LAST CHANCE GRADE PERMANENT RESTORATION PROJECT

DEL NORTE COUNTY, CALIFORNIA
DISTRICT 1 – DN – 101 POST MILES 12.7 to 16.5
EA 01-0F280 / EFIS 0115000099

Draft Environmental Impact Report/ Environmental Impact Statement and Draft Section 4(f) Evaluation



Prepared by the
State of California, Department of Transportation

The environmental review, consultation, and any other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by Caltrans pursuant to 23 USC 327 and the Memorandum of Understanding dated May 27, 2022, and executed by FHWA and Caltrans.

December 2023



General Information about This Document

What's in this document:

The California Department of Transportation (Caltrans), as assigned by the Federal Highway Administration (FHWA), has prepared this Environmental Impact Report/Environmental Impact Statement (EIR/EIS), which examines the potential environmental impacts of the alternatives being considered for the proposed project located in Del Norte County, California. Caltrans is the lead agency under the National Environmental Policy Act (NEPA). Caltrans is also the lead agency under the California Environmental Quality Act (CEQA). The document tells you why the project is being proposed, what alternatives we have considered for the project, how the existing environment could be affected by the project, the potential impacts of each of the alternatives, and the proposed avoidance, minimization, and/or mitigation measures.

What you should do:

- Please read this document.
- Additional copies of this document are available for review at Caltrans District 1 Office, 1656 Union Street, Eureka, CA and at the Del Norte County Library, 190 Price Mall, Crescent City, CA. Technical studies are available upon request. This document may be downloaded at the following website: www.lastchancegrade.com/.
- Attend the virtual public open house on Wednesday, January 24, 2024, from 5:30-7:00 PM. A link to the virtual meeting will be available on the project website listed above.
- We'd like to hear what you think. If you have any comments about the proposed project, please attend the virtual public open house and/or send your written comments via postal mail or email Caltrans by the deadline.
    - Send comments via postal mail to:

      Steve Croteau, Senior Environmental Scientist
      Caltrans North Region Environmental–D01
      P.O. Box 3700
      Eureka, CA 95502-3700
    - Send comments via email to: DEDcomments@lastchancegrade.com
- Be sure to send comments by the deadline: February 13, 2024

What happens next:

After comments are received from the public and reviewing agencies, Caltrans, as assigned by the FHWA, may: (1) give environmental approval to the proposed project, (2) do additional environmental studies, or (3) abandon the project. If the project is given environmental approval and funding is obtained, Caltrans could design and construct all or part of the project.

Alternative formats:

For individuals with sensory disabilities, this document can be made available in Braille, in large print, or in digital format. To obtain a copy in one of these alternate formats, please call or write to Department of Transportation, Attn: Myles Cochrane, P.O. Box 3700, Eureka, CA 95502-3700; (707) 498-4272 (Voice) or use the California Relay Service 1 (800) 735-2929 (TTY to Voice), 1 (800) 735-2922 (Voice to TTY), 1 (800) 855-3000 (Spanish TTY to Voice and Voice to TTY), 1-800-854-7784 (Spanish and English Speech-to-Speech) or 711.



SCH #2021110050
1-DN-101-PM 12.7/16.5
EA 01-0F280
EFIS 0115000099

Permanent roadway restoration and realignment project on U.S. Highway 101 located approximately 10 miles south of Crescent City in Del Norte County, California

LAST CHANCE GRADE PERMANENT RESTORATION PROJECT

Draft Environmental Impact Report / Environmental Impact Statement and Draft Section 4(f) Evaluation

Submitted Pursuant to: (Federal) 42 USC 4332(2)(C), 49 USC 303 and/or 23 USC 138
(State) Division 13, California Public Resources Code

THE STATE OF CALIFORNIA
Department of Transportation

Cooperating Agencies:
National Park Service, U.S. Army Corps of Engineers,
U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service,
National Marine Fisheries Service

Responsible Agencies:
California Coastal Commission, California Department of Fish and Wildlife, California Department of Parks and Recreation, California Transportation Commission,
North Coast Regional Water Quality Control Board

12/08/2023
Date

Brandon Larsen, on behalf of
Matthew K. Brady
District Director
California Department of Transportation
NEPA Lead Agency

12/08/2023
Date

Brandon Larsen, on behalf of
Matthew K. Brady
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***Abstract:** This project proposes a long-term solution to the instability and potential roadway failure at Last Chance Grade. Potential substantial environmental effects include those related to biological resources. Please submit comments by February 13, 2024.*



SUMMARY

S.1 NEPA Assignment

California participated in the "Surface Transportation Project Delivery Pilot Program" (Pilot Program) pursuant to 23 United States Code (USC) 327, for more than five years, beginning July 1, 2007, and ending September 30, 2012. MAP-21 (Public Law 112-141), signed by President Obama on July 6, 2012, amended 23 USC 327 to establish a permanent Surface Transportation Project Delivery Program. As a result, Caltrans entered into a Memorandum of Understanding (MOU) pursuant to 23 USC 327 (NEPA Assignment MOU) with the Federal Highway Administration (FHWA). The NEPA Assignment MOU became effective October 1, 2012, and was renewed on May 27, 2022, for a term of ten years. In summary, Caltrans continues to assume FHWA responsibilities under NEPA and other federal environmental laws in the same manner as was assigned under the Pilot Program, with minor changes. With NEPA Assignment, FHWA assigned and Caltrans assumed all of the United States Department of Transportation Secretary's responsibilities under NEPA. This assignment includes projects on the State Highway System and Local Assistance Projects off the State Highway System within the State of California, except for certain categorical exclusions that FHWA assigned to Caltrans under the 23 USC 326 CE Assignment MOU, projects excluded by definition, and specific project exclusions.

S.2 Project Overview

The Last Chance Grade (LCG) Permanent Restoration Project is located on a section of U.S. Highway 101 (U.S. 101) known as LCG in southern Del Norte County, California. It is approximately 10 miles south of Crescent City, between post miles 12.7 and 16.5. For many years, one-way traffic controls have been in place through this section of highway due to geologic instability. The purpose of the project is to develop a long-term solution to the instability and potential roadway failure at LCG. The project considers alternatives that would provide a more reliable connection, reduce maintenance costs, and protect the economy, natural resources, and cultural landscapes.

S.2.1 Lead Agencies and CEQA/NEPA Documentation

The proposed project is a joint project by Caltrans and FHWA and is subject to federal and state environmental review requirements. Project documentation, therefore, has been prepared in compliance with both NEPA and CEQA. Caltrans is the lead agency under

NEPA and also the lead agency under CEQA. In addition, FHWA's responsibility for environmental review, consultation, and any other actions required by applicable federal environmental laws for this project are being, or have been, carried out by Caltrans pursuant to 23 USC 327 and the MOU dated May 27, 2022, and executed by FHWA and Caltrans.

Some impacts determined to be significant under CEQA may not lead to a determination of significance under NEPA because NEPA is concerned with the significance of the project *as a whole*.

After receiving comments from the public and reviewing agencies, a Final Environmental Impact Report/Environmental Impact Statement (EIR/EIS) will be prepared. Caltrans may prepare additional environmental and/or engineering studies to address comments. The Final EIR/EIS will include responses to comments received on the Draft EIR/EIS and will identify the preferred alternative. After the Final EIR/EIS is circulated, if Caltrans decides to approve the project, a Notice of Determination will be published for compliance with CEQA, and a Record of Decision will be published for compliance with NEPA.

S.2.2 Project Area

The project is located in Del Norte County, a small rural county in northwestern California, with a population of just under 28,000 (U.S. Census Bureau 2021a). The project is along a section of U.S. 101 just east of the Pacific Ocean, approximately 10 miles south of Crescent City and 7 miles north of the unincorporated community of Klamath. The project area is uninhabited and undeveloped, with no residences or other facilities present. U.S. 101 is the only north/south state highway in the county, and the only viable route between Klamath and Crescent City; a closure of the highway between the two communities would result in a 449-mile detour. This portion of U.S. 101 also serves as the Pacific Coast Bike Route and is designated a State Scenic Highway. The project area is rural, with primarily resource-oriented lands, including federal and state lands and working timberlands. The project traverses Redwood National Park and Del Norte Coast Redwoods State Park. These two parks are cooperatively managed as Redwood National and State Parks (RNSP) by the National Park Service and the California Department of Parks and Recreation. RNSP was designated a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site in 1980 (UNESCO 2012).

S.2.3 Purpose and Need

The purpose of the project is to develop a long-term solution to the instability and potential roadway failure at LCG that would provide a more reliable connection, reduce maintenance costs, and protect the economy, natural resources, and cultural landscapes.

A long-term sustainable solution at LCG is needed to address:

- Economic ramifications of a long-term failure and closure
- Risk of delay/detour to the traveling public
- Increasing maintenance and emergency project costs
- Increases in the frequency and severity of large storm events caused by climate change

S.2.4 Proposed Action

The project proposes two build alternatives—Alternative X and Alternative F—and a No-Build Alternative.

Alternative X would involve reengineering and partially realigning a 1.6-mile-long section of the existing highway to minimize the risk of landslides. Main project components would include 1.6 miles of retaining walls along the roadway, an underground drainage system to help reduce landslide risk by capturing groundwater, and strategic eastward retreats from the existing roadway.

Alternative F would involve constructing a 6,000-foot (1.1-mile) tunnel east of the existing highway to avoid the most intense areas of known landslides and geologic instability. Main components would include a tunnel and associated portals, a bridge at the northern portal to connect the tunnel alignment to the existing highway, and an on-site Operations and Maintenance Center (OMC) for tunnel support.

Geotechnical investigations would be needed for both Alternative X and Alternative F to more fully inform final project design.

Under the No-Build Alternative, no project work would be done on the existing highway. Existing conditions would persist, including the indefinite continuation of emergency repairs and enhanced maintenance which have been ongoing for more than a decade.

S.3 Project Impacts

One of the primary differences between NEPA and CEQA is the way significance is determined. Under NEPA, the determination of significance is based on context and intensity; some impacts determined to be significant under CEQA may not be of sufficient magnitude to be determined significant under NEPA. Under NEPA, it is the magnitude of the impact *as a whole* that is evaluated, and not the judgment of significance to individual

resources. NEPA does not require that a determination of significant impacts be stated in the environmental documents.

CEQA, on the other hand, does require identification of each "significant effect on the environment" resulting from the project and ways to mitigate each significant effect. All significant environmental effects must be disclosed and mitigated, if feasible.

For the LCG project, the CEQA impact conclusions are summarized below:

- The project is anticipated to have *no impact* on agriculture and forest resources, hazards and hazardous materials, land use and planning, mineral resources, population and housing, public services, recreation, and utilities and service systems.
- The project would have *less than significant impacts* on aesthetics, air quality, cultural resources, energy, geology and soils, hydrology and water quality, noise, transportation, tribal cultural resources, and wildfire.
- The project would have *less than significant impacts with mitigation incorporated* on greenhouse gas (GHG) emissions and special status bat species.
- The project would have *significant and unavoidable impacts*, even after inclusion of avoidance, minimization, and mitigation measures, on the following biological resources: late successional redwood forest (Alternative F only), late successional Sitka spruce forest, and marbled murrelet and their critical habitat.

Table S-1 summarizes the potential impacts of the project alternatives and the proposed avoidance, minimization, and mitigation measures under NEPA and CEQA. The table also includes Standard Measures or Best Management Practices (BMPs), which are measures that are implemented on most, if not all, Caltrans projects and were not developed in response to any specific environmental impact resulting from the proposed project alternatives, and are considered elements of the project.

Resources that would not be impacted are not discussed in Table S-1. However, details for all environmental subjects evaluated are presented in Chapters 3 (NEPA) and 4 (CEQA) of this document. The full avoidance, minimization, and mitigation measures are listed in Appendix D, *Draft Mitigation Summary and Environmental Commitments Record*, and Standard Measures and BMPs in Section 2.6, *Standard Measures and Best Management Practices*.

Table S-1. Summary of Potential Impacts from Alternatives

Affected Resources	Alternative X	Alternative F	No-Build Alternative	Standard Measures and Avoidance, Minimization, and Mitigation Measures for Build Alternatives	Mitigation Measures Pursuant to CEQA for Build Alternatives
Human and Physical Environment					
Aesthetic Resources	Construction-related impacts; effects to public views	Construction-related impacts; effects to public views; new source of light	Effects related to continuation of emergency repairs	AR-1 through AR-5 Visual-1 through Visual-3	N/A
Air Quality	Short-term degradation of air quality during construction	Short-term degradation of air quality during construction	Effects related to continuation of emergency repairs	TT-1, GHG-1 through GHG-4	N/A
Climate Change/GHG	Construction-related GHG emissions	Construction-related GHG emissions; operational emissions associated with the OMC	Effects related to continuation of emergency repairs	AR-2, BR-4, GHG-1 through GHG-5, TT-1	Bio-1*
Energy	Construction-related energy use	Construction-related energy use; operational energy use associated with the OMC	Effects related to continuation of emergency repairs	GHG-1 through GHG-4, TT-1	N/A
Geology, Soils, Seismic, Topography	Construction-related erosion	Construction-related erosion	None	WQ-1, WQ-2, GS-1, GS-2	N/A
Cultural Resources (Historic Resources)	Potential adverse effect on historic resource.	Potential adverse effect on historic resources	None	CR-1 through CR-4, Cultural-1	N/A
Noise	Construction-related noise	Construction-related noise; operational noise associated with the OMC	Effects related to continuation of emergency repairs	Bio-5	N/A

Affected Resources	Alternative X	Alternative F	No-Build Alternative	Standard Measures and Avoidance, Minimization, and Mitigation Measures for Build Alternatives	Mitigation Measures Pursuant to CEQA for Build Alternatives
Parks and Recreational Facilities	Acquisition of land from RNSP, as well as a subterranean easement	Acquisition of land from RNSP, as well as a subterranean easement and a temporary construction easement. Potential relinquishment of bypassed section of the existing highway back to RNSP	None	Park-1 through Park-3	N/A
Traffic and Transportation	Construction-related delays associated with regular reversing traffic control and occasional full facility closures; effects to emergency vehicles and general traffic	Construction-related delays associated with occasional full facility closures; effects to emergency vehicles and general traffic	Effects related to continuation of emergency repairs and frequent maintenance	TT-1, UE-1	N/A
Water Quality and Stormwater Runoff	Construction-related effects to water quality; operation-related changes to groundwater associated with drainage galleries	Construction-related effects to water quality	None	WQ-1, WQ-2	N/A
Wildfire	Temporary, minor emergency vehicle access delays associated with traffic control	Temporary, minor emergency vehicle access delays associated with traffic control	None	TT-1, UE-1 through UE-3	N/A

Affected Resources	Alternative X	Alternative F	No-Build Alternative	Standard Measures and Avoidance, Minimization, and Mitigation Measures for Build Alternatives	Mitigation Measures Pursuant to CEQA for Build Alternatives
Biological Environment					
Animal Species	Effects to: • Amphibians • Purple martin and Vaux's swift • Fisher • Ringtail • Sonoma tree vole and white-footed vole • Special status bats* • Migratory birds	Effects to: • Amphibians • Purple martin and Vaux's swift • Fisher • Ringtail • Sonoma tree vole and white-footed vole • Special status bats* • Migratory birds	None	BR-1, BR-2, Bio-5	Bio-5 through Bio-9*
Natural Communities	Effects to sensitive natural communities	Effects to sensitive natural communities	None	BR-3, BR-4, Bio-2 through Bio-4	Bio-1*
Threatened and Endangered Species	Effects to: • Bald eagle • Marbled murrelet and its critical habitat* • Northern spotted owl • Humboldt marten	Effects to: • Bald eagle • Marbled murrelet and its critical habitat* • Northern spotted owl • Humboldt marten • Coho salmon	None	BR-1, BR-2	Bio-1*
Wetlands and Other Waters	Temporary and permanent impacts	Temporary and permanent impacts	None	BR-1, BR-3, BR-4, BR-5, Bio-4	N/A

*Pursuant to CEQA, Bio-1 has been specifically proposed for natural communities, marbled murrelet and their designated critical habitat, and GHG emissions, and Bio-5 through Bio-9 have been specifically proposed for special-status bat species; however, these measures would likely benefit other sensitives resources.



S.4 Coordination with Public and Other Agencies

As part of the NEPA and CEQA process, a scoping meeting is required when preparing an EIR and EIS. A Notice of Preparation (NOP) of an EIR was received and accepted by the State Clearinghouse on November 5, 2021, and advertised to the public and mailed to elected officials and federal, state, and local agencies having jurisdiction or discretionary approval within the project corridor. A Notice of Intent (NOI) to prepare an EIS was published in the *Federal Register* on November 5, 2021. A public scoping meeting was held November 18, 2021.

Various agencies were invited to participate in the project as cooperating, participating, trustee, and/or responsible agencies, as applicable. Under 23 USC 139, letters of invitation requesting various agencies' involvement as cooperating and/or participating agencies were distributed November 10, 2021. A summary of consultation and coordination is provided in Chapter 5, *Comments and Coordination*.

S.5 Permits and Approvals

Table S-2. Permits and Approvals Needed

Agency	Permit/Approval	Status
United States Fish and Wildlife Service (USFWS)	Section 7 Consultation for Threatened and Endangered Species	Biological Opinion expected from USFWS prior to Final Environmental Document (FED).
United States Army Corps of Engineers (USACE)	Section 404 Permit for filling or dredging Waters of the United States	Application for Nationwide Section 404 permit expected after FED approval.
National Marine Fisheries Service (NMFS)	Section 7 Consultation for Threatened and Endangered Species	Concurrence expected from NMFS on anadromous species prior to FED.
California Coastal Commission (CCC)	Coastal Development Permit (CDP); Federal Consistency Determination	Application for CDP expected after FED approval; the Federal Consistency Determination would be included as part of the permitting process.
California Department of Fish and Wildlife (CDFW)	1602 Permit: Lake and Streambed Alteration Agreement	Applications for 1602 permit expected after FED approval.
North Coast Regional Water Quality Control Board (NCRWQCB)	401 Water Quality Certification; Waste Discharge Requirements	Applications expected after FED approval.

Agency	Permit/Approval	Status
State Historic Preservation Officer (SHPO)	Programmatic Agreement (PA) or Memorandum of Agreement (MOA), Determination of Eligibility, Finding of Effect	Signing or concurrence on each item prior to FED approval.
Redwood National and State Parks (RNSP)	Section 4(f)	Coordination on Section 4(f) prior to FED.
California Transportation Commission (CTC)	CTC vote to approve funds and approve a route adoption	Following the approval of the FED, the CTC will be required to vote to approve funding for the project, as well as approve the route adoption for U.S. 101.

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ABBREVIATIONS AND ACRONYMS

ABBREVIATION / ACRONYM	DESCRIPTION
°F	degrees Fahrenheit
AAR	Alternatives Analysis Report
AB	Assembly Bill
AC	Activity Center
ACE	Areas of Conservation Emphasis
ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
ADI	Area of Direct Impact
ADL	aerially deposited lead
APE	Area of Potential Effects
ARPA	Archaeological Resources Protection Act
ARS	Acceleration Response Spectrum
ASBS	Area of Special Biological Significance
BMP(s)	Best Management Practice(s)
BOS	Board of Supervisors
BSA	Biological Study Area
BTU	British thermal unit
CAFE	Corporate Average Fuel Economy
CAL EPA	California Environmental Protection Agency
Cal-IPC	California Invasive Plant Council
Cal/OSHA	California Division of Occupational Safety and Health
Caltrans	California Department of Transportation
CAPM	Capital Preventive Maintenance
CAPTI	Climate Action Plan for Transportation Infrastructure
CARB	California Air Resources Board
CBP	chromium-based paint
CCA	California Coastal Act of 1976
CCAA	California Clean Air Act
CCC	California Coastal Commission
CCR	California Code of Regulations
CCT	California Coastal Trail
CDFW	California Department of Fish and Wildlife
CDPR	California Department of Parks and Recreation
CEHC	California Essential Habitat Connectivity Project
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act

ABBREVIATION / ACRONYM	DESCRIPTION
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CESA	California Endangered Species Act
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
CGP	Construction General Permit
CGS	California Geological Survey
CH	Critical Habitat
CH_4	methane
CHP	California Highway Patrol
CIDH	Cast-In-Drilled-Hole (pile)
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CTC	California Transportation Commission
CWA	Clean Water Act
CZMA	Coastal Zone Management Act of 1972
dB	decibel
dBA	A-weighted decibel
DBH	diameter at breast height
DEIR	Draft Environmental Impact Report
DN	Del Norte
DNCRSP	Del Norte Coast Redwoods State Park
DNLTC	Del Norte Local Transportation Commission
DPS	Distinct Population Segment
DSA	Disturbed Soil Area
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EBRA	Expert-Based Risk Assessment
ECL	Environmental Construction Liaison
ECR	Environmental Commitments Record
EDAS	Engineered Deformation Absorption System
EDR	Environmental Data Resources
EFH	Essential Fish Habitat
EFS	Engineered Feasibility Study

ABBREVIATION / ACRONYM	DESCRIPTION
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act of 2007
EO	Executive Order
EPIC	Environmental Protection Information Center
ESHA(s)	Environmentally Sensitive Habitat Area(s)
ESL	Environmental Study Limits
ESU	Evolutionarily Significant Unit
°F	degrees Fahrenheit
FCAA	Federal Clean Air Act
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHSZ	Fire Hazard Severity Zone
FHWA	Federal Highway Administration
FTIP	Federal Transportation Improvement Program
GDP	Gross Domestic Product
GDRC	Green Diamond Resource Company
GHG	greenhouse gas
GMP	General Management Plan
GP	General Plan
HA	Hydrologic Area
H&SC	Health and Safety Code
HCAOG	Humboldt County Association of Governments
HCP	Habitat Conservation Plan
HEL	Highly Erodible List (USDA)
HFC	hydrofluorocarbon
HPTP	Historic Property Treatment Plan
HU	Hydrologic Unit
HUM	Humboldt
IPCC	Intergovernmental Panel on Climate Change
ITEK	Indigenous Traditional Ecological Knowledge
ISA	Initial Site Assessment
IUCN	International Union for Conservation of Nature
LBP	lead-based paint
LCG	Last Chance Grade
LCP	Local Coastal Program
L_{eq}	Equivalent sound level
L_{max}	Maximum sound level

ABBREVIATION / ACRONYM	DESCRIPTION
LEDPA	Least Environmentally Damaging Practicable Alternative
LSAA	Lake and Streambed Alteration Agreement (CDFW)
LWCF	Land and Water Conservation Fund
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
MLD	Most Likely Descendant
MMRP	Mitigation Monitoring and Reporting Program
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
mph	miles per hour
MPO(s)	Metropolitan Planning Organization(s)
MS4	Municipal Separate Storm Sewer System
MSAT	Mobile Source Air Toxics
MWH	Megawatt-hours
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NAHC	Native American Heritage Commission
NAVD 88	North American Vertical Datum of 1988
NCRWQCB	North Coast Regional Water Quality Control Board
NCUAQMD	North Coast Unified Air Quality Management District
NEPA	National Environmental Policy Act
NES	Natural Environment Study
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOA	Naturally Occurring Asbestos
NOI	Notice of Intent
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
O_3	ozone

ABBREVIATION / ACRONYM	DESCRIPTION
OHWM	Ordinary High Water Mark
OMC	Operations and Maintenance Center
OPR	(Governor's) Office of Planning and Research
OUV	Outstanding Universal Value
PA	Programmatic Agreement
Pb	lead
PCBR	Pacific Coast Bike Route
PLACs	Permits, Licenses, Agreements and Certifications
PM(s)	Post Mile(s)
PM	particulate matter
$PM_{2.5}$	particles of 2.5 micrometers or smaller
PM_{10}	particles of 10 micrometers or smaller
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
PR	Project Report
PRC	Public Resources Code
project	Last Chance Grade Permanent Restoration Project
PS&E	Plans, Specifications, and Estimates
PSR	Project Study Report
RCRA	Resource Conservation and Recovery Act of 1976
RE	Resident Engineer
RHZ	Root Health Zone
RNP	Redwood National Park
RNSP	Redwood National and State Parks
ROD	Record of Decision
ROG	Reactive Organic Gases
RSA	Resource Study Area
RSP	Rock Slope Protection
RTP(s)	Regional Transportation Plan(s)
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCS	Sustainable Communities Strategy
SDC	Seismic Design Criteria
SEM	Sequential Excavation Method
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLR	Sea Level Rise
SNC(s)	Sensitive Natural Community(ies)
SO_2	sulfur dioxide

ABBREVIATION / ACRONYM	DESCRIPTION
SONCC	Southern Oregon/Northern California Coast (coho salmon ESU)
SO_X	sulfur oxides
SRZ	Structural Root Zone
SS	Standard Specifications
SSC	Species of Special Concern
SSP	Standard Special Provision
SWMP	Statewide Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TBM	tunnel boring machine
TCE	Temporary Construction Easement
TCL	Traditional Cultural Landscape
TCP	Traditional Cultural Property
THP	Timber Harvesting Plan
THPO	Tribal Historic Preservation Officer
THVF	Temporary High-Visibility Fencing
TMDLs	Total Maximum Daily Loads
TMP	Transportation Management Plan
UNESCO	United Nations Educational, Scientific and Cultural Organization
U.S. 101	U.S. Highway 101
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
U.S. DOT	U.S. Department of Transportation
U.S. EPA	U.S. Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VA	Value Analysis
VMT	vehicle miles traveled
WBWG	Western Bat Working Group
WDRs	Waste Discharge Requirements
WPCP	Water Pollution Control Program
YNHP	Yolo Natural Heritage Program
ZEV	zero-emission off-road vehicle

CHAPTER 1. Proposed Project

1.1 Introduction

The California Department of Transportation (Caltrans), as assigned by the Federal Highway Administration (FHWA), is the lead agency under the National Environmental Policy Act (NEPA). Caltrans is also the lead agency under the California Environmental Quality Act (CEQA).

The Last Chance Grade Permanent Restoration Project is proposed to permanently address the instability and potential roadway failure along a segment of U.S. Highway 101 (U.S. 101) known as Last Chance Grade (LCG) in southern Del Norte County, north of Wilson Creek and south of Crescent City (Post Miles [PMs] 12.7–16.5[1]). Figure 1-1 shows the project location.

This project is identified as a regionally significant project in the 2020 Regional Transportation Plan (RTP) (Del Norte Local Transportation Commission 2021) and is programmed as a long lead State Highway Operation and Protection Program project funded through the Permanent Restoration Program (Caltrans 2022a). This project will be funded in phases.

[1] Post Miles 12.7 to 16.5 include the entire area along the highway where construction signs and traffic control may occur. The limits of work associated with the alternatives would be smaller than the project limits, as described in Section 2.2.1, *Project Alternatives.*

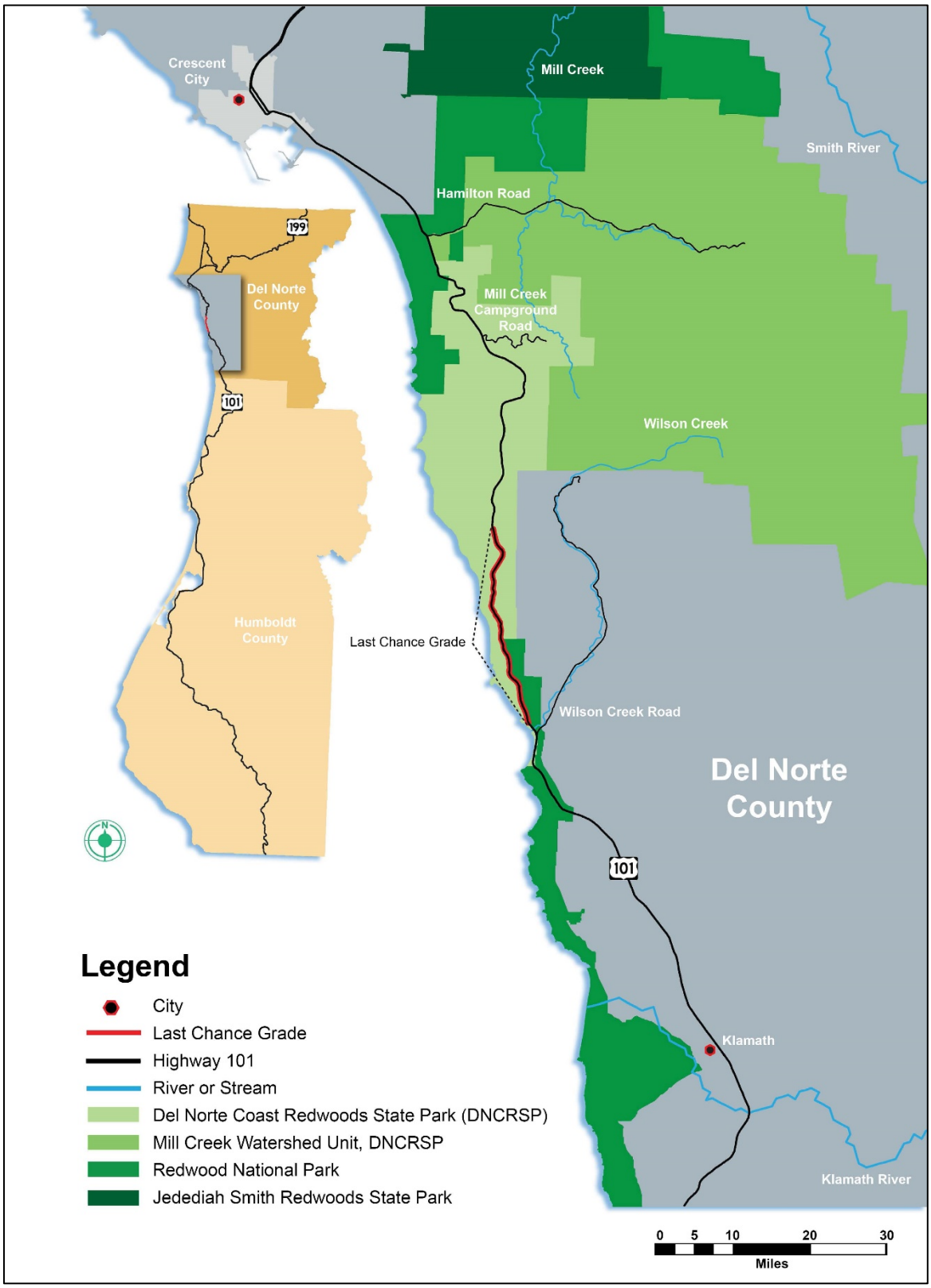


Figure 1-1. Project Location

1.2 Purpose and Need

1.2.1 Project Purpose

The purpose of the project is to develop a long-term solution to the instability and potential roadway failure at LCG. The project would consider alternatives that provide a more reliable connection, reduce maintenance costs, and protect the economy, natural resources, and cultural landscapes.

1.2.2 Project Need

A long-term sustainable solution at LCG is needed to address:

- Economic ramifications of a long-term failure and closure
- Risk of delay/detour to the traveling public
- Increasing maintenance and emergency project costs
- Increases in the frequency and severity of large storm events caused by climate change

LCG is located in an area of geologic instability; there is a landslide complex that is approximately 3 miles long with more than 30 active landslides of varying widths and depths. This instability has required significant expenditures of tax dollars on emergency construction projects and maintenance activities to keep the highway open and safe. Between 1997 and 2021, landslide mitigation efforts, including retaining walls, drainage improvements, and roadway repairs, cost more than $85 million. There is no foreseeable end to such expenditures, and effects of climate change may exacerbate conditions.

Other than U.S. 101, there are no viable routes between Crescent City and Klamath. Klamath is a community just south of LCG; many people routinely travel between Crescent City for work, school, or personal business. Typically, a one-way journey between the two cities would be about 22 miles, taking approximately 30 to 40 minutes. However, in the event of a closure, a 449-mile detour would be required, which would take approximately 8 hours (Figure 1-2).

Potential economic consequences of an emergency 1-year closure of LCG include the loss of approximately 3,800 jobs and the reduction of business output by nearly half a billion dollars ($456 million) (Caltrans 2018a). Such a closure would also lead to an estimated $236 million in travel costs to be collectively borne by individuals, businesses, and government institutions.

