at USGS Station 11-479700 (located near the downstream the end of the Project area). Table from Tetra Tech (2015).

Recurrence Interval (years)	Estimated Peak Flow Discharge (cfs)
1.5	2,483
2	2,713
5	3,191
10	3,456

25	3,748

Estimated peak flow discharge is based on limited gage data spanning WY 1958 through WY 1967.

Sediment History

As described in Section 2.1, sediment loads associated with excessive timber harvest in the 1988-1997 period (coupled with significant wet weather events, erosive geology, and downstream channel characteristics), resulted in major sediment deposition which reduced channel conveyance capacity and raised surface water elevations and lateral flooding to unprecedented levels. Sediment deposition in the channel bed, banks, and floodplain altered the morphology of the river, resulting in a reduction of flow capacity, achievable water velocities, and sediment transport capacity. This alteration to the hydrologic function in the impacted reaches has made the impacted reach highly sensitive to sediment loads (Tetra Tech, 2015) . Impacted geomorphic and hydraulic conditions have resulted in lower conveyance capacity, lower flow velocities, and ongoing sediment deposition that have collectively exacerbated nuisance flooding conditions in the Middle Reach of Elk River. According to recent estimates, sedimentation has reduced channel conveyance in the upper mainstem Elk River by 60% since 1965 (Patenaude, 2004) .

Figure 28. The mainstem Elk River in the downstream portion of the project area during December 2014. Note flooding caused by excessive fine sediment aggradation.

Current Modeling

A predictive hydrodynamic and sediment transport (HST) model was developed and applied by Northern Hydrology and Engineering (NHE) and Stillwater Sciences (SWS) under an RCAA contract with the SWRCB (NHE and SS 2013). The model includes the North Fork, South Fork, and mainstem Elk River where detailed monitoring of streamflow, turbidity, suspended sediment load, bed sediment composition, and channel topography (e.g., repeated cross-section surveys) has been conducted since about 2002 (longer for some parameters). Under the Elk River Recovery Assessment, the HST model is being used as a predictive tool to analyze the potential effects of sediment load reduction and various actions to remove in-stream sediment deposits.

Water Quality

State water quality standards are established by the North Coast Regional Water Quality Control Board in their Basin Plan, as mandated by both the Federal Clean Water Act (CWA) and the State Porter-Cologne Water Quality Act (Porter-Cologne). The Basin Plan is the Region Water Board's master water quality control planning document.

Sediment

Under Section 3.4.11 of the Basin Plan, the suspended sediment load and suspended discharge rate to surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

Suspended Material

Under Section 3.4.13 of the Basin Plan, waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

Temperature

Temperature objectives are specified in the State Water Board's Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California (Thermal Plan). Further, Section 3.4.15 of the Basin plan establishes that at no time or place shall the temperature of any COLD water be increased by more than 5 °F above natural receiving waters.

Turbidity

Under Section 3.4.17 of the Basin Plan, turbidity shall not be increased more than 20% above naturally occurring background levels. Allowable zones of dilution within which higher

percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof.

TMDL

The Elk River is subject to a TMDL for excessive sediment within the project area, which includes an updated, adopted Action Plan. The goal of the TMDL Action Plan is to achieve sediment related water quality standards, including the protection of the beneficial uses of water and the prevention of nuisance conditions. The Action Plan includes the Elk River Recovery Assessment (a non-regulatory feasibility assessment of sediment remediation and channel restoration activities completed in December 2018), load reductions in the upper watershed, and the Proposed Project which is, is directly core and germane to the Elk River Sediment TMDL action plan.

Current water quality conditions and impacts are reviewed below (Dr. Gerald Bowes, July 12, 2012, pg. 7):

Altered Channel and Floodplain Morphology

Anthropogenic sediment loads have overwhelmed the transport capacity of the river resulting in substantial sediment deposition.

Cumulative Effects

In addition to morphologic changes, persistent high suspended sediment loads in combination with low stream velocities have limited the river's ability to scour deposited sediment. Reduced channel cross-sectional area has resulted from continuing sediment deposits on the river bed, bank, and floodplain areas.

Nuisance Flooding

Flooding occurs at an increased frequency and magnitude compared to historic conditions. Fields, roadways, driveways, homes, and septic systems are inundated and damaged, affecting the health, safety, and livelihoods of residents in the Elk River Valley.

Beneficial Uses are Not Supported

Fisheries habitat and domestic and agricultural water supplies are impaired. Pools and gravels are filled with fine sediment. High turbidity and suspended sediment concentrations impair beneficial uses and result in physiologic stress to salmonids, limit their feeding capabilities, and therefore affect growth rates and survival in ocean conditions. Impaired conditions limit the usability of the river as a water supply due to sediment damaging equipment and causing health problems.

Water Quality Objectives for Sediment Are Not Achieved

Suspended sediment concentrations adversely affect water supplies and fisheries and result in deposition of material which fills pools and embeds gravels. The deposition of material violates the water quality objective for settleable materials resulting in reduction of cross-sectional area and contributing to nuisance flooding conditions. Turbidity is significantly elevated above naturally occurring background conditions throughout the basin. The overall sediment loads have been altered in violation of water quality objectives and the assimilative capacity of the watershed has been reduced.

Anthropogenic-related Sediment Sources Exceed the Stream's Assimilative Capacity

Quantification of the stream's sediment loading capacity and natural and management-related sediment source categories since 1955[22] indicate that management-related sources have contributed to degradation of instream resources. Reduction in management-related sediment loading, in combination with addressing the stored instream sediment deposits, is necessary to ensure recovery of the ecosystem functions, beneficial uses of water, and abatement of nuisance conditions.

HRC and GDRC are required by SWRCB and RWQCB orders to monitor water quality in association with timber harvesting activities. Elk River was included on the Clean Water Act Section 303(D) List of impaired waters in 1998 on the basis of excessive sedimentation primarily due to discharges from timber harvesting activities (Table 28). Placement on the 303(d) list resulted in the development of a Total Maximum Daily Load (TMDL) which includes a schedule for developing a control plan to address the impairment (TMDL Action Plan)

Table 28. Clean Water Act Section 303(D) List of Impaired Water Bodies

Water Body Name	Listing Extent	Pollutant	Category
Elk River Watershed; Lower Elk River and Martin Slough	Lower Mainstem Elk River and Martin Slough	Indicator Bacteria	5
	Entire Water Body	Sedimentation/Siltation	5
Elk River Watershed, Upper Elk River	Entire Water Body	Sedimentation/Siltation	5

[22] Historical measurements by USGS from 1954-1965 on the upper mainstem Elk River provide an appropriate basis for the desired target conditions to prevent nuisance in upper mainstem, lower North Fork, and lower South Fork Elk River (Dr. Gerald Bowes, July 12, 2012, pg. 7).

Elk River Watershed; Upper Little South Fork Elk River	Entire Water Body	Sedimentation/Siltation	5

Water Temperature

Water temperatures within the project reach is monitored annually by Humboldt Redwood Company (HRC). 2014 monitoring found that maximum weekly average water temperatures (MWAT) at all monitored locations met the target of <16.8 °C. Long-term water temperature monitoring conducted by HRC found that water temperatures throughout the North Fork and South Fork of the Elk River consistently met the 16.8 °C target (**Figure 29, Figure 30**), which is indicative of the high degree of riparian shade and coastal climate of the watershed (HRC 2014).

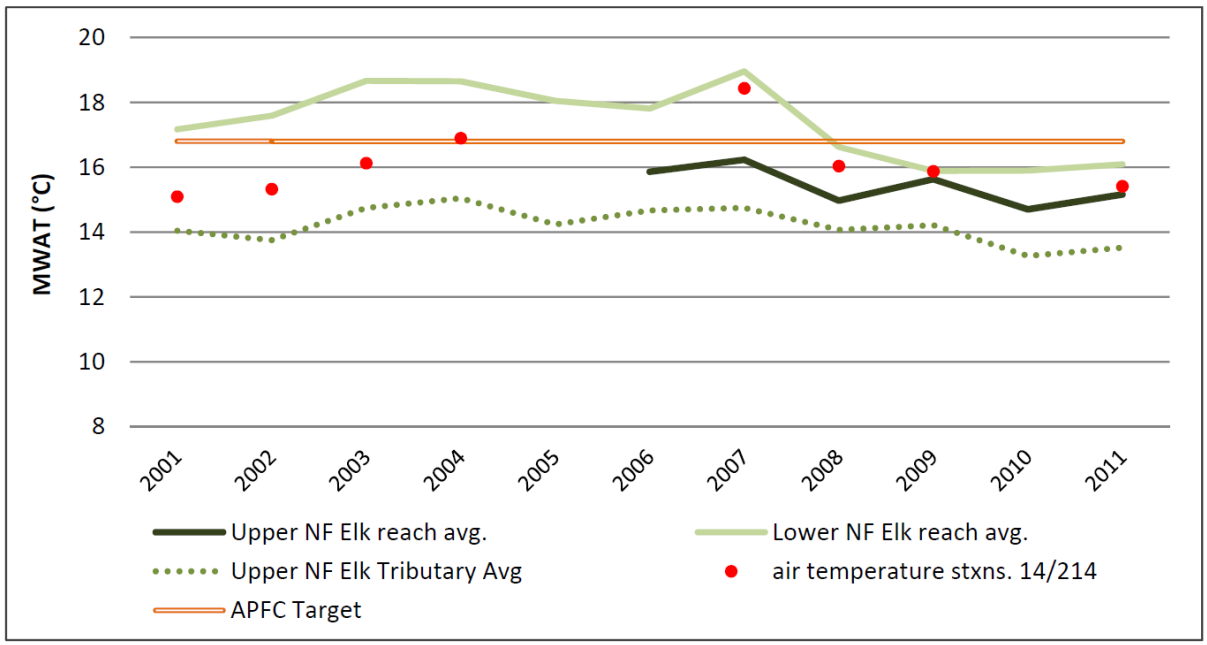

Figure 29. North Fork Elk River water temperatures records from 2001-2011. Figure from Humboldt Redwood Company (HRC) 2014b.