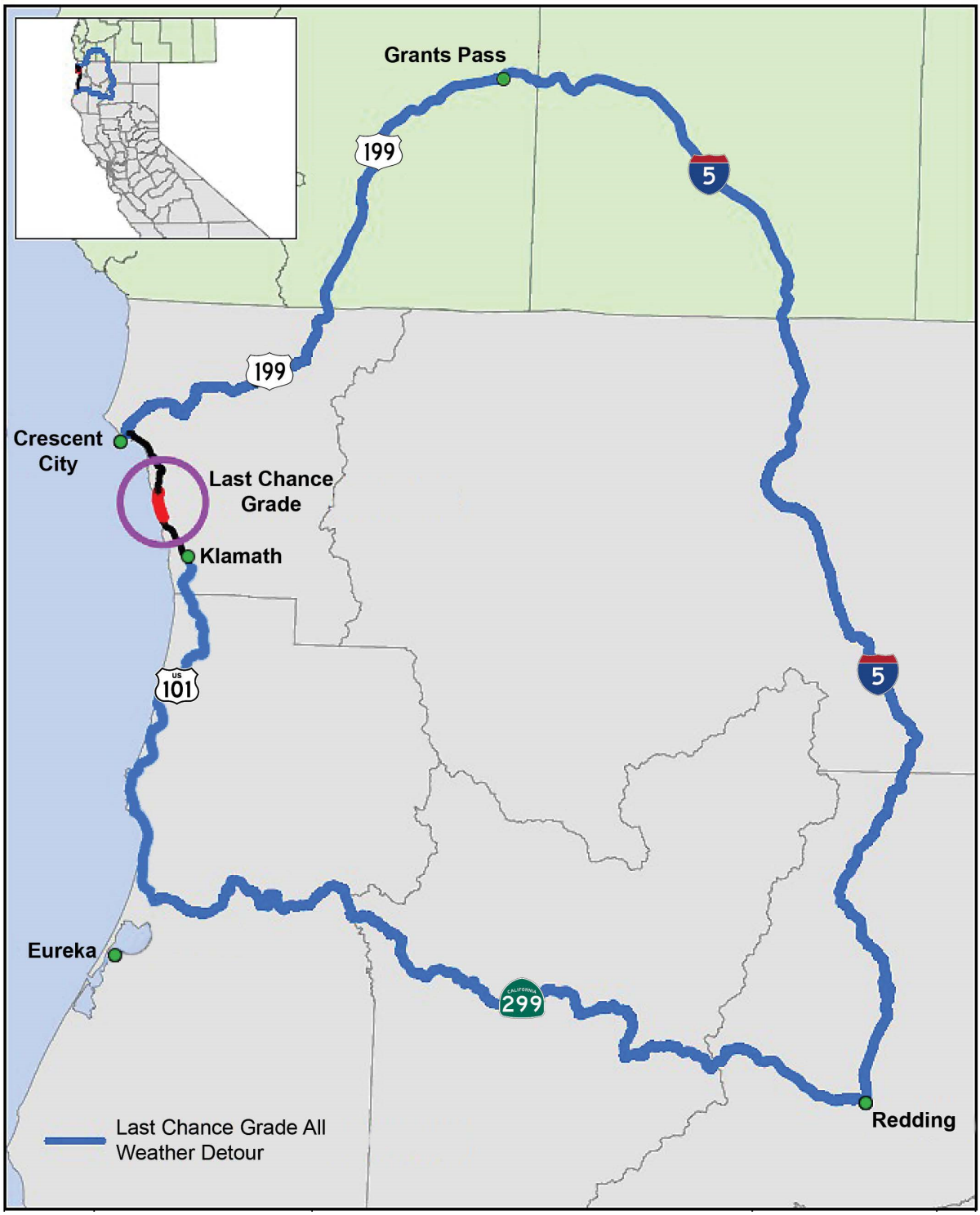


Figure 1-2. Regional Location and Detour Map

1.3 Independent Utility and Logical Termini

Regulations from the FHWA (23 Code of Federal Regulations [CFR] 771.111(f)) require that the project:

- Connect logical termini and be of sufficient length to address environmental matters on a broad scope,
- Have independent utility, and
- Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

FHWA defines logical termini as the rational endpoints for both a transportation improvement and for a review of environmental impacts for the transportation improvement. Choosing a transportation corridor with logical termini prevents segmentation, which may arise if a transportation need extends throughout an entire corridor, but environmental issues and transportation need are discussed only for a segment of the corridor. The LCG end points (i.e., PMs 12.7–16.5) are considered logical termini because they cover a corridor of sufficient length and the geographic scope to address the purpose and need of the project and to review environmental impacts.

Independent utility is an FHWA requirement that highway projects must be usable and are a reasonable expenditure even if no additional transportation improvements in the area are made. A project is considered independent when it can function, or operate, on its own, without further construction of an adjoining segment. The proposed project would construct improvements that would make the roadway more functional and reliable without the need for any additional transportation investments in the area and would therefore have independent utility.

A project must not restrict consideration of alternatives for other reasonably foreseeable transportation improvements. Project termini must be selected to prevent a highway improvement from "forcing" further improvements that may have negative consequences not addressed in environmental studies. The proposed project is addressing issues along a segment of U.S. 101, and has logical termini and independent utility. As it would maintain the connection of the highway between Crescent City and Klamath, there are no other improvements being considered in the area, and it would not require other improvements, this project is not anticipated restrict consideration of alternatives for reasonably foreseeable transportation improvements.



CHAPTER 2. Project Alternatives

This chapter describes the project action and the design alternatives that were developed to meet the purpose and need of the project in addition to the No-Build Alternative. The build alternatives are:

- Alternative X – Reengineer Existing Highway
- Alternative F – Tunnel (Bypass Landslide)

2.1 Project Description

The proposed project is located on a section of U.S. 101 known as Last Chance Grade (LCG). LCG is located in southern Del Norte County, approximately 10 miles south of Crescent City and and approximately 7 miles north of Klamath, between PMs 12.7 and 16.5. Through this area, U.S. 101 is classified as a conventional two- to four-lane rural highway, though for many years, year-round one-way traffic control has been in place through a particularly acute section of landsliding. The need for the project stems from geologic instability in the area that has required decades of emergency repairs to keep the roadway open. The purpose of the project is to address the instability and potential roadway failure at LCG in the long term.

2.2 Alternatives

2.2.1 Project Alternatives

There are three alternatives for this project, which include two build alternatives—X and F—that were developed to meet the purpose and need of the project (Figure 2-1 and Appendix A, *Project Layouts*, Figures 3a and 3b), as well as a No-Build Alternative. The full set of project layouts can be found in Appendix A.

Alternative X would involve reengineering a 1.6-mile-long portion of the existing roadway. This alternative would include a series of retaining walls, underground drainage features, and strategic eastward retreats (realignments) to minimize the risk of landslides (Appendix A, Figures 5a–7b, 14, and 15a).



Figure 2-1. Build Alternatives Overview

Alternative F would involve constructing an approximately 6,000-foot-long (1.1-mile) tunnel to avoid the most intense area of known landslides and geologic instability, thereby avoiding the portion of U.S. 101 most prone to closure (Appendix A, Figures 8a – 14, and 15b). The tunnel would replace the existing highway at this location.

For the ***No-Build Alternative***, no work would be done to the existing highway; existing conditions would persist, including the continuation of emergency repairs and enhanced maintenance activities.

As further detailed below, both Alternatives X and F would involve geotechnical investigations related to the specific X and F routings. These would supplement previous geotechnical investigations conducted in the area over the past several years.

In addition, the project contains a number of standard project measures which are employed on applicable Caltrans projects and were not developed in response to any specific environmental impact resulting from the proposed project. These measures are addressed in more detail in Section 2.6, *Standard Measures and Best Management Practices*.

Geotechnical Investigations

For both Alternatives X and F, geotechnical investigations would be conducted to confirm the location of basal failure planes and landslide depths. Twenty-two boring locations (designated as "B") are currently proposed for the project alternatives (Appendix A, Figure 4):

- **Alternative X:** B-59 to B-66, B-68, and B-70 to B-77
- **Alternative F**: B-56 and B-57
- **Alternatives X and F**: B-67, B-69, and B-78

While some locations could be accessed by old or existing roads, most boreholes would be accessed by helicopter to minimize impacts on environmental resources and to overcome access limitations caused by dense vegetation and steep slopes.

Exact location of the boreholes would be determined prior to the investigation; locations would be based on accessibility, safety, and avoidance of environmental resources.

Additional boreholes may be required. These would be drilled within the currently proposed project footprint, such as along the walls for Alternative X and at the portals for Alternative F. If additional information is needed along the Alternative F tunnel alignment, the information would be obtained through an exploratory tunnel that would begin at the northern and/or southern portal location.

Use of helicopters and other equipment that produces noise above 90 decibels (dB) would be limited to the time between September 16 and January 31.

Truck-and-Track Drilling Operations

Boreholes B-56, B-57, B-63, and B-78 would be on or adjacent to old or existing roads and would be drilled using a truck- or track-mounted drill rig. Minor limbing and trimming of vegetation with hand tools may be required due to the size of the drilling equipment and the exact placement of the boreholes.

Borehole B-57 would be located on an overgrown road. Clearing and grading the road may be required for access.

Helicopter Drilling Locations

The remaining boreholes would be accessed by helicopter. The potential helicopter drilling sites were identified based on openings in the canopies; exact placement of the boreholes would be based on accessibility for helicopters and field personnel, safety, and avoidance of environmental resources.

Access trails would be needed for the drill teams to reach helicopter borehole locations. Creation of the trails would require trimming of vegetation with hand tools and other minor disturbances, such as moving or cutting downed debris. Given the steep terrain, measures such as temporary stairs and/or ropes may also be needed. Access trails would be maintained for the duration of instrumentation monitoring activities, which could span several years. Tree impacts would be limited to trimming or removal of small diameter trees where feasible; tree removal would be coordinated with the appropriate agencies.

Each borehole location would require approximately 50 x 50 feet of vegetation to be trimmed for the drilling activities. Some boring locations may require more than two boreholes; where this is the case, the boreholes would be installed within 10 feet of each other, within the same 50 x 50-foot work area.

There are three potential helicopter staging areas in clearings along Green Diamond Resource Company (GDRC) logging roads, east of the project area. An AS350 Airbus Helicopter with a 1,400-pound load capacity and low noise and downdraft would likely be used to transfer equipment to drilling sites. Helicopters would fly at a high enough altitude between staging areas and boreholes to reduce rotor wash on trees. Equipment would be lowered from the helicopter using a 100- to 200-foot cable. A prefabricated modular steel drill platform, approximately 20 x 20 feet, would be placed at each drill site. Ground disturbance may be needed to ensure the platform has stable contact with the ground.

Approximately 12 helicopter trips would be needed to deliver equipment from the staging area to each borehole location. The longest flight path is approximately 2 miles, between the easternmost helicopter staging area and the southernmost boring location (B-59). Based on the anticipated flight speed, each flight would take approximately 7 to 8 minutes. Assuming a few miles round trip and no complications, approximately 90 minutes would be needed for each drilling location. Additional flights to resupply drill sites would also be required. Work at each location is anticipated to take one week. Depending on equipment and staff availability, two crews may work simultaneously; however, both crews would be serviced by the same helicopter.

Drilling Procedure

To obtain quality soil and rock samples, a mud rotary drilling system would be required for the borings. Borings would be 4.75 inches in diameter and extend up to 400 feet below the ground. Drilling fluid (clean water or water thickened with agency-approved biodegradable polymer) would be contained and recirculated through a closed system, and the soil cuttings/fluid would be stored in a mud tank. The cuttings would be placed in steel drums and disposed of at a licensed facility. Instrumentation, such as inclinometers, would be installed in the boreholes and connected to data loggers with remote download capabilities. The instrumentation would be monitored for several years before being destroyed. For decommissioning, each borehole would be filled with hydrated bentonite pellets and cut off 5 feet below the ground. Upon completion of decommissioning, all materials would be removed, and all disturbed areas would be restored.

Alternative X – Reengineer Existing Highway

Alternative X would involve reengineering a 1.6-mile-long section of the existing highway to minimize the risk of landslides (Appendix A, Figures 5a–7b, 14, and 15a).

This alternative would include highway improvements between PMs 14.08 and 15.9. Main project components would include the construction of an underground drainage system and a series of retaining walls. Geotechnical investigations would be conducted to inform project design.

From the south, at approximately PM 14.11, an access road would be created for the underground drainage gallery. Work on the roadway would begin near PM 14.3. Existing retaining walls on the east side of the highway would be removed and a single new wall would be constructed. On the west side of the highway, a retaining wall would be constructed in a gap between existing walls. The reengineered highway would be shifted to

the east by up to 130 feet at spot locations and curves near the northern limits would be reduced. These changes would reduce this section of highway from 1.6 miles to 1.3 miles.

Details on these and other project features are included in the sections below.

Roadway Design

The existing highway has 12-foot-wide lanes and, except for a few locations, shoulder widths range from 0 to 4 feet. Vehicle speeds range from 35 to 55 miles per hour (mph). Within the area of improvement, Alternative X would maintain two 12-foot-wide lanes, while increasing shoulders to 8 to 10 feet (Appendix A, Figure 7b). The wider shoulders would improve access for bicyclists and pedestrians and provide refuge for stranded vehicles. The new highway would accommodate vehicle speeds of 35 mph. Guardrail would be replaced and upgraded where needed. Permanent lighting is not anticipated.

Underground Drainage System

Prior to work on the highway retaining walls, an underground drainage system would be constructed to capture and redirect groundwater from within the slope to the Pacific Ocean (Appendix A, Figures 6a, 6b and 7a). This redirection of groundwater would reduce slope movement.

The underground drainage system would consist of three drainage galleries installed at various elevations, parallel to the slope's contours, to ensure groundwater is removed from the slope's basal failure planes. The drainage galleries would consist of 12-foot-diameter tunnels constructed using tunnel boring machines (TBMs) and lined with segments of concrete. Drainage would be achieved by drilling into the tunnel walls and installing small-diameter perforated pipes (or drains) that would radiate outward into the surrounding substrate to capture groundwater.[2] Each drainage gallery would be between 6,700 and 7,200 feet long, with a total combined length of approximately 21,000 linear feet.

Each gallery would be accessed by a 30-foot-diameter vertical shaft at its southern end; these shafts would extend to a depth of approximately 200 feet and no more than 4 feet above the ground. It is anticipated that these shafts (three in total) would be constructed with interconnected secant piles with soil and rock removed using augers and excavators.

[2] To minimize potential effects of groundwater drawdown on wetlands and other waters that may be reliant on groundwater, such as near the northern and southern limits of Alternative X, the project design may include measures such as having fewer or no perforated pipes at certain locations, sealing a portion of the drainage tunnels, or reducing the northern extent of the drainage galleries.

Captured groundwater would flow through the drainage galleries to the vertical shafts. An approximately 4-foot-diameter pipe connecting the shafts would then convey the groundwater to a single outfall located approximately 100 feet above the ocean. Rock slope protection (RSP) would be placed below the outfall.

An access road would be needed for the construction and maintenance of the drainage system. The road is anticipated to be 24 to 32 feet wide; the greater widths within this range would be needed to allow vehicles to navigate sharp roadway curves. The road may be wider near vertical shafts to provide sufficient space for maintenance activities (Appendix A, Figure 6b). It is anticipated that porous pavement would be used to allow stormwater to infiltrate. In addition, a temporary access road, approximately 12 feet wide and 500 feet long, would be needed for construction of the outfall.

Highway Retaining Walls

Currently, a series of retaining walls within the project limits support the existing highway. However, a more robust, comprehensive, and proactive system of retaining walls is needed to improve the slope instability and address earth movement.

On the uphill (east) side of the highway, existing walls would be removed and a single continuous wall, approximately 6,000 feet long and up to 50 feet high, would be installed (Appendix A, Figures 5a, 5b, and 7b). It is anticipated that one 300-foot section of wall would be tiered to accommodate the road realignment and to improve slope stability and resilience at this location. The second level tier would be up to 50 feet height and third level tier up to 35 feet height. Benches would be required above and between each wall to both increase slope stability and provide access for construction.

On the downhill (west) side of the highway, a single wall, approximately 300 feet in length, would be installed in a gap between existing walls (Appendix A, Figures 5a and 7b). This retaining wall would be up to 10 feet high. The benches adjacent to the existing walls would be used and extended for construction access and future wall maintenance.

The new walls would be anchored soldier pile walls with timber lagging. Soldier pile walls consist of steel beams inserted into the ground at regular intervals, with horizontal timber supports (lagging) between the soldier piles to retain the slope. To construct the walls, slopes would be excavated, and augers and oscillators used to prepare holes for the steel beams. Once steel beams are inserted, the holes would be backfilled with concrete, and timber lagging placed. Ground anchors would be installed to secure the wall to the slope using a multi-directional drill rig. No pile driving is anticipated for the construction of the walls.

Roadway Drainage

In addition to the underground drainage system, Alternative X may affect up to 14 existing culverts: PMs 14.08, 14.22, 14.35, 14.56, 14.65, 14.73, 14.75, 14.88, 14.96, 15.02, 15.06, 15.15, 15.31, and 15.38 (Appendix A, Figure 6a). Work may include extending the culverts to match new roadway widths and placing RSP at outfalls. Outfall locations would not be moved—existing culverts would be extended to the east, as needed.

Utilities

There are no existing utilities within the Alternative X project area. However, a trenched conduit would be installed within the shoulder or paved area of the highway to accommodate broadband cable as part of a larger State effort to provide broadband along state highways[3].

Landscaping

Most of the existing U.S. 101 roadbed would be removed where it diverges from the proposed roadway. Where removed, the old roadbed would then be revegetated with native vegetation.

Excavation

Substantial excavation would be required to realign the existing highway and construct the retaining walls. Approximately 270,000 cubic yards of material would be removed. Some of this material could be incorporated into the construction of the alternative, with the remainder exported to a legally permitted off-site location. It is anticipated that 15,000 to 20,000 truck trips to and from the project site would be needed to dispose of the excess material.

Staging Areas

Existing paved or graveled areas within the right of way and lanes closed to facilitate construction would be used as staging (Appendix A, Figure 14). In addition, a staging area would be created near the entrance to the underground drainage system access road, as well as at various locations along the access road (Appendix A, Figure 6b). These areas support construction and would be used for activities such as parking equipment and storing materials. Temporarily disturbed areas not needed for ongoing maintenance activities would be restored to pre-construction conditions.

[3] Broadband cable may be installed prior to the construction of LCG. If this is the case, cable may need to be moved during construction of this project.

Equipment

Heavy equipment used for construction includes earthmovers/loaders, excavators, augers, oscillators, bulldozers, multidirectional rig, graders, and pavers. At a distance of 50 feet, noise generated from heavy equipment is anticipated to be in the range of 74 to 90 A-weighted decibels (dBA).

Construction Scenario

Alternative X would be constructed in a specific sequence, with the underground drainage system constructed first to reduce the movement of the landslide, followed by construction of the retaining walls, as described below. Tunnel boring associated with the drainage galleries would operate continuously, including overnight. While no other nighttime construction is currently planned, construction work is not limited to daylight; night work would be conducted as needed. Night lighting is required for safety and may be needed for the security of the construction area.

The general sequence of construction activities would be:

1. Conduct geotechnical investigations.
2. Clear and grub as needed for site access.
3. Construct access road to the underground drainage system.
4. Construct the underground drainage system.
5. Once the underground drainage system is constructed, close northbound side of highway.
6. Remove existing walls and install new walls on east side of highway.
7. Switch traffic to northbound lane and construct wall on west side of highway.
8. Install new guardrails.
9. Repave and restripe.

Traffic Management

Because there are no feasible detours, Alternative X would be constructed without any long-term closures. During construction, the highway would be reduced to a single lane with reversing traffic control. Delays would typically be up to 30 minutes. Longer full facility closures, typically in the range of 2 to 3 hours, may be needed periodically to allow

placement of construction equipment and other activities[4]. Informational signage, flaggers, and temporary traffic lights would be used for the duration of construction.

Right of Way

Alternative X would require up to 11.16 acres of new right of way, primarily to the west of the existing highway (Appendix A, Figure 15a). A subterranean easement of approximately 37.76 acres would be needed for the underground drainage system.

Construction Schedule

Alternative X is anticipated to take 3 to 5 years to complete. If this alternative is selected, construction is projected to start in 2031 and be completed by 2035.

Construction and Maintenance Costs

Construction of Alternative X is anticipated to cost approximately $580 million in 2022 dollars. The adjusted cost estimate for 2031, the anticipated start of construction, is $880 million. Most of the cost is related to structures—primarily the retaining walls and underground drainage system. The remaining amount would be for roadway construction and right of way acquisition.

The underground drainage system is anticipated to reduce the need for emergency closures due to landslides. However, the roadway, walls, and underground drainage system would need periodic maintenance. Assuming the walls and underground drainage system perform as anticipated, annual maintenance costs are anticipated to be approximately $2 to $5 million per year in 2022 dollars.

Alternative F – Tunnel (Bypass Landslide)

Alternative F would involve constructing an approximately 6,000-foot-long (1.1-mile) tunnel to the east of the existing highway to avoid the most intense areas of known landslides and geologic instability (Appendix A, Figures 8a–14 and 15b).

This alternative would include work between PMs 13.42 and 15.7. Portions of Alternative F are near sections of the California Coastal Trail. No work is proposed on the trail, and it is anticipated the trail would remain accessible during construction, though there may be temporary, short-term delays and/or closures, primarily where the trail crosses the highway, for safety.

[4] Any closures longer than 30 minutes would require prior approval from Caltrans management. Closure times may range from 1 to 10 hours, and periods of closure would be selected to minimize impacts to the public.

The main components of this alternative include the construction of tunnel portals and the tunnel, a bridge, and an Operations and Maintenance Center (OMC). Geotechnical investigations would be conducted to inform project design.

From the south, Alternative F would diverge from the existing highway near the end of the existing truck climbing lane (PM 14.33), traveling approximately 800 feet towards the southern portal. The portal would open into a single, large-diameter tunnel, which would be approximately 200 feet below ground for most of its length. The tunnel would exit the hillside just north of the existing slide. A bridge would be constructed at the northern portal to reconnect the new alignment to the existing highway (PM 15.62). An OMC would be built south of the tunnel to facilitate tunnel operation and maintenance.

More details on these features and other project components are included below.

Roadway Design (Outside of Tunnel)

The existing highway has 12-foot-wide lanes and, except for a few locations, shoulder widths range from 0 to 4 feet, with vehicle speeds of 35 to 55 mph. The new alignment would be a substantial change from the existing roadway. While the new alignment would maintain 12-foot-wide lanes in either direction, shoulders would be expanded to 8 to 10 feet. The wider shoulders would improve access for bicyclists and pedestrians and provide refuge for stranded vehicles. Guardrail would be replaced and upgraded where needed. Alternative F would accommodate vehicle speeds of at least 45 mph.

Tunnel Portals, Approaches, and Retaining Walls

Alternative F would diverge from the existing highway at PM 14.33 and travel approximately 800 feet to the southern portal (Appendix A, Figures 8b and 9). Near the area of divergence, a concrete retaining wall on spread footings would be constructed below the downhill (west) side of the new road segment. This wall would be up to 20 feet high.

The approach to the southern portal would require excavation into the hillside. Cut slopes would be protected and reinforced with concrete retaining walls on spread footings. These retaining walls would be up to 50 feet high, with an average height of 30 feet.

An Engineered Deformation Absorption System (EDAS) would be constructed between the retaining walls at the southern portal and the cut slopes. This system is intended to absorb earthflow movement by using columns engineered to compress over time[5]. As the earthflow

[5] The design life of the columns is 75 years, which assumes a certain rate of earth movement per year. If earth movement exceeds anticipated rates, column replacement may be needed before 75 years is reached.

continues to move downhill toward the Pacific Ocean, the portal would remain intact. To minimize impacts, once constructed, a "roof" would be placed over the highway for an approximately 500-foot section of the portal and soil would be placed on top of the roof (Appendix A, Figures 8b, 9, and 13a). The backfilled soil would be graded to match the surrounding topography and revegetated.

The tunnel would exit the hillside north of the existing slide (Appendix A, Figures 8b and 10). The northern portal would be supported by retaining walls. These walls would likely be up to 30 feet high, made of concrete, and on cast-in-drilled-hole (CIDH) pile foundations.

After exiting the tunnel, the new highway would travel approximately 1,100 feet, crossing a new bridge to reconnect the new alignment to the existing U.S. 101.

Permanent lighting is anticipated at the tunnel portals.

Tunnel

The Alternative F tunnel would be approximately 6,000 feet long and approximately 200 feet below the ground.

The tunnel would be a single cavern with a 12-foot-wide lane in each direction, and 8- to 10-foot-wide shoulders (Appendix A, Figure 13b). In addition, separated 6-foot-wide bike/pedestrian lanes would be included in the tunnel. These would be approximately 8 feet above the highway and located above pressurized emergency egress corridors. The lanes would be accessed by ramps at the portals.

The tunnel would include various safety features, including ventilation[6], lighting, longitudinal pressurized chambers for emergency egress, emergency communications systems, equipment chambers, and a fire suppression system. A drainage facility would be constructed to collect water within the tunnel, which would be drained to a holding facility near the southern portal for disposal.

The tunnel would be built using the sequential excavation method (SEM), which is characterized by the sequential excavation of material followed by installation of support[7].

[6] Fans associated with tunnel ventilation would be screened on the intake side to prevent birds/bats/debris from being pulled into the fan. The size of screens is not known at this phase of the project; however, the system would be designed to avoid bird/bat/wildlife mortality.

[7] The SEM would include measures such as rock mass grouting to mitigate groundwater drainage and manage groundwater drawdown before the final lining is completed. The completed tunnel would be designed to be watertight, with an impermeable PVC membrane outside of a concrete lining.

Two crews would be working on the tunnel at one time, with one crew working from the southern portal northward and the other from the northern portal southward. Upon completion of the tunnel, the roadway and other tunnel facilities would be completed.

Bridge

A bridge would be constructed to span a Wilson Creek tributary between the northern portal and where the new alignment merges with U.S. 101 to the north.

The single-span, pre-cast, concrete girder bridge would be approximately 150 feet long and 48 feet wide, with a single 12-foot-wide lane in each direction, and 10-foot-wide shoulders (Appendix A, Figure 13b). The wider shoulders would improve access for bicyclists and pedestrians and provide refuge for stranded vehicles. Further, a separate 6-foot-wide path is proposed that would allow southbound bicyclists and pedestrians an alternative access route around the bridge to the southbound pedestrian/bike lane in the tunnel (Appendix A, Figure 10).

The bridge abutment locations would be accessed by the existing highway from the north and through a staging area created for bridge construction and tunnel access located immediately to the south. The concrete abutments and associated wingwalls would be constructed on CIDH pile foundations. A crane would place pre-cast concrete girders on the abutments, and falsework would be constructed using the girders as support. Rebar would be installed, the concrete deck would be cast, and see-through bridge rails installed. RSP may be placed for bank stabilization.

The bridge deck would not contain drains (scuppers). Instead, water would be conveyed to the ends of the bridge via gravity and discharged to adjacent vegetated slopes or RSP.

Operations and Maintenance Center

An Operations and Maintenance Center (OMC) would be required for the tunnel (PM 13.52). The OMC would be located south of the tunnel on approximately 1.4 acres. The site would include a building, parking spaces, outdoor storage, and maintenance equipment (Appendix A, Figures 8a and 11).

The building would be an approximately 12-foot-tall, 18,000-square-foot, single-story structure. It would contain equipment and other facilities related to tunnel maintenance, operations, and emergency response. It is anticipated the roof would be planted (i.e., a "green" roof) to blend into the surrounding terrain.

Construction of the OMC would involve cutting into the hillside and regrading a portion of the existing highway to create an access road to the facility. It is anticipated that porous pavement would be used to allow stormwater to infiltrate.

Permanent outdoor lighting would be required for this facility.

Roadway Drainage

In addition to drainage features associated with the tunnel, bridge, and OMC described above, there would be changes to drainages at various other locations.

At the tunnel portals, bridge, and OMC, stormwater runoff would be captured and conveyed to existing drainages at PMs 14.08 and 14.35 for the southern portal; at PM 15.38 for the northern portal and bridge; and PM 13.42 for the OMC (Appendix A, Figures 8a, 8b, and 8c). Some culverts would be extended to accommodate roadway changes. In addition, new inlets and culverts would be installed near the southern portal, northern portal, and OMC, which would be connected to existing culverts. Culvert outfall locations would remain unchanged; any lengthening of existing culverts would occur to the east. RSP may be needed at the outlets.

A new culvert would be installed under the northern tunnel approach between the bridge and the northern portal; the culvert would be 24 inches in diameter or larger, and approximately 200 feet long (Appendix A, Figure 10).

Best Management Practices (BMPs), such as bioswales, may be implemented to offset impacts to water quality. Potential areas for bioswales or other BMPs have been identified near the northern and southern portals and the OMC (Appendix A, Figures 9, 10, and 11).

Utilities

To provide electricity to the OMC and tunnel, these facilities would be connected to a PacificCorp transformer in the vicinity of the OMC. Lines would be run through an approximately 1,000-foot ductbank from the transformer to the OMC, and then through an approximately 4,000-foot ductbank from the OMC to the tunnel (Appendix A, Figures 12a–12c).

In addition, within the project area, a trenched conduit would be installed within the shoulder or paved area of the highway and within the underground utility space of the tunnel to

accommodate broadband cable as part of a larger State effort to provide broadband along state highways[8].

Landscaping

Plantings would be installed on the newly graded slopes around the proposed north and south tunnel portals. At the proposed OMC, the area between existing U.S. 101 and the proposed facility would be planted with trees to help screen the OMC. The graded slope behind the facility would also be revegetated. All plantings would be native to the region.

Excavation

Alternative F would require excavation for the tunnel and associated features, generating approximately 1.1 million cubic yards of material. This material would need to be transported off-site for disposal and/or reuse. It is anticipated that approximately 70,000 truck trips to and from the project site would be needed to dispose of excavated materials.

Staging Areas

Existing paved or graveled areas within the right of way and lanes closed to facilitate construction would be used as staging. In addition, staging areas would be constructed adjacent to the northern and southern portals, and within the proposed footprint of the OMC. The new bridge would also be used for staging once completed (Appendix A, Figures 9, 10, 11, and 14). These areas support construction and would be used for such activities as parking equipment and storing materials.

Equipment

Heavy equipment used for construction includes earthmovers/loaders, excavators, augers, oscillators, bulldozers, multidirectional rig, graders, and pavers. At a distance of 50 feet, noise generated from heavy equipment is anticipated to be in the range of 74 to 90 dBA.

[8] Broadband cable may be installed prior to the construction of LCG. If this is the case, cable may need to be moved during construction of this project.

Construction Scenario

The following is an overview of the general sequence of events for the construction of Alternative F. Some activities may be run concurrently. Tunneling activities may occur 24 hours a day. While no other nighttime construction is currently planned, construction work is not limited to daylight; night work would be conducted as needed. Night lighting is required for safety, and may be needed for the security of the construction area.

The general sequence of construction activities would be as follows:

1. Conduct geotechnical investigations.
2. Clear and grub as needed for project site access.
3. The northern and southern portal areas and the OMC site would be graded.
4. Staging areas would be constructed near the southern and northern portals, as well as at the OMC site.
5. Retaining walls would be constructed at the portals.
6. Work would begin on the tunnel, bridge, and OMC.
7. The OMC and tunnel would be connected to an existing transformer for electricity.
8. Tunnel approaches would be completed.
9. Traffic would be diverted onto the new alignment.
10. Old alignment would be decommissioned (e.g., where feasible, highway infrastructure would be removed, and the affected area would be re-vegetated with native species).

Traffic Management

Because major construction associated with Alternative F would primarily be outside of the existing highway, long-term lane closures with reversing traffic control would not be required. However, occasional 30 minute to 1 hour partial or full facility closures may be needed for some activities, such as moving equipment to or from the tunnel portals, as well as work adjacent to where the new alignment begins and ends[9]. Otherwise, the highway could operate uninterrupted throughout the construction period. Informational signage,

[9]Any closures longer than 30 minutes would require prior approval from Caltrans management. Closure times may range from 1 to 10 hours, and periods of closure would be selected to minimize impacts to the public.

flaggers, and temporary traffic lights would be used for the duration of construction or as needed.

Right of Way

Alternative F would require approximately 18.71 acres of new right of way at the OMC and the tunnel portals. In addition, a subterranean easement of approximately 12.07 acres would be needed for below-ground portions of the tunnel, and a temporary construction easement (TCE) of approximately 2.06 acres for utility work south of the OMC (Appendix A, Figure 15b).

Once operational, Alternative F would bypass approximately 8,000 linear feet of existing roadway and Caltrans right of way, totaling about 35.09 acres, all of which would be decommissioned. Decommissioning would include removing existing structures, to the extent feasible, such as the roadway, culverts, and walls. Areas not needed for ongoing maintenance activities would be contoured to match surrounding topography and restored with native vegetation where feasible.

Construction Schedule

Alternative F is anticipated to take 6 to 8 years to complete. If this alternative is selected, construction is projected to start in 2031 and be completed by 2038 (Appendix A, Figure 14).

Construction and Maintenance Costs

Alternative F is anticipated to cost approximately $1.4 billion in 2022 dollars. The adjusted cost for 2031—the anticipated start of construction—is $2.1 billion. Over 90% of the cost would be related to structures—primarily the tunnel, bridge, and retaining wall.

Ongoing maintenance and operations activities would be needed for the tunnel. Activities would include staffing the maintenance facility, refilling water tanks for fire suppression system, refilling fuel tank for backup power generator, periodically washing tunnel walls, and periodically replacing lights, fan units, and railing. In addition, electric power for the OMC and tunnel would need to be maintained.

Annual maintenance costs of the tunnel may vary year to year. However, it is estimated these costs would average $2 to 3 million per year in 2022 dollars[10].

2.2.2 No-Build Alternative

Under the No-Build Alternative, no construction would be planned at LCG. Regular maintenance and operations would continue, with emergency restoration projects conducted as needed to address landslides and roadway failures.

The size, depth, and instability of the known slide planes at LCG, combined with erosion of the coastal bluffs, has resulted in a loss of roadway resiliency. Engineering solutions such as retaining walls have not been able to provide long-term stability but would continue to be necessary to provide an adequate highway facility. Maintenance of the existing road alignment has become more difficult and costly, and costs are expected to escalate as repairs and retreats become even more difficult. In addition, there is the potential that landslide movement that is deep and large enough could cause a major roadway failure, resulting in a long-term closure of the highway.

2.3 Comparison of Alternatives

2.3.1 Alternative Comparison

This section presents a summary of the key differences between the project's alternatives. This includes how the alternatives relate to the purpose and need and its primary components (e.g., environmental resources), as well as other topics of concern. Table 2-1 provides a summary of these differences.

Purpose and Need

Both build alternatives were designed to meet the purpose and need of the project, providing a long-term solution to the potential instability and roadway failure at LCG. Alternative X would accomplish this through a comprehensive solution of reengineering the existing road and removing groundwater to reduce slope movement, while Alternative F, with the exception of the south portal, is designed to avoid the landslide.

[10]Given replacement might not occur for up to 75 years, long-term maintenance costs associated with replacing the EDAS columns are difficult to quantify and may not be fully captured by this number. In 2023 dollars, the cost to construct the columns is estimated at $26 million. Adjusting for typical inflation, in 2039 dollars the approximate cost would be $36 million. This estimate is for column construction only—it does not include any other potential associated costs.

Reliable Connection

Though both alternatives are anticipated to provide a more reliable connection (i.e., less risk of delays/detours) compared to the No-Build Alternative, Alternative F is anticipated to be the more reliable of the two, as most of the tunnel is outside the area of earth movement. In addition, Alternative F would likely be less affected by potential increased slide movement resulting from the increasing frequency and severity of large storm events caused by climate change.

However, there are risks associated with both alternatives. The effectiveness of the underground drainage system and retaining walls associated with Alternative X are not fully determined and would require additional analysis. Similarly, the southern portal of Alternative F is within an active landslide area and would require a special collapsible column system called an Engineered Deformation Absorption System (EDAS). As currently designed, the columns would last for 75 years during which time they would slowly collapse. Once the columns reach a certain state of collapse, they would then need to be replaced. This system has not been used within similar geologic conditions and the design assumes a certain rate of movement per year. Faster than anticipated slide movement could result in the need for more frequent EDAS replacement. As with Alternative X, Alternative F would require additional analysis to indicate the level of effectiveness.

Construction and Maintenance Costs

In 2022 dollars, Alternative X is estimated to cost $580 million to construct, while Alternative F would cost over twice that amount, at $1.4 billion.

Once built, Alternative X is anticipated to cost approximately $2-5 million a year to maintain, while Alternative F would cost $2-3 million a year. The maintenances costs for Alternative X, however, are not certain, as costs to maintain the underground drainage system have some uncertainty because the scale and complexity of the drainage system is much greater than others on the state highway system. Maintenance costs for Alternative F, for the most part, are relatively predictable, as they can be based on similar tunnels on the state highway system, such as the Tom Lantos Tunnels at Devil's Slide on Highway 1 in San Mateo County. However, the southern portal is within an active slide area. Though the design life is 75 years, as the system has not been used on this type of scale, it may require maintenance before that time. Long-term maintenance costs associated with replacing the EDAS columns are difficult to quantify and are not captured by the maintenance estimate. Therefore, maintenance costs for Alternative F have a degree of uncertainty as well.

Biological Resources

The build alternatives would affect various biological resources, including late successional (mature to old-growth) redwood forest and other coniferous forest habitat for marbled murrelet and northern spotted owl, and wetlands.

While Alternative X would require the removal of more large conifers than Alternative F, it does not remove as many of the largest trees in the area. In addition, Alternative X removes trees primarily along the edge of the highway, compared to Alternative F, which removes a section of trees from within the center of high quality late successional redwood forest. The trees removed for Alternative X are primarily within the active slide area, and are associated with Douglas-fir forest (though there is a redwood component), while the trees at the north portal of Alternative F are outside of the slide, within redwood forest.

Both project alternatives would remove suitable habitat for marbled murrelet and northern spotted owl, which are federal and state listed species; suitable habitat includes critical habitat for marbled murrelet. For both species, Alternative X would remove more suitable habitat than Alternative F. However, the quality of the habitat removed under Alternative X isn't as high as the habitat for Alternative F.

Both alternatives would affect small amounts of wetlands, while only Alternative F would affect streams and riparian habitat. For the wetlands, Alternative F would impact a greater amount, and the wetlands impacted are of higher quality than those associated with Alternative X.

Cultural Resources

Both project alternatives would affect historic properties. For Alternative X, this includes old-growth redwoods and other conifers, a contributing element of a Traditional Cultural Landscape (TCL). For Alternative F, this includes the TCL as well as the Crescent City to Trinidad Wagon Road. As discussed under Biological Resources, Alternative F would remove more of the largest trees than X.

Parks and Right of Way

Both build alternatives would require work within Redwood National and State Parks (RNSP). Neither alternative is anticipated to require work on the California Coastal Trail, the recreational facility within the project's vicinity, though Alternative F is close to the trail at certain locations and is more likely to cause temporary disruption to trail users, such as from visuals and noise. Both alternatives would require the acquisition of above-ground right of way, with 11.16 acres required for Alternative X and 18.71 acres for Alternative F.

Approximately 35.09 acres of existing roadway may be decommissioned and relinquished for Alternative F. However, the right of way to be acquired for this alternative is closer to the California Coastal Trail, and contains more of the larger redwoods, for which it is listed as a UNESCO World Heritage Site.

Construction

Both alternatives would require occasional full-facility closures during construction. However, only Alternative X would require regular reversing traffic control. Alternative X is anticipated to take 3 to 5 years to construct, while Alternative F would take 6 to 8 years, both beginning in 2031.

Both alternatives would require large amounts of excavated material. Alternative X would require approximately 270,000 cubic yards, while Alternative F would require over four times more, with approximately 1,100,000 cubic yards. This is estimated to take 15,000 to 20,000 truck trips for Alternative X, and 70,000 for Alternative F.



Table 2-1. Alternatives Comparison Table

Project Feature or Environmental Effect	Alternative X	Alternative F	No-Build (No-Project)
Project Purpose and Need			
Provide a more reliable connection	A more reliable connection would be provided. However, the effectiveness of the subsurface drainage and retaining walls has not been fully determined.	A more reliable connection would be provided. However, the effectiveness and feasibility of EDAS at the south portal has not been fully determined.	The connection would not be more reliable; ongoing emergency repairs and enhanced maintenance are anticipated to continue indefinitely.
Reduce maintenance costs	Over the long term, this alternative is likely favorable relative to the No-Build; however, long-term costs of maintaining the underground drainage system are unknown.	The tunnel would require specialized maintenance equipment and facilities (OMC), but long-term maintenance costs may be more predictable than Alternative X.	Costs of ongoing emergency repairs and temporary closures would continue indefinitely.
Protect the economy	Improvement over No-Build; however, the long-term reliability and maintenance costs are still unclear.	Most predictable in terms of long-term performance, but has greatest up-front costs, and there is uncertainty in the long-term maintenance of the EDAS at the south portal.	Existing conditions are anticipated to continue indefinitely, including the potential economic ramifications of a long-term failure and closure.
Protect natural resources	Would remove more large conifers (over 2 feet DBH), but fewer of the largest trees than Alternative F, and trees would be removed from the edge of the highway. Would remove higher amounts of marbled murrelet and northern spotted owl habitat, but the habitat is lower quality. Lower quantity and quality of wetlands removed, and no impacts to streams or riparian habitat.	Would remove fewer conifers over 2 feet DBH than Alternative F, but would remove more of the largest trees, and trees would be removed from high quality habitat. Would remove lower amounts of marbled murrelet habitat, but habitat is of higher quality. Higher quantity and quality of wetlands removed and impacts to streams and riparian habitat.	Existing conditions are anticipated to continue.

Project Feature or Environmental Effect	Alternative X	Alternative F	No-Build (No-Project)
Protect cultural landscapes	A Traditional Cultural Landscape (old-growth trees) would be adversely affected.	A Traditional Cultural Landscape (old-growth trees) and the historic Crescent City to Trinidad Wagon Road would be adversely affected.	Existing conditions are anticipated to continue
Estimated Number of Large Conifer Trees Removed (Conifers Over 2 feet DBH)			
Redwood	52 7 of which are > 4 feet DBH	39 16 of which are > 4 feet DBH	N/A
Sitka spruce	20 9 of which are > 4 feet DBH	49 18 of which are > 4 feet DBH	N/A
Douglas-fir	44 5 of which are > 4 feet DBH	9 3 of which are > 4 feet DBH	N/A
Western hemlock	0	7 3 of which are > 4 feet DBH	N/A
Habitat for Key Threatened Bird Species (acres)			
Marbled murrelet and northern spotted owl, tree removal within suitable habitat, acres	4.74 acres	2.75 acres	N/A
Potential Impacts to Wetlands and Waters of the U.S. (acres)			
Permanent impacts	0.002	0.101	N/A
Temporary impacts	0.014	0.009	N/A
Riparian Habitat (acres)			
Permanent impacts	0	0.214	N/A
Temporary impacts	0	0.038	N/A
Right of Way Required (acres)			
Acquisition	11.16	18.71	N/A
Subterranean easements	37.76	12.07	N/A

Project Feature or Environmental Effect	Alternative X	Alternative F	No-Build (No-Project)
Temporary Construction Easements	0	2.06	N/A
Decommissioning	0	35.09	N/A
Construction and Design			
Estimated years to construct	3 to 5	6 to 8	N/A
Estimated volume of excavated materials (cubic yards)	270,000	1,100,000	N/A
Estimated number of truck trips to haul off excavated material	15,000 to 20,000	70,000	N/A
Anticipated lane closures/traffic operations during construction	Regular reversing traffic control with occasional full-facility closures.	Occasional full-facility closures.	N/A
Estimated Costs			
Construction Costs (2022 Dollars / 2031 Dollars)	$580 million/$880 million	$1.4 billion/$2.1 billion	No project would be built, and therefore there would be no construction costs.
Maintenance Costs (2022 Dollars)	$2-5 million	$2-3 million	Enhanced maintenance and emergency repairs are anticipated to continue indefinitely.



2.3.2 Environmentally Superior Alternative

In accordance with CEQA Guidelines Section 15126.6(c)(2), an "environmentally superior alternative" must be identified among the alternatives analyzed in the EIR. The environmentally superior alternative is the alternative found to have an overall environmental advantage based on the impact analysis in the EIR. If the environmentally superior alternative is the "no project" alternative, also known as the No-Build Alternative, the EIR must identify an environmentally superior alternative among the proposed build alternatives.

For the Last Chance Grade Permanent Restoration Project, the No-Build Alternative would maintain existing conditions and not result in environmental resource impacts. Though the highway is located within a geologically unstable area and may require future emergency repairs that could potentially impact resources, these cannot be predicted and are not part of a planned project. Compared to the proposed build alternatives, which include several features that would impact environmental resources, the No-Build Alternative would be the environmentally superior alternative.

Determining which of the build alternatives is environmentally superior can involve judgment and depends on many factors. An evaluation of concerns that have the greatest potential to result in long-term, significant impacts must be conducted. Areas of concern may include, but are not limited to, visual, biological, and cultural resources, and traffic, geology, environmental justice, noise, and public recreation. Pursuant to CEQA Guidelines Section 15126.6(b), discussion of alternatives with potential for avoiding or substantially lessening the significant impacts should be considered even if these alternatives would impede to some degree the attainment of the project objectives or would be more costly.

As indicated in Tables S-1 and 2-1, for several resources Alternatives X and F have similar potential for effects (e.g., water quality, noise, air quality, etc.); however, there are some key differences related to the more sensitive resources located within the project area. Based on the sensitivity associated with these resources, the analysis indicates that Alternative X (Reengineer Existing Highway) would be the environmentally superior alternative. The key factors are listed below:

- UNESCO has designated Redwood National and State Parks as a World Heritage Site with its outstanding universal values related to redwood forests. Alternative X would remove more redwood trees; however, the redwood trees removed are mostly along the existing highway, within existing landslides, and are located within Douglas-fir forest, not redwood forest. In addition, Alternative F would remove more trees

greater than 4-foot DBH (7 for Alternative X and 16 for Alternative F), and all of the redwood trees would be removed from redwood forest.

- Although Alternative F would affect fewer acres of habitat compared to Alternative X for species like marbled murrelet and northern spotted owl, the overall value of the habitat affected by Alternative F is considered higher due to its location within late successional redwood forest.
- Permanent acquisition of park land for Alternative X would be 11.16 acres and 18.71 acres for Alternative F.
- Compared to Alternative F, Alternative X would also affect a substantially smaller area of wetlands/waters of the U.S. compared to Alternative F.
- In terms of construction, Alternative X would have a shorter construction timeframe, likely resulting in reduced temporary impacts, such as noise. Also, Alternative X would have substantially fewer cubic yards of excess material needing disposal (270,000 cubic yards for Alternative X and 1,100,000 cubic yards for Alternative F), thus requiring fewer truck disposal trips.

As indicated above, Alternative X is the Environmentally Superior Alternative[11]; however, depending on the geotechnical risk assessment, which would be completed prior to the final environmental document, and given Alternative F would mostly avoid the landslide, it might be determined that Alternative F would better meet the purpose and need of the project (e.g., better anticipated reliability and potentially lower long-term maintenance costs).

2.3.3 Anticipated Final Decision-Making Process

After the public circulation period, all comments will be considered, and Caltrans will confirm selection of a preferred alternative and make the final determination of the project's effect on the environment. Under CEQA, Caltrans will certify that the project complies with CEQA, prepare findings for all significant impacts identified, prepare a Statement of Overriding Considerations for impacts that will not be mitigated below a level of significance, and certify that the findings and Statement of Overriding Considerations have been considered prior to project approval. Caltrans will then file a Notice of Determination with the State Clearinghouse that will identify whether the project will have significant impacts, if mitigation measures were included as conditions of project approval, that findings

[11] The Lead Agency is not, however, obligated to select the Environmentally Superior Alternative for implementation if it would not accomplish the basic project objectives and/or is infeasible (see State CEQA Guidelines Section 15126.6(a), (c) & (f)).

were made, and that a Statement of Overriding Considerations was adopted. With respect to NEPA, Caltrans, as assigned by the FHWA, will document and explain its decision regarding the selected alternative, project impacts, and mitigation measures in a Record of Decision.

2.4 Background on Refinements of Alternatives X and F

Numerous alternatives have been considered over a three-decade period to address the ongoing problems associated with LCG. This section describes how Alternatives X and F originated and evolved. Other alternatives that were considered but ultimately eliminated from consideration are discussed in Section 2.5, *Alternatives Considered but Eliminated from Further Discussion*.

2.4.1 Alternative X– Reengineer Existing Highway

Dating back to 1993, several alternatives were originally considered to improve the existing roadway either on or near the existing alignment, similar in intent to what later evolved into Alternative X. These early alternatives allowed for strategic retreats through the placement of one or more retaining walls to protect the road from landslides. The first was in the 1993 Project Report (PR), which identified a "minimal impact alternative" to "stabilize the highway using viaducts, retaining walls, and spot treatments into the hillside to the east." Variations on this type of alternative appeared in the 1995 Project Study Report (PSR) and the 2003 Supplemental PSR (as Alternatives 2A and 2B). The 2018 Expert-Based Risk Assessment (EBRA) was the first study to name this alignment as "Alternative X."

In 2018, Alternative X was included in the geotechnical EBRA and the Value Analysis (VA) Report and was carried into the 2019 Addendum to the 2016 PSR. The alternative proposed reconstructing existing retaining walls and adding additional upslope retaining walls on an approximately 1.1-mile-long section of the roadway (PMs 14.55 to 15.56), and would include retreats from the existing roadway. All of these reports recommended Alternative X remain under consideration due to its presumed relatively low cost and that it would be unlikely to affect redwood trees on the ridgeline above.

In an effort to investigate an on-alignment alternative that did not rely so extensively on retaining walls to stop or slow the landslide east of the roadway, an early 2021 iteration of Alternative X investigated a different approach. Instead of retaining walls to protect the road from landslides to the east, this iteration contemplated excavating and removing substantial quantities of earth from the east side of the roadway. This iteration was dismissed for its large physical footprint and degree of environmental impact. Refer to Table 2-2, which

summarizes key environmental impacts associated with this iteration relative to the current version of Alternative X.

Following the dismissal of the earlier iteration, Alternative X was one of several alternatives evaluated in the 2021 Alternatives Analysis Report (AAR; Caltrans 2021a). The AAR was the product of a deliberative, iterative process of working with stakeholders on a quantitative analysis of the seven then-existing alternatives across a series of environmental, engineering, and roadway operations factors. The version of Alternative X considered in the AAR assumed it would include a series of retaining walls to the east of the roadway. It was also assumed that Alternative X would include a drainage gallery component to improve stability of the landslide above the roadway by capturing groundwater and redirecting it into the Pacific Ocean. At the time of the AAR, details on this drainage component were not yet developed.

Table 2-2. Alternative X (Pre-Alternatives Analysis Report Modifications) Selected Comparative Impacts

Resources	X (Pre-AAR)	X (Current – Post AAR)
Large-Diameter Trees Removed	At least 852[a]: 424 coast redwood 326 Douglas-fir 80 Sitka spruce 22 red alder	129 total: 52 coast redwood 44 Douglas-fir 20 Sitka spruce 13 red alder
Estimated Permanent Wetland Impacts (acres)	0.01	0.002
Marbled Murrelet Critical Habitat Impacts (acres)	36.17	11.27

[a] This iteration of Alternative X would have involved grading/ground disturbance on approximately 13.1 acres outside of the Environmental Study Limits[12] (ESL) and its buffer area. Tree counts were conducted only within the ESL and its 100-foot buffer. The estimated number of removed trees associated with this earlier iteration does not include any trees from outside the ESL or buffer. Accordingly, it is reasonable to assume that more than 852 large-diameter trees would have required removal.

Alternative X was one of the two alternatives (along with Alternative F) that the AAR recommended be carried forward for further study; all other alternatives were rejected (refer to *Alternatives Considered 2020–2021* below).

In the summer of 2021, after the determination to carry forward Alternative X, a VA was conducted on the two remaining alternatives (X and F) to identify possible further refinements. The VA endorsed the concept of underground drainage galleries to slow

[12]The ESL encompasses the project footprint where there could be direct and indirect disturbance during construction plus additional area beyond the project footprint to accommodate any future scope changes.

landslide movement and also recommended narrowing the tiering of retaining walls on the hillsides to the east of the roadway to minimize the overal footprint. The AAR documents these and other recommendations of the 2021 VA.

Following the AAR, these and other minor refinements were incorporated into Alternative X. Notably, the inclusion of the drainage galleries and an ocean outfall necessitated the incorporation of right of way west of the roadway in an area where the galleries would meet the outfall pipe. As shown in Appendix A, Figures 5a–7b, this area includes a permanent access road plus temporary areas to construct the drainage galleries and ocean outfall.

2.4.2 Alternative F – Tunnel (Bypass Landslide)

The concept of a tunnel was included in the 1995 PSR. However, the then-proposed quarter-mile tunnel was determined to be infeasible because it was too short to fully avoid the landslide; it was recommended a longer tunnel be considered.

In the 2015 Engineered Feasibility Study (EFS), a tunnel bypass of LCG—Alternative F—was among the 14 alternatives considered. The EFS stated that Alternative F would consist of an approximately 1-mile-long tunnel beginning at the existing U.S. 101 alignment in the south near PM 14.2 and emerge in the north near PM 15.7. This study recommended Alternative F be carried forward for further study because it had a relatively small aboveground area offering the opportunity to minimize environmental impacts. However, the study noted that the then-current version of Alternative F had the potential to remove up to an acre of redwood forest and that extensive geotechnical investigation was necessary to confirm its viability. The 2019 Addendum to the 2016 PSR carried forward Alternative F from the 2016 PSR, recommending consideration of a possible double-bore tunnel given the anticipated length.

Alternative F, as analyzed in the AAR, included a 5,600-foot-long tunnel beginning at the existing U.S. 101 alignment at PM 14.06 in the south and rejoining at PM 15.56 in the north.

Following the AAR, Alternative F was refined for performance. Extending the south end of the tunnel to avoid a longer portion of the landslide complex was considered, which would have increased the tunnel from 5,600 feet to 10,000 feet long, with the southern portal near PM 13.61, and the OMC nearby (at PM 13.52). However, due to cost, the longer tunnel was not implemented, though the OMC was retained at PM 13.52.

A northern portal option was considered in December 2021 that was about 150 to 200 feet to the east (uphill) of its current location, placing it well within the dense redwood forest. Some post AAR refinements included:

- **Northern Tunnel Portal:** Based on preliminary tree survey data collected in 2021, the proposed northern portal for Alternative F was found to be in a dense stand of late successional conifers. The original northern portal location would have entailed the removal of the largest tree encountered in the entire ESL, a redwood with a DBH of about 186 inches (15.5 feet) as well as the largest Sitka spruce (DBH of more than 128 inches [10.5 feet]). Overall, this northern portal location would have required removal of 48 large-diameter redwoods (large diameter defined as having a DBH of at least 24 inches).

  The northern portal area was shifted to the west, closer to the existing roadway, in an area with comparatively smaller trees. With the shift, the largest redwood requiring removal has a DBH of about 103 inches (8.5 feet) and the largest Sitka spruce requiring removal has a DBH of about 70.8 inches (6 feet). In addition, this shift reduced the total number of large-diameter redwoods requiring removal from 48 to 36.

  A bridge would be required at the northern portal to reconnect the tunnel to U.S. 101. The initial tunnel portal location would have required a bridge of such length (400 feet) that a mid-span column was needed for support; the column would have been placed in a wetland area. The refined portal location would allow the bridge to be shorter than initially contemplated and thus able to span the wetland area.

- **Southern Tunnel Portal:** Numerous adjustments were made to the southern tunnel portal area, including adjusting the location to reduce curvature and to avoid sensitive resources. In addition, to help southbound travelers better adjust to the transition from tunnel to open roadway, the tunnel portal was refined to include a hooded portion to minimize sun glare on southbound drivers exiting the tunnel.

- **Operations and Maintenance Center**: Following the AAR, project engineers noted that Alternative F would require an OMC to contain equipment and other facilities related to tunnel maintenance, operations, and emergency response. Initially, the proposed OMC was approximately 20,000 square feet, modeled after a similar facility associated with the Tom Lantos Tunnels near Devils Slide (State Route 1) in San Mateo County. However, in a series of efforts to minimize impacts on sensitive resources, the OMC design was refined, reducing it to 18,000 square feet. In addition, proposed retaining walls around the OMC were replaced with vegetated cut

slopes. This change, along with a proposed green roof, would soften the visual impact of the OMC. Pervious paving was also added to the entirety of the OMC site; combined with the OMC's green roof, these design features would help reduce the net increase in stormwater entering nearby culverts.

- **Single Tunnel:** In the AAR, the Alternative F tunnel was assumed to be comprised of two twin tunnels, separately bored, one for each direction of traffic. However, following the AAR, project engineers proposed and ultimately refined Alternative F to be a single tunnel.
- **Tunneling Methodology:** Prior to finalizing the tunneling approach to the SEM, tunnel boring was considered. Tunnel boring uses tunnel boring machines (TBMs), which can disturb and remove surrounding earthern material. In SEM, a tunnel is divided and excavated in relatively small sections, allowing greater opportunities for monitoring and measuring earth movement and tailoring appropriate support structures accordingly.
- **Separated Bicycle/Pedestrian Paths:** In response to comments that emerged during public engagement for the AAR, tunnel plans were refined to incorporate phyiscally separated (raised) bicycle/pedestrian paths along each travel lane within the tunnel.

2.5 Alternatives Considered but Eliminated from Further Discussion

This section describes the alternatives considered between 1987 and 2021, but dismissed from further discussion for reasons related to anticipated environmental impacts, cost, feasibility, and/or other reasons. Table 2-3 provides a high-level overview of the major studies undertaken since 1987 to consider improvements to LCG. These studies are incorporated into the report by reference[13].

The following subsections provide further detail on the alternatives generated in these studies and summarizes the reasoning (expressed in these earlier studies) to eliminate these alternatives (Table 2-4). These subsections group alternatives studies into three periods of concentrated activity: 1987–2003, 2015–2019, and 2019–2021.

[13]The LCG project reports referenced are available for review on the LCG project website's document library: www.lastchancegrade.com

Table 2-3. Summary of Last Chance Grade Alternatives Studies (1987–2021)

Year	Supporting Document Title	Alternatives	Synopsis
1987	PSR: Wilson Creek Bluffs Bypass	A, B, C (No-Build), D, E	This project proposed realignment of U.S. 101 from 0.2 mile south to 3.7 miles north of Wilson Creek Bridge. Four build and one No-Build alternatives were proposed, which ranged from two to four lanes, bypassing the existing highway to the east.
Terminated 1993 prior to completion	Wilson Creek Bluffs Bypass PR	R, S, T, U, V, W, Y, X	Following the 1987 PSR, the Wilson Creek Bluffs Bypass Project Report considered eight alternatives, including one minimal impact alternative, with most designed as 4-lane facilities. The Project Report was terminated in late 1993 prior to completion.
1993	U.S. Route 101 in Del Norte County: A Corridor Study	1, 2, 3	A study to address the ultimate development of U.S. 101 in Del Norte County, with an emphasis on the LCG and Cushing Creek segments. Proposed three alternatives, including one on the existing alignment.
1995	PSR: Stabilize Roadway	1, 2A, 2B, 3, 4 (No-Build)	Following the termination of the Wilson Creek Bypass Project, a new project was initiated. This project proposed four alternatives—a short tunnel (1,230 feet long), two realignment/stabilization options, and a retreat behind the slide plane through a cut instead of a tunnel.
2001	Preliminary Geotechnical Report: Last Chance Grade Correction and Tunnel Study	1, 2A, 2B, 3	A geotechnical study was conducted to investigate and make recommendations for the alignments discussed in the 1995 PSR. Alternative 3, a major realignment, was the preferred alternative from a geotechnical perspective.
2002	VA Report: SR 101* Roadway Stabilization	1.0, 2.0, 3.0 (No-Build)	This report considered alternatives to those identified in the 1995 PSR, all of which had deficiencies, with a focus on minimizing impacts on trees and park right of way. Alternative 2B from the 1995 PSR was considered the baseline against which the three new alternatives (including a No-Build Alternative) were evaluated. The report identified alternatives that were out of the scope of the VA (A, B.1, B.2, C.1, C.2, D, and E); these alternatives were considered out of scope because they were not in or very close to the Caltrans right of way, and none were considered feasible due to environmental impacts.

Year	Supporting Document Title	Alternatives	Synopsis
2003	Supplemental PSR: Last Chance Grade	1, 2A, 2B, 3 (same as in 1995 PSR), 4 (different from 1995 PSR)	This report further updated the 1995 PSR with additional geotechnical information. This report added (and ultimately recommended programming) a new alternative, Alternative 4, which proposed improving the existing alignment to minimize impacts, but addressing landslides with the addition of five retaining walls.
2015	Last Chance Grade Engineered Feasibility Study (EFS)	A1, A2, B1, B2, C3, C4, C5, D3, D4, D5, E3, E4, E5, F, No-Build	In response to observations of substantial landslide movement between 2012 and 2015, this study considered 14 build alternatives (plus a No-Build alternative) ranging from a 1-mile-long tunnel retreating behind the LCG slide to a 15.5-mile bypass east of the existing U.S. 101 alignment. The study did not recommend Alternatives B1, B2, D3, D4, D5, E3, E4, and E5 for further study.
2016	Last Chance Grade PSR	A1, A2, C3, C4, C5, F, M (No-Build)	Synthesizing information from the 2015 Feasibility Study, this report considered six build alternatives that were not dismissed in the 2015 Engineered Feasiblity Study, plus a No-Build alternative, which was noted as not meeting project purpose and need but was included for comparison.
2018 (June)	Last Chance Grade EBRA	A1, A2, C3, F, L, X	This report considered six alternatives, including four carried forward from the 2016 PSR plus a new upslope realignment alternative (L) and a revised plan to re-engineer the existing alignment (X). Alternatives C4 and C5 were not considered due to higher risks when compared to C3.
2018 (October)	Final VA Study Report for D-1 Del Norte 101 Last Chance Grade	11 alternative concepts framed around 8 alignments (A1, A2, C3, C4, C5, F, L, X,)	This analysis considered a variety of approaches implementing build alternatives from the 2016 PSR in addition to the L and X alternatives. This study recommended carrying forward A1, A2, L, F, and X and rejecting the other build alternatives.
2019	Addendum to the 2016 PSR, Last Chance Grade Permanent Restoration Project	A1, A2, F, G1, G2, L, X, No-Build	This addendum modified some of the project alternatives from the 2016 PSR, rejecting Alternatives C3, C4, and C5, and adding two new eastern alignments (G1 and G2).
2021	Last Chance Grade Permanent Restoration Project, AAR	A1, A2, F, G1, G2, L, X	This was a comprehensive evaluation of alternatives that had not yet been eliminated from further discussion; F and X were recommended to be carried forward for further study. The other alternatives were eliminated.

*The title of the 2002 Value Analysis Report erroneously referred to U.S. Highway 101 as State Route (SR) 101.

2.5.1 Alternatives Considered 1987–2003

Between 1987 and 2003, 28 different alternatives on 16 different alignments were studied to address the problems at LCG. These were considered in a total of six different reports, one of which was terminated before completion. The alternatives ranged in scale from full bypasses of the existing alignment to stabilization of/improvements to the existing alignment. These earlier studies culminated in the construction of retaining walls along the existing highway alignment; this option was chosen as the most cost-effective option. The studies are summarized below; their associated alignments/alternatives are summarized in Table 2-4.

In 1987, a PSR for the Wilson Creek Bluffs Bypass Project was prepared; this report included four build alternatives that proposed to bypass the slide to the east (Alternatives A, B, D, and E) in addition to a No-Build alternative (Alternative C) (Caltrans 1987). The build alternatives ranged from a two-lane conventional highway to a four-lane expressway.

A PR for the for the Wilson Creek Bluffs Bypass Project was then started; this report was to evaluate seven different iterations of Alternative A, a four-lane expressway bypass, from the 1987 PSR (Alternatives R, S, T, U, V, W, and Y), in addition to a minimum impact alternative (Alternative X). However, this project and its associated report were terminated in 1993 due to funding difficulties and anticipated environmental impacts on federal and state park lands, though it was agreed that studies to restore the existing alignment would continue.