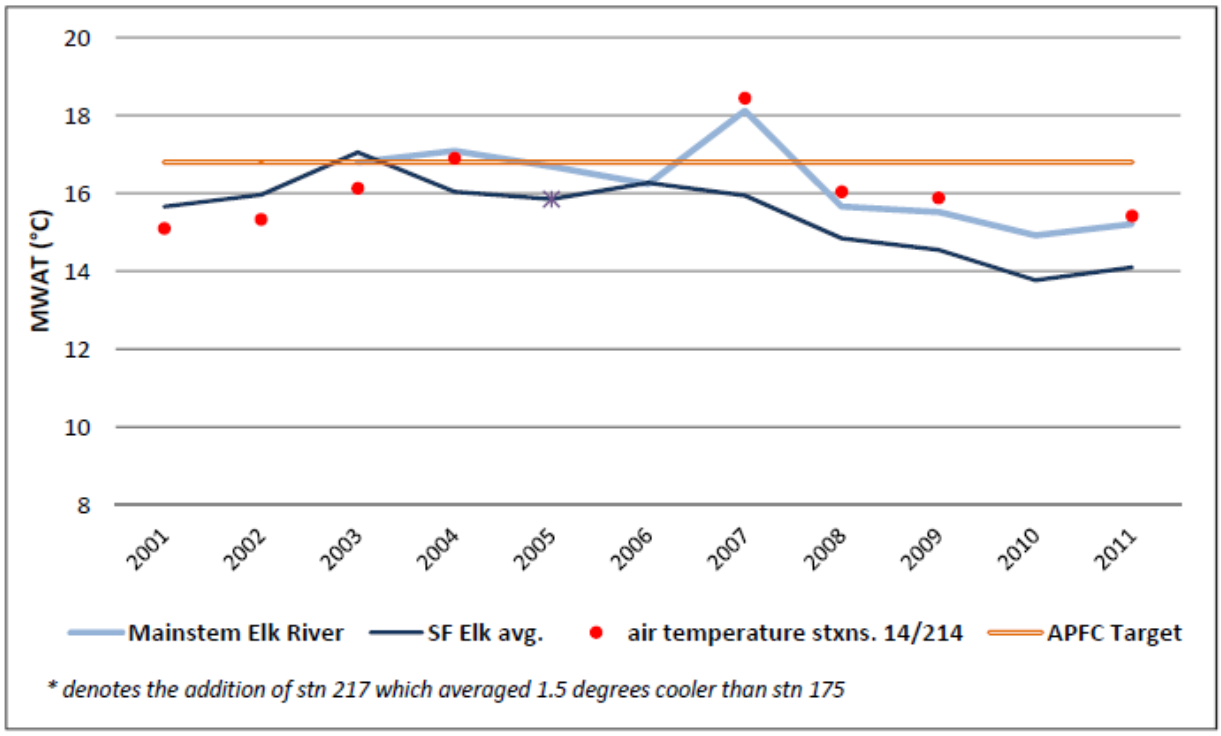

Figure 30. South Fork Elk River water temperatures records from 2001-2011. Figure from Humboldt Redwood Company (HRC) 2014b.

Flooding

The Project proposes sites in Humboldt County's designated 100-year flood hazard zone and Humboldt County's Streamside Management Area (SMA) (**Figure 2 and Figure 3**). All in-channel project actions are located within the FEMA 100-year flood zone, as are all floodplain actions except one. Three sediment reuse (spoils) areas are also located within the FEMA 100-year flood zone. The project area is located within a Zone AE base floodplain. A Zone AE denotes a base floodplain where flood elevations have been determined based on topography (but no detailed study had been conducted). 22,000 cubic yards of materials is expected to be placed within the base floodplain as part of the Proposed Project.

The SMA is narrower than the 100-year flood zone, and all in-channel project features and most floodplain project features are located within the SMA corridor. All of the sediment reuse (spoils) areas are located outside of the SMA corridor.

IMPACT DISCUSSION

a) <u>Would the project violate any water quality standards or waste discharge requirements?</u>

Thresholds of Significance

Exceed any state water quality standards or waste discharge requirements.

Assessment

Construction of the Proposed action would occur during the dry season, between August 15 and October 15 (or October 31 if no rain is forecast), when flows in Elk River are low (below 3 cfs). Channel and floodplain excavation would require the diversion and dewatering of the channel which could temporarily increase turbidity, suspended sediment, and water temperatures if not properly managed, particularly during rewatering activities. In addition, sediment and other pollutants (such as oil, grease, fuels, hydraulic fluids, or related pollutants) could result in surface water degradation if not appropriately mitigated.

In order to implement the Proposed Project, the RWQCB will be required to certify that the Proposed Project will comply with water quality standards through the issuance of a 401 Water Quality Certification, which will include stormwater provisions. Water quality standards include: beneficial uses, water quality objectives, and the State Antidegradation Policy. In addition, a Notice of Intent for coverage under the General Construction National Pollutant Discharge Elimination System (NPDES) would be required prior to any earth disturbing activities. The conditions of that permit would define Best Management Practices (BMPs) to be implemented based on site-specific conditions to reduce erosion and sedimentation and inadvertent release of pollutants into surface waters during construction activities. BMPs from the California Storm Water Quality Association Storm Water Best Management Practice (BMP) Handbook for Construction (CSWQA 2003) will be implemented by the contractor as appropriate. Finally, Humboldt County requires a permit for all grading in excess of 5,000 cubic yards. Compliance with the grading permit will help ensure that grading activities will not pose a risk of soil erosion or top soil loss by establishing criteria for cut/fill slopes, setbacks, drainage, on-site soil management, and other parameters. The

The Proposed project would have a less than significant impact and would not violate any water quality standards or waste discharge requirement if mitigation measures contained in permit conditions (including the RWQCB 401 Water Quality Certification and Humboldt County Grading Permit) are successfully implemented.

The impact of the Proposed Project with respect to established water quality standards (as defined in the North Coast RWQCB Basin Plan) are summarized below.

Sediment

The proposed project is designed to alleviate nuisance sediment issues by increasing flood conveyance and improving floodplain connectivity, hydrologic function, and natural fluvial geomorphic function of the project area. Once complete, the project will not result in any new sediment source.

Suspended Material

The proposed project will reduce the amount of suspended material currently plaguing landowners within and near the project area, as well as the salmonid habitat and ecological function of Elk River itself. The project will not increase suspended material or in any way cause a nuisance.

Temperature

The project will not create a new temperature waste discharge. The project will remove riparian vegetation adjacent to the stream channel, which may contribute to localized channel warming during certain periods of the year, until which time as the riparian vegetation is established. Because the project area is approximately four miles inland from the Pacific Ocean, observed water temperatures have not been deemed a constraint and potential localized warming of water temperatures is not expected to have a detrimental impact to water temperatures.

Turbidity

Small increases in turbidity area anticipated during and immediately after construction. These releases are not expected to exceed the 20% background threshold established by the Basin Plan. Construction-related short-term turbidity will be minimized below allowable thresholds through the implementation of BMPs and Mitigation Measures, described below, as well as through the 401 Water Quality Certification approved by the North Coast Regional Water Quality Control Board.

TMDL

The proposed project is a direct component of the TMDL Action Plan for the Elk River and has been developed to specifically address sediment-related constraints within the Elk River watershed, under the guidance and authority of the North Coast Regional Water Quality Control Board. Project actions including clearing riparian vegetation, dewatering the channel, excavation and grading in the bankfull channel and floodplain, placement of fill and grading of upland areas should not violate any state water quality standards or waste discharge requirements, with the implementation of mitigation measures to avoid and minimize erosion (see Geology and Soils Mitigation Measures) and to prevent the release of hazardous materials associated with construction equipment (see Hazardous Materials Mitigation Measures) and through compliance

with the RWQCB 401 water quality certification and compliance with the Humboldt County grading permit.

During project implementation (August 15 through October 15), the in-channel work areas will be dewatered and hydrologically isolated from streamflows. Short-term increases in suspended sediment-turbidity in Elk River should not occur as a result of Environmental Commitments (Section 2.9). Any turbid water pumped from the construction zone will be contained within the project area and allowed to settle in a hydrologically isolated area (nearby field) prior to seeping back into the groundwater table.

Increases in suspended sediment-turbidity in the Elk River with and downstream of the project area could occur because of project excavation and grading if exposed soil surfaces are left unprotected from rainfall and stormwater runoff occurs before these surfaces are revegetated. Initial channel and floodplain inundation will be a short-term source of fine sediment. Suspended sediment may result in an initial, short-term increase in turbidity down river of the project but will be negligible within the context of background suspended sediment loading in the upper Elk River (North Fork and South Fork).

The Proposed Project would have a less than significant effect, with the incorporation of Mitigation Measures defined in Section 2.9, particularly GEN-1 through GEN-16.

To prevent the entry of polluted storm water runoff into receiving waters during construction and the storage and transportation of excavated materials and during stream diversion and dewatering/rewatering, BMPS shall be implemented in accordance with the California Storm Water Quality Association Storm Water Best Management Practice (BMP) Handbook for Construction, 2003 including guidelines for Dewatering Operations (NS-2), Clear Water Diversion (NS-5), Earth Dikes and Drainage Swales (EC-9), and Velocity Dissipation Devices (EC-10).

b) Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Thresholds of Significance
Substantially deplete groundwater supplies or interfere with groundwater recharge or lowering of the local groundwater table.

Assessment

The project will have no impact. The project will not affect groundwater supplies, interfere with groundwater recharge, or lower the local groundwater table.

Some nearby landowners rely on private wells for their domestic and agricultural water supply. These wells will be unaffected by project actions. Project excavations are limited to in-channel and floodplain areas and are shallow in nature, eliminating the potential for groundwater interactions.

c) **Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off-site?**

Thresholds of Significance

Substantially alter existing drainage, increasing surface runoff and/or resulting in substantial erosion or siltation on or off site.

Assessment

The project will have a less than significant impact with the incorporation of mitigation measures. Long-term sediment deposition within the project area resulting from upstream land management has resulted in significant deposition of fine sediments, severely altering the project area's fluvial geomorphic condition and resulting in frequent detrimental flooding of adjacent properties. This is a flood risk reduction and flood conveyance improvement project designed specifically to improve drainage and reduce siltation and deposition on site. The project will have a beneficial impact to drainage, flood conveyance, and erosion/siltation reduction.

Surface Runoff

Implementation of in-channel features and floodplain restoration and enhancement will not increase surface runoff. Temporary access roads and soils reuse areas will be recontoured post-project implementation, including standard BMP treatment for erosion control and revegetation and will also not increase surface runoff.

Substantial Erosion

The placement of fill in soil reuse areas does increase the risk for substantial erosion after project-completion during winter storm events. Sediment reuse areas will be sloped and contoured in compliance with Humboldt County's grading ordinance to minimize storm-related erosion risk.

Mitigation Measures and the use of BMPs have been incorporated into the project to minimize the erosion risk associated with sediment reuse areas within the project footprint.

Substantial Siltation

Grading and fill placement activities during and after construction do have the potential to temporarily increase siltation originating from the project area. Increases to siltation area not expected to be substantial and will remain within the allowable 20% of background turbidity threshold established in 9 (a) above. Once implemented and revegetated, the project is expected to decrease impacts from siltation to the Elk River, over the long term. Mitigation Measures and the use of BMPs have been incorporated into the project to minimize the siltation risk associated with sediment reuse areas within the project footprint.

Mitigation Measures

Mitigation measures for 9 (c) are addressed in Mitigation Measures for 9 (a), to prevent potential impacts associated with potential erosion impacts.

d) **Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?**

Thresholds of Significance

Substantially alter existing drainage of the site or Increase the volume of surface runoff that potentially could cause localized flooding.

Assessment

The project will have a less than significant impact. A primary objective of this project is to reduce localized nuisance flooding within the project area. Project actions have therefore been designed to improve in-channel capacity, reduce channel roughness, improve sediment transport, and increase flood conveyance to treat and reduce localized nuisance flooding. A hydrodynamic model assessment was conducted using the environmental Fluid Dynamics Code (EFDC) model. Modeling assessed and simulated two storms from the WY 2003 – WY 2015 record to evaluate post-project conditions. Two storms which included the peak flows of record in WY 2003 and WY 2015 were assessed as two consecutive storms. Model results indicate that the Proposed Project decreased water surface elevations over most of the project area, with only small localized increases in water levels near the downstream end of the project area. The depth and velocity of the flow field are not shown to significantly change downstream of the project area. Overall, the proposed project

would decrease flood levels over most flow conditions, which would have a positive effect on nuisance flooding in the project area.