In 1993, the *US Route 101 in Del Norte—A Corridor Study* (Caltrans 1993) was prepared to address concerns about the ultimate development of U.S. 101 in Del Norte County and how the development would affect adjacent land. This study was for all of U.S. 101 in Del Norte County, with an emphasis on the LCG segment (PMs 12.5–16.3) and the Cushing Creek segment (PMs 20.3–22.3), which were being studied under the Wilson Creek Bluffs Project mentioned above, and the Cushing Creek Project. The corridor study considered three alternatives, which included a long three- to four-lane bypass (Alternative 1), a shorter two-lane bypass (Alternative 2), and a four-lane facility in the existing alignment at LCG (Alternative 3). The study determined that it was infeasible to fully avoid (i.e., bypass) all national and state park lands. In addition, the study determined that the four-lane expressway, which was the concept at the time, should be scaled back to a two-lane facility. The study concluded that Alternatives 1 and 2 were infeasible due to anticipated costs and environmental impacts; Alternative 3 was considered potentially feasible based on cost but again, its four-lane facility through park land was not considered feasible.

Table 2-4. Last Chance Grade Alternatives Considered and Dismissed (1987–2003)

Alternative	Origin Document	Description	Rationale for Elimination	Elimination Document
A	1987 Project Study Report: Wilson Creek Bluffs Bypass	Four-lane bypass facility that started south of Wilson Creek, crossing it approximately 200 feet east of the existing bridge. This alternative would follow the ridge parallel to the existing alignment, rejoining U.S. 101 inland of the bluffs, approximately 3.7 miles north of Wilson Creek Bridge.	The transportation concept at this time was a freeway/expressway with four lanes. The 1987 alternatives did not include an alternative that avoided impacts on park lands. However, the project was terminated before completion due to anticipated funding difficulties and anticipated environmental impacts, including impacts on parks. A moratorium was placed on right of way only projects.	1993 Wilson Creek Bluffs Bypass PR (report terminated prior to completion)
B		Same as Alternative A except the roadway is a two-lane facility with alternating truck passing lanes and no median.		
C		No-Build Alternative[1].		
D		Similar to Alternative A, shifted slightly further east.		
E		Alternative D with a two-lane facility.		
R	1993 Wilson Creek Bluffs Bypass PR (terminated prior to completion)	Similar to Alternative A in the 1987 PSR: 4-lane alternative that bypassed coastal bluffs by following the Wilson Creek drainage then turning north onto timberlands and tying back into the existing highway.	Project terminated before completion due to anticipated funding difficulties and anticipated environmental impacts. A moratorium was placed on right of way only projects. However, the “S”, “T”, and “U” alternatives were planned to be dropped in favor of Alternative “Y” due to costs, and Alternative “Y” was developed with the best features of the other alternatives. Alternative V was outside of the scope of the study and was dropped, but ultimately became Alternative 1 in the 1993 Del Norte Corridor Study.	1993 Wilson Creek Bluffs Bypass PR (report terminated prior to completion)
S		Alternative R with more impacts to park land.		
T		Alternative R with more impacts to park land.		
U		Refinement of “S” and “T” with less impacts on parks.		
V		Bypass concept[1], a route that would remain clear of parks and bypass both Wilson Creek Bluffs and Cushing Creek areas, and the intervening 4 miles.		
W		Realignment of roadway 200 feet to the east.		

Alternative	Origin Document	Description	Rationale for Elimination	Elimination Document
X		Minimal Impact Alternative that would stabilize the highway using viaducts, retaining walls, and spot retreats into the hillside to the east.		
Y		A combination of “S”, “T”, and “U”.		
1	1993 Del Norte 101 Corridor Study	Developed from Alternative V in the 1993 Wilson Creek Bypass PR. A 4-lane 17-mile near-total bypass of national and state park land[1]. Diverges from U.S. 101 north of the High Prairie Creek drainage, follows the drainage north, then follows Wilson Creek west before conforming to U.S. 101 north of Hamilton Road.	Alternative 1 was determined to be imprudent and infeasible in the 1993 Del Norte 101 Corridor Study due to anticipated funding difficulties and environmental impacts. This alternative would not accommodate programmed projects at Wilson Creek Bluffs or Cushing Creek. Construction could not be staged, which would negatively affect the traveling public as this portion of the highway would be closed throughout the entire construction period.	1993 Del Norte 101 Corridor Study
2		Modified bypass that diverges from U.S. 101, crosses Wilson Creek east of the existing bridge, crosses a small portion of Redwood National Park, and traverses 3 miles of private land and state park land before conforming back to U.S. 101. Entails 8 miles of new construction.	Alternative 2 was deemed imprudent and infeasible in the 1993 Del Norte 101 Corridor Study due to anticipated funding difficulties and environmental impacts. While this alternative accommodates programmed projects, it would have substantial adverse impacts on private landholders, including isolating a portion of timberland, making it difficult to manage.	1993 Del Norte 101 Corridor Study
3		A 4-lane facility proposed for the “Wilson Creek Bluffs” (LCG area) and a 3-lane facility at Cushing Creek while retaining the existing highway. Safety and maintenance projects would be pursued on an as-needed basis.	Alternative 3 would meet the purpose and need of the programmed project but would not address the problems on U.S. 101. While this alternative was potentially feasible due to cost, it was deemed environmentally infeasible to expand to 4 lanes through park land in the 1993 Del Norte 101 Corridor Study.	1993 Del Norte 101 Corridor Study

Alternative	Origin Document	Description	Rationale for Elimination	Elimination Document
1	1995 PR	Realign highway in a 2,113-foot tunnel to the east behind slide plane.	In the 2002 VA, this alternative was dismissed because geotechnical analysis, including field investigations and engineering analyses, determined this alternative would not address the deep-seated slide—which would not meet the project purpose and need.	2002 VA
2A		Minor roadway realignment slightly to the east and stabilize with a solider pile tieback wall and slope stressing.	In the 2002 VA, this alternative was dismissed because geotechnical analysis, including field investigations and engineering analyses, determined this alternative would not address the deep-seated slide—which would not meet the project purpose and need.	2002 VA
2B		Same as 2A except with an additional soldier pile tieback wall in place of slope stressing to minimize impacts on State Park property.	In the 2002 VA, this alternative was dismissed because geotechnical analysis, including field investigations and engineering analyses, determined this alternative would not address the deep-seated slide—which would not meet the project purpose and need.	2002 VA
3		This alternative would align the highway in a through-cut behind the slide plane in the same alignment used for Alternative 1.	In the 2002 VA, Alternative 3 was dismissed because while this alternative would address the deep-seated slide, it had unacceptable impacts to park lands.	2002 VA
4		No-Build Alternative.	Would offer no solution for the identified problem. The existing roadway would continue to deteriorate, which would increase maintenance, impacts on the public, and safety concerns. Perpetual risk of a major closure.	1995 PR

Alternative	Origin Document	Description	Rationale for Elimination	Elimination Document
1.0	2002 VA	Same alignment as Alternative 2B of the 1995 PR but would construct tieback soldier pile walls on both sides of U.S. 101. Length of walls are increased in length compared to Alternative 2B.	This alternative was rejected in the 2002 VA because it would not resolve slope instability issues and would have more environmental impacts than Alternative 2, including unacceptable impacts on park resources and old-growth redwoods. Other reasons included the right of way needed for a 4-lane facility, grades between 8 and 11%, excessively large volume of excavation and disposal for cuts and fills, and geotechnical issues.	2002 VA
2.0		Addresses only the most unstable areas of the project and entails construction of retaining walls that only address specific terrain instability locations.	This alternative was the only alternative deemed acceptable in the 2002 VA. While it was not a complete fix to the terrain instability problems, it was acceptable to agencies and stakeholders, had minimal right of way requirements and environmental impacts, and would result in cost savings compared to the original concept in the 1995 PSR. This alternative was carried forward, further analyzed in the 2003 Supplemental PR, and carried forward. The retaining walls were ultimately constructed in 2010, but the deep landslide was not addressed by this alternative and studies for a long-term solution continued.	2003 Last Chance Grade Supplemental PR

Alternative	Origin Document	Description	Rationale for Elimination	Elimination Document
3.0		Augment the maintenance program with a contingency plan to accelerate road damage repairs on the existing alignment (similar to a No-Build alternative).	This alternative was rejected in the 2002 VA because it would not resolve slope instability issues and would not provide a long-term solution to the identified problem.	2002 VA
A		Realign U.S. 101 in a through-cut to the east of the slide plane. Similar to 1995 PSR Alternative 2B but with an additional soldier pile tieback wall in place of slope stressing to minimize impacts on State Park property.	This alternative was rejected in the 2002 VA due to significant impacts on Del Norte Coast Redwoods State Park and old-growth redwoods. Large disposal area would be required.	2002 VA
B.1		Bypasses the landslide complex with a horizontal alignment to the east of the distressed slope area. Two basic alignments proposed within this alternative: Hamilton Road Bypass and Simpson Bypass. Both begin at Wilson Creek Bridge.	This alternative was rejected in the 2002 VA due to environmental impacts and because it would not meet the purpose and need.	2002 VA
B.2		Simpson bypass with tunnel. Entails a two-lane alignment to the east with two bypass variations: Simpson bypass (similar to Alternative E in the 1987 PSR) and a tunnel at the northern terminus. Both variations have a southerly terminus at the mouth of Wilson Creek.	This alternative was rejected in the 2002 VA because it would not stay within the Caltrans alignment and right of way or meet the purpose and need of the project. Other reasons for dismissing this alternative included design standard issues, stormwater management issues, and anticipated funding difficulties.	2002 VA
C.1		One large-diameter, bored, two-lane tunnel similar to Alternative 1 from the 1995 PSR, but approximately 5,200 feet long.	This alternative was dismissed in the 2002 VA because it would be constructed in a potentially active landslide area and would not eliminate risk of catastrophic failure. Tunnel failure would result in longer closures, which would not meet the purpose and need. There would be significant maintenance costs as well as fire and safety concerns.	2002 VA

Alternative	Origin Document	Description	Rationale for Elimination	Elimination Document
C.2		Similar to Alternative C.1 alignment but with two smaller-diameter, bored, one-way tunnels.	This alternative was dismissed in the 2002 VA because it would not eliminate the risk of catastrophic failure as the tunnels would still pass through a potentially active landslide. Tunnel failure would result in longer closures, which would not meet the project purpose and need. There would be significant maintenance costs as well as fire and safety concerns, and deep slide slope stabilization measures would still be required.	2002 VA
D		Slight realignment of roadway between PMs 15.0 and 15.6 using soldier pile wall and slope stressing to stabilize the deep slide plane.	This alternative was dismissed in the 2002 VA because it went outside of the Caltrans right of way and resulted in substantial impacts to old-growth trees. The improvements might fail in a major seismic event, which would not address the project purpose and need.	2002 VA
E		Slope stressing upslope and downslope of the roadway on similar alignment to Alternative 2A from the 1995 PSR.	This alternative was dismissed in the 2002 VA because it went outside of the Caltrans right of way and resulted in substantial impacts to old-growth trees. Large right of way takes would be required, and the construction period would be lengthy.	2002 VA

[1] While a bypass alternative was considered in the 1990s, Del Norte Coast Redwoods State Parks expanded in 2002, and this alternative would no longer be considered a bypass alternative.

After the termination of the Wilson Creek Bluffs Bypass Project, a new project was initiated and the 1995 PSR (Caltrans 1995) was prepared. This PSR considered four alternatives (Alternatives 1, 2A, 2B, and 3) in addition to the No-Build (Alternative 4). The build alternatives ranged from a quarter-mile-long tunnel behind the slide plane (Alternative 1), slight easterly realignments with stabilization (Alternatives 2A and 2B), and a major realignment of the roadway through a large cut behind the slide plane (Alternative 3). Two other alternatives, a viaduct and a buttress along the existing alignment, were considered but deemed infeasible due to geologic instability. In 2001, a geotechnical report was completed to investigate and make recommendations for the alternatives in the 1995 PSR (Caltrans 2001). Alternative 3 was the preferred alternative from the geotechnical perspective; it was the only alternative that could be successful in addressing the deep-seated slide. However, this alternative was found to have unacceptable impacts on park land.

In 2002 a VA was conducted to identify additional alternatives to those proposed in the 1995 PSR; this study was limited to the existing highway corridor, with a focus of minimizing park right of way requirements and impacts on trees. The 1995 PSR Alternative 2B was designated as the baseline, and three alternatives were identified (Alternatives 1.0, 2.0, and 3.0), which ranged from constructing walls on both sides of the highway throughout the project limits (Alternative 1.0), constructing retaining walls to address specific terrain instability (Alternative 2.0), and a No-Build, in which the highway would be maintained under the existing maintenance/construction strategy and a contingency plan developed to address a "catastrophic" failure event (Alternative 3.0). The VA concluded that Alternative 2.0 was the best alternative of the three, with less environmental disturbance and right of way take.

In addition to the alternatives above, the VA identified multiple other alternatives that were out of the scope of the report (i.e., they were not in or close to the Caltrans right of way). These alternatives focused on bypass and tunnel alignments. However, all these alternatives had major negative environmental impacts related to disturbance of the terrain and to redwood trees. Therefore, none were considered viable.

After the VA, a supplemental PSR was prepared in 2003 to address the findings of the 2001 geotechnical report and the 2002 VA, while presenting a new alternative. In addition to Alternatives 1, 2A, 2B, and 3, which were deficient due to unfeasible structure requirements or had unacceptable impacts on park land and environmental resources, Alternative 4 was added based on refinements of the recommendation in the VA. This alternative would construct five retaining walls and widen the highway. This was the preferred alternative, which would locally stabilize the landslide, but not address the deep-seated slide.

Maintenance efforts would be reduced, but long-term maintenance would be needed. These retaining walls were ultimately constructed in 2010.

2.5.2 Alternatives Considered 2015-2019

As shown in Figure 2-2, in 2015, an EFS (Caltrans 2015) was completed; its purpose was to develop and study sustainable alternatives for LCG. All previously studied alternatives were considered, though none were recommended as originally envisioned because of the development of more advanced technology, a greater value placed on park and park resources, and a better understanding of geotechnical issues and highway grades. In addition, a two-lane facility, rather than a four-lane facility, was the preferred transportation concept.

Fourteen alternatives were developed based on constructability, adherence to design standards, and impacts on the environment and other resources. These were two-lane alternatives with intermittent truck climbing/passing lanes. The alternatives in the EFS bypassed the LCG area to the east; they departed from and reconnected to the existing highway at various locations, with the southernmost departure south of Wilson Creek, and the northernmost connection near Hamilton Road, just south of Crescent City (Figure 2-2). These alternatives included features such as viaducts and tunnels. Eight of the 14 alternatives were ultimately eliminated (Alternatives B1, B2, D3, D4, D5, E3, E4, and E5) because they had larger impacts with no unique or added value compared to other alternatives. See Table 2-5 for additional information on these alternatives. The remaining six alternatives (Alternatives A1, A2, C3, C4, C5, and F) and a No-Build alternative were recommended for further study.

In 2016, a PSR was completed, further analyzing and refining the seven remaining alternatives (Alternatives A1, A2, F, C3, C4, C5 and the No-Build [M]) (Caltrans 2016). The PSR noted that, while none of the alternatives were eliminated, Alternative C5, owing to its relatively long length and high cost, was recommended to be carried forward for programming project cost purposes only.

In 2018, a geotechnical EBRA was conducted to estimate risks associated with long-term ownership of the alternatives (Caltrans 2018b). It evaluated Alternatives A1, A2, C3, and F, and added Alternatives X and L for consideration—an alternative with improvements along the existing alignment, and a retreat uphill for an alternative for geotechnical stability and longevity. The assessment found that Alternative C3 had the highest risks and lowest resistance to change, and the other C alternatives would have higher risks, due to their greater lengths.

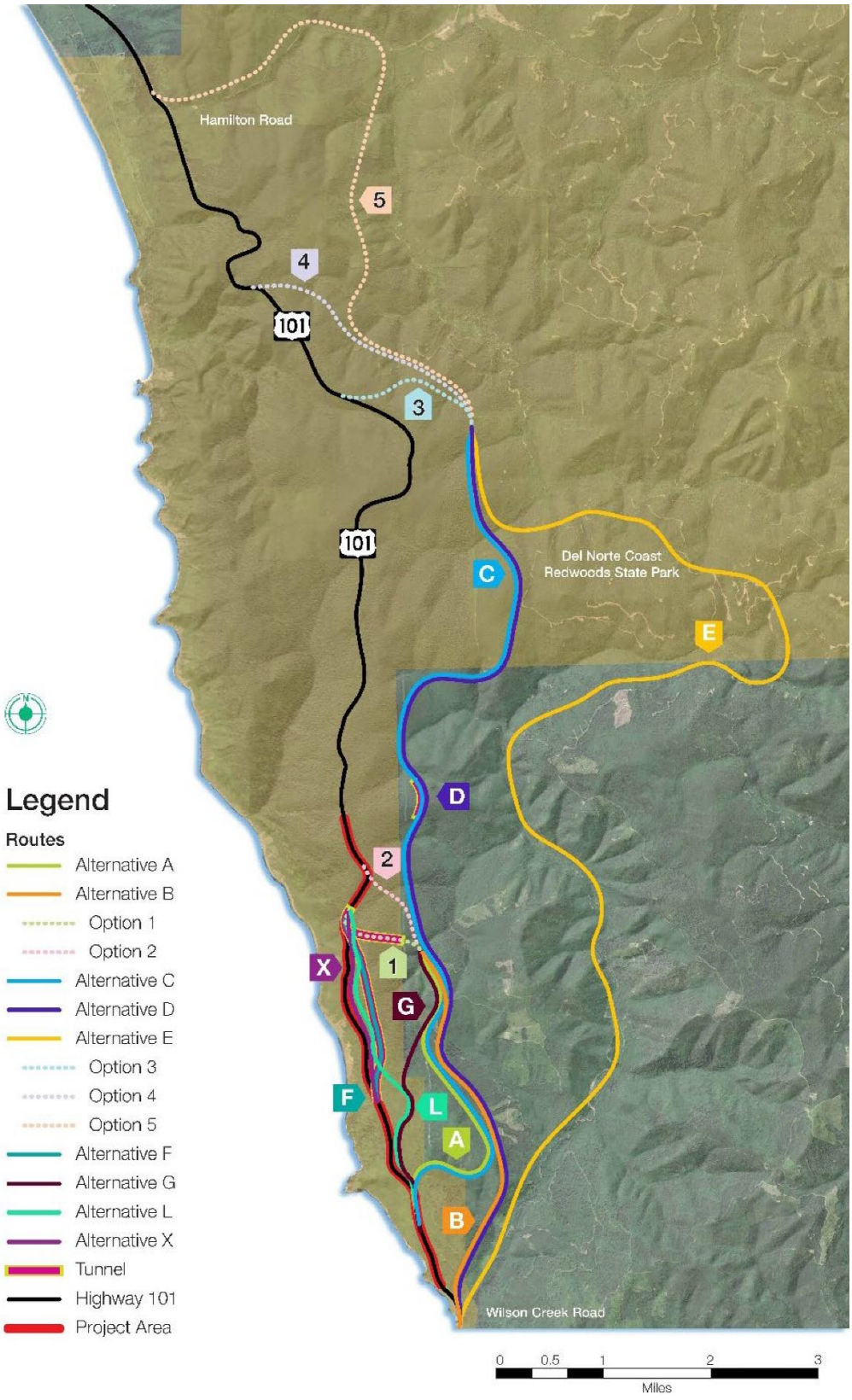


Figure 2-2. Alternatives Evaluated During 2015–2019 Planning Effort



Table 2-5. Alternatives Considered but Rejected from Further Study (2015–2019)

Alternative	Description	Justification for Eliminating Alternative	Source Document
B1	Starts at Wilson Creek Bridge (PM 12.57) and quickly turns east, gaining elevation along Wilson Creek before heading north to follow Segment 1, an approximately 2,000-foot tunnel under Del Norte Coast Redwoods State Park (DNCRSP), before reconnecting to U.S. 101 at PM 15.7.	The A and B alternatives shared Segments 1 and 2, but B1 and B2 had greater habitat and cultural landscape impacts because of their larger construction footprints. They would also cost more and require more soil to be moved. For these reasons, without any added value, these alternatives were eliminated.	2015 EFS
B2	Same southern alignment as B1, but follows Segment 2 after turning north, using a viaduct over DNCRSP to reconnect to U.S. 101 at PM 15.8.		
C3	Departs U.S. 101 at Rudisill Road (PM 13.4) and turns north, following the DNCRSP border before entering the Mill Creek watershed to follow Segment 3, which quickly turns west to connect to U.S. 101 at PM 19.7.	Though recommended for further study in the 2015 EFS, further studies, including the 2018 EBRA, found that the C alternatives had a high risk of long-term failure at a greater capital cost and higher environmental impacts compared to other alternatives. The alternatives went through the Mill Creek watershed, which is important for the threatened coho salmon; the alternatives were strongly recommended against by the National Marine Fisheries Service. In addition, there would have been greater impact on wildlife connectivity, and conversion of forest lands. And, though the alternatives were designed to avoid redwoods, some impacts would still be possible. For these reasons, the C alternatives were eliminated.	2015 EFS 2018 EBRA 2018 VA
C4	Same alignment as C3, but follows Segment 4 rather than Segment 3, heading northwest to reconnect to U.S. 101 at PM 20.7		
C5	Same alignment as C3 and C4, but follows Segment 5, which ultimately continued further north, reconnecting to U.S. 101 near Hamilton Road at PM 22.9.		
D3	Shared the southern portion of its alignment with the B alignments, starting east at Wilson Creek Bridge (PM 12.57), gaining elevation along Wilson Creek, and heading north, meeting up with the C alignments and entering the Mill Creek watershed before following Segment 3, reconnecting with U.S. 101 at PM 19.7.	The D alternatives were similar to the C alternatives, with the exception of starting points. However, the D alternatives had greater potential impacts on habitat areas and cultural landscapes because of their larger construction footprints. In addition, they were more expensive than the C Alternatives. As they did not present a unique value or equal benefit to the C alternatives, they were eliminated.	2015 EFS
D4	Same alignment as D3, but follows Segment 4, reconnecting to U.S. 101 at PM 20.7		
D5	Same alignment as D3 and D4, but follows Segment 5, reconnecting to U.S. 101 near Hamilton Road at PM 22.9.		

Alternative	Description	Justification for Eliminating Alternative	Source Document
E3	Starts south of Wilson Creek Bridge at PM 12.48 and turns east along Wilson Creek, gaining elevation as it follows Wilson Creek before entering the Mill Creek watershed before following Segment 3 and reconnecting with U.S. 101 at PM 19.7.	The E alternatives were less favorable than the C and D alternatives and, with the longest routes and the largest construction footprints, had big impacts to habitat areas and cultural landscapes, in addition to high costs. Though the E alternatives appeared to avoid more landslides, the area hadn't received as focused of studies, added travel time, and had greater impacts on wildlife connectivity and watershed integrity. For these reasons, these alternatives were eliminated.	2015 EFS
E4	Same alignment as E3, but follows Segment 4, reconnecting to U.S. 101 at PM 20.7		
E5	Same alignment as D3 and D4, but follows Segment 5, reconnecting to U.S. 101 near Hamilton Road at PM 22.9.		

Also in 2018, another VA was conducted to analyze the potential alignments (Caltrans 2018c); this included Alternatives A1, A2, C3, C4, C5, F, L and X. The VA recommended that Alternatives C3, C4, and C5 be removed from consideration, most notably due to large environmental impacts. The C alternatives were subsequently dropped due to their high geotechnical risk, high cost, high environmental impacts, and no unique advantages.

In 2019, an addendum to the 2016 PSR was prepared to describe changes to the project since the previous PSR (Caltrans 2019a). This report considered refinements of Alternatives A1, A2, F, L, and X in addition to two additional alternatives, G1 and G2, which were developed as variations of the A alignments. These alternatives were carried forward and are detailed further below.

2.5.3 Alternatives Considered 2020–2021

As shown in Figure 2-3, in 2021, an AAR (Caltrans 2021a) was prepared to document the analysis of the build alternatives: A1, A2, F, G1, G2, L, and X.

As part of the process, a series of workshops were held with LCG's various stakeholder groups to present alternatives screening methods, receive input on the assessment process, and provide a transparent and defensible process for eliminating alternatives. Stakeholder groups included representatives from federal, state, and local agencies, Native American tribes, interest groups, and elected officials. The process involved the selection and weighting of criteria to use for evaluations, consideration of scoring results, and identification of alternatives to carry forward into environmental review.

Three core factors were identified as having the greatest relevance in determining which alternatives to carry forward: 1) estimated effects on mature trees, 2) estimated construction cost, and 3) estimated mitigation cost. The AAR also considered a range of other factors, including various natural factors, construction related factors, and operational factors.

Through the AAR process, all remaining build alternatives except Alternatives X and F were eliminated. Alternatives X and F, along with a No-Build Alternative, would be carried forward into formal environmental analysis under NEPA and CEQA.

Table 2-6 provides a summary of the alternatives that were eliminated, and the basis for elimination.



Figure 2-3. Alternatives Considered During 2020/2021 Screening Process

Table 2-6. Alternatives Considered but Rejected from Further Study (2020–2021)

Alternative	Description	Project Footprint Acreage	Redwood Forest/ Mature Conifer Acreage	Wilson Creek Watershed: Disturbed Area	New Tributary Crossings	Wetland Impact Acreage	Cubic Yards of Material; deposited on-site	Cubic Yards of Material; deposited off-site	Source Document	Justification for Eliminating Alternative
A1	Departs U.S. 101 at PM 13.47, heading inland, and reconnects with U.S. 101 at PM 15.56. A1 includes a 2,425-foot-long tunnel that begins inland and ends near PM 15.56.	359.9	2.3 acres	159 acres	7	1 acre	6.8 million	0	2021 AAR	Large footprint; very high cost to construct and mitigate; impacts on northern spotted owl habitat and high disturbance within Wilson Creek watershed.
A2	Similar to A1 but without tunnel at northern end; reconnects to U.S. 101 at PM 15.92.	371.6	4.7 acres	177.6 acres	8	1 acre	7.1 million	0	2021 AAR	Large footprint; very high cost to construct and mitigate; impacts on northern spotted owl habitat and high disturbance within Wilson Creek watershed.
G1	Departs U.S. 101 at PM 13.47 and reconnects with U.S. 101 at PM 15.56. Shares the same southern alignment as Alternative L and the same northern alignment as Alternative A1. Includes the same 2,425-foot-long tunnel alignment as A1.	348.7	4.9 acres	83.6 acres	5	1 acre	5.6 million	0	2021 AAR	Large footprint, higher impacts on mature trees, high disturbance within Wilson Creek watershed, relatively high cost.

Alternative	Description	Project Footprint Acreage	Redwood Forest/ Mature Conifer Acreage	Wilson Creek Watershed: Disturbed Area	New Tributary Crossings	Wetland Impact Acreage	Cubic Yards of Material; deposited on-site	Cubic Yards of Material; deposited off-site	Source Document	Justification for Eliminating Alternative
G2	Follows Alternative G1 for the initial 2.4 miles and reconnects to U.S. 101 at PM 15.92. Shares the same northern alignment as Alternative A2. Alternative G2 does not include a tunnel.	359.5	7.2 acres	91.2 acres	7	1 acre	5.9 million	0	2021 AAR	Large footprint, greater impacts on mature trees, high disturbance within Wilson Creek watershed, relatively high cost.
L	Departs the existing alignment at PM 13.47, remains upslope of the existing alignment, and reconnects to U.S. 101 at PM 15.56.	167.5	72.5 acres	66.2 acres	1	0	0	2.4 million	2021 AAR	Greatest impacts on mature conifers, including coast redwoods, relatively poor operational/ performance expected; high marbled murrelet habitat acreage and Wilson Creek watershed disturbance.

2.6 Standard Measures and Best Management Practices

Each project alternative includes the following Standard Measures and Best Management Practices (BMPs) that are pre-existing measures, allow little discretion regarding their implementation, and are not specific to the circumstances of a particular project. These measures are implemented on most, if not all, Caltrans projects and were not developed in response to any specific environmental impact resulting from the proposed project alternatives. As such, these features are considered elements of the project and are described below.

Avoidance, minimization, and mitigation measures specifically prescribed for this project to address potential resource impacts are discussed throughout the document within their relevant sections. These measures are also summarized in Appendix D, *Draft Mitigation Summary and Environmental Commitments Record*.

2.6.1 Aesthetic Resources

- **AR-1:** Aesthetic treatments to the bridge, guardrails, and retaining walls would be included to address context sensitivity.
- **AR-2:** Temporary access roads, construction easements, and staging areas that were previously vegetated would be restored to a natural contour and revegetated with regionally-appropriate native vegetation consistent with species within the project area.
- **AR-3:** Where feasible, guardrail terminals would be buried.
- **AR-4:** Artificial night lighting may be required. To reduce potential disturbance to sensitive resources, work area lighting would be temporary and directed specifically on the portion of the work area actively under construction; lighting would be limited to Cal/OSHA work area lighting requirements. Lighting for security would be directed specifically on the area needed for this purpose.
- **AR-5:** Where feasible, the removal of established trees and vegetation would be minimized. Environmentally sensitive areas would have Temporary High Visibility Fencing (THVF) installed before construction to demarcate areas where vegetation would be preserved, and root systems of trees protected.

2.6.2 Biological Resources

- **BR-1:** Before start of work, as required by permit or consultation conditions, a Caltrans biologist or Environmental Construction Liaison (ECL) would meet with the contractor to brief them on environmental permit conditions and requirements relative to each stage of the proposed project, including, but not limited to, work windows, drilling site management, and how to identify and report regulated species within the project areas.
- **BR-2: Animal Species**

  A. To protect migratory and nongame birds (occupied nests and eggs), if possible, vegetation removal would be limited to the period outside of the bird breeding season (removal would occur between September 16 and January 31). If vegetation removal is required during the bird breeding season, a nesting bird survey would be conducted by a qualified biologist within five days prior to vegetation removal. If an active nest is located, the biologist would coordinate with CDFW to establish appropriate species-specific buffer(s) and any monitoring requirements. The buffer(s) would be delineated around each active nest and construction activities would be excluded from these areas until birds have fledged, or the nest is determined to be unoccupied.

  B. Pre-construction surveys for active raptor nests within one-quarter mile of the construction area would be conducted by a qualified biologist within one week prior to initiation of construction activities. Areas to be surveyed would be limited to those areas subject to increased disturbance because of construction activities (i.e., areas where existing traffic or human activity is greater than or equal to construction-related disturbance need not be surveyed). If any active raptor nests are identified, appropriate conservation measures (as determined by a qualified biologist and CDFW) would be implemented. These measures may include, but are not limited to, establishing a construction-free buffer zone around the active nest site, biological monitoring of the active nest site, and delaying construction activities near the active nest site until the young have fledged.

  C. To prevent attracting corvids (birds of the Corvidae family which include jays, crows, and ravens) and other predators such as coyotes and raccoons, no trash or foodstuffs would be left or stored on-site. All trash would be deposited in a secure container daily and disposed of at an approved waste facility at least once a week. Also, on-site workers would not attempt to attract or feed any wildlife.

D. A qualified biologist would monitor in-stream construction activities that could potentially impact sensitive biological receptors (e.g., amphibians, fish). To ensure adherence to permit conditions, the biological monitor would be present during activities such as installation and removal of dewatering or diversion systems, and any instream construction activity. In-water work restrictions would be implemented.

E. An Aquatic Species Relocation Plan, or equivalent, would be prepared by a qualified biologist which would include provisions for pre-construction surveys and the appropriate methods or protocols for species relocation. If previously unidentified threatened or endangered species are encountered or anticipated incidental take levels are exceeded, work would either be stopped until the species is out of the impact area, or the appropriate regulatory agency would be contacted to establish steps to avoid or minimize potential adverse effects. This Plan may be included as part of the Temporary Creek Diversion System Plan identified in BR-5.

F. Artificial night lighting may be required. To reduce potential disturbance to sensitive resources, work area lighting would be temporary and directed specifically on the portion of the work area actively under construction; lighting would be limited to Cal/OSHA work area lighting requirements. Lighting for security would be directed specifically on the area needed for this purpose.

G. A Limited Operating Period would be observed, whereby all in-stream work below ordinary high water would be restricted to the period between June 15 and October 15 to protect water quality and vulnerable life stages of sensitive fish species.

H. Sinusoidal rumble strips would be installed in place of traditional rumble strips to reduce potential auditory disturbance to sensitive animal species, if approved by District Traffic Safety.

I. To protect nesting marbled murrelet, no potential marbled murrelet nest trees would be removed during the nesting season (March 24 through September 15). No construction activities generating sound levels 20 or more decibels (dB) above ambient sound levels or with maximum sound levels (ambient sound levels plus activity-generated sound levels) above 90 dB (with the exception of backup alarms) would occur between March 24 and August 5. Between August 6 and September 15, work that generates sound levels equal to or greater than 10 dB above ambient sound levels or above 90 dB max would observe a daily work

window beginning 2 hours post-sunrise and ending 2 hours pre-sunset. Sound-related work windows would be lifted between September 16 and March 23.

J. To protect nesting or roosting northern spotted owl, no suitable northern spotted owl nest trees would be removed during the nesting season (February 1 through September 15). A 2-year protocol survey for northern spotted owl would be conducted prior to construction (excepting geotechnical work). Additional spot check surveys may be needed throughout the construction period and would be determined in consultation with USFWS. If an active nest is found, no construction activities generating sound levels 20 or more decibels (dB) above ambient sound or with maximum sound levels (ambient sound level plus activity-generated sound level) above 90 dB (with the exception of backup alarms) would occur between February 1 and July 31. Sound-related work windows would be lifted between July 31 and January 31.

K. Surveys would be performed for Pacific (Humboldt) marten, fisher, and ringtail during the breeding season prior to the start of construction. If an active den is identified, work would stop in the area of discovery and coordination with the appropriate resource agencies would occur.

L. No suitable marten denning/resting habitat or potentially suitable marten den or rest trees will be removed or altered (i.e., to the extent the tree or habitat are no longer suitable for denning or resting) during the denning season (i.e., from March 1 through September 15).

- **BR-3: Invasive non-native species control would be implemented. Measures would include:**
  - Straw, straw bales, seed, mulch, or other material used for erosion control or landscaping would be free of noxious weed seed and propagules.
  - All equipment would be thoroughly cleaned of all dirt and vegetation prior to entering the job site to prevent importing invasive non-native species. Project personnel would adhere to the latest version of the *California Department of Fish and Wildlife Aquatic Invasive Species Cleaning/Decontamination Protocol (Northern Region)* (CDFW 2016) for all field gear and equipment in contact with water.

- **BR-4: Plant Species, Sensitive Natural Communities, and ESHA**

    A. Seasonally appropriate, pre-construction floristic surveys for sensitive plant species would be completed (or updated) by a qualified biologist prior to construction in accordance with *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018a).

    B. A Revegetation Plan would be prepared which would include a plant palette, establishment period, watering regimen, monitoring requirements, and pest control measures. The Revegetation Plan would also address measures for wetland and riparian areas temporarily impacted by the project.

    C. Prior to the start of work, Temporary High Visibility Fencing (THVF) and/or flagging would be installed around sensitive natural communities, environmentally sensitive habitat areas (ESHAs), rare plant occurrences, intermittent streams, and wetlands and other waters, where appropriate. No work would occur within fenced/flagged areas.

    D. Where feasible, the structural root zone (SRZ) would be identified around each large-diameter tree (>2-foot diameter-at-breast-height [DBH]) directly adjacent to project activities, and work within the zone would be limited.

    E. When possible, excavation of roots of large diameter trees (>2-foot DBH) would not be conducted with mechanical excavator or other ripping tools. Instead, roots would be severed using a combination of root-friendly excavation and severance methods (e.g., sharp-bladed pruning instruments or chainsaw). At a minimum, jagged roots would be pruned away to make sharp, clean cuts.

    F. Upon completion of construction, superfluous construction materials would be completely removed from the site. The site would then be restored by regrading and stabilizing with a hydroseed mixture of native species along with fast growing sterile erosion control seed, as required by the Erosion Control Plan.

- **BR-5: Wetlands and Other Waters**

  A. The contractor would be required to prepare and submit a Temporary Creek Diversion System Plan to Caltrans for approval prior to any creek diversion. Depending on site conditions, the plan may also require specifications for the relocation of sensitive aquatic species (see also Aquatic Species Relocation Plan in BR-2). Water generated from the diversion operations would be pumped and discharged according to the approved plan and applicable permits.

  B. In-stream work would be restricted to the period between June 15 and October 15 to protect water quality and vulnerable life stages of sensitive fish species (see also BR-2G). Construction activities restricted to this period include any work below the ordinary high water mark (OHWM). Construction activities performed above the OHWM of a watercourse that could potentially directly impact surface waters (i.e., soil disturbance that could lead to turbidity) would be performed during the dry season, typically between June through October, or as weather permits, per the authorized contractor-prepared Stormwater Pollution Prevention Plan (SWPPP) and/or project permit requirements.

  C. See BR-4 for Temporary High Visibility Fencing information.

  D. If allowed by regulatory agencies, temporary wetland protection mats may be used to prevent permanent damage and minimize temporary damage to wetlands from construction activities. Mats should be designed to accommodate motorized equipment or vehicles. Mats shall be removed when wetland access is no longer needed or by November 1 of each year.

2.6.3 Cultural Resources

- **CR-1:** Caltrans would coordinate with the Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation, and the Yurok Tribes (tribes) and incorporate measures to protect tribal resources, including potential work windows associated with tribal ceremonies.
- **CR-2:** An archaeological monitor and tribal monitor from Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation, and/or the Yurok Tribe, as appropriate, would be used during ground-disturbing activities in areas of cultural significance.

- **CR-3:** If cultural materials are discovered during construction, a Historic Property Treatment Plan (HPTP) would be implemented. A standard measure of the HPTP would be for all work activity within a 60-foot radius of the discovery be stopped and the area secured until a qualified archaeologist can assess the nature and significance of the find in consultation with the Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation, and/or the Yurok Tribe, the National Park Service, California Department of Parks and Recreation, and the State Historic Preservation Officer (SHPO).
- **CR-4:** If human remains and related items are discovered on private or State land, they would be treated in accordance with State Health and Safety Code § 7050.5. Further disturbances and activities would cease in any area or nearby area suspected to overlie remains, and the County Coroner contacted. Pursuant to California Public Resources Code (PRC) § 5097.98, if the remains are thought to be Native American, the coroner would notify the Native American Heritage Commission (NAHC) who would then notify the Most Likely Descendent (MLD).

  Human remains and related items discovered on federally-owned lands would be treated in accordance with the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (23 USC 3001). The procedures for dealing with the discovery of human remains, funerary objects, or sacred objects on federal land are described in the regulations that implement NAGPRA at 43 CFR Part 10. All work in the vicinity of the discovery shall be halted and the administering agency's archaeologist would be notified immediately. Project activities in the vicinity of the discovery would not resume until the federal agency complies with the 43 CFR Part 10 regulations and provides notification to proceed.

2.6.4 Geology, Seismic/Topography, and Paleontology

- **GS-1:** The project would be designed to minimize slope failure, settlement, and erosion using recommended construction techniques and BMPs. New earthen slopes would be vegetated to reduce erosion potential.
- **GS-2:** In the unlikely event that paleontological resources (fossils) are encountered, all work within a 60-foot radius of the discovery would stop, the area would be secured, and the work would not resume until appropriate measures are taken.

2.6.5 Greenhouse Gas Emissions

- **GHG-1:** Caltrans Standard Specification "Air Quality" requires compliance by the contractor with all applicable laws and regulations related to air quality (Caltrans Standard Specification [SS] 14-9).
- **GHG-2:** Compliance with Title 13 of the California Code of Regulations (CCR), which includes restricting idling of diesel-fueled commercial motor vehicles and equipment with gross weight ratings of greater than 10,000 pounds to no more than 5 minutes.
- **GHG-3:** Caltrans Standard Specification "Emissions Reduction" ensures construction activities adhere to the most recent emissions reduction regulations mandated by the California Air Resource Board (CARB) (Caltrans SS 7-1.02C).
- **GHG-4:** Use of a Transportation Management Plan (TMP) to minimize vehicle delays and idling emissions. As part of this, traffic would be scheduled and directed to reduce congestion and related air quality impacts caused by idling vehicles along the highway during peak travel times.
- **GHG-5:** All areas temporarily disturbed during construction would be revegetated with appropriate native species, as appropriate. Landscaping reduces surface warming and, through photosynthesis, decreases CO_2. This replanting would help offset any potential CO_2 emissions increase.
- **GHG-6:** Pedestrian and bicycle access would be maintained during project activities.

2.6.6 Hazardous Waste and Material

- **HW-1:** Per Caltrans requirements, the contractor(s) would prepare a project-specific Lead Compliance Plan (CCR Title 8, Section 1532.1, the "Lead in Construction" standard) to reduce worker exposure to lead-impacted soil. The plan would include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of materials containing lead.
- **HW-2:** When identified as containing hazardous levels of lead, traffic stripes would be removed and disposed of in accordance with Caltrans Standard Special Provision "Remove Yellow Traffic Stripes and Pavement Markings with Hazardous Waste Residue" (SSP 14-11.12).

- **HW-3:** If treated wood waste (such as removal of sign posts or guardrail) is generated during this project, it would be disposed of in accordance with Standard Specification "Treated Wood Waste."
- **HW-4:** If hexavalent chromium is identified in the soil, it would be handled and disposed of in accordance with Nonstandard Special Provision 14-11.11.

2.6.7 Traffic and Transporation

- **TT-1:** A Transportation Management Plan would be applied to the project and would include the following measures:
  - The contractor would be required to schedule and conduct work to avoid unnecessary inconvenience to the public and to maintain access to driveways, houses, and buildings within the work zones.
  - Bicycles and pedestrians would be accommodated through the work zone. Signage would be used to alert vehicles of the possible presence of bicyclists. During reversing traffic control, bicyclists would be instructed to join the vehicle queue.
  - The public would be notified of any lane and/or route closure closures.
  - Construction activities would be coordinated with the local busing system (including school buses and public systems) to minimize impact on bus schedules.

2.6.8 Utilities and Emergency Services

- **UE-1:** All emergency response agencies in the project area would be notified of the project construction schedule and would have access to U.S. 101 throughout the construction period.
- **UE-2:** Caltrans would coordinate with utility providers to plan for relocation of any utilities to ensure utility customers would be notified of potential service disruptions before relocation.
- **UE-3:** The project is located within the *Moderate* CAL FIRE Hazard Severity Zone (FHSZ). The contractor would be required to submit a jobsite Fire Prevention Plan as required by Cal/OSHA before starting job site activities. In the event of an emergency or wildfire, the contractor would cooperate with fire prevention authorities.

2.6.9 Water Quality and Stormwater Runoff

- **WQ-1:** The project would comply with the Provisions of the Caltrans Statewide National Pollutant Discharge Elimination System (NPDES) Permit (Order 2022-0033-DWQ), effective January 1, 2023. If the project results in a land disturbance of one acre or more, coverage under the Construction General Permit (CGP) (Order 2022-0057-DWQ) is also required.

  Before any ground-disturbing activities, the contractor would prepare a SWPPP (per the CGP Order 2022-0057-DWQ) that includes erosion control measures and construction waste containment measures to protect Waters of the State during project construction. For SWPPP projects (which are governed according to both the Caltrans NPDES permit and the Construction General Permit), soil disturbance is permitted to occur year-round as long as the Caltrans NPDES and CGP and the corresponding requirements of these permits are adhered to.

  The SWPPP would identify the sources of pollutants that may affect the quality of stormwater; include construction site BMPs to control sedimentation, erosion, and potential chemical pollutants; provide for construction materials management; include non-stormwater BMPs; and include routine inspections and a Monitoring and Reporting Plan. All construction site BMPs would follow the latest edition of the *Caltrans Storm Water Quality Handbooks: Construction Site BMPs Manual* to control and reduce the impacts of construction-related activities, materials, and pollutants on the watershed.

  The project SWPPP would be continuously updated to adapt to changing site conditions during the construction phase.

  Construction may require one or more of the following temporary construction site BMPs:

  - Any spills or leaks from construction equipment (e.g., fuel, oil, hydraulic fluid, and grease) would be cleaned up in accordance with applicable local, state, and/or federal regulations.
  - Accumulated stormwater, groundwater, or surface water from excavations or temporary containment facilities would be removed by dewatering.
  - Water generated from the dewatering operations would be discharged on-site for dust control and/or to an infiltration basin or disposed of off-site.
  - Temporary sediment control and soil stabilization devices would be installed.

- Existing vegetated areas would be maintained to the maximum extent practicable.
- Clearing, grubbing, and excavation would be limited to specific locations, as delineated on the plans, to maximize the preservation of existing vegetation.

- **WQ-2:** The project would incorporate pollution prevention and design measures consistent with the most recent Caltrans Storm Water Management Plan. This plan complies with the requirements of the Caltrans Statewide NPDES Permit (Order 2022-0033-DWQ) as amended by subsequent orders.

  The project design may include one or more of the following:

  - Vegetated surfaces would feature native plants, and revegetation would use the seed mixture, mulch, tackifier, and fertilizer recommended in the Erosion Control Plan prepared for the project.
  - Where possible, stormwater would be directed in such a way as to sheet flow across vegetated slopes, thus providing filtration of any potential pollutants.

2.7 Permits and Approvals Needed

The following permits, licenses, agreements, and certifications (PLACs) are required for project construction:

Table 2-7. Permits and Approvals Needed

Agency	Permit/Approval	Status
United States Fish and Wildlife Service (USFWS)	Section 7 Consultation for Threatened and Endangered Species	Biological Opinion expected from USFWS prior to Final Environmental Document (FED).
United States Army Corps of Engineers (USACE)	Section 404 Permit for filling or dredging Waters of the United States	Application for Nationwide Section 404 permit expected after FED approval.
National Marine Fisheries Service (NMFS)	Section 7 Consultation for Threatened and Endangered Species	Concurrence expected from NMFS on anadromous species prior to FED.
California Coastal Commission (CCC)	Coastal Development Permit (CDP); Federal Consistency Determination	Application for CDP expected after FED approval; the Federal Consistency Determination would be included as part of the permitting process.
California Department of Fish and Wildlife (CDFW)	1602 Lake and Streambed Alteration Agreement	Applications for 1602 permit expected after FED approval.
North Coast Regional Water Quality Control Board (NCRWQCB)	401 Water Quality Certification; Waste Discharge Requirements	Applications expected after FED approval.

Agency	Permit/Approval	Status
State Historic Preservation Officer (SHPO)	Programmatic Agreement (PA) or Memorandum of Agreement (MOA), Determination of Eligibility, Finding of Effect	Signing or concurrence on each item prior to FED approval.
Redwood National and State Parks (RNSP)	Section 4(f)	Coordination on Section 4(f) prior to FED.
California Transportation Commission (CTC)	CTC vote to approve funds and approve a route adoption	Following the approval of the FED, the CTC will be required to vote to approve funding for the project, as well as approve the route adoption for U.S. 101.

CHAPTER 3. Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

Chapter 3 includes the identification of regulations, description of environmental setting and conditions, and explanation of methodologies applicable to the resource topics discussed as they relate to the proposed project. These are discussed under the Regulatory Setting and Affected Environment sections for each resource topic. This information is used to establish setting and context for assessing the potential for the proposed project alternatives to result in permanent and/or temporary direct, indirect, and cumulative effects. The analysis of potential effects, and the identification of proposed avoidance, minimization and/or mitigation measures, where applicable, is in conformance with NEPA, 40 CFR 1508.8, and consistent with the NEPA lead agency's guidance for the preparation of joint EIR/EIS documents. For this EIR/EIS, the guidance used is Caltrans' current Standard Environmental Reference. The analysis and proposed measures, as applicable, are provided under the Environmental Consequences section for each environmental topic. Analysis of the proposed project alternatives under CEQA is provided in Chapter 4, *California Environmental Quality Act Evaluation*, of this EIR/EIS.

As described in Section 2.6, *Standard Measures and Best Management Practices*, this project contains a number of standard measures and BMPs that are employed on most, if not all, Caltrans projects and were not developed in response to any specific environmental impact resulting from the proposed project alternatives.

3.1 Topics Considered but Determined Not to Be Relevant

As part of the scoping and environmental analysis carried out for the project, the following environmental issues were considered. However, as no adverse impacts were identified, there is no further discussion of these issues in this document.

3.1.1 Wild and Scenic Rivers

No designated Wild and Scenic Rivers are within or adjacent to the project area; therefore, no Wild or Scenic River would be affected by the project.

3.1.2 Farmlands

No farmland is present in the project area; therefore, farmland would not be affected by the project.

3.1.3 Timberlands

While there is timberland within the project ESL, and there would be staging of helicopters for geotechnical investigations within timberland, this use would be temporary, and be conducted on existing graveled areas. Therefore, the project would have no effect on the timber production zone or result in a loss or conversion of timberland.

3.1.4 Growth

The purpose of the project is to develop a long-term solution to the problems associated with LCG. While the alignments may shift U.S. 101, the project would not increase capacity or change travel demands or traffic patterns when compared to existing conditions. The highway would maintain a single lane in each direction, and there would be no change in access to the surrounding area. Therefore, the project is not anticipated to influence growth.

3.1.5 Community Character and Cohesion

The project is entirely within national and state parks; there are no communities within the ESL. The project is therefore not anticipated to affect any community's character ("setting") or cohesiveness.

3.1.6 Relocations and Real Property Acquisition

Property to be acquired includes land from national and/or state parks. These areas do not contain any households or residents. Accordingly, no relocations are anticipated.

3.1.7 Hydrology and Floodplain

Neither alternative is within a 100-year base floodplain; therefore, there would be no effects to a 100-year base floodplain (Caltrans 2023b).

3.1.8 Wildfire

The project is not located within or near a *very high* Fire Hazard Severity Zone. See Section 4.5, *Climate Change,* for more information.

3.2 Human Environment

3.2.1 Existing and Future Land Use

The project is in the rural county of Del Norte in northwestern California. Last Chance Grade is located along a section of U.S. 101 just east of the Pacific Ocean, within national and state parks. Timberland borders the parks to the east. U.S. 101 is the only north/south state highway in the area, and the only viable route between the communities of Klamath and Crescent City. It also serves as the Pacific Coast Bike Route and is designated a State Scenic Highway within the project limits.

Within the project's Environmental Study Limits (ESL)[14], the project is zoned as either Public Ownership or Timberland Preserve, with land use designations of Federal and State Lands and Timberland, respectively.

The Public Ownership Zone is associated with Redwood National Park (RNP) and Del Norte Coast Redwoods State Park (DNCRSP), which are under the jurisdiction of the National Park Service (NPS) and the California Department of Parks and Recreation (CDPR), respectively (Figure 3-1). The two parks, along with Jedediah Smith Redwoods State Park and Prairie Creek Redwoods State Park, are cooperatively managed as Redwood National and State Parks (RNSP). The parks were designated a United Nations Educational, Scientific, and Cultural Organization (UNESCO) World Heritage Site in 1980, with its outstanding universal values related to the redwood forests (UNESCO 2012). Within the project's ESL and surrounding area, the park is primarily in a natural, undeveloped state, with steep, densely vegetated slopes, though there are a few recreational features in the area, including the California Coastal Trail (CCT), Damnation Creek Trail, and the DeMartin Backcountry Camp.

The Timberland Preserve Zone is associated with the lands of Green Diamond Resource Company (GDRC), which is managed as timberlands (Figure 3-1). Only a small portion of the ESL falls within timberland, including staging for helicopters associated with geotechnical investigations.

Other than the recreational features associated with RNSP, no residences or other developed facilities are present. Due to the nature of the surrounding lands, no future development is anticipated; no future change in land use is expected.

[14]The ESL encompasses the project footprint where there could be direct and indirect disturbance during construction plus additional area beyond the project footprint to accommodate scope changes.

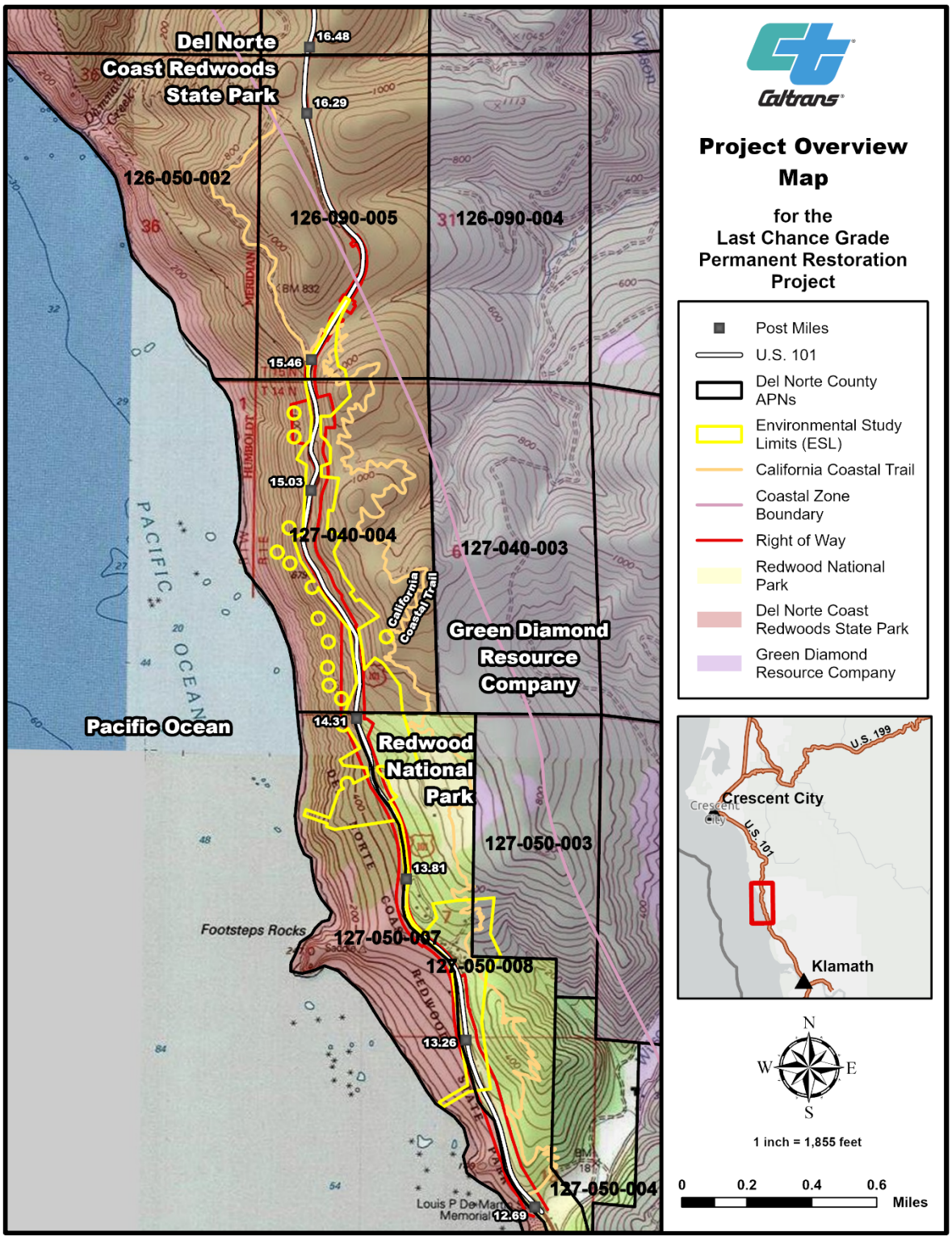


Figure 3-1. Project Overview Map

3.2.2 Consistency with State, Regional, and Local Plans and Programs

Affected Environment

When analyzing land use impacts, it must be determined whether a project is consistent with state, regional, and local policies that govern land use and development. The following plans are applicable to the project area. In addition, the California Coastal Act (CCA) and the 1983 Del Norte County General Plan, Coastal Element (Local Coastal Program Land Use Plan) (Del Norte County 1983) are relevant within the project area; consistency with these are discussed in detail in Section 3.2.3, *Coastal Zone.*

Del Norte County Regional Transportation Plan

The 2020 Regional Transportation Plan (RTP) was prepared for the Del Norte Local Transportation Commission (DNLTC), which is the Regional Transportation Planning Agency for Del Norte County. The RTP is a long-range planning document that acts as the blueprint for transportation planning in the region (DNLTC 2021). The RTP includes goals related to state highways, including maintaining a safe, efficient, and convenient regional roadway system, and to support recreational travel by making it safe, easy, and inviting.

Del Norte County General Plan

The Del Norte County General Plan, released in 2003, covers the unincorporated areas of the county. It serves as the blueprint, outlining policies, standards, and programs that guide decisions concerning development in the county (Del Norte County 2003). This plan consolidates coastal and non-coastal policies from the 1976 General Plan and the 1983 Coastal Element of the plan.

RNSP General Management Plan/General Plan

The RNSP General Management Plan/General Plan (GMP/GP) was established in 2000 to cooperatively manage the complex of parks. The purpose of the plan is to provide a clearly defined coordinated direction for resource preservation and visitor use, and a foundation for decision making and park management (NPS and CDPR 2000). The management zones, goals, strategies, and actions contained in the document serve as resource management policy, and give general guidance for land use, facilities, concessions, and operation of the parks. There are two management zones within the ESL: the Backcountry (Mechanized) Zone, primarily to the east of the highway, and the Primitive Zone to the west.

Backcountry (mechanized) zones are mostly natural, with generally pristine conditions and previously disturbed areas that have been or will be restored to natural conditions, while primitive zones are the most natural of all, and have areas with pristine conditions as well as areas with dense vegetation that are extremely difficult to enter or move through without trails.

Environmental Consequences

Table 3-1 evaluates whether the proposed project is consistent with relevant policies from the Del Norte County Regional Transportation Plan and Del Norte County General Plan, and the management strategies within the RNSP GMP/GP.

Table 3-1. Consistency with Local Plans and Policies

Policy	Build Alternative X	Build Alternative F	No-Build Alternative
Del Norte County Regional Transportation Plan			
Policy 2.1: Support improvements to US 101 that address stability problems at Last Chance Grade (LCG).	**Consistent**. Alternative X would address stability problems at LCG by reengineering a 1.6-mile-long section of the existing highway to minimize the risk of landslides.	**Consistent**. Alternative F would address stability problems at LCG by constructing a 1.1-mile tunnel east of the existing highway to avoid geologic instability and minimize the risk of landslides.	**Not Consistent.** Under the No-Build Alternative, regular maintenance and operations would continue, with emergency restoration projects conducted as needed to address landslides and roadway failures. However, underlying stability problems would not be addressed, and there would no permanent solution to the instability of the area.
Del Norte County General Plan			
Policy 5.B.34: The County shall continue to emphasize the importance of maintaining and retaining Highways 101 and 199 as primary access routes which cross through parks to serve the County and its communities. **Policy 8.A.1:** The County shall encourage Caltrans to continue to maintain Highway 101's availability to county communities at all times.	**Consistent**. Alternative X involves realigning a portion of the existing U.S. 101 with the purpose of creating a more reliable connection of U.S. 101 at LCG. Access through the parks and to surrounding communities would be maintained.	**Consistent**. Alternative F involves constructing a 1.1-mile tunnel east of the existing highway with the purpose of creating a more reliable connection of U.S. 101 at LCG. Access through the parks and to surrounding communities would be maintained.	**Generally Consistent.** Under the No-Build Alternative, Caltrans would work to maintain the availability of the highway at all times, with continued enhanced maintenance and emergency repairs as needed to keep the highway open.

Policy	Build Alternative X	Build Alternative F	No-Build Alternative
Policy 1.B.1: The County shall seek to maintain, and where feasible, enhance the existing quality of all water resources in order to ensure public health and safety and the biological productivity of waters.	**Consistent.** Alternative X would implement Standard Measures and BMPs to minimize potential water quality impacts during construction and would comply with all applicable permits to protect water quality. The project is not anticipated to have long-term impacts to water quality during operation and maintenance.	**Consistent.** Alternative F would implement Standard Measures and BMPs to minimize potential water quality impacts during construction and would comply with all applicable permits to protect water quality. The project is not anticipated to have long-term impacts to water quality during operation and maintenance.	**Not Applicable.** Under the No-Build Alternative, no development is proposed; there would be no change to existing conditions.
Policy 1.B.3: The County shall continue to follow all existing and future Federal and State water quality standards.	**Consistent**. Alternative X would comply with all water quality standards.	**Consistent**. Alternative F would comply with all water quality standards.	**Consistent**. Under the No-Build Alternative, no development is proposed. Caltrans would continue to comply with all water quality standards.
Policy 1.E.2: The County shall support the critical habitat protections for federally listed threatened and endangered species. **Policy 1.E.9:** The County shall require that new development is consistent with critical habitat protection for federally listed threatened and endangered species, when such critical habitat is specifically identified at the affected project site or the development has identified offsite impacts that affect critical habitat.	**Consistent**. Caltrans would comply with the Federal Endangered Species Act (FESA) and would consult with federal agencies under Section 7 of FESA for the protection of listed species and their critical habitat.	**Consistent.** Caltrans would comply FESA and would consult with federal agencies under Section 7 of FESA for the protection of listed species and their critical habitat.	**Not Applicable**. Under the No-Build Alternative, there is no proposed development; there would be no effect to listed species or their critical habitats.

Policy	Build Alternative X	Build Alternative F	No-Build Alternative
Policy 1.E.5: The County shall require that development on hillsides be designed to utilize native vegetation when possible or natural vegetation as erosion control measures.	**Consistent**. All areas temporarily disturbed during construction of Alternative X would be revegetated with native species, as appropriate.	**Consistent**. All areas temporarily disturbed during construction of Alternative F would be revegetated with native species, as appropriate.	**Not Applicable**. Under the No-Build Alternative, no development would be planned.
Policy 1.E.19: The County shall permit the diking, filling, or dredging of wetlands in accordance with other applicable provisions of this General Plan where there is no feasible less environmentally damaging alternative and where feasible mitigation measures have been provided to minimize adverse environmental effects. Within the coastal zone, such projects shall be limited to those identified in Section 30233 of the Coastal Act.	**Consistent**. Alternative X would affect wetlands. Standard Measures and BMPs would be implemented prior to and during construction to avoid and minimize impacts. Impacts would be offset to ensure no net loss of wetlands.	**Consistent**. Alternative F would affect wetlands. Standard Measures and BMPs would be implemented prior to and during construction to avoid and minimize impacts. Impacts would be offset to ensure no net loss of wetlands.	**Not Applicable**. Under the No-Build Alternative, no development is proposed.

Policy	Build Alternative X	Build Alternative F	No-Build Alternative
Policy 1.E.21: The County shall ensure that development in areas adjacent to environmentally sensitive wetland habitat areas be sited and designed to prevent impacts which could significantly degrade such areas, and shall be compatible with the continuance of such habitat areas. The primary tool to reduce impacts around wetlands between the development and the edge of the wetland shall be a buffer of one hundred feet in width. A buffer of less than one hundred feet may be utilized where it can be determined that there is no adverse impact on the wetland. A determination to utilize a buffer area of less than one hundred feet shall be made in cooperation with the California Department of Fish and Game and the County's determination shall be based upon specific findings as to the adequacy of the proposed buffer to protect the identified resource.	**Consistent**. With the implementation of Caltrans Standard Measures and BMPs, including protecting vegetation, minimizing vegetation removal, and preparing a Revegetation Plan and an Erosion Plan, aquatic resources would continue to function as they had pre-project in less than a year. These Standard Measures and BMPs would minimize potential direct temporary impacts from Alternative X on wetlands, non-wetland waters, and riparian vegetation.	**Consistent**. With the implementation of Caltrans Standard Measures and BMPs, including protecting vegetation, minimizing vegetation removal, and preparing a Revegetation Plan and an Erosion Plan, aquatic resources would continue to function as they had pre-project in less than a year. These Standard Measures and BMPs would minimize potential direct temporary impacts from Alternative F on wetlands, non-wetland waters, and riparian vegetation.	**Not Applicable.** Under the No-Build Alternative, no development is proposed.

Policy	Build Alternative X	Build Alternative F	No-Build Alternative
Policy 1.E.26: In cases where the County requires replacement for a wetland loss, the level of replacement to be required with respect to any given project will be evaluated according to the following criteria: 1. On-site mitigation shall be preferred to off-site, and in-kind mitigation shall be preferred to out-of-kind; 2. Functional replacement ratios may vary to the extent necessary to incorporate a margin of safety reflecting the expected degree of success associated with the mitigation plan; and 3. Acreage replacement ratios may vary depending on the relative functions and values of those wetlands being lost and those being supplied, including compensation for temporal losses.	**Consistent**. Alternative X would offset impacts to wetlands to ensure no net loss.	**Consistent**. Alternative F would offset impacts to wetlands to ensure no net loss.	**Not Applicable**. Under the No-Build Alternative, no development proposed, and therefore there would be no human-induced impact on existing wetlands.