Substantially Alter Existing Drainage

The Proposed project will beneficially alter and ultimately improve existing drainage by reducing vegetative roughness and improving flood flow conveyance. Following Project implementation, surface runoff and surface waters from the Elk River and adjacent floodplains and properties will continue to drain unimpeded to the Elk River channel and downstream receiving waters. Sediment reuse sites are located in upland areas away from the stream channel or at the edge of the floodplain and would not alter existing drainage patterns.

Increase the Rate of Surface Runoff

Local landowners are currently impacted by chronic nuisance flooding. They experience damage to their physical property, loss of agricultural production, and limited access to their homes during periods of flood, which occur multiple times per year. This Proposed project seeks to directly address and reduce these flood related impacts. This would be a beneficial impact.

Regraded surfaces, fill surfaces (upland sediment reuse areas), and surfaces cleared of vegetation will temporarily increase the rate of surface runoff within the project footprint. Because of seasonal construction work restrictions and because temporarily impacted ground features will be revegetated and treated with erosion control measures and BMPs as described in Section 3.9 (a) and are not proportionally significant to the Elk River drainage area in size, the increased rate of surface runoff resulting from the Proposed Project would not be significant.

e) **Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?**

Thresholds of Significance

Runoff exceeds the capacity of existing or planned stormwater drainage systems or provides substantial additional sources of polluted runoff.

Assessment

There would be no impact. The Proposed Project would not result in any changes affecting the capacity of existing or planned stormwater drainage systems. Throughout the project area, there are local drainage channels and culverts that drain areas adjacent to the Elk River. However, the proposed project features will not affect these existing drainage culverts. There are no detention

basins, percolation galleries, or underground storage basins in or near the project area. No new stormwater culverts will be installed as part of the Proposed Project. As discussed above, the project will improve flood capacity within the stream channel and will thus improve the stormwater capacity of Elk River itself.

f) **Would the project otherwise substantially degrade water quality?**

Thresholds of Significance

Exceed any state water quality standards not previously assessed in Section 3.9 (a).

Assessment

There would be no impact. The Proposed Project is intended to improve water quality to address impaired beneficial uses. Although there is the potential for construction-related pollutants to be released from construction areas, such impacts are adequately addressed in Section 3.9 (a) of this Initial Study and through required permits including a 401 Water Quality Certification from the North Coast RWQCB and a Grading Permit from the County of Humboldt. The Proposed action would have a less than significant impact and would not violate any water quality standard or waste discharge requirement if mitigation measures designed to control construction-related pollutants are successfully implemented.

g) **Would the project place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary of Flood Insurance Rate Map or other flood hazard delineation map?**

Thresholds of Significance

Placing housing within the 100-year flood plain, or other area subject to flooding.

Assessment

The project will have no impact as it does not involve placement of any housing. No mitigation is required.

h) **Would the project place structures within a 100-year flood hazard area structures, which would impede or redirect flood flows?**

Thresholds of Significance

Construction of structures in the 100-year flood hazard area which would impede or redirect flood flows.

Assessment

The project will have no impact. Although portions of the project area are within FEMA's designated 100-year floodplain, the Proposed project does not involve placement of any structures which would impede or redirect flood flows.

The Proposed Project involves the construction of large wood habitat structures and will replace large wood pieces removed from the channel during construction prior to rewatering. It should be noted that any large wood returned to the channel is subject to transport during future flood events.

i) **Would the project expose people or structures to a significant risk or loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?**

Thresholds of Significance

Expose people or structures to risk of loss, injury or death involving flooding.

Assessment

The project will have no impact. Portions of the project are located within FEMA's designated 100-year floodplain. The risk of exposure to people or structures involving flooding remains unchanged as a result of project implementation. The Basis of Engineering Designs Report for the Proposed Project (NHE, 2019) summarizes the technical modeling results which verify that 100-year flood elevations would remain within the allowable window for change (+/- one foot) as a result of project implementation.

j) **Would the project result in inundation by seiche, tsunami, or mudflow?**

Thresholds of Significance

Project results in inundation by seiche, tsunami or mudflow.

Assessment

There is no impact. The Proposed Project is located more than four linear miles upriver from the mouth of Humboldt Bay. Therefore, there is no risk of seiche or tsunami and there would be no impact related to increase of any such risk as a result of the Proposed action. The Project Area is

located on the valley floor at the base of various hillslope areas. However, the proposed project will not affect the likelihood of, or increase the potential of, mudflows. Therefore, no impact related to increase of mudflow risks is anticipated. No mitigation is required.

3.10 Land Use and Planning

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

REGULATORY SETTING

Land use planning in unincorporated areas of Humboldt County is governed by the Humboldt County General Plan (Humboldt County, 2017). The General Plan EIR (https://humboldtgov.org/DocumentCenter/View/1348) page 123) describes agricultural production as "an important component of both the local economy and community character." The General Plan includes a number of goals specific to agricultural preservation and related land uses. The General Plan also includes prescriptions related to flood protection development in the floodplain and in waterbodies, as well as many goals that indirectly guide and constrain land use planning through protections for the County's aesthetic values, agricultural uses, riparian and wetland areas, and sensitive plant and wildlife species.

The Water Resources Element of the Humboldt County General Plan includes multiple policies to "Maintain or enhance the quality of the county's water resources and the fish and wildlife habitat utilizing those resources." Policies to "Maximize, where feasible, the long-term public and economic benefits from the biological resources within the county by maintaining and restoring fish and wildlife habitats" are included in the General Plan Conservation and Open Space Element, Biological Resources Chapter, and Water Resources Element. A number of General Plan goals and policies and implementation measures also specifically address the need to protect water quality and support the

County's water quality and aquatic resources, particularly native and anadromous fish species, and are listed below in Table 31**.**

Table 29. Related General Plan Goals, Policies, and Implementation Measures

Goals	
WR-G1	**Water Supply, Quality, and Beneficial Uses.** High quality and abundant surface and groundwater water resources that satisfy the water quality objectives and beneficial uses identifies in the Water Quality Control Basin Plan for the North Coast Region.
WR-G2	**Water Resource Habitat.** River and stream habitat supporting the recovery and continued viability of wild, native salmonid and other abundant coldwater fish populations supporting a thriving commercial, sport, and tribal fishery.
WR-G9	**Restored Water Quality and Watersheds**. All water bodies de-listed and watersheds restored, providing high-quality habitat and a full range of beneficial uses and ecosystem services.
Policies	
WR-P3	**Proactive Protections.** Focus regulatory attention and educational efforts in specified watersheds where limited water supply or threats to water quality have potentially significant cumulative effects on the availability of water for municipal or residential uses o the aquatic environment.
WR-P18	**State and Federal Regulation**. Encourage state and federal agencies to maintain responsibility for water resources supply and water quality management. The County shall not accept administrative responsibility for state or federal program unless sustainable funding sources are secured.
WR-P25	**State and Federal Watershed Initiatives.** Support implementation of state and federal watershed initiatives such as the Total Maximum Daily Loads (TMDLs) for the North Coast Regional Water Quality Control Board's (NCRWQCB) Watershed Management Initiative, the National Marine Fisheries Service and Department of Fish and Wildlife coho recovery plans and the California Non-point Source Program Plan.
WR-P39	**Restoration Projects.** The County shall encourage restoration projects aimed at reducing erosion and improving habitat values in Streamside Management Areas and wetlands
WR-S6	**Total Maximum Daily Load (TMDL) Implementation.** Discretionary development within watersheds containing impaired water bodies as defined under Section 303(d) of the federal Clean Water Act and governed by TMDL implementation plans shall be conditioned to reduce or prevent further impairment consistent with applicable TMDLs.
Implementation Measures	
WM-20	**Basin Plan.** Work cooperatively with the North Coast Regional Water Quality Control Board and other interested parties in the update and implementation of Basin Plan policies and programs.

The project area is entirely within the unincorporated portion of Humboldt County and, like much of the unincorporated County, is rural and agricultural in character. The Proposed Project would be located entirely on privately-owned land. The affected parcels and parcel numbers are listed in **Table 1**. The Proposed Project is within the boundary of the Eureka Community Plan. The 2017 Humboldt

County General Plan designates the majority of lands within the project area as Agricultural Rural (AR-10) and they are zoned Agricultural General (AG) B-5(10) with flood hazard and stream management area overlays, as indicated in Figures 2, 3 and 4). Lands owner by HRC are designated for Timber Production (T). According to Assessor's Maps, these parcels include "historically irreconcilable differences in property lines". Based on communications with HRC, the property boundary is the center line of the creek and the property line will therefore move as the centerline of the channel moves.

The Agricultural Rural or AR-10 land use designation is intended outside of urban/rural community center areas and allows one dwelling unit per 10 acres. https://humboldtgov.org/DocumentCenter/View/62009). The Agriculture General B-5(10) zone is dictated by the Humboldt County General Plan and is intended to be applied in areas in which agriculture is the desirable predominant use and rural residential uses are secondary (Humboldt County Zoning Regulations, page 375- https://humboldtgov.org/DocumentCenter/View/4029).

Streamside Management Area Ordinance

Lands along the Elk River are subject to the Humboldt County Streamside Management Area (SMA) Ordinance (Title 3, Land Use and Development, Division 1, Planning Zoning Regulation Chapter 6: General Provisions and Exceptions, Section 314-61.1 Streamside Management Area Ordinance and General Plan policies BR-P3, BR-P4, and BR-P5). The Ordinance limits development in Streamside Management Areas (SMAs) and imposes conditions on discretionary projects proposed within SMAs and prohibits development within SMAs, stream channels, and other wet areas unless the County determines, based on specific actual findings, that such development would not result in significant adverse impacts to fish, wildlife, riparian habitat, or soil stability. Development within the SMA or buffer is permitted by obtaining concurrence from CDFW and the County (through a special permit) that the recommended mitigations in the biological assessment mitigate potential impacts to a less than significant level. The ordinance identifies allowed development and prohibited activities within SMAs, stream channels, and other wet areas. No development is allowed within the SMA. This is done through the processing and issuance of a Special Permit. In processing the Special Permit, the biological assessment is relied on heavily to assist the County in making the required findings. The biological assessment will include an evaluation of potential impacts and recommendations for appropriate mitigation measures that reduce potential impacts to a less than significant level.

Land Use

Land use within the upland and eastern portion of the Elk River watershed is dominated by timber management. The lower watershed is occupied by agricultural interests (primarily dairy and feeder cattle), with a small area of residential/urban property. Nearly 100 percent of the HRC-owned land is

forest land. Agriculture lands are confined to the floodplain areas adjacent to the Elk River. The nearest urban areas are the Town of Fields Landing and the King Salmon industrial/residential area.

Figure 32 depicts land use and major land owners in the watershed. HRC and Green Diamond Resource Company (GDRC) are the major private landowners in the Upper Elk River watershed. Lands owned by HRC and GDRC are primarily managed for commercial timber production. HRC purchased the holdings of the former Pacific Lumber Company (PALCO) in 2008 and currently owns the majority of land in the Upper Elk River watershed. GDRC land is primarily in the McCloud Creek sub-basin, draining to the South Fork Elk River. Thirteen percent of the Elk River watershed is public land, including lands owned by the Bureau of Land Management (BLM). BLM owns and operates the Headwaters Forest Reserve in the South Fork Elk River watershed as an ecological refuge.