Policy	Build Alternative X	Build Alternative F	No-Build Alternative
Policy 1.E.27: The County deems the continuation of existing agricultural uses such as grazing and pastoral activities and the raising and harvesting of crops to be a principle use within existing Farmed Wetlands. Maintenance activities auxiliary to the above agricultural uses are, therefore, allowable uses including drainage related to crop rotation. Such areas are subject to the other policies of this General Plan.	**Consistent.** Alternative X would not affect agricultural resources or timberlands.	**Consistent**. Alternative F would not affect agricultural resources or timberlands.	**Not Applicable.** Under the No-Build Alternative, no development is proposed.
Policy 1.E.28: The County shall ensure that riparian vegetation be maintained along streams, creeks, and sloughs and other water courses for their qualities as wildlife habitat, stream buffer zones, and bank stabilization. Where alterations to segments of stream habitat cannot be avoided, policy 1.E.29 shall apply. **Policy 1.E.29:** The County shall require mitigation for development projects where segments of stream habitat are unavoidably altered. Such impacts should be mitigated on-site with in-kind habitat replacement or elsewhere in the	**Consistent**. Alternative X would not affect streams or riparian vegetation.	**Consistent**. Alternative F would affect streams and riparian habitat. Standard Measures and BMPs would minimize potential temporary and permanent impacts on riparian vegetation. Furthermore, measures would be taken to offset any potential impacts to riparian vegetation.	**Not Applicable.** Under the No-Build Alternative, there is no proposed development; riparian vegetation would not be affected.

Policy	Build Alternative X	Build Alternative F	No-Build Alternative
stream system through stream or riparian habitat restoration work. **Policy 1.E.30:** The County shall require development projects proposing to encroach into a creek corridor or creek setback to do one or more of the following, in descending order of desirability: a. Avoid the disturbance of riparian vegetation; b. Replace riparian vegetation (on-site, in-kind); c. Restore another section of creek (in-kind); and/or d. Participate in a mitigation-banking program.			

Policy	Build Alternative X	Build Alternative F	No-Build Alternative
Policy 2.C.4: The County shall continue to require that a geologic investigation be made by a registered geologist, engineering geologist, or Registered Civil Engineer for all proposals in landslide potential areas, coastal or riverbluffs, and development on slopes greater than 10 percent, including road construction. These investigations should assess the stability of the site under both normal and seismic conditions as well as recommend mitigation measures. If it is found that the hazards cannot be mitigated to within acceptable risk levels appropriate with the intended land use, the proposal should be denied.	**Consistent.** Geotechnical investigations have been performed to assess geologic conditions, and additional investigations would be conducted prior to construction of main project components. These investigations are to inform project design to minimize geologic risk to the project alternative.	**Consistent.** Geotechnical investigations have been performed to assess geologic conditions, and additional investigations would be conducted prior to construction of main project components. These investigations are to inform project design to minimize geologic risk to the project alternative.	**Not Applicable.** Under the No-Build Alternative there is no proposed development.
Policy 5.H.1: The County shall continue to require appropriate surveys and site investigations when needed as part of the initial environmental assessment for development projects in accordance with the California Environmental Quality Act (CEQA). Surveys and investigations shall be performed under the supervision of a professional archaeologist or other person qualified in the appropriate field approved by the County.	**Consistent.** Cultural resource surveys were conducted for the project.	**Consistent.** Cultural resource surveys were conducted for the project.	**Not Applicable.** Under the No-Build Alternative, no development is proposed.

Policy	Build Alternative X	Build Alternative F	No-Build Alternative
Policy 5.H.2: The County shall continue to require that discretionary development projects identify and protect from damage, destruction, and abuse important historical, archaeological, paleontological, and cultural sites and their contributing environment. Such assessments shall be incorporated into a countywide cultural resource database. **Policy 5.H.10:** In cooperation with the State Historic Preservation Office, where it is determined development would adversely affect archaeological resources, the County shall continue to require reasonable mitigation measures.	**Consistent.** Cultural resource surveys have been conducted, and consultation with the State Historic Preservation Office initiated. Once an alternative is selected and effects on historic properties are determined, a Historic Property Treatment Plan would be prepared with specific measures included to address adverse effects in coordination with consulting parties.	**Consistent.** Cultural resource surveys have been conducted, and consultation with the State Historic Preservation Office initiated. Once an alternative is selected and effects on historic properties are determined, a Historic Property Treatment Plan would be prepared with specific measures included to address adverse effects in coordination with consulting parties.	**Not Applicable.** Under the No-Build Alternative, no development is proposed; no ground disturbance or potential impacts on archaeological resources would occur.

Policy	Build Alternative X	Build Alternative F	No-Build Alternative
Policy 6.A.4: The County shall continue to require the alteration of natural landforms in designated scenic areas to be minimized, where feasible, in construction projects by: a. Designing roadways, driveways, and other corridors to blend with the natural contours of the landscape by avoiding excessive cuts and fills; and b. Concentrating development on relatively level areas over steep hillsides. Provisions to be considered include: clustering, density exchange, and open space dedication.	**Consistent.** U.S. 101 in the project area is an officially designated scenic highway. Under Alternative X, 1.6 miles of the highway would be realigned to the east and curves would be reduced and retaining walls would be built. While substantial excavation would occur, the roadway would avoid excessive cuts and fills, to the extent feasible. Standard Measures and BMPs, including aesthetic treatment on retaining walls and revegetating disturbed areas, would minimize impacts on scenic areas.	**Consistent.** As with Alternative X, the portion of U.S. 101 in the project area is a designated scenic highway. Under Alternative F, a tunnel would be constructed to avoid the landslide. Large-scale, human-made structures, like the OMC and tunnel portals, would be introduced to the environment. Some features would be screened with plantings and other treatments. The tunnel would eliminate views for drivers on this segment, but viewers outside the tunnel would not see the project features, other than the tunnel portals and OMC, as it would blend in with the landscape. Standard Measures and BMPs would minimize impacts on scenic areas.	**Not Applicable.** Under the No-Build Alternative, no work would be done to the existing highway and existing conditions would persist.
Policy 6.A.7: The County shall urge State facilities to use low-energy shielded lights to be directed downward for better efficiency and to minimize nighttime glare.	**Consistent.** Alternative X would not change the existing conditions; roadway lighting would not be added.	**Consistent.** Alternative F would require permanent lighting at the tunnel portals and OMC. All lighting would be directed downward and would be placed to minimize light intrusion.	**Not Applicable.** Under the No-Build Alternative, existing conditions would not change. No permanent lighting facilities are on site.
Policy 6.A.11: The County shall maintain the coastal scenic viewpoints in scenic corridors which the County owns as identified in Table 6-1 [of the General Plan] and illustrated in Figure 6-1 [of the General Plan].	**Consistent.** No identified scenic viewpoints would be affected.	**Consistent.** No identified scenic viewpoints would be affected.	**Consistent.** Under the No-Build Alternative, existing conditions would not change.

Policy	Build Alternative X	Build Alternative F	No-Build Alternative
Policy 6.B.1: The County should support the maintenance and enhancement of the scenic qualities of Highways 101, 197, and 199, while ensuring the improvement of these routes and the economic viability of the area they serve.	**Consistent.** Alternative X would improve the reliability of U.S. 101, which would maintain the economic viability of the area. Standard measures and context-sensitive solutions are incorporated into the project to reduce effects from visual changes of the project.	**Consistent.** Alternative F would improve the reliability of U.S. 101, which would maintain the economic viability of the area. Standard measures and context-sensitive solutions are incorporated into the project to reduce effects from visual changes of the project.	**Consistent.** Under the No-Build Alternative, there would be no development; existing conditions would not change.
RNSP General Management Plan/General Plan			
Natural Resource Management and Protection, Management Strategies: • Ensure that all resource management efforts are consistent with and supportive of the perpetuation of the redwood forest ecosystem as the prime resource of the parks. • Actively participate in land use decisions for activities such as logging, mining, and the development of highways and subdivisions adjacent to the parks to minimize impacts on RNSP resources and values. • Cooperate with the timber industry, private landowners, and other government agencies to accomplish long-range resource management planning and reduce threats to the RNSP resources.	**Consistent.** Environmental review has been conducted for the project, with efforts taken to minimize impacts to RNSP, including to redwoods. Within the GMP/GP, RNSP acknowledges that operation and maintenance of highways sometimes conflicts with the protection of RNSP resources and values, and that if realignments need to take place, RNSP would work with Caltrans to ensure proper protection of the values and resources of the parks. Caltrans has been actively working with RNSP on the project to minimize and reduce threats to RNSP resources.	**Consistent.** Environmental review has been conducted for the project, with efforts taken to minimize impacts to RNSP, including to redwoods. Within the GMP/GP, RNSP acknowledges that operation and maintenance of highways sometimes conflicts with the protection of RNSP resources and values, and that if realignments need to take place, RNSP would work with Caltrans to ensure proper protection of the values and resources of the parks. Caltrans has been actively working with RNSP on the project to minimize and reduce threats to RNSP resources.	**Consistent.** For the No-Build Alternative, existing conditions would not change. Regular maintenance and operations would continue, with emergency restoration projects conducted as needed. Coordination with RNSP would continue for activities that may affect RNSP.

Policy	Build Alternative X	Build Alternative F	No-Build Alternative
Public Use, Recreation, and Visitor Safety, Management Strategy: Support and facilitate appropriate public use and enjoyment of the parks and participation in activities related to the parks' resources.	**Consistent.** Alternative X would not change access to the parks or their facilities and would provide a more reliable connection along this section of U.S. 101, which is used to access park resources.	**Consistent.** Alternative F would not change access to the parks or their facilities and would provide a more reliable connection along this section of U.S. 101, which is used to access park resources.	**Not Applicable.** The No-Build Alternative would not change public use of RNSP.
Visitor Access and Circulation/Roads Management Strategies: • Depend on U.S. highways in the parks to serve as the primary access routes to the parks, to be managed and maintained by state and federal transportation agencies. • Work cooperatively with the agencies having primary jurisdiction on these U.S., state, and county roadways throughout the parks to promote public safety, to enhance opportunities for travelers to enjoy scenic vistas and gain access to RNSP resources and facilities, and to protect RNSP resources that are adjacent to the roadways.	**Consistent.** Alternative X would provide a more reliable connection of U.S. 101, which is the primary access route for the parks. Caltrans is working cooperatively with RNSP on the LCG project, including for the protection of RNSP resources.	**Consistent.** Alternative F would provide a more reliable connection of U.S. 101, which is the primary access route for the parks. Caltrans is working cooperatively with RNSP on the LCG project, including for the protection of RNSP resources.	**Consistent.** Under the No-Build Alternative, U.S. 101 would continue to serve as the primary access route to parks, and Caltrans would continue to work cooperatively with RNSP for projects within the parks.

As shown in Table 3-1, LCG is mentioned specifically in the 2020 RTP and is considered a high-priority project. Therefore, Alternatives X and F, which would implement a long-term solution to ongoing landslides, are consistent with the Del Norte County RTP.

Alternatives X and F are also consistent with the relevant policies of the Del Norte County General Plan. As part of the environmental process, natural, cultural, and visual resources within the project area were assessed and impacts reduced to the extent feasible. In addition, consultation would be conducted, and permits would be obtained from agencies responsible for the resources outlined within the General Plan, and measures included in the project to avoid, minimize, and/or mitigate for impacts.

Overall, Alternatives X and F are consistent with the RNSP GMP/GP. Though Alternatives X and F may affect park resources, the parks have recognized the importance of a long-term restoration at LCG. Caltrans is working cooperatively with the parks on the project to minimize impacts on RNSP resources and values.

As there is no planned development with the No-Build Alternative and thus no change to existing conditions, most policies listed in Table 3-1 are not applicable; policies related to maintenance of existing conditions are generally consistent. However, the No-Build is not consistent with Policy 2.1 of the 2020 RTP as it does not address the underlying instability of LCG. The RTP identifies maintaining connectivity of Del Norte County to Humboldt County as critical, and the vulnerability at LCG is of concern. The RTP is in support of finding a permanent solution at LCG and identifies the LCG project as regionally significant.

Avoidance, Minimization, and/or Mitigation Measures

No measures related to consistency with plans and policies would be required.

3.2.3 Coastal Zone

Regulatory Setting

This project has the potential to affect resources protected by the Coastal Zone Management Act (CZMA) of 1972. The CZMA is the primary federal law enacted to preserve and protect coastal resources. The CZMA sets up a program under which coastal states are encouraged to develop coastal management programs. States with an approved coastal management plan are able to review federal permits and activities to determine if they are consistent with the state's management plan.

California has developed a coastal zone management plan and has enacted its own law, the California Coastal Act of 1976 (CCA), to protect the coastline. The policies established by the CCA are similar to those for the CZMA. These policies include the protection and expansion of public access and recreation; protection, enhancement, and restoration of environmentally sensitive areas; protection of agricultural lands; protection of scenic beauty; and protection of property and life from coastal hazards. The California Coastal Commission (CCC) is responsible for implementation and oversight under the CCA.

Just as the federal CZMA delegates power to coastal states to develop their own coastal management plans, the CCA delegates power to local governments to enact their own local coastal programs (LCPs). Certified LCPs contain the rules for development and protection of coastal resources in their jurisdiction consistent with the CCA goals. This project is subject Del Norte County's Local Coastal Program. A Federal Consistency Determination from the CCC would be required as part of the permitting process.

Affected Environment

The entire ESL is within the Coastal Zone (Figure 3-1). A large portion of the ESL is within Del Norte County's jurisdiction. The remainder of the ESL is on federal land, which is under the jurisdiction of the California Coastal Commission (CCC). Given the overlapping jurisdictions, it is anticipated that the Coastal Development Permit (CDP) would be consolidated[15] to the state, with the CCA as the standard of review and the policies of Del Norte County's LCP used as guidance.

[15] Section 30601.3 of the CCA allows the CCC to process a "consolidated" CDP application for projects that would otherwise require a CDP from both the CCC and the local government when the local government, the applicant, and the CCC agree to do so.

Throughout the ESL, U.S. 101 is a designated State Scenic Highway[16] and is part of the Pacific Coast Bike Route (PCBR). It is the only viable route between Klamath and Crescent City, running along steep forested slopes within RNSP that rise up to 1,080 feet above sea level. The California Coastal Trail (CCT) winds roughly parallel to and east of the project limits, crossing the highway in the northern part of the ESL. Lands west of the roadway feature extremely steep slopes dropping hundreds of feet to the ocean.

Environmental Consequences

The CCA has protection policies for a variety of resources. Each of these resources is discussed below in Table 3-2. Community resources, such as agricultural resources and timberlands, and public access and recreation, would not be affected by this project; see the relevant sections within this document for additional information. The location hydraulic study conducted for the project found that elevations along U.S. 101 within the ESL are above the projected sea level rise elevations (Caltrans 2023b), and therefore would not be directly affected by sea level rise. However, other resources protected by the CCA that may be affected by the project include natural, cultural, and visual resources. Impacts on these resources are discussed in various technical studies prepared for the project and are addressed in the relevant sections of this environmental document.

Overall, the project build alternatives would be consistent with applicable policies within the CCA. Coastal resources would be considered as part of the environmental process and protected to the extent feasible. The No-Build Alternative would not implement a project; thus, consistency with the CCA is not applicable.

Avoidance, Minimization, and/or Mitigation Measures

With the measures identified in Table 3-2, the project would be consistent with the CCA and the Del Norte County LCP.

[16]California's Scenic Highway Program was established by the California Legislature in 1963 and is managed by Caltrans. An eligible State highway becomes officially designated through a process in which the local governing body applies to Caltrans for scenic highway approval, adopts a Corridor Protection Program, and receives notification that the highway has been officially designated a State Scenic Highway by the Caltrans Director.



Table 3-2. Coastal Act Chapter Three Policy Consistency Summary Table

Coastal Act Chapter Three Policy Area	Coastal Act Consistency Analysis
WETLANDS	
Coastal Act Section 30230: *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreation, scientific, and educational purposes.* **Coastal Act Section 30231:** *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.* **Coastal Act Section 30233 (in relevant part):** *(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following: (1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities. (2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps. (3) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational*	The ocean adjacent to the project limits has been designated an Area of Special Biological Significance (ASBS). Neither alternative would involve construction in or immediately adjacent to open coastal waters; however, Alternative X includes a drainage gallery that would discharge water directly to the ocean. Given the setting of the project area and the traditional land use, groundwater is anticipated to be contaminant free. Groundwater testing would be performed prior to implementation. With the inclusion of standard measures, it is anticipated neither build alternative would impact water quality or marine species and their associated communities; therefore, the project would be consistent with Section 30230. Please see Section 3.3.1, *Water Quality and Stormwater Runoff*, for more information. Both alternatives would have unavoidable impacts on wetlands and non-wetland waters, as described in Section 3.4.2, *Wetlands and Other Waters*. The need for permanent fill triggers a three-part test under Section 30233(a): allowable use, alternatives, and mitigation. Under the first test, a project must qualify as one of the seven stated uses under Section 30233(a). As a roadway, the project may be considered an incidental public service, one of the allowable use exemptions under 30233(a). Multiple build alternatives have been evaluated over time, and no other design or site alternative is feasible that meets the purpose and objectives of the project and maximally protects other resources without requiring wetland fill. Standard Measures and BMPs would be implemented to minimize potential impacts on wetlands, non-wetland waters, and riparian vegetation. Permanent impacts would be offset through a combination of on- and off-site restoration and replacement at a minimum a mitigation ratio of 1:1 (1 acre of restoration to 1 acre of impact). Exact location and type of mitigation and enhancement would be coordinated with all applicable agencies.

Coastal Act Chapter Three Policy Area	Coastal Act Consistency Analysis
piers that provide public access and recreational opportunities. (4) Incidental public service purposes, including, but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines. (5) Mineral extraction, including sand for beaches, except in environmentally sensitive areas. (6) Restoration purposes. (7) Nature study, aquaculture, or similar resource dependent activities.... **Del Norte County LCP (1983):** *The diking, filling, or dredging of wetlands shall be permitted in accordance with other applicable provisions of this program, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects. Such projects shall be limited to those identified in Section 30233 of the Coastal Act.*	With standard measures and avoidance, minimization, and mitigation measures implemented, the project would be consistent with the applicable CCA policies of Sections 30231 and 30233 and with the policies in the Del Norte County LCP.
AGRICULTURAL RESOURCES	
Coastal Act Section 30241: *The maximum amount of prime agricultural land shall be maintained in agricultural production to assure the protection of the areas' agricultural economy, and conflicts shall be minimized between agricultural and urban land uses through all of the following:* *By establishing stable boundaries separating urban and rural areas, including, where necessary, clearly defined buffer areas to minimize conflicts between agricultural and urban land uses* *By limiting conversions of agricultural lands around the periphery of urban areas to the lands where the viability of existing agricultural use is already severely limited by conflicts with urban uses or where the conversion of the lands would complete a logical and viable neighborhood and contribute to the establishment of a stable limit to urban development.*	No agricultural resources are present within the project area. Therefore, there would be no conversion of agricultural land or other agricultural impacts and agricultural resources are not analyzed in this environmental document. While there is timberland within the project ESL, other than temporary staging in existing graveled areas for geotechnical investigations, no work would occur in this area; therefore, there would be no conversion of timberlands. Given the project would not affect any agricultural or timberland resources, the policies related to these resources in the CCA and the Del Norte County LCP are not applicable.

Coastal Act Chapter Three Policy Area	Coastal Act Consistency Analysis
By permitting the conversion of agricultural land surrounded by urban uses where the conversion of the land would be consistent with Section 30250. *By developing available lands not suited for agriculture prior to the conversion of agricultural lands.* *By assuring that public service and facility expansions and nonagricultural development do not impair agricultural viability, either through increased assessment costs or degraded air and water quality.* *By assuring that all divisions of prime agricultural lands, except those conversions approved pursuant to subdivision (b), and all development adjacent to prime agricultural lands shall not diminish the productivity of such prime agricultural lands.* ***Coastal Act Section 30242:*** *All other lands suitable for agricultural use shall not be converted to nonagricultural uses unless (l) continued or renewed agricultural use is not feasible, or (2) such conversion would preserve prime agricultural land or concentrate development consistent with Section 30250. Any such permitted conversion shall be compatible with continued agricultural use on surrounding lands.* ***Coastal Act Section 30113:*** *"Prime agricultural land" means those lands defined in paragraph (1), (2), (3), or (4) of subdivision (c) of Section 51201 of the Government Code.* *Section 51201(c) of the California Government Code includes: (1) a rating as class I or class II in the Natural Resource Conservation Service Land use capability classifications; (2) a rating 80 through 100 in the Storie Index Rating; or (3) the ability to support livestock used for the production of food and fiber with an annual carrying capacity equivalent to at least one animal unit per acre as defined by the United States Department of Agriculture; or (4) the ability to normally yield in a commercial bearing period on an annual basis not less than two hundred dollars ($200) per acre of unprocessed agricultural plant production of fruit- or nut-bearing trees, vines, bushes or crops which have a nonbearing period of less than five years.*	

Coastal Act Chapter Three Policy Area	Coastal Act Consistency Analysis
Coastal Act Section 30243: *The long-term productivity of soils and timberlands shall be protected, and conversions of coastal commercial timberlands in units of commercial size to other uses or their division into units of noncommercial size shall be limited to providing for necessary timber processing and related facilities.* ***Del Norte County LCP (1983):*** *Del Norte County fully acknowledges the need to conserve is valuable agricultural resources. The following policies are established in order to maintain agricultural productivity in the Coastal Zone: (1) If a parcel is designated for prime agricultural use, conversion to a non-agricultural use shall not be permitted except where allowed in Section 30241 of the Coastal Act. (2) An Agricultural land use designation shall be given to parcels that meet both of the following: (a) A minimum of 5 acres of contiguous ownership (b) Lands in agricultural use not designated prime agricultural land as above.*	
PUBLIC ACCESS	
Coastal Act Section 30210: *In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.* **Coastal Act Section 30211:** *Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.* **Coastal Act Section 30212:** *(a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where: (1) it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources, (2) adequate access exists nearby, or, (3) agriculture would be adversely affected. Dedicated accessway shall not be required to be*	Neither build alternative would change, limit, or remove public coastal access or recreational activities in the area. There is no access to the shoreline within the project limits. During construction, there may be temporary delays along U.S. 101 due to traffic control. However, the public would be notified of lane closures through various sources, such as the Caltrans Quickmap, social media, press releases, and signage along the highway. A Transportation Management Plan (TMP) would be prepared and implemented to minimize traffic delays that could result from lane restrictions or closures in a work zone. There may also be temporary, short-term delays and/or closures on the California Coastal Trail (CCT), primarily where the CCT crosses the highway, for safety. However, no work is proposed on the CCT, so effects would only be during construction. After construction, both alternatives would improve accessibility through the project area compared to existing conditions by creating

Coastal Act Chapter Three Policy Area	Coastal Act Consistency Analysis
opened to public use until a public agency or private association agrees to accept responsibility for maintenance and liability of the accessway. ***Coastal Act Section 30213***: *Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided. Developments providing public recreational opportunities are preferred.* ***Coastal Act Section 30214***: *(a) The public access policies of this article shall be implemented in a manner that takes into account the need to regulate the time, place, and manner of public access depending on the facts and circumstances in each case including, but not limited to, the following: (1) Topographic and geologic site characteristics. (2) The capacity of the site to sustain use and at what level of intensity. (3) The appropriateness of limiting public access to the right to pass and repass depending on such factors as the fragility of the natural resources in the area and the proximity of the access area to adjacent residential uses. (4) The need to provide for the management of access areas so as to protect the privacy of adjacent property owners and to protect the aesthetic values of the area by providing for the collection of litter. (b) It is the intent of the Legislature that the public access policies of this article be carried out in a reasonable manner that considers the equities and that balances the rights of the individual property owner with the public's constitutional right of access pursuant to Section 4 of Article X of the California Constitution.* ***Coastal Act Section 30220***: *Protection of certain water-oriented activities Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.* ***Coastal Act Section 30221***: *Oceanfront land suitable for recreational use shall be protected for recreational use and development unless present and foreseeable future demand for public or commercial recreational activities that could be accommodated on the property is already adequately provided for in the area.* ***Coastal Act Section 30223***: *Upland areas necessary to support coastal recreational uses shall be reserved for such uses, where feasible.*	wider shoulders and, in the case of Alternative F, a separated bike/pedestrian path within the tunnel. Public access and recreation are discussed in Section 3.2.4, *Parks and Recreational Facilities*, and Section 3.2.8, *Traffic and Transportation/Pedestrian and Bicycle Facilities.* An analysis of "use" of RNSP property was conducted pursuant to Section 4(f) of the Department of Transportation Act of 1966, and is provided as Appendix B, *Section 4(f)*. Given the above, the project is consistent with public access policies of the CCA and the Del Norte County LCP.

Coastal Act Chapter Three Policy Area	Coastal Act Consistency Analysis
Coastal Act Section 30224**:** *Increased recreational boating use of coastal waters shall be encouraged, in accordance with this division, by developing dry storage areas, increasing public launching facilities, providing additional berthing space in existing harbors, limiting non-water dependent land uses that congest access corridors and preclude boating support facilities, providing harbors of refuge, and by providing for new boating facilities in natural harbors, new protected water areas, and in areas dredged from dry land.* ***Coastal Act Section 30252*****:** *The location and amount of new development should maintain and enhance public access to the coast by (1) facilitating the provision or extension of transit service, (2) providing commercial facilities within or adjoining residential development or in other areas that will minimize the use of coastal access roads, (3) providing non-automobile circulation within the development, (4) providing adequate parking facilities or providing substitute means of serving the development with public transportation, (5) assuring the potential for public transit for high intensity uses such as high-rise office buildings, and by (6) assuring that the recreational needs of new residents will not overload nearby coastal recreation areas by correlating the amount of development with local park acquisition and development plans with the provision of onsite recreational facilities to serve the new development.* ***Del Norte County LCP (1983):*** *Shoreline access is emphasized in the California Coastal Act to provide for all people the full benefits of coastal recreation resources. This section will state the general provisions regarding public shoreline access for the County of Del Norte: (1) the County shall work actively towards the attainment of maximum coastal access for the public, where it is consistent with public safety, property owner rights and the protection of fragile coastal resources. (2) The rights of private property owners shall be protected in all consideration of public access.*	

Coastal Act Chapter Three Policy Area	Coastal Act Consistency Analysis
VISUAL RESOURCES AND COMMUNITY CHARACTER	
Coastal Act Section 30251: *The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.* **Del Norte County LCP (1983):** *The LCP's policy is to ensure minimization to permanent impacts on areas included in the Del Norte Visual Resource Inventory. The False Klamath Cove Area is within project limits and listed in the Visual Resource Inventory. This area includes Redwood Highway and a Caltrans Vista Point 1 mile north of Wilson Creek Road on the west side of 101.*	While the project would alter the existing visual setting of the project corridor, the project includes aesthetic features, such as context-sensitive landscaping and constructing structures to be visually compatible with the surrounding area. Given the current infrastructure along the existing highway, it is anticipated Alternative X would have minimal impacts on the existing visual character. Alternative F would introduce a tunnel and other structures, but these would be designed to be harmonious with the natural setting. While the tunnel would alter views from a natural to human-made setting and would be memorable, the duration of these views would be brief, lasting approximately 2 minutes for drivers and 7 to 10 minutes for bicyclists. It is not anticipated that the visual changes under Alternative F would be enough to change the scenic highway designation for the corridor, as demonstrated by similar tunnel projects such as the Tom Lantos Tunnels at Devil's Slide on Highway 1 in San Mateo County. Overall, with the proposed design measures included, the project would be consistent with the visual resources policies of the CCA and the Del Norte County LCP. See Section 3.2.9, *Visual/Aesthetics*, for a detailed evaluation of the visual impacts associated with the project.

Coastal Act Chapter Three Policy Area	Coastal Act Consistency Analysis
ENVIRONMENTALLY SENSITIVE HABITAT AREA (ESHA)	
Coastal Act Section 30240: *(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas. (b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.* **Coastal Act Section 30107.5:** "*Environmentally sensitive area" means any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.* **Del Norte County LCP (1983):** *Del Norte County recognizes the economic and biologic significance of maintaining and where possible enhancing marine resources, coastal waters and sensitive coastal habitats. General policies designed towards achieving these important goals are stated in this section. (6) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas. Development in areas adjacent to environmentally sensitive habitat areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas.*	The project would affect ESHAs including, potentially, redwood forest, Douglas-fir forest, and Sitka spruce forest and wetlands and riparian areas. Impacts to these resources are unavoidable; however, the project was sited and designed to minimize impacts. Standard Measures and BMPs, including fencing around ESHAs to be avoided, protecting root zones of large trees where feasible, and minimizing tree and vegetation removal would be implemented to minimize impacts. The project would implement measures Bio-1 and Bio-4 (Section 3.4.1) to compensate for impacts to ESHAs. As a result of design, Standard Measures and BMPS, and compensation, the project would be consistent with the applicable policies of the CCA and the policies of the Del Norte County LCP related to ESHAs. See Section 3.4.1, *Natural Communities*, for more information on ESHAs.

Coastal Act Chapter Three Policy Area	Coastal Act Consistency Analysis
WATER QUALITY	
Coastal Act Section 30230: *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreation, scientific, and educational purposes.* **Coastal Act Section 30231:** *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.* **Coastal Act Section 30232:** *Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.* ***Del Norte County LCP (1983):*** *Del Norte County recognizes the economic and biologic significance of maintaining and where possible enhancing marine resources, coastal waters and sensitive coastal habitats. General policies designed towards achieving these important goals are stated in this section. (1) The county seeks to maintain and where feasible enhance the existing utility of all marine and water resources. (3) All surface and subsurface waters shall be maintained at the highest level of quality to insure the safety of public health and the biological productivity of coastal waters. (4) Wastes from industrial, agricultural, domestic or other uses shall not impair or contribute significantly to a cumulative impairment of water quality to the extent of causing a public health hazard or adversely impacting the biological productivity of coastal waters.*	Both build alternatives have the potential to affect water quality; however, standard measures (WQ-1, WQ-2) would be implemented to avoid and minimize potential effects to water quality. Alternative X proposes the construction of an underground drainage system to improve slope stability. This system would extract groundwater and convey it directly to the Pacific Ocean. As the groundwater would originate from within RNSP, it is not expected to contain contaminants. Through these measures, the build alternatives would be consistent with the water quality protection policies of the CCA and LCP. See Section 3.3.1, *Water Quality and Stormwater Runoff*, for an evaluation of water quality impacts.

Coastal Act Chapter Three Policy Area	Coastal Act Consistency Analysis
COASTAL HAZARDS/SHORELINE DEVELOPMENT	
Coastal Act Section 30253 (in part)**:** *New development shall: (a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard. (b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.* **Coastal Act Section 30235:** *Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion, and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply. Existing marine structures causing water stagnation contributing to pollution problems and fish kills should be phased out or upgraded where feasible.* **Coastal Act Section 30236:** *Channelizations, dams, or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to (1) necessary water supply projects, (2) flood control projects where no other method for protecting existing structures in the floodplain is feasible and where such protection is necessary for public safety or to protect existing development, or (3) developments where the primary function is the improvement of fish and wildlife habitat.* ***Del Norte County LCP (1983):*** *(P-4) The County should restrict and control construction of roads in flood prone areas due to their growth inducement potential. (P-5) The Coastal Program's land use policy shall recognize that flood plains have unique and significant public values, including wildlife habitats or recreational, aesthetic and scientific value, open space, and groundwater recharge. The value of the flood plain as an environmental resource and public benefits to be derived from it should be considered.*	Alternative X is designed to minimize the risk of landslides and Alternative F is designed to avoid the most active areas of known landslide and geologic instability, and neither alternative would increase the risk of flood or fire hazards. The project is anticipated to be consistent with the CCA and the Del Norte County LCP based on the following: 1) The project would not modify the shoreline, nor would it include channelizations, dams, or other substantial alterations of rivers and streams. 2) Both alternatives would be outside the 100-year floodplain. 3) Neither of the alternatives are within an area subject to earthquake hazards. 4) Design features included as part of the project would address any potential issues related to liquefaction and lateral spreading. 5) The project is not expected to interact with soils highly susceptible to erosion, or expansive soil near shallow structures. 6) Potential impacts from each alternative would be reduced with temporary and permanent BMPs. For further information see Section 3.3.1, *Water Quality and Stormwater Runoff*, and Section 3.3.2, *Geology, Soils, Seismic, Topography.*

Coastal Act Chapter Three Policy Area	Coastal Act Consistency Analysis
ARCHAEOLOGICAL AND PALEONTOLOGICAL RESOURCES	
Coastal Act Section 30244: *Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.* **Del Norte County LCP (1983):** *Coastal-Dependent Development: Archaeological Resources: In cooperation with the State Historic Preservation Office, where it is determined development would adversely affect archaeological resources reasonable mitigation measures shall be required.*	Excavation for project alternatives would be in areas with low sensitivity for paleontological resources; therefore, it is not expected that fossils would be encountered or would be damaged during ground-disturbing construction activities. Standard Measure GS-2 would be implemented if paleontological resources are encountered during project construction. It is anticipated the project would adversely impact cultural resources. Consultation with the State Historic Preservation Officer, national parks, state parks, and the tribes would be completed under the project. Proposed avoidance, minimization, and mitigation strategies would be determined through consultation once a preferred alternative is selected. Standard Measures for the protection of cultural resources would also be included as part of the project (see Standard Measures CR-1 through CR-4). With the implementation of Standard Measures and other measures made in agreement with consulting parties, the project would be consistent with Section 30244 of the CCA and policies of the LCP. See Section 3.3.3, Paleontology, and Section 3.2.10, Cultural Resources, and for a full evaluation of these resources.

Coastal Act Chapter Three Policy Area	Coastal Act Consistency Analysis
ENVIRONMENTAL JUSTICE	
Coastal Act Section 30604: *When acting on a coastal development permit, the issuing agency, or the Commission on appeal, may consider environmental justice, or the equitable distribution of environmental benefits throughout the state.* **Coastal Act Section 30006:** *The public has a right to fully participate in decisions affecting coastal planning, conservation and development; that achievement of sound coastal conservation and development is dependent upon public understanding and support; and that the continuing planning and implementation of programs for coastal conservation and development should include the widest opportunity for public participation.*	There are no communities within the project limits. However, U.S. 101 plays a vital role in connecting communities within Del Norte County, and there are environmental justice populations and other underserved groups both north and south of the project area. Individuals of these groups may be affected by delays due to traffic control. However, traffic control would affect all highway users equally, though may be more frequently encountered by those who live south of the project area who may use the highway more often due to the rural nature of the area and the need to access the Crescent City area for goods and services. These effects, however, would be minimal to none compared to existing conditions, which have required frequent traffic control. Both alternatives would provide a more reliable connection on this section of highway, improving traffic after construction. Based on the level of impact and its temporary nature, the project would not have a disproportionally high and adverse effect on minority and low-income populations[17] or on equity. Accordingly, the project would be consistent with CCA Section 30604. See Sections 3.2.5 and 3.2.6, for discussions on *Environmental Justice* and *Equity.* Caltrans has regularly engaged the public about the project, and thus is consistent with CCA Section 30006. See Chapter 5, *Comments and Coordination,* for information on coordination for the project.

[17] FHWA defines a disproportionately high and adverse effect on minority and low-income populations as a type of adverse effect that (1) is predominately borne by a minority population and/or a low-income population; or (2) will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or non-low-income population (FHWA 2012).

3.2.4 Parks and Recreational Facilities

Regulatory Setting

The Park Preservation Act (California Public Resources Code [PRC] Sections 5400–5409) prohibits local and state agencies from acquiring any property which is in use as a public park at the time of acquisition unless the acquiring agency pays sufficient compensation or land, or both, to enable the operator of the park to replace the park land and any park facilities on that land.

Affected Environment

This section was prepared using information from the project's Section 4(f) (Appendix B, *Section 4(f)*) and *Community Impact Memo* (Caltrans 2023a).

The project is within Redwood National Park (RNP) and Del Norte Coast Redwoods State Park (DNCRSP), both of which are public parks, and thus protected by the Parks Preservation Act. RNP and DNCRSP both belong to the complex of parks known as Redwood National and State Parks (RNSP) managed by the National Park Service (NPS) and the California Department of Parks and Recreation (CDPR), respectively. The purpose of RNSP is to preserve significant examples of primeval coastal redwood forests and the prairies, streams, seashore, and woodlands with which they are associated for the purposes of public inspiration, enjoyment, and scientific study, and to preserve all related scenic, historical, and recreational values (NPS and CDPR 2000).

While the parks are known and valued for their biological diversity, redwood ecosystem, and general lack of development, they are also valuable recreationally. There are three key developed recreational facilities within RNSP that are either within or near the project's ESL. These include the California Coastal Trail (CCT), the Damnation Creek Trail, and the DeMartin Backcountry Camp.

The CCT is an interconnected public trail system being developed along the length of the California coast. This is the only developed recreational feature present within the LCG ESL, passing through both RNP and DNCRSP, providing views of the forests within RNSP.

The Damnation Creek Trail is north of the ESL, within DNCRSP. It is an out-and-back trail that passes through redwood forest. This trail is connected to the CCT, crossing it approximately 0.7 miles in.

The DeMartin Backcountry Camp is located along the CCT within RNP, outside of the ESL. It is a hike-in campground that requires a permit from the park.

In addition to RNSP and its recreational features, the California National Coastal Monument, which includes exposed off-shore rocks within 12 nautical miles of the California coast, is present in the project's vicinity. The monument is protected by the Bureau of Land Management and is considered a wildlife and waterfowl refuge due to its mission to conserve, protect, and restore nationally significant landscapes that have outstanding cultural, ecological, and scientific values for the benefit of current and future generations.

Environmental Consequences

Build Alternatives

Redwood National and State Parks

Because the RNP and DNCRSP are public parks, Caltrans would coordinate with the agencies to provide compensation under the Park Preservation Act. In addition, RNSP is protected by Section 4(f) of the Department of Transportation Act of 1966. This project would result in a "use" of the parks as defined by Section 4(f). See Appendix B, *Section 4(f)*, for additional details. A brief overview of the impacts to parks is included below.

Both build alternatives would require the acquisition of right of way from RNSP for the main project components. In addition, both alternatives would require temporary access to the parks for geotechnical investigations.

Alternative X would require acquisition of approximately 11.16 acres of ROW from RNSP for the construction of the transportation facility, and approximately 0.63 to 0.86 acre may be temporarily used for geotechnical investigations. In addition, a subterranean easement of approximately 37.76 acres would be needed for the underground drainage system.

Alternative F would require the acquisition of approximately 18.71 acres of ROW for the maintenance and construction of the transportation facility and an approximately 2.06-acre temporary construction easement. In addition, approximately 0.44 acre would be temporarily used for geotechnical investigations. A subterranean easement of approximately 12.07 acres would be needed for the tunnel. Approximately 35.09 acres of existing ROW bypassed by the tunnel would be decommissioned and potentially relinquished to parks.

Geotechnical investigations for both alternatives would require the creation of trails to access borehole sites and trimming of vegetation for drilling. In addition, helicopters would be needed to bring in equipment to several of the locations—18 for Alternative X and 2 for Alternative F. Noise from helicopters—and from boreholes at certain locations—may be audible to park users. In addition, vegetation trimming at one borehole (drilled for either

alternative) may be visible to users of the CCT, and CCT users may be delayed for safety reasons when the helicopter is picking up or dropping off equipment. However, the park recreational facilities in the area—the CCT and the DeMartin Backcountry Camp—are not high use areas, and investigations would be completed in the off-season due to environmental restrictions. Any noise associated with the investigations would be temporary and short-term, and vegetation to be trimmed (such as brambles) grows back quickly, within 6 to 12 months. Therefore, these investigations are anticipated to have limited, if any, impacts to the park recreational resources and park users.

For the main project components for both alternatives, work within parks is anticipated to be within the areas of ROW to be acquired. While some components of Alternative F are close to the CCT, neither alternative would require work on the trail. Other than some temporary delays and/or closures on small sections of the CCT for both alternatives, the majority of which could be accessed by alternative routes, the trails would be unaffected by the project. During construction, park users may also experience temporary impacts from the project, such as traffic delays, noise, and vegetation removal. However, these impacts would be temporary, and minimized with project design features and standard measures, such as context-sensitive solutions, revegetation, fencing/flagging sensitive areas, and others, as described in Section 2.6, *Standard Measures and Best Management Practices.*

Overall, neither alternative would permanently affect access to the parks or their recreational features. Effects related to geotechnical investigations and construction activities would be temporary and minimal for both alternatives. Alternative X would require less ROW than Alternative F, and these are in areas that are generally steep and inaccessible. While Alternative F would involve the decommissioning of a large amount of highway that could potentially be relinquished to the parks, the areas of ROW acquisition are closer to the CCT, particularly at the north portal, and are more accessible and visible to park users; therefore, impacts are anticipated to be greater for this alternative.

Throughout the life of the project, Caltrans has been working to minimize impacts to park land. This has included coordinating with RNSP from an early stage, evaluating various alternatives with respect to parks, and refining project alternatives to minimize impacts to park resources. Due to the project's location and the size of RNSP and its proximity to U.S. 101, there is no feasible build alternative that would avoid impacts to RNSP. Further detail is provided in the Section 4(f) in Appendix B.

California National Coastal Monument

The California National Coastal Monument is off the coast in the Pacific Ocean, over 700 feet from the ESL. Due to the distance and proposed project activities closest to this resource, it is not anticipated to be affected by the project.

No-Build Alternative

Under the No-Build Alternative, routine maintenance and operations would continue, with emergency restoration projects conducted as needed to address landslides and roadway failures. No ROW would be required; however, potential future road failures may necessitate emergency retreats, which could require the use of RNSP land in the future.

Avoidance, Minimization, and/or Mitigation Measures

The project would affect RNSP through acquisition of park land, and through temporary impacts during construction. Measure Park-1 is proposed to reduce temporary visual effects from geotechnical drilling, and Park-2 would be implemented to inform park users of construction activities near recreational resources. Measure Park-3 may be implemented for impacts for Section 4(f).

In addition to the measures below, measures to minimize effects to biological resources would also reduce impacts to park users. This includes measures for sensitive natural communities and the associated trees (Bio-1 to Bio-3) and noise measures (Bio-5), which would reduce temporary effects to users of the CCT and the DeMartin Backcountry Camp.

- **Park-1:** Where feasible, boreholes near the CCT would be placed in areas that would be screened from view of trail users.
- **Park-2:** Signage would be posted at trailheads and on websites to notify park users of construction activities when there is work near the CCT.
- **Park-3:** Measures would be implemented to offset potential temporary impacts on Section 4(f) recreational resources. This may include CCT improvements or funding to support other park projects or trail management activities. Implementation of this measure would depend on the level of impacts under each alternative and would be determined in consultation with NPS and CDPR.

3.2.5 Environmental Justice

Regulatory Setting

All projects involving a federal action (funding, permit, or land) must comply with Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, signed by President William J. Clinton on February 11, 1994. This EO directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law.

For purposes of the environmental justice evaluation, *minorities* are people of a race other than white alone and/or people who list their ethnicity as Hispanic or Latino.[18] *Low-income* people are those whose median household income is at or below the U.S. Department of Health and Human Services poverty guidelines. For 2021, this was $26,500 for a family of four (U.S. Census Bureau 2021b).

All considerations under Title VI of the Civil Rights Act of 1964, and related statutes, have also been included in this project. Caltrans' commitment to upholding the mandates of Title VI is demonstrated by its Title VI Policy Statement, signed by the Director, which can be found in Appendix C, *Title VI Policy Statement*, of this document.

Affected Environment

This section is based on the environmental justice analysis included in the *Community Impact Memo* (Caltrans 2023a) prepared for the project.

The LCG section of U.S. 101 is in rural Del Norte County, within national and state parks. There are no communities or residences within the project limits, and no inholdings (privately owned land inside the boundary of a national or state park); thus, no minority or low-income populations are within or directly adjacent to the project.

[18] The FHWA defines a minority as a person who is: (1) Black: a person having origins in any of the black racial groups of Africa; (2) Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race;(3) Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia or the Indian subcontinent; (4) American Indian and Alaskan Native: a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition; or (5) Native Hawaiian and Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa or other Pacific Islands (FHWA 2012).

The closest communities are Crescent City, approximately 10 miles to the North, and Klamath, approximately 7 miles to the south (Figure 1-1). However, this section of U.S. 101 is vital for connecting communities within Del Norte County, as it is the only viable route between the two locations, and many rely on it for work, school, and/or personal business. Both the Crescent City and Klamath areas have environmental justice populations.

The Crescent City area contains the majority of the county's population, with a 2021 estimate of 22,986 out of 27,665 people in the county (U.S. Census Bureau 2021a). Some census tracts within the city and surrounding areas do have concentrations of low-income or minority populations. This includes a local tribe, the Elk Valley Rancheria. Comparatively, the population in the Klamath area is small, with an estimated 1,079 people in 2021 (U.S. Census Bureau 2021b). This area contains the Yurok Reservation and Resighini Rancheria; the percentage of minorities is much greater than the county as a whole. This area also has higher percentages of low-income populations.

Environmental Consequences

Build Alternatives

As the project area is uninhabited, and there are no residences nearby, the project would have no direct effects on environmental justice populations, such as air quality, noise, visuals, community cohesion, or displacement. Once completed, both project alternatives would provide a more reliable connection between Klamath and Crescent City. This would be an overall benefit to these communities, which have been subject to the delays and closures associated with the enhanced maintenance and emergency repairs needed to keep the highway open and safe.

During construction, both build alternatives would experience delays associated with traffic control. While this would affect all highway users, delays may affect those from the Klamath area to a greater extent as, due to Klamath's rural nature, individuals from this community would be more reliant on the highway for access to the goods and services available in Crescent City, such as medical care, schools, groceries, and other supplies.

Alternative X would need regular reversing traffic control with delays up to 30 minutes, while alternative F would not require regular traffic control. Both alternatives may need occasional full-facility closures. As described under Standard Measure TT-1, both alternatives would implement a Transportation Management Plan (TMP) to minimize disruption to the traveling public from traffic control, including facility closures. The public would be notified of any closures.

Traffic control is a common component of construction projects. In the LCG area in particular, traffic control has been frequent and long-term for enhanced maintenance and emergency repair activities, including varying full-facility closures as needed. Reversing traffic control in the area has had estimated delays of approximately 15 minutes, with up to 30 minutes for the overall corridor delays on U.S. 101 in Del Norte County. During construction, as Alternative X has 30-minute reversing traffic control, other delays on the corridor would be managed to lessen impacts.

Overall, there are no direct impacts to environmental justice populations, as there are no populations within the project vicinity. During construction, all travelers, including individuals of environmental justice populations, would experience traffic delays associated with the project, particularly for Alternative X. However, traffic control is a component of construction projects and is frequently needed at LCG, and any delays would be minimized through the application of a TMP. Traffic control would occur throughout construction. Upon completion of construction, the LCG segment of U.S. 101 would provide a more reliable connection to all users. The project is thus not anticipated to have a disproportionately high and adverse effect[19] on any minority or low-income populations.

No-Build Alternative

Under the No-Build Alternative, enhanced maintenance and emergency repairs would continue to keep the freeway open and safe, with the associated traffic control. Given that the No-Build Alternative would maintain existing conditions and that all travelers would be affected equally, there would be no disproportionately high and adverse effects to environmental justice populations. While there is potential that landslide movement could result in a major roadway failure, resulting in a long-term closure of the highway, these events cannot be predicted.

[19] The FHWA defines adverse effects as the totality of significant individual or cumulative human health or environmental effects. A disproportionately high and adverse effect on minority and low-income populations is a type of adverse effect that (1) is predominately borne by a minority population and/or a low-income population; or (2) will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or non-low-income population (FHWA 2012).

Avoidance, Minimization, and/or Mitigation Measures

Based on the above discussion and analysis, neither of the build alternatives would cause disproportionately high and adverse effects on any minority or low-income populations in accordance with the provisions of EO 12898. No further environmental justice analysis is required. No avoidance, minimization, and/or mitigation measures would be required.

3.2.6 Equity

Regulatory Setting

Federal

EO 13985, Advancing Racial Equity and Support for Underserved Communities Through the Federal Government, was signed by President Joe Biden on January 20, 2021, to "pursue a comprehensive approach to advancing equity for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality."

Under EO 13985, equity means the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment. The term "underserved communities" refers to populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life. These communities may include minority persons; low-income persons; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; or persons who live in rural areas.

State

California Senate Bill (SB) 535 (De León, Chapter 830, Statutes of 2012) established minimum funding levels for investments to benefit disadvantaged communities[20] using proceeds from the state's cap-and-trade program for the reduction of greenhouse gas (GHG) emissions. Authorized by Assembly Bill (AB) 32, the California Global Warming Solutions

[20] Disadvantaged communities under SB 535 include but are not limited to (1) Areas disproportionately affected by environmental pollution and other hazards that can lead to negative public health effects, exposure, or environmental degradation; or (2) Areas with concentrations of people that are of low income, high unemployment, low levels of homeownership, high rent burden, sensitive populations, or low levels of educational attainment.

Act of 2006, "these investments are aimed at improving public health, quality of life and economic opportunity in California's most burdened communities, and at the same time, reducing pollution that causes climate change." The California Environmental Protection Agency (CAL EPA) released updated designations of disadvantaged communities for the purpose of SB 535 in May 2022 (California Office of Environmental Health Hazard Assessment 2023).

California EO N-16-22, issued by Governor Gavin Newsom in 2022, directed the Governor's Office of Planning and Research to establish a Racial Equity Commission to address the impacts of structural and systemic racism in California government. This EO also directs various state departments to advance equity by identifying and addressing disparities in their operations and services.

California Department of Transportation

Caltrans' formal Equity Statement was released on December 10, 2020; it acknowledges that communities of color and underserved communities experienced fewer benefits and a greater share of negative impacts associated with our state's transportation system. Some of these disparities reflect a history of transportation decision-making, policy, processes, planning, design, and construction that "quite literally put up barriers, divided communities, and amplified racial inequities, particularly in our Black and Brown neighborhoods." Caltrans has prepared a Race and Equity Action Plan, a living document that includes concrete actions to advance equity and livability in all communities.

Affected Environment

This section is based on the equity analysis included in the *Community Impact Memo* (Caltrans 2023a) prepared for the project.

The LCG project area is within the RNSP; there are no communities present. The closest communities are Crescent City, approximately 10 miles to the north, and Klamath, approximately 7 miles to the south. Both communities are home to minority and low-income populations, as described in Section 3.2.5, *Environmental Justice,* which are also considered underserved populations. Concentrations of other underserved populations may also be present. In addition to being considered environmental justice populations, tribal communities in the area are identified as disadvantaged communities by CAL EPA for the purposes of SB 535 (CAL EPA 2022).

Environmental Consequences

Build Alternatives

As described in Section 3.2.5, the project would not directly impact any communities, including underserved communities, as there are none present within the project vicinity. Individual members of underserved communities may be affected by traffic delays through the project area during construction. However, all highway users would experience traffic delays.

Alternative X would need regular reversing traffic control with delays up to 30 minutes, while alternative F would not require regular traffic control. Both alternatives may need occasional full-facility closures. As described under Standard Measure TT-1, both alternatives would implement a TMP to minimize disruption to the traveling public from traffic control, including facility closures. The public would be notified of any closures.

After construction, both alternatives would provide a safer and more reliable connection on this section of highway, benefiting underserved communities within the project area.

Based on the above, neither build alternative is expected to have a negative effect on equity.

No-Build Alternative

Under the No-Build Alternative, enhanced maintenance and emergency repairs would continue to keep the highway open and safe, with the associated traffic control. Given that the No-Build Alternative would maintain existing conditions and that all travelers would be affected equally, there would not be a disproportionate effect on underserved populations. While there is potential that landslide movement could result in a major roadway failure, resulting in a long-term closure of the highway, these events cannot be predicted.

Avoidance, Minimization, and/or Mitigation Measures

Based on the above discussion and analysis, neither of the build alternatives would result in inequitable treatment of any underserved populations; therefore, no avoidance, minimization, and/or mitigation measures would be required.

3.2.7 Utilities/Emergency Services

Affected Environment

Information in this section was developed from the *Community Impact Memo* (Caltrans 2023a) that was prepared for the project.

The project is in a rural area, and the only utility currently in the vicinity is an electric transmission line (owned by PacificCorp) which passes through the eastern edge of the project's ESL.

There are no emergency service providers based within the ESL. When needed, emergency services and law enforcement are provided by the California Highway Patrol, Del Norte County, and/or by RNSP rangers. Nearly all of these service providers are based in Crescent City, north of LCG. However, RNSP's South Operations Center in Orick also houses park rangers that would respond to incidents in the area.

When emergency vehicles travel between Crescent City and Klamath, they must use U.S. 101 and thus, at present, experience delays due to the traffic control that has been in place for years to facilitate emergency construction and maintenance activities. As of 2023, daytime delays are up to 15 minutes, with delays closer to 30 minutes for the U.S. 101 corridor within Del Norte County as a whole.

Environmental Consequences

Build Alternatives

Neither build alternative would require relocation of or otherwise affect the PacificCorp transmission line. However, Alternative F would connect to this transmission line for the electric power needed for the proposed tunnel (e.g., lighting, ventilation) and OMC.

Both build alternatives would install a trenched conduit within the shoulder or paved area of the modified portion of the roadway. This conduit would accommodate broadband cable to be installed in the future as part of a larger State effort to provide broadband along state highways. If cable is installed prior to construction of the project, it may need to be moved during construction.

Both build alternatives would require traffic control during construction, which could affect emergency response vehicles. Alternative X would have regular reversing traffic control that could result in delays of up to 30 minutes, while Alternative F would not have regular

closures as work would primarily occur off the existing roadway. Both alternatives would have occasional full-facility closures.

Depending on construction equipment staging, emergency vehicles could potentially be subject to the same traffic delays as other vehicles during reversing traffic control (when the highway would be reduced to a single lane), which is standard. It is anticipated that vehicles in construction zones would pull over for emergency vehicles, if feasible, or wait at the green light to let emergency service vehicles pass, reducing delay times, as 30-minute delays would assume a certain traffic queue. During full closures, emergency vehicles would be accommodated through the construction area as soon as a path is cleared.

As described under Standard Measure TT-1, a TMP would be implemented to minimize impacts from traffic delays, including full-facility closures, which would be timed to minimize impacts to the public. Closures are often at night when there would be lower traffic volumes. Under Standard Measure UE-1, emergency response agencies would be notified of the project schedule, including lane closures.

Overall, there may be delays to emergency response vehicles due to traffic control. Effects would be greater for Alternative X than Alternative F due to regular reversing traffic control, but would not be substantial due to the implementation of standard measures. Upon completion of the project, it is anticipated both alternatives would have a beneficial effect on emergency services.

No-Build Alternative

Under the No-Build Alternative, emergency projects and enhanced maintenance would continue as needed, with traffic control and associated delays. With no viable detour between Crescent City and Klamath, ongoing repairs could affect general traffic as well as emergency response vehicles.

Avoidance, Minimization, and/or Mitigation Measures

Based on the above discussion and analysis, neither of the build alternatives would have a substantial effect on utilities or emergency access; therefore, no avoidance, minimization, and/or mitigation measures would be required.

3.2.8 Traffic and Transportation/Pedestrian and Bicycle Facilities

Regulatory Setting

Caltrans, as assigned by the FHWA, directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of Federal-aid highway projects (23 CFR 652). It further directs that the special needs of the elderly and the disabled must be considered in all Federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users who share the facility.

In July 1999, the U.S. Department of Transportation issued an Accessibility Policy Statement pledging a fully accessible multimodal transportation system. Accessibility in federally assisted programs is governed by U.S. Department of Transportation regulations (49 CFR 27) implementing Section 504 of the Rehabilitation Act (29 USC 794). The FHWA has enacted regulations for the implementation of the 1990 Americans with Disabilities Act (ADA), including a commitment to build transportation facilities that provide equal access for all persons. These regulations require application of the ADA requirements to Federal-aid projects, including Transportation Enhancement Activities.

Affected Environment

Information in this section was developed from the *Community Impact Memo* (Caltrans 2023a) that was prepared for the project.

Within the ESL, the LCG portion of U.S. 101 is a two- to four-lane conventional highway traversing mountainous terrain. LCG is the only viable route between Crescent City and Klamath (and points south); closures of the highway require a detour of more than 400 miles. The existing highway has 12-foot-wide lanes and shoulders between 0 and 4 feet in width. At the main landslide area, one-way traffic control was in place for over a decade due to the construction and maintenance needed to keep the roadway open and safe. During this period, traffic control was estimated to last up to 15 minutes, with overall corridor delays on U.S. 101 in Del Norte County closer to 30 minutes. Full facility closures of varying length have been required in the past to facilitate work at this location.

This portion of the ESL is also part of the PCBR; bicycles are present year-round. Pedestrians are allowed along the highway but are less common.

Public transportation through the area is provided by the Redwood Coast Transit Authority; its Route 20 bus provides service between Crescent City and the Arcata Transit Center (scheduled as an approximately 2.5-hour trip).

Environmental Consequences

Build Alternatives

Both project alternatives would provide a single lane in either direction; neither would increase roadway capacity, change travel demand, or substantially change traffic patterns. The alternatives would increase shoulder widths to 8 to 10 feet, which would improve access for bicyclists and pedestrians and provide refuge for disabled vehicles. Alternative F would also provide separated bicyclist and pedestrian lanes within the tunnel, reducing conflicts between motorized and non-motorized vehicles.

The build alternatives would likely result in traffic delays during construction. Alternative X would be reduced to a single lane with reversing traffic control, similar to the traffic control that has been in place for over a decade. Delays would typically last up to 30 minutes, with periodic longer full-facility closures as needed.

Alternative F's major construction would primarily be outside of the existing highway, so only occasional partial or full closures would be needed, such as for moving equipment or building the highway tie-ins at the tunnel portals.

All modes of transportation would be accommodated through traffic control during construction, and the public would be notified of lane closures through various sources, such as the lane closure system, which populates the Caltrans Quickmap, in addition to social media, press releases and signage along the highway. As described under Standard Measure TT-1, a TMP would be implemented to minimize traffic delays that could result from lane restrictions or closures in a work zone. Full closures would be scheduled to avoid unnecessary inconvenience to the public.

Overall, there would be delays at LCG due to traffic control. Effects would be greater for Alternative X than Alternative F due to regular reversing traffic control, but would be minimized with the use of a TMP. Delays would be temporary, and only occur during construction. After construction, the project would improve U.S. 101 for all users, and would not change access or circulation.

No-Build Alternative

Under the No-Build Alternative, emergency projects and enhanced maintenance would continue as needed, with traffic control and associated delays.

Avoidance, Minimization, and/or Mitigation Measures

Based on the above discussion and analysis, neither of the build alternatives would have a substantial effect on traffic or transportation; therefore, no avoidance, minimization, and/or mitigation measures would be required.

3.2.9 Visual/Aesthetics

Regulatory Setting

The National Environmental Policy Act of 1969, as amended, established that the federal government use all practicable means to ensure all Americans safe, healthful, productive, and *aesthetically* (emphasis added) and culturally pleasing surroundings (42 USC 4331[b][2]). To further emphasize this point, the FHWA, in its implementation of NEPA (23 USC 109[h]), directs that final decisions on projects are to be made in the best overall public interest, taking into account adverse environmental impacts including, among others, the destruction or disruption of aesthetic values.

CEQA establishes that it is the policy of the state to take all action necessary to provide the people of the state "with…enjoyment of *aesthetic*, natural, scenic and historic environmental qualities" (PRC 21001[b]).

California Streets and Highways Code Section 92.3 directs Caltrans to use drought-resistant landscaping and recycled water when feasible, and incorporate native wildflowers and native and climate-appropriate vegetation into the planting design when appropriate.

Affected Environment

This section was developed based on the *Visual Impact Assessment* (Caltrans 2023c) that was prepared for the project.

Visual Impact Assessments consider changes for viewers—those with views *of* the highway, such as hikers on the CCT, and those with views *from* the highway, such as tourists and sightseers, bicyclists, and local commuters.

To assess effects to viewers, visual character (forms, lines, color, texture, dominance, scale, diversity, and continuity) and visual quality (vividness, intactness, and unity) are considered, and impacts are determined by assessing the degree of changes to existing visual resources, and the anticipated viewer response.

The section of U.S. 101 within project limits is an officially designated scenic highway due to views of the Pacific Ocean, steep coastal bluffs, and forested inland slopes. Scenic highways are protected by corridor protection measures, which regulate land use density, site planning, outdoor advertising, grading, and appearance of structures. For this section of highway, Del Norte County is responsible for the corridor protection measures, which are included in the county's zoning and planning policies.

Del Norte County's LCP lists this section of U.S. 101 as a "view corridor" for False Klamath Cove (Del Norte County 1983), with the identified scenic features in line with the scenic highway designation—elevated views of the marine environment, steep coastal bluffs, and forested inland slopes. The view corridor protects established views from being obstructed by development.

The project area is within Redwood National and State Parks. For most of U.S. 101 within the project limits, forested areas are present on both sides of the highway, though the canopy does not fully extend over the road. The forest rises up on slopes to the east, while there are periodic views of the ocean to the west. In the north, however, the project enters the dense canopies of late successional redwood forest, with trees towering over the road on both sides. Overcast skies and fog is common, and the fog is often dense enough to obscure elements of the landscape, including ocean views.

Rock outcroppings, eroded slopes, and timber retaining walls are also visible along the highway, in addition to active construction, which, for many years, has been a consistent element of the visual environment in the area due to the frequent need for enhanced maintenance and emergency repairs to keep the roadway open and safe. The highway and associated human elements have added non-natural lines, colors, and textures in the otherwise natural setting.

The California Coastal Trail (CCT) is also present in the project vicinity. It crosses U.S. 101 in the northern portion of the project area, and generally parallels the highway to the east. The CCT is narrow and unpaved, and views are dominated by natural colors, forms, and textures. Variations in plant communities along the trail and changes in topography contribute to a diverse visual character. The highway is only visible to trail users in the northern portion of the project area through breaks in the vegetation. As above, the highway

adds human-made lines, colors, and textures that detract from the trail's overall visual continuity.

Overall, other than areas of active construction, the visual quality within the project limits is high, with high vividness, intactness, and unity[21]. Within areas of construction, viewers have to focus on navigating safely through the work zone, and the construction activities and human-made structures intrude on views of the natural environment and the natural setting. This decreases the vividness, intactness, and unity of the area, reducing the overall visual quality on this section of the highway.

Several key viewpoints—locations anticipated to have the highest amount of visual change—were identified for each build alternative. Three viewpoints (Viewpoints 6-8) were chosen along the retaining wall for Alternative X, while five viewpoints were chosen for Alternative F—one each at the OMC (Viewpoint 1), south portal (Viewpoint 2) and north portal (Viewpoint 5), and two along the CCT (Viewpoints 3 and 4). These viewpoints and the direction they are facing are shown in Figure 3-2. No viewpoints were selected along the southern portion of the CCT near the OMC or from the ocean, as there would be no to limited views of the project from these locations.

[21] *Vividness* is the extent to which the landscape is memorable and is associated with distinctive, contrasting, and diverse visual elements. *Intactness* is the integrity of visual features in the landscape and the extent to which the landscape is free from non-typical visual intrusions. *Unity* is the extent to which visual elements combine to form a coherent and harmonious visual pattern.