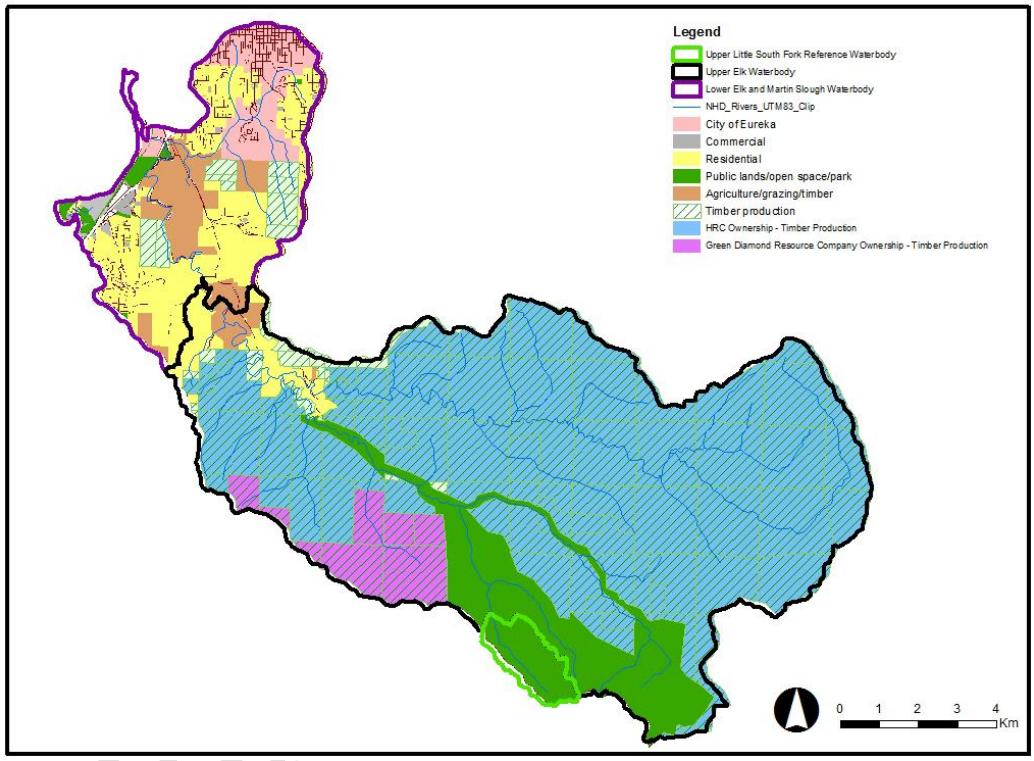

Figure 31. Land use ownership in the Elk River watershed

An archery club range and a church camp lie along the main North Fork Elk River Road at the lower end of PALCO's property. A Girl Scout camp and a Boy Scout camp are situated adjacent to the confluence of Browns Gulch with the North Fork Elk River. A trailhead parking lot and walking trail along the old road adjacent to the South Fork Elk River see heavy pedestrian, but no bicycle, horse, or vehicular use.

Forest Management History

Elk River was settled in the late 1800s. Soon afterward, the lowlands were cleared of timber for pastures (Conroy 1999). Logging in the Elk River Watershed began in the 1880s. The first major mill was established during this period at Falk in 1884. Logging initially took place along the main stream channels in the lower North Fork Watershed (PWA 1998). In the 1920s, steam donkey and railroad logging in the adjacent Freshwater Creek Watershed spilled over into the northern ridge tops and slopes of the North Fork Elk River (PWA 1998). Logging spread from these areas to the lower watershed during the 1930s with the onset of railroad logging. In the 1930s and early 1940s, railroad logging and early tractor logging spread south along the main stem of the North Fork as well as along the entire North Branch of the North Fork Elk River (PWA 1998). Very little logging occurred during the 1950s. The 1960s saw the first entries into the high reaches of the North Fork, and the surrounding ridgetops were not harvested until the 1970s. A large block of the South Branch of the North Fork and Corrigan Creek was also first logged in the 1970s. The initial harvesting of timber in the headwaters south of the upper North Fork and the South Fork occurred during the 1990s. Subsequent harvests of second- and third-growth timber have occurred throughout the North Fork Elk River Basin and continue today subject to Habitat Conservation Plans and Waste Discharge Requirements associated with the Elk River Sediment TMDL.

Ridgewood Heights is a major residential area in the Elk River watershed, characterized by both urban and rural land uses. According to the Humboldt County General Plan, the Martin Slough sub-basin is to be the focus of growth for the City of Eureka, potentially growing by up to 8,000 new residences.

DISCUSSION OF CHECKLIST RESPONSES

a) **Would the project physically divide an established community?**

Thresholds of Significance

Physically divide an established community.

Assessment

The Proposed Project would take place in a rural, agricultural area. Earthwork to improve hydraulic conveyance and reduce flooding in the project area would be located immediately along and adjacent to the Elk River, and would not materially alter the way the river functions in its societal context. Consequently, there would be no impact to physical division of an established community. No mitigation is required.

b) Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

Thresholds of Significance

Failure to comply with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project.

Assessment

Land use planning in the project area is guided by the Humboldt County General Plan (Humboldt County, 2017). Implementation of the Proposed Project, which is intended to improve hydraulic conveyance, reduce nuisance flooding, and restore beneficial uses along the Elk River, is consistent with and supports the General Plan goals, policies, and implementation measures included in **Table 29**.

The 2017 Humboldt County General Plan designated lands within the project area as Agricultural Rural (majority of parcels) and Timber Production (HRC). No agricultural or timber production lands are proposed to be converted to another land use under the Proposed Project. In addition, the project is designed to reduce flooding of agricultural lands adjacent to the Elk River, consistent with General Plan Safety Element (S-P11) which states that "agricultural lands in mapped floodplains shall be retained for use in agriculture."

The Proposed Project would be exempt from Humboldt County setback requirements because it: (1) would not result in the construction of structures, and (2) would be required to obtain state and federal permits through processes protective of natural resource values.

Streamside Management Area Ordinance

As previously described, lands along the Elk River are subject to the Humboldt County Streamside Management Area Ordinance. The Proposed Project will require a Special Permit and Conditional Use Permit from the Humboldt County Planning and Building Department for development in the Stream Management Area.

Humboldt County Flood Damage Prevention Ordinance

The Federal Emergency Management Agency's requires that each county have a flood ordinance in place to continue their participation in the National Flood Insurance program in accordance with FEMA's revision of the flood maps. A Flood Plain Development Permit is required to be obtained before construction or development begins within any established

area of special flood hazard. Pursuant to Humboldt County's Flood Damage Prevention Ordinance (Ordinance No. 2560), §335-6 Floodways, (a) There shall be no encroachments, including fill, new construction, substantial improvements, or other development unless a registered professional engineer provides a certificate demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge. Because the project will alter flood conveyance, the project actions are subject to Humboldt County's Flood Damage Prevention Regulations.

Fill for Beneficial Reuse on Agricultural Uplands

To achieve equal amounts of cut and fill within the Project area (in order to facilitate the permitting process), material which is excavated from the channel and floodplain will be reused on agricultural uplands identified as "spoils" sites. The excavated soils will be loosely compacted to a thickness appropriate for the elevation of the spoil site. Agricultural-related uses are principally permitted within the Agriculture Rural zoning designation (https://humboldtgov.org/DocumentCenter/View/62009 page 51) and the County of Humboldt has recognized that placement of the excavated sediment in agricultural areas is a compatible use on similar projects. Placement of excavated sediment on agricultural uplands in therefore consistent with the definition of General Agriculture (Humboldt County Zoning Regulations: 314-170.1 – General Agriculture).

The Proposed Project, which emphasizes restoring and improving habitat value, while reducing flood risks through improves channel function is consistent and in detail with numerous Humboldt County General Plan Goals and Policies and with applicable County land use and planning codes. Therefore, there would be no impact related to conflicts with land use plans, policies, or regulations. No mitigation is required.

c) Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

Thresholds of Significance

If the Projected is located in an area with an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan, is it inconsistent with the applicable Plan?

Assessment

The project area is not covered by any HCP or NCCP. Therefore, there would be no impact related to conflict with an adopted or proposed conservation plan. No mitigation is required.

3.11 Mineral Resources

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

ENVIRONMENTAL SETTING

According to the Humboldt County General Plan, state mineral zone maps have not been developed by the State Geologist for Humboldt County. The Mineral Land Classification process identifies and assesses the quantity, quality, and extent of economically significant mineral deposits to ensure that the mineral resource potential of these lands is recognized and considered in land use planning.

Humboldt County has significant mineral resources. About eighty-five extraction sites around the County produce sand and gravel, metals, stone, and clay. Sand and gravel extraction constitute the major portion of mining activity in the County, both in terms of quantity of material produced and value of extracted resource. The volume of in-stream gravel and sand extracted in 2015 was 272,240 cubic yards, 68 percent of the 400,919 cubic yards approved for extraction. According to Section 7.1, Mineral Extraction of Chapter 7, Mineral and Energy Resources of the Natural Resources and Hazards Technical Report, the majority of gravel and sand extracted activity took place along the Eel River-Van Duzen River complex (76 percent), and the Mad River (22 percent). The remainder was extracted from Willow Creek and the Trinity River. (https://humboldtgov.org/DocumentCenter/Home/View/58828 Page 3.9-2)

DISCUSSION OF CHECKLIST REPONSES

a) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State?

Thresholds of Significance

Development of land overlying a mineral resource that would physically preclude future access to that resource.

Assessment

Riffle enhancement components of the proposed project would require gravel augmentation during project construction. Gravel would be sourced from other tributaries or nearby quarries. In either case, this use of gravel would be isolated and small-scale and would not represent an appreciable fraction of the total aggregate resources used annually in the County. Consequently, there would be no impact with respect to mineral resources of local, regional, or statewide importance. No mitigation is required.

b) Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

Thresholds of Significance

Loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

Assessment

None of the mines described in the Environmental Setting section above are located within the boundaries of the Elk River where the Proposed Project is located. Furthermore, the Proposed Project would not involve any activities that could directly affect the long-term production of any mineral production sites. Any impact on a mineral production site would be negligible, no mitigation is required.

3.12 Noise

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

Noise Concepts and Terminology

Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient sound level, or sound intensity. The decibel (Db) scale is used to quantify sound intensity. Because sound pressure can vary enormously within the range of human hearing, a logarithmic scale is used to keep sound intensity numbers at a convenient and manageable level. The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called "A-weighting," written "dBA."

Different types of measurements are used to characterize the time-varying nature of sound. Below are brief definitions of these measurements and other terminology used in this chapter.

a) **Sound** is a vibratory disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, can be detected by a receiving mechanism, such as the human ear or a microphone.

b) **Noise** is sound that is loud, unpleasant, or otherwise undesirable.

c) **Decibel (dB)** is a unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure to amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.

d) **A-weighted decibel (dBA)** is an overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.

e) **Maximum sound level (L_{max})** is the maximum sound level measured during the measurement period.

f) **Minimum sound level (L_{min})** is the minimum sound level measured during the measurement period.

g) **Equivalent sound level (L_{eq})** is the equivalent steady-state sound level that, in a stated period of time, would contain the same acoustical energy as time-varying sound level during that same period of time.

h) **Percentile-exceeded sound level (L_{xx})** is the sound level exceeded x percent of a specific time period. L_{10} is the sound level exceeded ten percent of the time.

i) **Day-night level (L_{dn})** is the energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels during the period from 10:00 pm to 7:00 am.sound level exceeded x percent of a specific time period. L_{10} is the sound level exceeded ten percent of the time.

In general, human sound perception is such that a change in sound level of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level. Table 30 presents example noise levels for common noise sources, the levels are measured adjacent to the source.

Table 30. Examples of common noise levels

Source	Noise Level (dBA)
Weakest sound heard by average ear	0
Whisper	30

Normal conversation	60
Ringing telephone	80
Power lawnmower	90
Tractor	96
Hand drill	98
Bulldozer	105
Chain saw	110
Ambulance siren	120
Jet engine at takeoff	140

Source: National Institute of Safety and Health 2008

The term "noise sensitive land uses" (also referred to in this section as sensitive receptors include residences, schools, hospitals, or other similar locations where excess noise would negatively affect normal functions.

REGULATORY SETTING

Acceptable noise levels in unincorporated areas of Humboldt County are established by Standard N-S7 of the Humboldt County General Plan. The maximum noise limits are based on zoning classification and are described in Table 31. As described in Section 3.10 (Land Use and Planning), lands within the Project area are zoned Agriculture General (AG) and Timber Production Zone (TPZ).

Table 31. Humboldt County Short-Term Noise Limits

Time Period	AG	TPZ
Day (6 am – 10 pm)	80 dBA	80 dBA
Night (7 pm – 7 am)	70 dBA	70 dBA

These short-term noise levels do not apply to the use of chainsaws for cutting firewood or power equipment used for landscape maintenance when accessory to permitted on-site uses.

Standard N-IM6 of the Humboldt County General Plan discusses the preparation of a noised control ordinance to regulate noise and/or vibration including maximum standards for construction activities and potentially exempting standards for agricultural uses.

Table 32 details typical construction equipment noise levels as measured 50 feet from the source, according to the Federal Highway Administration. Equipment that is anticipated to be used to construct the Proposed Project is included in the table.

Table 32. Examples of Common Noise Levels of Typical Construction Equipment

Equipment	Typical noise levels 50 feet from source (dBA)
Tractor	84
Aerial boom lift	75
Excavator	81
Dozer	82
Chain saw	84
Plate compactor	83
Haul truck	76

Source: Federal Highway Administration 2006
(http://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/rcnm.pdf)

ENVIRONMENTAL SETTING

The Humboldt County General Plan identifies major noise sources within the unincorporated Eureka area of Humboldt County as US 101, Myrtle Avenue, Harris Avenue, Henderson Avenue, H Street, the Murray Field Airport, the Northwestern Pacific Railroad, and the Redwood Acres Fairgrounds https://ca-humboldtcounty.civicplus.com/DocumentCenter/View/1895 page 3-2). The nearest of these receptors to the Project area is US 101. Noise conditions in the project area are characteristic of a rural, agricultural area and are consistent throughout the Project area. Existing noise sources include vehicular traffic on Elk River Road, loud 18-wheel timber trucks, tractors, harvesters, and other agricultural equipment. Typical noise levels from tractors, measured at a distance of 50 feet, average approximately 84 dBA. Typical noise levels from timber trucks, measured at a distance of >400 m, average approximately <54 dBA.(https://www.fs.fed.us/rm/pubs/rmrs_rn003.pdf)

DISCUSSION OF CHECKLIST RESPONSES

a) **Would the project expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?**

Thresholds of Significance

Generating noise and exposing people to noise in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

Assessment

As described in Section 2.5 (Project Implementation/Construction Methods), the Proposed Project would be constructed in one construction season between August 15/30 and October 15/31. The order of final design and construction will be determined by consultation with the construction contractor but will be organized to limit disturbance. Noise from the operation of construction

equipment does have the potential to affect sensitive receptions in the project vicinity. Sensitive receptors within the project area include adjacent residences or residences within the line of sight. (http://www.noisenet.org/Noise_Terms_calcs.htm)

Construction noise sources would include a variety of heavy equipment and other machinery. An inventory of construction equipment and associated noise levels are presented in Table 34. Anticipated noise levels associated with this equipment generally exceed the maximum daytime noise limits for the associated zoning classifications as defined in Table 31 of 80 dBA.

Construction noise levels are within the range of existing noise levels within the Project area associated with typical farming activities (average of approximately 54 dBA).

Nonetheless, there is still some potential for significant impacts where construction occurs in close proximity to local residents. To reduce impacts from short-term construction-related noise as much as possible, Environmental Commitment measure GEN-15 will ensure notification of residences and the implementation of noise attenuation measures. With these measures in effect, noise impacts would be reduced below the level of significant. No mitigation is required.

Project maintenance activities may require the use of heavy equipment, or gasoline-powered hand tools that would result in increases in noise. However, these increases would be temporary, short-lived, and highly localized and would occur in an agricultural setting where noise associated with agricultural operations. This impact is considered to be less than significant. No mitigation is required.

b) Would the project expose persons to or generate excessive ground borne vibration or ground borne noise levels?

Thresholds of Significance
Generate excessive ground borne vibration or noise levels.

Assessment
Construction activities associated with the operation of heavy equipment may generate localized ground-borne vibration and noise. Vibration from ground-disturbing construction activity is typically considered to be below the threshold of perception when the activity is more than 50 feet away from the receiver. Construction activities are proposed within 50 feet of some residences within the Project area. However, these increases would be construction-related and would therefore be temporary, short-lived, and highly localized. In addition, the daytime noise

levels of agricultural equipment and construction equipment are comparable (approximately 84 dBA). Therefore, this impact is considered to be less than significant. No mitigation is required.

Therefore, impacts from ground borne vibration or noise are not expected to be perceptible. No impact would occur.

c) Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Thresholds of Significance
Substantial permanent increase of ambient noise levels in the project vicinity.

Assessment
Construction of the proposed project and associated maintenance activities would result in intermittent increases in noise. However, these increases would be temporary, short-lived, and would occur intermittently throughout the approximately 1-mile project reach. Project maintenance activities will be required to comply with the same noise abatement measures required for project construction. Therefore, this impact would be less than significant. No mitigation is required.

d) Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Thresholds of Significance
Substantial temporary or periodic increase of ambient noise levels.

Assessment
Construction of the proposed project and associated maintenance activities would result in temporary increases in noise. However, as discussed in the response to item (A) above, the contractor will implement Environmental Commitments measure GEN-15 to reduce effects on sensitive receptors within the project area. Therefore, this impact is determined to be less than significant. No additional mitigation is required.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Thresholds of Significance

Expose people to excessive noise levels within the vicinity of a public airport.

Assessment

The Proposed Project is not located within an airport land use plan area or within two miles of any public airport of airstrip. Therefore, there would be no impact related to airport noise exposure. No mitigation is required.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Thresholds of Significance

Expose people to excessive noise levels within the vicinity of a private airport.

Assessment

See response to Section 3.12.

3.13 Population and Housing

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

This section describes the communities and populations that potentially could be directly or indirectly affected by the Proposed Project.

ENVIRONMENTAL SETTING

As shown in Figure 1, the Proposed Project would occur along an approximate one-mile section of the Elk River channel near the intersection of Elk River Road and Wrigley Road. The Proposed Project would involve 6 parcels and 4 different property owners. There are minimal housing units within the project boundaries as a result of low-density zoning associated with agricultural land use designation. Housing types within the Proposed Project footprint include rural ranch houses and single-family homes.

DISCUSSION OF CHECKLIST RESPONSES

a) Would the project induce substantial population growth in an area, either directly (e.g., by proposing new homes and/or businesses) or indirectly (e.g., through extension of roads or other infrastructure)?

Thresholds of Significance

Result in substantial population growth in the area.

Assessment

The proposed project would not directly or indirectly induce population growth in the area because no new homes or businesses are proposed. The proposed project would not require the extension of roads or other infrastructure. The proposed project would not induce population

growth nor induce population growth in the area ad would not affect nearby towns. Therefore, no impact would occur.

b) Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

Threshold of Significance
Displace substantial numbers of existing housing.

Assessment
The proposed project would not displace housing requiring the construction of replacement housing elsewhere. Therefore, no impact would occur.

c) Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

Threshold of Significance
Displace substantial numbers of people.

Assessment
The proposed project would not displace people requiring the construction of replacement housing elsewhere. To the contrary, the Proposed Project may alleviate flooding and potential future displacement of residents in homes that flood currently. Therefore, there would be no impact.

3.14 Public Services

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

This section describes direct or indirect adverse physical impacts to public services caused by the Proposed Project and any potential need for new or altered facilities.

ENVIRONMENTAL SETTING

Fire Protective Services

Fire Hazard Severity Zones provide the basis for application of various mitigation strategies to reduce risks associated with wildland fires. The Proposed Project is located within a High Fire Hazard Severity Zone and is located within a State Responsibility Area in Humboldt County. file:///F:/fhszs_map.12.pdf The Project area is "out of district" or a response area outside of district boundaries that the departments currently respond to. Fire departments do not receive funding for "out of District" areas and are not legally obligated to respond.

Law Enforcement Services

Law enforcement services are provided in the Elk River neighborhood by the Humboldt County Sheriff's Department. The footprint of the Proposed Project is located in the Patrol Area of the Main Eureka Station, located at 826 4th Street, Eureka, CA. The Central Beat covers the unincorporated areas of Arcata, Eureka, Kneeland, and Elk River. Within the channel Right of Way and banks, the California Highway Patrol (CHP) has law enforcement authority.

Schools and Libraries

No schools are located within the Proposed Project footprint. The nearest school, Koinonia Academy (7540 Elk River Road), is located off of Elk River Road approximately 4,000 feet from the Project area. The nearest library is the Humboldt County Library, located at 1313 3rd Street, approximately ten miles north of the project area.

Park Facilities

No park facilities are located within the footprint of the Proposed Project. However, the Headwaters Forest Preserve (managed by the Bureau of Reclamation) is located north of the Project area. The Elk River Trailhead is located approximately 0.5 miles from the Project area at the end of Elk River Road. In addition, the 77-acre Westfall property located recently acquired by Save the Redwoods League will include public access trails and is located along the South Fork Elk River less than half a mile from the Project area. https://www.savetheredwoods.org/project/westfall-ranch/

DISCUSSION OF CHECKLIST REPSONSES

a-e) No impact. The Proposed Project would involve temporary lane closures and/or detours as necessary. The primary roadways within the Project area, Elk River Road, is a rural two-land roadway that are not frequently travelled except for local residents, logging trucks, and travelers to the Headwaters Forest Preserve. The roadway dead ends at the Headwaters Forest Preserve parking lot and is not a thoroughfare, nor is it frequently travelled. Similarly, Wrigley Road is a dead-end road and is primarily used by residents whose properties are part of the Proposed Project. The proposed Project would not result in an increase in population and would not affect the demand for governmental services (law enforcement, fire protection, emergency, medical, educational, or other public facilities). Likewise, there would be no impact to current service ratios, response times, or other performance objectives from the project design. The project would not induce the expansion of water treatment facilities, nor would it exceed potable or wastewater treatment requirements of the North Coast RWQCB. Furthermore, the proposed project would not result in any additional population growth that could increase the use of existing neighborhood or regional parks or other recreational facilities. Therefore, no impact would occur.

3.15 Recreation

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

This section describes the park and recreation priorities maintained by federal, State, and regional and local agencies that have the potential to be directly or indirectly affected by the Proposed Project. The discussion below includes the federal, State, regional, and local parks and other recreation lands that are accessible outside of the Proposed Project footprint.

ENVIRONMENTAL SETTING

The lower North Fork of the Elk River provides limited recreational opportunities for fishing. There is no access and within the footprint of the Proposed Project, and river access is located on private property. The Proposed Project is surrounded by rural landscape and private property and has no designated recreational opportunities. Other than fishing from bridges, the recreational opportunities closest to the Proposed Project footprint are the Headwaters Forest Preserve, an approximately 7,500-acre area that was previously owned by PALCO but is now owned by the United State and managed by the US Bureau of Land Management (BLM). Recreational opportunities will be incorporated into the Westfall property restoration recently acquired by Save the Redwoods League and the Elk River Estuary Tidal Marsh Restoration project located downstream in the inter-tidal zone and which will include a walking path and a boat launch.

DISCUSSION OF CHECKLIST RESPONSES

a) Does the project Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Threshold
Increase the use of existing recreational facilities.

Assessment
As discussed in Section 3.13 (Population and Housing), the Proposed Project would not result in either short- or long-term population growth in the Project Areas, so it would not result in increased recreational demand related to population growth. The Proposed Project would not modify or otherwise affect existing recreational facilities or resources, and this is not expected to alter patterns of recreational demand or usage. No impacts related to increased use of existing recreational facilities is anticipated, and no mitigation is required.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Threshold
Include or require the expansion of recreational facilities.

Assessment
The Proposed Project is located entirely within private property and does not include a recreational component and would not require the construction of new recreational facilities or expansion of existing facilities. There would be no impact related to new recreational facilities, and no mitigation is required.

3.16 Transportation/Traffic

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exceed the capacity of the existing circulation system, based on an applicable measure of effectiveness (as designated in a general plan policy, ordinance, etc.), taking into account all relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?			✓	
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?			✓	
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?				✓
d) Substantially increase hazards due to design features (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				✓
e) Result in inadequate emergency access?				✓
f) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				✓

This section describes county and State roads where normal traffic conditions could be affected directly or indirectly by the Proposed Project.

SETTING

In general, the Proposed Project is located south of Eureka approximately three miles east of US Highway 101 and the Humboldt Bay National Wildlife Refuge. The Project area is located in a sparsely populated agricultural area approximately two miles southeast of the communities of Humboldt Hill, Pine Hills, and Ridgewood Heights. Vehicle access to the Project area is by US Highway 101 from the Elk River Road exit in Eureka (exit 702), then approximately 2.4 miles southeast on Elk River Road.

Existing and proposed access roads and staging areas for all project activity areas are indicated in **Figure 24**.

The upstream extent of the Project area is the Wrigley Orchard Pilot Project, which includes Project excavation areas Ch4, FP4, and sediment resue areas SP5 and SP6. Each of these project action areas will be accessed from the Wrigley Parcel (APN 311-041-006) via an existing driveway.

The Elk River Flood Curve Pilot Project involves channel and floodplain excavation in the vicinity of the intersection of Elk River Road and Wrigley Road (often referred to as the Concrete Bridge) and Project activities in the vicinity of the North Fork/South Fork confluence (upstream to what is often referred to as the Wrigley Red House).

The location of the Concrete Bridge includes Project action areas CH3 and CH2, FP2 and FP3, and sediment reuse area SP3. , These sites will be accessed from Elk River Road via the Nicklas parcel (APN 311-242-001) on the east side of Elk River Road.

Project sites upstream of the Wrigley Red House include Project action areas CH1, CH2, and FP1. These sites will be accessed from Wrigley parcel APN 311-021-011 via an existing driveway off of Elk River Road. An adjacent sediment reuse site, Project action area SP2, is located on the opposite side of Elk River Road and is accessible directly from Elk River Road.

Two adjacent sediment reuse sites (action areas SP2 and SP4) and channel excavation area CH2

will be accessed via an existing, unimproved drive off of Elk River Road that is located between the Keele parcel (APN 311-243-001) and the Nicklas parcel (311-243-002). New access will be constructed to reach the remainder of the Project action areas which comprise the Flood Curve Pilot Project.

As described in Section 2.5 (Project Implementation/Construction Methods), heavy equipment will access the excavation sites by using the dewatered channel bed after riparian vegetation has been cleared. Temporary ramps will need to be constructed to access the dewatered channel bottom.

DISCUSSION OF CHECKLIST RESPONSES

a) **Would the project exceed the capacity of the existing circulation system, based on an applicable measure of effectiveness (as designated in a general plan policy, ordinance, etc.), taking into account all relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?**

Thresholds of Significance

Substantial increase in the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections.

Assessment

Construction would generate four types of traffic: construction worker commute vehicles, mobilization and demobilization of heavy construction equipment, delivery of materials and supplies, and hauling of spoils between work sites and designated sediment reuse areas. Maintenance activities would result in additional but less significant trips within the same general categories. As previously noted, all excavated sediment will be reused within the footprint of the Proposed Project. No excavated material will be transported off site unless it is unsuitable for use as fill.

Construction Worker Trip Generation

As described in Section 2.5 (Project Implementation/Construction Methods), the Project is proposed to be constructed in the summer of 2019 between August 15 and October 15 (or October 31st if no rain is forecast). Under this scenario, during construction activities it is estimated that no more than 20 construction workers would be onsite. Over the construction period, it is estimated that construction worker vehicles would add no more than 20 round trips (40 individual trips) per day to the Project area.

Heavy Equipment Deliveries

Construction equipment would be staged onsite, meaning that once onsite, equipment would remain onsite until construction has been completed. Transportation of equipment to (mobilization) and from (demobilization) the Project area and movement of equipment between designated work sites would generate a small number of additional trips. Additional trips would be generated by delivery of material and supplies (e.g., erosion control materials), but would only generate an additional 1-2 trips per day.

Truck Trips Associated with Delivery of Spoils Materials

As currently proposed, the Proposed Project would generate a minimum of 18,000 and a maximum of 22,000 cubic yards of material. The majority of spoils locations are located immediately adjacent to channel and floodplain excavation areas, on the same parcel, and would not require transport on public roads. However, within the Elk River Flood Curve reach, up to 1,600 cubic yards of material would be hauled to sediment reuse sites SP1 on a pasture area on the North side of Elk River Road (Wrigley ownership). Less than 50 feet of Elk River Road will be utilized to haul sediment to the SP1. In addition, approximately 9,200-9,300 cubic yards of sediment would be hauled from the Elk River Flood Curve Project area to sediment reuse site SP5 on the Wrigley Orchard pasture. Approximately 3,000 feet of Elk River Road will be used to transport up to 9,300

cubic yards of material between the egress point south of the Concrete Bridge and the Wrigley Orchard driveway, requiring approximately 930 trips of a 10 cubic yard dump truck.

Summary

Construction vehicles may cause a short-term delay of traffic along Elk River Road and Wrigley Road, as vehicles enter and exit project access points. All construction vehicles will access project areas via Elk River Road, Wrigley Road or existing or newly-constructed access roads. However, this level of activity is not anticipated to increase traffic or cause traffic congestion in relation to the capacity of the road and current level of use. Each roadway to be affected is lightly used and has a high level of service (LOS). If necessary, traffic control would be implemented by the construction contractor to allow the passage of construction vehicles and the delivery of materials to the site. In addition, any associated transportation impacts on local roadways will be temporary, and intermittent. Therefore, the impact would be less than significant. No mitigation is required.

b) Would the project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

Threshold of Significance

Conflicts with an applicable congestion management program.

Assessment

Assuming a seek week construction duration during which excavated sediments would be spoiled, construction vehicle traffic on Elk River Road between the Concrete Bridge and Wrigley Orchard is expected to increase by up to approximately 21 vehicle trips per day. Note that only approximately 100 feet of Elk River Road would be required to deliver spoils materials to SP1 and SP4, requiring up to 160 and up to 370 trips of a 10-cubic yard dump truck respectively. Construction vehicle traffic between the Wrigley Red House driveway and Sp1 would increase by an average of 3.5 truck trips per day (Assuming a 45-day construction period). Construction vehicle traffic between the Project area near the Concrete Bridge and SP4 would increase by an average of 8.2 truck trips per day (assuming a 45-day construction period). Vehicles travelling to and from the site during project construction would not cause, either individually or cumulatively, the level of service standard for Elk River Road or Wrigley Road to be exceeded. The increase in vehicle traffic would be temporary and would be concentrated over eight weeks during the summer construction season. In addition, the impact is temporary and intermittent. Therefore, the impact would be less than significant. No mitigation is required.

c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?

Threshold of Significance
Alter air traffic patterns.

Assessment
No impact. The proposed project does not involve air transportation and would not affect air traffic patterns.

d) Would the project substantially increase hazards due to design features (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Threshold of Significance
Increase of traffic-related impacts due to project design features.

Assessment
No impact. The proposed project would not change any road design or cause any road obstructions.

e) Would the project result in inadequate emergency access?

Threshold of Significance
Adversely impact emergency service.

Assessment
The proposed project would not change emergency access from existing conditions. Implementation of the Proposed Project in intended to reduce flooding and improve emergency access to affected neighborhoods/residences. Therefore, there would be no impact, no mitigation is required.

f) Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

Threshold of Significance

Conflict with approved alternative transportation plans.

Assessment

The proposed project would not conflict with alternative transportation policies, plans, or programs. The proposed project would be located on private property. There is adequate room to stage construction vehicles, equipment, and materials and to park construction-worker vehicles. Therefore, there would be no impact, no mitigation is required.

3.17 Tribal Cultural Resources

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

REGULATORY SETTING

The purpose of AB 52 and the consultation is to identify and consider potential impacts to Tribal Cultural Resources (TCRs), and take into account tribal cultural values, in addition to scientific and archaeological values, when determining possible impacts and mitigation.

Public Resources Code (PRC) Section 21074(a) defines Tribal Cultural Resources as either of the following:

> Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either: (1) included or determined to be eligible for inclusion in the California Register of Historical Resources; or (2) included in a local register of historical resources as defined in subdivision (k) of PRC Section 5020.1; or
>
> A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1.

An impact to a TCR may result in a significant impact under CEQA which would require avoidance or minimization of the impact.

a) **Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:**

> **Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or**
>
> **A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.**

Threshold of significance
Adversely alter tribal cultural resources.

Assessment
AB52 consultation letters were distributed to the relevant Tribal governments (Wiyot Tribe and Bear River Band of the Rohnerville Rancheria-Mattole) on March 22, 2019. Some input from these tribes was elicited during the preparation of the cultural resources survey for this project (Appendix G), which did not indicate a significant concern about the potential for this project to disturb cultural resources. Tribal consultation is ongoing, and these tribes will also be welcomed to participate in the Elk River Stewardship Program.

3.18 Utilities and Service Systems

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

ENVIRONMENTAL SETTING

Soils excavated from the bed and banks of the Elk River will be hauled to adjacent spoils sites for reuse. The spoil site nearest to the floodplain or channel excavation site will be filled to capacity before utilizing the next spoils site that is closest in proximity. The project has been designed to achieve equal amounts of cut and fill within the project area, such that no excavated materials will need to off-hauled out of the project area.

As described in Section 3.8 (Hazards and Hazardous Materials), the project area is located downstream of industrial timber operations conducted since the mid-1800's and adjacent to agricultural operations conducted since the early 1900's. As such, there is potential for unknown contamination to exist within the project area. As described in Section 2.9 (Environmental Commitment GEN-6), hazardous materials encountered or generated during construction will transported to a solid waste, recycling, or hazardous waste collection facility as appropriate.

Solid Waste Disposal

Humboldt County is served by the Humboldt Waste Management Authority (HWMA) (http://www.hwma.net/). The HWMA owns and operates the Hawthorne Street Transfer Station, the Eureka Recycling Center, the Household Hazardous Waste Facility, and the Cummings Road Landfill. Any spoils materials that is excavated from the river channel and floodplains that cannot be reused (as mulch or in spoils locations) would be taken to Hawthorne Street Transfer Station (HSTS), located at 1059 West Hawthorne Street in Eureka. Materials that can be recycled will be taken to the Eureka Recycling Center, at the same address. The HSTS is also the site of a hazardous waste collection facility. The HSTS facility receives over 60,000 tons of municipal solid waste annually. Items brought to the Hawthorne Street Transfer Station are first assessed for recycling, reuse, or composting before being sent to the one of three out-of-area landfills for disposal: the Anderson Landfill in Shasta County; Dry Creek Landfill in Medford, Oregon; and Potrero Hills Landfill in Suisun City

Water Supply, Wastewater Disposal, and Sanitary Sewers

The Humboldt County Community Services District (CSD) purchases about one third of its potable water from the Humboldt Bay Municipal Water District (HBMWD), one third from the City of Eureka (which purchases it from HBMWD through the Hubbard and Harris booster pump station), and one third of the potable water is pumped from District-owned wells in the Humboldt Hill area (Elk River aquifer). The County CSD recently expanded their sphere of influence to accommodate development in the Ridgewood Heights area and purchased 30 percent of the City of Eureka Wastewater Treatment Plant to handle sewage in the CSD jurisdiction (Humboldt Local Agency Formation Commission, 2014).

Because the Proposed Project would not affect water or wastewater demands, wastewater capacity needs, or solid waste disposal (because all excavated material will be spoiled on-site), these public facilities are not discussed further in this setting section.

Historically, numerous residents relied on surface water intakes in the river for domestic and agricultural use supplies. Implementation of RWQCB Order R1-1998-100 resulted in alternative supplies being provided to nine residences along North Fork Elk River Numerous South Fork and Mainstem Elk River residents still do not have an alternative water supply source (RWQCB, 2013).

Stormwater Drainage

The project area is not served by storm drain infrastructure. Information on stormwater drainage in the project area is provided in the Hydrology and Water Quality section of this chapter (Section 3.9).

DISCUSSION OF CHECKLIST RESPONSES

a) **Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?**

Threshold of Significance
Exceed RWQCB wastewater treatment requirements.

Assessment
Grading and site layout have been designed to avoid or minimize the impact to existing public utilities. No sewer lines would be impacted by the Proposed Project. The Proposed Project would not increase the need for wastewater treatment in the County. Therefore, there would be no impact related to potential exceedance of wastewater treatment standards or requirements. No mitigation is required.

b) **Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?**

Threshold of Significance
Require or result in the construction or expansion of water or wastewater treatment facilities.

Assessment
The Proposed Project would not increase population in the project area or alter land use in a way that would increase the demand for water or wastewater utility services. The Proposed Project does not propose the construction of wastewater treatment facilities and would not require the expansion of existing facilities. Therefore, there would be no impact. No mitigation is required.

c) **Would the project require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?**

Threshold of Significance
Require or result in the construction or expansion of water or storm water drainage facilities.

Assessment

The project area is not served by city or county storm drain facilities and would not modify existing stormwater drainage facilities. The Proposed Project would not construct new areas of impervious surface requiring storm drainage. Therefore, there would be no impact. No mitigation is required.

d) Would the project have insufficient water supplies available to serve the project from existing entitlements and resources (i.e., new or expanded entitlements are needed)?

Threshold of Significance

Requires new or expanded entitlements to serve the project.

Assessment

The Proposed Project has been designed with landowner input to avoid or minimize the impact to existing private utilities at each site. No public groundwater wells or water supply lines would be impacted by the Proposed Project. Therefore, there would be no impact to potable water supply availability or demand. No mitigation is required.

e) Would the project result in a determination by the wastewater treatment provider, which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Threshold of Significance

Demand exceeds the capacity of the wastewater treatment provider.

Assessment

The proposed project would not require or result in the construction or expansion of stormwater drainage features. Therefore, there would be no impact. No mitigation is required.

f) Would the project be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs?

Threshold of Significance

Exceeds landfill's permitted capacity.

Assessment

Green waste associated with the Proposed Project will be chopped up and used as mulch and spoiled on-site or cut-up and offered to landowners as firewood. Overall, the amount of solid waste that the Proposed Project would generate is very small. The amount of solid waste generated is expected to be negligible and landfills served by Humboldt County have adequate capacity to accept the waste. Project-related waste volumes could easily be accommodated as part of the Project Area' s existing waste stream. Therefore, there would be no impact. No mitigation is required.

g) **Would the project violate any Federal, State, and local statutes and regulations related to solid waste?**

Threshold of Significance

Violates Federal, State, or local solid waste regulations.

Assessment

The proposed project would generate a very small amount of solid waste requiring transport and disposal. As described in Chapter 2, any solid wastes associated with the Proposed Project would be handled and disposed of in accordance with applicable federal, state, and local regulations and policies. Therefore, there would be no impact. No mitigation is required.

3.19 Mandatory Findings of Significance

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

Section 15065 of the "CEQA Guidelines," which are found in Title 14 of the California Code of Regulations, requires the lead agency to determine whether the proposed project may have a significant effect on the environment, which would require the preparation of an Environmental Impact Report.

a) **Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?**

The Proposed Project is a sediment remediation and habitat enhancement pilot project specifically designed to mitigate nuisance flooding conditions while improving the quality of habitat in the project reaches. An archaeological investigation of the project area did not identify any known cultural resources within the project area. If implemented correctly and in accordance with mitigation measures and permit conditions, the proposed project would not degrade the quality of the

environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.

As identified under Environmental Checklist Sections 3.4 (Biological Resources), 3.5 (Cultural Resources), 3.7 (Greenhouse Gas Emissions), 3.8 (Hazards and Hazardous Materials), 3.12 Noise, and 3.16 (Transportation and Traffic), implementation of the proposed project could result in potentially significant impacts that degrade the quality of the environment, and impact biological and cultural resources. Implementation and mitigation measures incorporated into the proposed project and adherence to best management practices would reduce the potential for impacts to a less-than-significant level.

b) **Would the project have impacts that are individually limited, but cumulatively considerable?**

A cumulative impact refers to the combined effect of "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines Section 15355). As defined by the State of California, cumulative impacts reflect "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. (CEQA Guidelines Section 15355[b]).

There are several activities in the watershed that may have a cumulative effect on federally-listed SONCC coho and Northern California steelhead. These activities include an Lake and Streambed Alteration Agreement (Jesse Noell: for riparian clearing in the Elk River Flood Curve reach, restoration of the Westfall property to be implemented by Save the Redwoods League, ongoing logging in the upper watershed as regulated under existing Timber Harvest Plans and waste discharge requirements, and associated impaired water quality as regulated under the Elk River Sediment Total Maximum Daily Load (TMDL), and new sources of runoff from urbanization.

The Project actions proposed herein do not have impacts that are individually limited, but cumulatively considerable. The project is a pilot project along an approximately 2,375 linear foot section of channel along the North Fork Elk River. If the pilot project shows that mechanical sediment remediation is feasible and cost-effective for increasing channel conveyance, additional lower portions of the Elk River may undergo similar sediment remediation and channel recontouring. Additional environmental documentation would be prepared for any future phases involving additional sediment remediation.

The intent of the proposed project is to evaluate whether the treatments employed are effective in order to evaluate whether future sediment remediation projects in the Elk River would be cumulatively beneficial for flood mitigation as well as for rare and threatened fish populations.

Cumulative impacts are thus determined to be less than significant, assuming implementation of the Environmental Commitments identified in Section 7.2 which will ensure there would be no significant adverse impacts on the environment.

Reasonably-expected related projects with the potential to impact federally-listed anadromous species in the Elk River Watershed are listed below:

Jesse Noell Lake and Streambed Alteration Agreement

A 5-year Lake and Streambed Alteration Agreement was approved by CDFW in 2016 for blackberry and willow removal to increase velocities under the Concrete Bridge abutments in order to mobilize aggraded sediment on the banks. The permit area includes a three-mile reach extending upstream from Elk River Courts to Kristi Wrigley's property on the North Fork, and Jesse Noell's property on the South Fork). Under the LSAA agreement, willows extending into the channel from the banks may be pruned and cut, with all willow within three feet (vertical) of the active channel preserved. Under the LSAA, instream overstory canopy is to be preserved to keep stream temperatures cold while inhibiting any new growth of sedge or bunch grasses within the channel.

> *Potential Impacts of Planned Activities (similar to the Proposed Project):* Similar short-term impact on fish habitat from removal of in-channel vegetation.

City of Eureka Elk River Estuary/Inter-Tidal Wetlands Enhancement and Coastal Access Project

The Elk River Estuary/Inter-Tidal Wetlands Enhancement and Coastal Access Project (State Clearinghouse No. 2017082048) proposes to restore and enhance estuary and inter-tidal wetland habitats on approximately 114 acres adjacent to the Elk River. The project would enhance and restore approximately 78 acres of salt marsh, 13 acres of riparian habitat, and 13 acres of inter-tidal channels. The project may also create approximately 2.8 miles of navigable channels connected to Elk River Slough. In addition, the project proposes to enhance public access to Elk River and Humboldt Bay through an approximately one-mile extension of the Waterfront Trail and other amenities including a boat launch, viewing platforms, and parking area. Environmental clearance and permitting of the Elk River Estuary Project are complete. Construction of the portion of the Project north of the Elk River is anticipated in Summer 2019, with the balance of construction south of Elk River expected to occur in the Summer of 2020.

Potential Impacts of Planned Activities (similar to the Proposed Project): Similar short-term, construction-related impacts with potential adverse impacts on fish, wildlife, and habitat quality associated with vegetation removal, and construction-related disturbance if not properly mitigated.

Elk River Stewardship Program

The Elk River Watershed Stewardship Program is supported by a Clean Water Act Section 319(h) grant and is designed to engage community and institutional stakeholders of the Elk River watershed in the planning and design of restoration alternatives to regain beneficial uses of the Elk River. The Stewardship Program will assess the technical, social, regulatory, and economic feasibility of the projects identified through the Elk River Recovery Assessment (ERRA) to address instream legacy sediment. Future remediation implementation will require a regulatory compliance strategy and a finance plan to attain CEQA compliance, permits, and adequate funding resources. The Stewardship Program will work iteratively with the ERRA technical team, agencies, and landowners to reach consensus on direct recovery actions and develop a community-supported strategy for moving into subsequent implementation phases. The study area of the ERRA and Elk River Watershed Stewardship Program extends from the mouth of the Elk River at Humboldt Bay all the way up into the North Fork to Tom's Gulch, and up into the South Fork Elk River at Bridge Creek.

Potential Impacts of Planned Activities (similar to the Proposed Project): None, no implementation projects are currently funded.

Save the Redwoods League Westfall Restoration

In 2016, Save the Redwoods League purchased the 77-acre Westfall Ranch which buffers the Headwaters Forest Preserve and is located above the Project area on the South Fork Elk River. According to the League's web site, "The League plans to restore the Elk River's salmon habitat on the Westfall property. Decades of large-scale industrial clear-cut logging in the region resulted in sediment flowing into the once free-running Elk River, which originates in Headwaters. Gone are the deep, clear pools and side channels that coho salmon need to survive. Now, the river is choked with silt. A habitat assessment will be conducted to determine the best approach to restoring the watershed. Recommended actions likely will include removal of sediment to improve water quality and strategic placement of large fallen trees back into the stream system to help re-establish pools, shade and cover for coho and other imperiled fish in the salmon family." (https://www.savetheredwoods.org/project/westfall-ranch/). Associated Project elements include public access to Headwaters Forest Reserve including hiking trails. Ultimately, the League plans to transfer the property to the Bureau of Land Management, depending on public funding.

Potential Impacts of Planned Activities (similar to the Proposed Project): Similar short-term, construction-related impacts with potential adverse impacts on fish, wildlife, and habitat quality associated with vegetation removal, and construction-related disturbance if not properly mitigated.

Elk River Recovery Assessment

The Elk River Recovery Assessment was initiated by the State Water Resources Control Board in 2014 to investigate feasible actions to abate nuisance flooding and recover water quality conditions necessary to restore ecosystem functions in the North Fork Elk River.

The Recovery Assessment includes the construction, calibration, and validation of a hydraulic/hydrodynamic and sediment transport models (HST model) suitable for assessing the effects of a range of actions individually, collectively, and under a range of flows, sediment loads, and time frames. The Recovery Assessment will assess and identify recovery actions which will be outlined in a peer-reviewed sediment reduction implementation framework that is scientifically defensible and has the highest probability of reducing sediment loads in order to restore a sustainable stream reach capable of supporting beneficial uses and abating the current nuisance flooding conditions in the Middle Reach. The goals of the Recovery Assessment are to:

- Contain the 1.5-2 year recurrence interval flows (1.5-2 year flood) within the banks of the Middle Reach of Elk River;
- Support beneficial uses of water by attaining sediment-related water quality objectives as defined in the Water Quality Control Plan for the North Coast Region (Basin Plan).

The Recovery Assessment will result in a list of technical recommendations for sediment reduction implementation, supported by the appropriate modeling, data analyses, and peer review. Potential recovery actions include dredging, new channel construction, on-channel or off-channel detention basins, levee construction or modification, vegetation management, infrastructure improvements, creation of inset floodplains, high flow channels, and placement of instream large woody debris.

The Recovery Assessment is funded by the State Water Resources Control Board Cleanup and Abatement Account with matching funds provided by the California Coastal Conservancy and Humboldt Redwood Company. The program is being directed by the Regional Water Quality Control Board, California Trout, a team of technical scientists, and a technical advisory committee. Project Partners include area landowners, California Trout, Northern Hydrology & Engineering, Stillwater Sciences, and Trinity Associates.

The Proposed Project described herein is intended to demonstrate implementation capacity and inform the ERRA of sediment remediation effectiveness, implementation costs, logistics (e.g. sediment reuse), and environmental compliance considerations.

> *Potential Impacts of Planned Activities Similar to the Proposed Project:* None, no implementation projects are currently funded.

Timber Harvest Plans and Waste Discharge Requirements

Land use and ownership within the Upper Elk River Watershed (immediately above the project area) is predominantly commercial timberlands owned and managed by Humboldt Redwood Company (HRC) and were previously owned by Pacific Lumber Company (PALCO). On the South Fork, Green Diamond Resource Company owns the McCloud Creek sub-basin, which is managed for timber harvest. HRC owns most of the remaining land in the South Fork basin.

Management of upper watershed lands for commercial timber production is expected to continue under California State Forest Practice Rules and waste discharge requirements (WDRs) which is the primary regulatory mechanism utilized by the RWQCB to control the nonpoint source pollution resulting from past and ongoing timber harvesting activities. WDRs for the timberland owners are currently being revised to ensure that they are consistent with the Elk River Sediment TMDL zero load allocation, through the application of a comprehensive prevention and minimization program, in combination with beneficial use enhancement projects. of the Elk River Sediment TMDL (because the Elk River has a zero capacity for additional sediment loading). load-allocations established by the recently adopted Elk River Sediment Total Maximum Daily Load. Impacts associated with timber harvest include changes to the hydrograph (timing, magnitude, and duration of runoff), increases in sediment supply, increases in suspended sediment/turbidity, decrease in shading of aquatic surfaces, and an increase in water temperature.

Timber harvest activities are regulated by the California Department of Forestry and Fire under Timber Harvest Plans (THPs), by the RWQCB under Waste Discharge Requirements (WDRs), and by the CDFW under Habitat Conservation Plans (HCPs). Despite adherence to WDRs and other regulatory approaches, "previously set harvest limitations and clean-up and abatement orders requirements have not resulted in substantially improving downstream conditions relative to domestic water supply and flooding, despite being in place for eight years and demonstrably effective in sediment control (HRC, Letter to RWQCB re Peer Review Draft Staff Report to Support the Technical Sediment TMDL for the Upper Elk River, 2013)".

Because of sediment aggradation, there is currently a zero loading capacity for additional sediment within the impacted reach. This observation is based on (1) sediment inflows to the impacted reach

that exceed outflows, (2) continued aggradation in the impacted reach, (3) continued exceedances of sediment-related water quality standards, and (4) a delay before sediment and channel restoration can be accomplished in the impacted reach. The zero sediment load regulatory cap will be maintained until the impacted reach's physical assimilative capacity has been expanded through sediment remediation and channel restoration during Phase 1 implementation (Tetra Tech, 2015, p. 74). The RWQCB will develop WDRs which translate the zero load allocation into permit conditions.

Potential Impacts of Planned Activities (similar to the Proposed Project): Legacy levels of sediment loading associated with industrial timber harvest in the upper watershed and landslides associates with logging and the upper watershed's soft Wildcat geology is accounted for in the TMDL's zero load allocation. WDRs reflecting the zero load allocation will have a positive impact on sediment loading if property implemented, and will reflect an additional source of sediment loading if not.

Urbanization

Residential uses in the Elk River watershed include the land along the river corridor, Elk River Road, Ridgewood Heights, and Humboldt Hill. Lands along Elk River Road, from the edge of Eureka to the northwest above the confluence of the North and South Forks, are in rural residential use. Ridgewood Heights and Humboldt Hill are the two major residential areas in the Elk River watershed besides the Elk River neighborhood, which lies along the river corridor along Elk River Road. The Ridgewood Heights neighborhood is characterized by both urban and rural land uses. Humboldt Hill is primarily residential in character. Both of these areas expect to see an increase in residential development in the coming years, particularly because of the neighborhood's close proximity to the City of Eureka and the scarcity of land within the City suitable for new residential development.

> *Potential Impacts of Planned Activities Similar to the Proposed Project:* Urban development of this neighborhood has the potential to increase the area of impervious surface and potentially generate erosion that could alter the hydrograph and/or deliver more sediment to the Elk River.

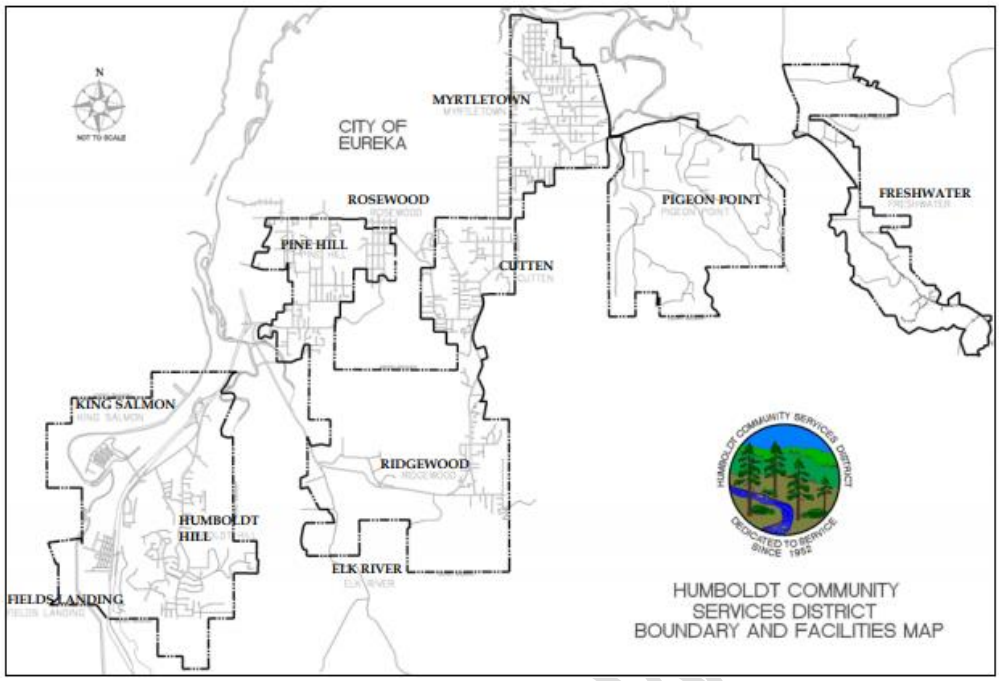

Figure 32. Humboldt Community Services District Boundary and Facilities Map showing proximity of Ridgewood Heights and Martin Slough neighborhoods to the Elk River http://humboldtlafco.org/wp-content/uploads/Humboldt-1-FPD-Adopted-MSR-Sept-19-2008.pdf).

No impact. The proposed project does not have impacts that are individually limited, but cumulatively considerable. The project is a pilot project along a one- mile section of the North Fork Elk River. If the pilot project shows that sediment remediation is feasible and effective for increasing channel conveyance, additional segments of the Elk River would undergo similar sediment remediation and channel recontouring. Additional environmental documentation would be prepared for this additional sediment remediation. The intent is that the pilot project along with future sediment remediation projects in the Elk River would be cumulatively beneficial for flood mitigation as well as for rare and threatened fish populations in the Elk River.

c) Would the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less than significant. Project impacts include the potential for temporary impacts to human beings during construction activities. However, these impacts are temporary and would be controlled through the implementation of mitigation measures provided in Checklist Section 3.12 (Noise). Failure to implement the proposed project would cause more adverse effects on humans than implementation of the proposed project, as a result of continued nuisance flooding conditions and continuing degradation of the surrounding environment.

Chapter 4

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