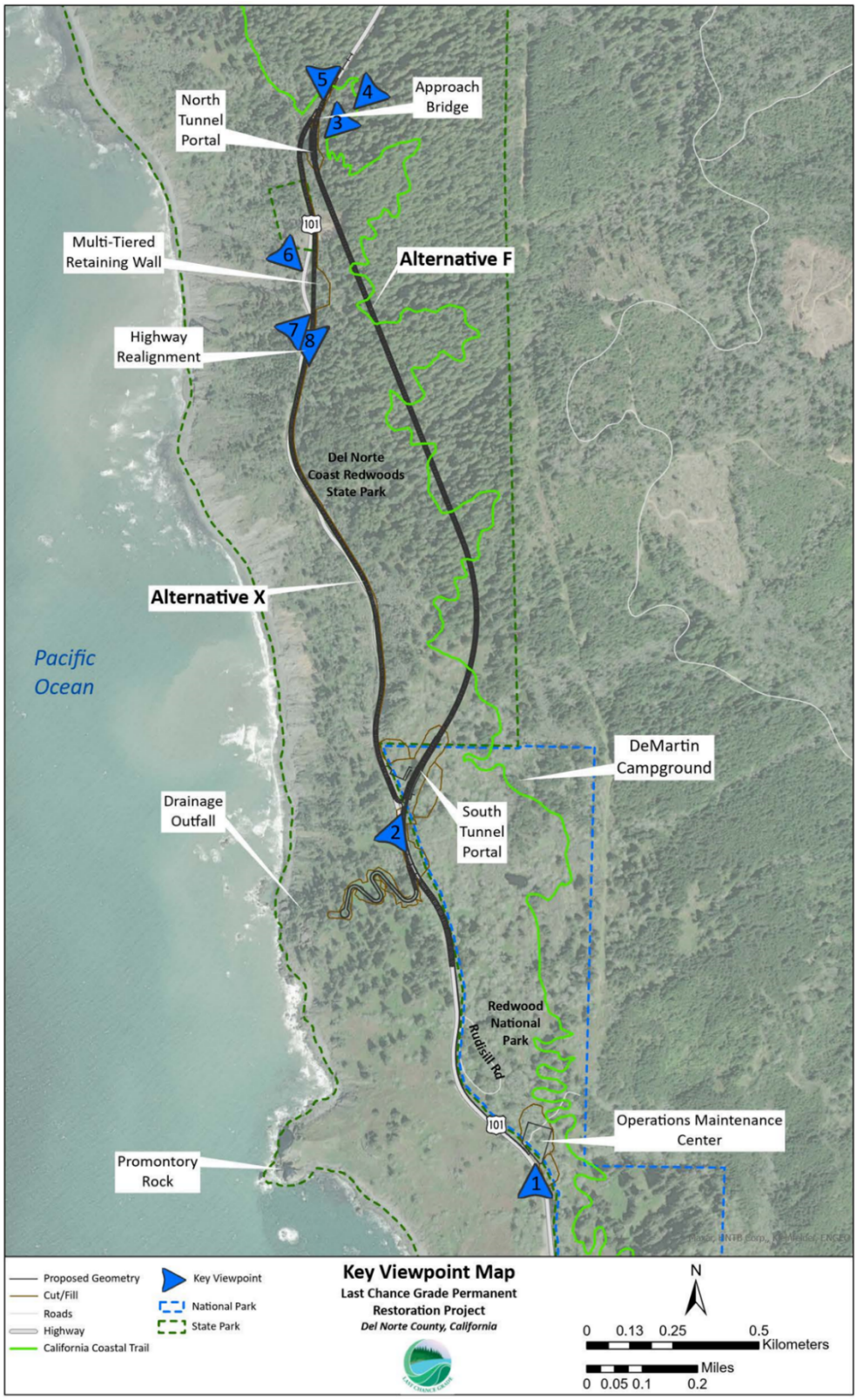


Figure 3-2. Key Viewpoint Map

Environmental Consequences

Alternative X

The three key viewpoints for Alternative X are adjacent to the proposed retaining wall (Figure 3-2, Viewpoints 6, 7, and 8).

Along this section of U.S. 101, a wooded ridge rises to the east, and periodic views of the Pacific Ocean are present to the west when not obscured by existing vegetation or fog. Frequent construction and other human-made elements reduce the overall visual quality on this section of the highway compared to areas just to the north and south.

Changes at the viewpoints include shifting the highway alignment to the east, increased shoulder widths, and the construction of an extensive retaining wall system, which would be substantially taller and longer than existing walls in the area (6,000 feet long and up to 50 feet high, with one portion having three tiers). In addition, the existing roadbed to the west of the shifted alignment would be removed and revegetated. Existing views and simulations of proposed conditions 10 years post-construction are shown in Figures 3-3 and 3-4 (Key Viewpoints 6 and 7) for the area of the multi-tiered retaining wall and associated retreat, and Figure 3-5 (Key Viewpoint 8) for the single retaining wall and retreat.

Construction of the project would last three to five years, and visual effects would be similar to existing conditions, where construction and its associated elements (e.g., construction equipment, materials staging, informational signage, temporary traffic control, grading and vegetation removal, etc.), would be visible to highway users.

After construction, while there would be retreats, the visuals along the western side of the highway would be maintained, including the periodic ocean views; replanting in areas of highway retreats would be done in a manner that protects current views. However, the scale and dominance of the proposed retaining wall on the east side of the highway would affect the visual character of this area. Visual diversity would decrease, as the proximity and height of the wall would obstruct views of the wooded ridge. While decreasing diversity, the wall would add continuity, as it would be of consistent design and condition compared to existing walls. Context-sensitive treatments for the wall, including the timber lagging and stained concrete walers, would help it blend into the natural colors and textures of the existing landscape, and would be visually compatible with other walls along the corridor. Alternative X would also remove the need for frequent construction, which would remove elements that have reduced the visual environment of the area.

In addition to the context-sensitive project features previously described (timber lagging retaining walls, stained concrete walers), aesthetic treatments would be applied to other structures to address context sensitivity, as indicated in Standard Measure AR-1. Various other standard measures would also be implemented, which would minimize visual impacts during and after construction. These include AR-2 through AR-5, which include limiting removal of vegetation and protecting vegetation where feasible, and restoring temporarily used areas to a natural contour and revegetating with native species. In addition, during construction, lighting used at night would be directed on areas of work or areas needed for security.

It is anticipated that viewers would be sensitive to the changes in the area. However, the duration of viewer exposure would be short, lasting approximately 2 minutes for motorists and 10 minutes for bicyclists. Though it would affect the visual setting, the project would not change the scenic designation for this section of U.S. 101; it would be consistent with scenic highway protection measures, as no outdoor advertising is proposed; there would be no change in existing land use; and the project's proposed structures have been designed to limit visual impacts.



Figure 3-3. Alternative X, Key Viewpoint 6: Multi-Tiered Wall and Highway Realignment, U.S. 101 Southbound



Figure 3-4. Alternative X, Key Viewpoint 7: Multi-Tiered Wall and Highway Realignment, U.S. 101 Northbound



Figure 3-5. Alternative X, Key Viewpoint 8: Retaining Wall and Highway Realignment, U.S. 101 Southbound

Alternative F

Five viewpoints were chosen for Alternative F—one each at the OMC (Viewpoint 1), south portal (Viewpoint 2) and north portal (Viewpoint 5), and two along the CCT near the north portal and north portal approach (Viewpoints 3 and 4), as shown in Figure 3-2.

The visual quality at the OMC and the portals is high due to the natural setting and the limited presence of human-made elements. All areas are characterized by mature forests with thick understories. The OMC and south portal are located on gentler slopes than the north portal, and are primarily in red alder forest, Sitka spruce forest, and coastal brambles. The north portal is adjacent to steeper slopes, and redwoods dominate the landscape with their size and scale. The CCT is near the highway at the north portal, and though the CCT presents a scenic path through redwoods, the highway is periodically visible.

Changes to the visual setting come from the construction of an OMC and from the tunnel and associated portals.

The OMC would consist of a building, parking lot, perimeter fencing, and other associated features. The proposed building would include a green "living" roof, and outdoor security lighting. Existing and proposed conditions (10 years post-construction) are shown in Figure 3-6.

In addition to construction of the portals, the south side of the tunnel would require construction of a new approach road, and the north would require a bridge on the approach. Shoulders would be wider than existing conditions on both sides, and there would be ramps to separated bicyclist/pedestrian paths for the tunnel. The tunnel portal itself would be elliptical, with the opening longer on the east side for slope retention. There would be a smaller secondary arch connected to—but set back from—the main tunnel portal for the tunnel equipment chamber. Lighting would be needed for the tunnel. Existing and proposed conditions (10 years post-construction) from the highway at the south portal are shown in Figure 3-7; from along the coastal trail to the north portal and to the north portal approach bridge are shown in Figures 3-8 and 3-9, respectively; and from the highway to the north portal as shown in Figure 3-10.

Construction of the project would last six to eight years, and visual effects would be similar to existing conditions, where construction and its associated elements (e.g., construction equipment, materials staging, informational signage, temporary traffic control, grading and vegetation removal, etc.), would be visible to highway users.



Figure 3-6. Alternative F, Key Viewpoint 1: OMC, U.S. 101 Northbound



Figure 3-7. Alternative F, Key Viewpoint 2: South Portal, U.S. 101 Northbound



Figure 3-8. Alternative F, Key Viewpoint 3: North Portal, California Trail



Figure 3-9. Alternative F, Key Viewpoint 4: Bridge, California Coastal Trail



Figure 3-10. Alternative F, Key Viewpoint 5: North Portal and Bridge, U.S. 101 Southbound

After construction, the proposed OMC, tunnel, tunnel portals, and tunnel approaches would introduce human-made elements into an otherwise natural environment.

At the OMC, impacts from the facility would be minimized by project features and context-sensitive solutions. These include plantings between U.S. 101 and the OMC to screen the facility, the green "living" roof and context-sensitive colors to help the facility blend in, and directing lighting downward to minimize light intrusion. Standard measures, such as revegetation, would help restore the natural setting after construction. Though viewers, particularly those traveling north, may notice a change at this location, overall impacts are anticipated to be low.

Human-made elements would change the visual character and reduce visual quality of the portal locations, in part by interrupting the continuity of the natural setting. In addition, at the north portal, the proximity and dominance of the redwood forest would be pulled back. These changes would be minimized by context-sensitive portal and bridge colors, textures, and forms, which would help integrate the portals into the existing landscape, in addition to other standard measures, such as revegetating disturbed slopes.

Viewers on the highway entering the tunnel from either side would be sensitive to the change in the landscape. However, the duration of exposure to the portals and the tunnel would be relatively short; for motorists, traveling through the tunnel would take approximately 2 minutes, and 10 minutes for bicyclists. While the tunnel itself would remove scenic views for highway users, it would create a unique and memorable element along the highway corridor that would act as a landmark feature. With the above taken into consideration, overall impacts are not anticipated to highly degrade the visual environment for highway viewers.

Viewers from the CCT would also be sensitive to changes at the north portal, though the overall scenic visual character would be retained. The portion of the CCT that would be affected is short, with less than a quarter to a half mile periodically exposed to changes (the DeMartin Section of the CCT, where the project is located, is approximately 10.7 miles long). The periodic views to the highway would be screened by existing vegetation, and the duration of exposure would be low, assuming continuous walking along the trail. Given the short distance of exposure and that potential effects would be lessened over time as revegetated areas mature, the views for CCT users are not anticipated to be highly degraded.

The project would include context-sensitive design features and standard measures to minimize visual impacts. Context-sensitive design features include the architecture of the portals, using see-through railing on the bridge, and plantings between the OMC and the highway, while other context-sensitive solutions include using context-sensitive colors,

forms and textures, as indicated in Standard Measure AR-1. In addition, other standard measures (Section 2.6—Standard Measure AR-2 through AR-5) would reduce impacts both during and after construction. These include limiting removal of vegetation and protecting vegetation where feasible and restoring temporarily used areas to a natural contour and revegetating with native species. During construction, lighting used at night would be directed on areas of work or areas needed for security.

Though Alternative F would bypass a section of the existing highway, the addition of a tunnel does not itself disqualify a highway from scenic designation (or eligibility) as exemplified by the Tom Lantos Tunnels at Devil's Slide on Highway 1 in San Mateo County and Robin Williams Tunnel on U.S. 101 in Marin County. The project would be consistent with corridor protection measures, as it would not spur a change in land use, encourage growth/development, or install outdoor advertising, and it would take careful attention to earth moving and landscaping and to the design and appearance of structures; therefore, U.S. 101 would be expected to maintain its scenic highway designation.

No-Build Alternative

Under the No-Build Alternative, no construction would be planned within the project area. Frequent maintenance would continue, with emergency restoration projects conducted as needed to address landslides and highway failures. The existing visual environment would not change.

Avoidance, Minimization, and/or Mitigation Measures

In addition to the Standard Measures and BMPs identified in Section 2.6, the following measures would be used to minimize impacts resulting from both Alternative X and Alternative F by aiding revegetation efforts, which would help restore the natural setting, and by ensuring context-sensitive treatments are applied appropriately.

- **Visual-1**: All replanting would use a variety of techniques, such as native seeding and container stock plantings, to provide a natural feel for the planting area(s).
- **Visual-2**: As feasible, construction topsoil would be salvaged and stockpiled for use within planting areas to increase vegetation success.
- **Visual-3**: As needed, a Caltrans-approved landscape architect or other appropriate specialist would be on-site during activities to oversee clearing and grubbing activities, tree and landscape preservation, structural aesthetic applications, and revegetation. The landscape architect would be on call as a resource for any aesthetic-related concerns that arise during construction.

3.2.10 Cultural Resources

Regulatory Setting

The term "cultural resources," as used in this document, refers to the "built environment" (e.g., structures, bridges, railroads, water conveyance systems, etc.), places of traditional or cultural importance, and archaeological sites (both prehistoric and historic), regardless of significance. Under federal and state laws, cultural resources that meet certain criteria of significance are referred to by various terms including "historic properties," "historic sites," "historical resources," and "tribal cultural resources." Laws and regulations dealing with cultural resources include:

Federal

The National Historic Preservation Act (NHPA) of 1966, as amended, sets forth national policy and procedures for historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for listing in the National Register of Historic Places (NRHP). Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and to allow the Advisory Council on Historic Preservation (ACHP) the opportunity to comment on those undertakings, following regulations issued by the ACHP (36 CFR 800). On January 1, 2014, the First Amended Section 106 Programmatic Agreement (PA) among the FHWA, the ACHP, the SHPO, and Caltrans went into effect for Caltrans projects, both state and local, with FHWA involvement. The PA implements the ACHP's regulations, 36 CFR 800, streamlining the Section 106 process and delegating certain responsibilities to Caltrans. The FHWA's responsibilities under the PA have been assigned to Caltrans as part of the Surface Transportation Project Delivery Program (23 USC 327).

As the project is partially located on lands owned by the NPS, the Caltrans PA cannot be used by the federal agency. Therefore, pursuant to implementing regulations of the NHPA (36 CFR Part 800.14b), a project-specific programmatic agreement is being developed between Caltrans, the SHPO, Redwood National Park, Del Norte Coast Redwoods State Park, Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation, and the Yurok Tribe. The *Programmatic Agreement Between the California Department of Transportation and the California State Historic Preservation Officer Regarding the Last Chance Grade Permanent Restoration Project in Del Norte County, California* (LCG PA)(working title) would implement the NHPA in a manner that allows the deferment of the

designation of the final Area of Potential Effects (APE)[22] and NRHP eligibility findings if necessary and ensures that the coordinating parties to the LCG PA have roles in its implementation. In coordination with the SHPO, the draft LCG is being considered an accepted alternative approach to implementing the regulations at 36 CFR Part 800 for conducting the Section 106 process. A Memorandum of Agreement (MOA) may be used rather than the PA, depending on the results of consultation with the SHPO.

The Archaeological Resources Protection Act (ARPA) applies when a project may involve archaeological resources located on federal or tribal land. The ARPA requires a permit be obtained before excavation of an archaeological resource on such land can take place.

State

CEQA requires the consideration of cultural resources that are historical resources and tribal cultural resources, as well as "unique" archaeological resources. PRC Section 5024.1 established the California Register of Historical Resources (CRHR) and outlined the necessary criteria for a cultural resource to be considered eligible for listing in the CRHR and, therefore, a historical resource. Historical resources are defined in PRC Section 5020.1(j). In 2014, California Assembly Bill 52 (AB 52) added the term "tribal cultural resources" to CEQA, and AB 52 is commonly referenced instead of CEQA when discussing the process to identify tribal cultural resources (as well as identifying measures to avoid, preserve, or mitigate effects to them). Defined in PRC Section 21074(a), a tribal cultural resource is a CRHR- or local register-eligible site, feature, place, cultural landscape, or object which has a cultural value to a California Native American tribe. Tribal cultural resources must also meet the definition of a historical resource. Unique archaeological resources are referenced in PRC Section 21083.2.

PRC Section 5024 requires state agencies to identify and protect state-owned historical resources that meet the NRHP listing criteria. It further requires Caltrans to inventory state-owned structures in its rights of way.

[22] As defined in 36 CFR 800.16(d), an Area of Potential Effect (APE) is "the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking."

Affected Environment

Multiple cultural resource studies and reports were completed for this project between 2019 and 2023. An *Archaeological Sensitivity Assessment, Background Research, and Inventory Plan for the Last Chance Grade Project* was completed in 2019 (Caltrans 2019b). Cultural resource surveys of an approximately 3,000-acre Cultural Study Area that encompasses all areas of the project's Area of Direct Impact (ADI) for all alternatives under consideration were completed between 2019 and 2022. A *Cultural Resources Survey Report for the Last Chance Grade Permanent Restoration Project* summarizing the results of all surveys was finalized in October 2022 (Caltrans 2022c). A *Historical Resources Evaluation Report for the Last Chance Grade Permanent Restoration Project* was completed in September 2022 (Caltrans 2022d). *Ethnographic Research Part 1: Preliminary Review of Ethnographic Research for the Last Chance Grade Project* was completed in September 2022 (Caltrans 2022e). A *Historic Property Survey Report for the Last Chance Grade Permanent Restoration Project* was completed in October 2022 (Caltrans 2022f).

Record searches were conducted at the Northwest Information Center of the California Historical Resources Information System at Sonoma State University in 2014 and 2018. Review of records included a review of the NRHP, CRHR, California Inventory of Historic Resources, California Historical Landmarks, California Points of Historical Interest, and the California Historic Highway Bridge Inventory. Archival research was conducted between 2018 and 2022 at the following locations: Redwood National Park; Del Norte Coast Redwoods State Parks; Del Norte County Historical Society Collections, Crescent City; Del Norte County Recorder's Office and the Assessor's Office; Humboldt State University Library Special Collections, Arcata; Caltrans Transportation Library and History Center, Sacramento; Bancroft Library at the University of California, Berkeley; California State Library, Sacramento; University of California, Davis, Shields Library General Collection and Map Collection; and online sources (Caltrans Cultural Resources Database, Bureau of Land Management GLO plat maps, Historical Map works, David Rumsey Collection, Shields Library at University of California, Davis, historicaerials.com, ancestry.com, newspaper archives, and State Water Resources Control Board records).

Several studies have been conducted to better understand the cultural history of the project area. In 2019, consultants conducted an analysis of precontact site sensitivity based upon existing geoarchaeological data and undertook a detailed study of LIDAR-based elevation data and historical aerial imagery to identify historic-period features. In 2020, archival research of historical and ethnographic literature was conducted as a preliminary step in identifying places of significance to local tribal communities and in preparation for

ethnographic interviews, which are currently in progress. Cultural resource surveys of the Cultural Study Area were conducted between July and October 2020. A supplemental survey of the coast west of the highway was conducted in summer 2022. In April 2022, six cultural resources within the footprints of the current alignments (X and F) were evaluated for eligibility to the NRHP and the CRHR. Eligibility determinations from this study are listed in the next section of this document.

The APE has not yet been defined for this project; it would be defined upon the selection of a preferred alternative, a process detailed in the LCG PA. Once established, the APE would encompass a large area to protect cultural resources in the project's vicinity. Because the APE is not defined, an approximately 3,000-acre Cultural Study Area was designed to encompass the alternatives under consideration, staging, secondary effects and to assist in defining a broader cultural landscape. This Cultural Study Area encompasses the entirety of the ESL and the ADI's of the remaining considered alternatives.

The ESL was defined by the Caltrans project development team to identify areas requiring environmental studies specifically for Alternatives X and F. For the purposes of this draft environmental document and in the absence of a formal APE, an ADI was defined for each alternative to assess the potential of impacts of each alternative to known cultural resources within the ESL.

Caltrans began consultation for this project with local Native American Tribes, Redwood National Park and Del Norte Coast Redwoods State Parks in 2014. Native American consultation included close coordination with Tribal Historic Preservation Officers and other representatives from Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation, and the Yurok Tribe through letters, phone calls, emails, in-person and virtual meetings. As a result of these early consultation efforts, a cultural resources working group consisting of representatives from each of the five tribes and cultural resources staff from State Parks, National Parks, and Caltrans was formed in 2017 to address cultural resource concerns and to develop the LCG PA. In 2018, Caltrans began attending tribal council meetings with each of the participating tribes each year to provide updates and get feedback on the project. Caltrans continues to have close coordination with the agencies and tribes and meets with the cultural resources working group on a quarterly basis. Additional tribal coordination is summarized in Chapter 5, *Comments and Coordination*.

Caltrans initiated consultation with the SHPO pursuant to Section 106 of the NHPA in October 2019. In December 2020, Caltrans began consultation with the SHPO on the draft LCG PA pursuant to 36 CFR 800.14(b). In November 2022, Caltrans evaluated six cultural resources within the ESL and sought SHPO concurrence on eligibility. The SHPO provided

concurrence in January 2023 that five resources were not eligible for listing to the NRHP and recommend that the Wagon Road be treated as eligible to the NRHP for the purposes of the undertaking. Letters of consultation with the SHPO can be found in Appendix F.

Studies resulted in the identification of nine cultural resources within or immediately adjacent to the ESL. As mentioned above, six cultural resources were evaluated to determine their eligibility for the NRHP and the CRHR; five were determined ineligible, and one resource (the Crescent City to Trinidad Wagon Road) will be assumed and treated as eligible to the NRHP and the CRHR for the purposes of the undertaking. Of the remaining three resources, one is listed on the NRHP and two will be considered eligible for the purposes of the undertaking only.

Historic Properties are cultural resources that have been determined eligible for or have been listed on the NRHP. Cultural resources that are considered eligible are also considered historic properties for the purposes of the undertaking. For the LCG project the following historic properties have been identified within the ESL:

- **The Crescent City to Trinidad Wagon Road (P-08-000470/ REDW00169)** was the primary route between Crescent City and Trinidad from its construction in 1894 until the advent of the Redwood Highway in the 1920s. The wagon road currently exists as discrete segments that vary in length and condition. A total of 31 wagon road segments were identified within the Cultural Study Area. Segments 1 through 13 were originally recorded in 2019 as part of the identification efforts for Phase 2B geotechnical investigations for the current undertaking. In 2020, the record was updated to include seventeen additional segments (A–Q), and in 2022, Caltrans identified one additional segment (C-1). The SHPO did not concur that the wagon road is eligible for the NRHP because there is not enough information to support its eligibility or its lack thereof. It is beyond the scope and scale of the undertaking to record and assess the integrity for the entire length of the remaining wagon road segments between Trinidad and Crescent City. Therefore, Caltrans is treating the wagon road as eligible for the purposes of the undertaking. Of the 31 segments identified during studies, only six segments (C, C-1, D, M, 1, and 10) located within the ESL retain sufficient integrity to contribute to the eligibility of the resource.
- **The Old Redwood Highway District (P-08-000550/ REDW00162) – Last Chance Grade to Damnation Creek Segment –** is a segment of decommissioned roadway extending northwest from the current U.S. 101 highway alignment. This segment of the Old Redwood Highway was constructed in 1919 and was previously listed on the NRHP in 1979. In 2020, the NPS recorded and evaluated the decommissioned

segments of the Old Redwood Highway within Redwood National Park and concluded the roadway meets the NRHP requirements for eligibility as a historic district under Criterion A with a period of significance from 1919 to 1952. This segment sits immediately adjacent to the ESL but would be avoided during construction through protection as an environmentally sensitive area, where no work would occur.

- **The Joseph DeMartin Barn Site (CA-DNO-263H/ P-08000258/ REDW00100)** is a historic-period ranching and barn site established by Joseph DeMartin in 1901, which continued under other ownership (Miriam Rudisill) until 1965. The site consists of an artificial pond, berm, coral, dirt access road, miscellaneous farm equipment and associated debris. All buildings and structures were removed by the NPS in the 1980s or 90s. This site sits immediately adjacent to the ESL and ADI. The resource was not evaluated but will be considered eligible for the purpose of the undertaking and avoided during construction through protection as an environmentally sensitive area, where no work would occur.
- Extensive consultation with five local Tribes suggests the presence of a **Traditional Cultural Landscape (**TCL), which is a type of Traditional Cultural Property (TCP**)** within the project ESL. Ethnographic research and interviews are currently underway to determine the boundaries and contributing elements of this landscape. Currently it is assumed that the landscape encompasses the entire ESL, which would include the entire ADI for both Alternative X and Alternative F. Contributing elements would likely include features both within and outside the ESL. Within the ESL old-growth redwoods and possibly other varieties of trees would be considered contributors to the TCL. It is currently assumed this landscape will be eligible for the NRHP under Criteria A, B, and D.

Environmental Consequences

Effects will not be determined until after an APE is defined. This section will use a preliminary ADI to assess potential effects on historic properties by alternative. It is currently anticipated that both build alternatives have potential to adversely affect historic properties; therefore, it should be assumed that this project would result in a Finding of Adverse Effect as defined in 36 CFR Part 800, regardless of which alternative is selected. Once an APE is defined and anticipated effects are determined, concurrence from the SHPO would be requested.

Alternative X

Two historic properties are located within or near the ADI for this alternative (Table 3-3). Because impacts to the Old Redwood Highway District would be avoided through designation and protection as an environmentally sensitive area, where no work would occur, it is anticipated there would be no adverse effect to the Old Redwood Highway District. The TCL completely overlaps the ADI for Alternative X. Known contributing elements of the TCL in the ADI include old-growth redwood trees. It is anticipated that Alternative X would have an adverse effect on the TCL, due to the removal of old-growth redwoods.

Alternative F

There are four historic properties in or near the ADI for Alternative F (Table 3-3), and it is anticipated that this alternative would have an adverse effect on two of those properties. The Old Redwood Highway District and the DeMartin Barn Site are immediately adjacent to the ADI but can be avoided through designation and protection as an environmentally sensitive area, where no work would occur. The TCL and the Wagon Road overlap the ADI for this alternative. Known contributing elements of the TCL in the ADI include old-growth redwood trees. Three segments of the Crescent City to Trinidad Wagon Road, which retain sufficient integrity to contribute to the eligibility of the property, also have potential to be adversely affected by Alternative F. Therefore, it is anticipated that Alternative F would adversely affect both the Crescent City to Trinidad Wagon Road and the TCL.

Table 3-3. Summary of Impacts on Historic Properties

	Alternative X	Alternative F
Historic Properties – Impacts	• Traditional Cultural Landscape: Impacts to Old-Growth Redwood Trees	• Traditional Cultural Landscape: Impacts to Old-Growth Redwood Trees • Crescent City to Trinidad Wagon Road: Impacts to 3 Contributing Segments (1, M and 10)
Historic Properties – Avoided	• Old Redwood Highway District: Last Chance Grade to Damnation Creek Segment	• Old Redwood Highway District: Last Chance Grade to Damnation Creek Segment • DeMartin Barn Site

Standard measures are included in the project for cultural resources, as described in Section 2.6, *Standard Measures and Best Management Practices*.

Under CR-1 and CR-2, Caltrans would coordinate with tribes to protect tribal resources, and archaeological and tribal monitors would be used, as appropriate, in areas of cultural significance.

Under CR-3, if cultural materials are discovered during construction, treatment guidelines and late-discovery protocols in a Historic Property Treatment Plan (HPTP) would be followed. The HPTP is under development, and would be attached to the LCG PA. A standard measure that would be included in the HPTP is that all earth-moving activity within 60 feet of an inadvertent discovery area be diverted until a qualified archaeologist could assess the nature and significance of the find in consultation with the Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation, Yurok Tribe, NPS, CDPR, and SHPO.

Under CR-4, if human remains are discovered on state-owned lands, California Health and Safety Code Section 7050.5 states that further disturbances and activities shall stop in any area or nearby area suspected to overlie remains, and the County Coroner contacted. If the remains are thought by the coroner to be Native American, the coroner will notify the Native American Heritage Commission, who, pursuant to PRC 5097.98, will then notify the Most Likely Descendant (MLD). At that time, the person who discovered the remains would contact the District 1 Cultural Resources Senior and the District 1 Native American Liaison so that they could work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed as applicable.

Human remains and related items discovered on federally owned lands would be treated in accordance with the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (23 USC 3001). The procedures for dealing with the discovery of human remains, funerary objects, or sacred objects on federal land are described in the regulations that implement NAGPRA (43 CFR Part 10). All work in the vicinity of the discovery shall be halted and the administering agency's archaeologist would be notified immediately. Project activities in the vicinity of the discovery would not resume until the federal agency complies with the 43 CFR Part 10 regulations and provides notification to proceed.

There are historic properties protected by Section 4(f) of the Department of Transportation Act of 1966 within the project vicinity. The proposed project would result in a "use" of those properties as defined by Section 4(f). Please see additional details in Appendix B, *Section 4(f)*.

No-Build Alternative

Under the No-Build Alternative, no construction would be planned at LCG. Regular maintenance and operations would continue, with emergency restoration projects conducted as needed to address landslides and roadway failures. Future emergency repairs would continue to take place and may result in cultural resources impacts, depending on the locations and nature of these future emergency repair activities.

Avoidance, Minimization, and/or Mitigation Measures

To reduce impacts to cultural resources, the following measure would be required for Alternative X (for potential effects on TCL) and Alternative F (for potential effects on TCL and the Wagon Trail):

- **Cultural-1: Prepare and Implement an HPTP to address potential effects on contributing elements of TCL and Wagon Road**. Measures to address potential effects on the contributing elements of the TCL would be developed in consultation with the Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation, Yurok Tribe, NPS, CDPR, and the SHPO. Each tribe has expressed interest in old-growth redwood trees that would be removed as part of the project so that these could be used in the construction of traditional canoes and structures. Potential actions to address TCL effects could include coordinating the delivery of old-growth redwood trees removed during construction to each tribe, onsite interpretive panels, and scholarships. Other measures may be considered as consultation continues.

  Potential measure to address effects on the Wagon Road may include interpretative displays and/or the preparation of a detailed historic context which would be available to the public. Further discussion is required with NPS, CDPR, and the SHPO to determine the most appropriate mitigation if an adverse effect finding is determined for this resource.

  Once an alternative is selected and effects on historic properties for the alternative are determined, specific measures would be agreed upon and documented in an HPTP, which would be attached to the LCG PA. Due to the nature of the project area, which consists of steep terrain that is difficult to access and has limited ground visibility, a late discovery plan would be incorporated into the HPTP to address additional buried cultural resources or unanticipated discoveries that could be identified during construction. The HPTP will be discussed in greater detail in the final environmental document.

3.3 Physical Environment

3.3.1 Water Quality and Stormwater Runoff

Regulatory Setting

Federal Regulations: Clean Water Act

In 1972, Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to waters of the U.S. from any point source[23] unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. This act and its amendments are known today as the Clean Water Act (CWA). Congress has amended the act several times. In the 1987 amendments, Congress directed dischargers of stormwater from municipal and industrial/construction point sources to comply with the NPDES permit scheme. The following are important CWA sections:

- Sections 303 and 304 require states to issue water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the U.S. to obtain certification from the state that the discharge will comply with other provisions of the act. This is most frequently required in tandem with a Section 404 permit request (see below).
- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. RWQCBs administer this permitting program in California. Section 402(p) requires permits for discharges of stormwater from industrial/construction and municipal separate storm sewer systems (MS4s)[24].
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers (USACE).

The goal of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

[23] A point source is any discrete conveyance, such as a pipe or a human-made ditch.
[24] A collection of structures designed to gather stormwater and discharge it into local streams and rivers.

The USACE issues two types of 404 permits: General and Individual. There are two types of General permits: Regional and Nationwide. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effects. Nationwide permits are issued to allow a variety of minor project activities with no more than minimal effects.

Ordinarily, projects that do not meet the criteria for a Regional or Nationwide Permit may be permitted under one of the USACE's Individual permits. There are two types of Individual permits: Standard permits and Letters of Permission. For Individual permits, the USACE decision to approve is based on compliance with U.S. Environmental Protection Agency's (U.S. EPA) Section 404(b)(1) Guidelines (40 CFR 230), and whether the permit approval is in the public interest. The Section 404(b)(1) Guidelines (Guidelines) were developed by the U.S. EPA in conjunction with the USACE, and allow the discharge of dredged or fill material into the aquatic system (Waters of the U.S.) only if there were no practicable alternative which would have less adverse effects. The Guidelines state that the USACE may not issue a permit if there is a least environmentally damaging practicable alternative (LEDPA) to the proposed discharge that would have lesser effects on Waters of the U.S. and not have any other significant adverse environmental consequences.

According to the Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures has been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent[25] standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to Waters of the U.S. In addition, every permit from the USACE, even if not subject to the Guidelines, must meet general requirements (see 33 CFR 320.4). A discussion of the LEDPA determination, if any, for the document is included in Section 3.4.2, *Wetlands and Other Waters*.

State Requirements: Porter-Cologne Water Quality Control Act

California's Porter-Cologne Water Quality Control Act (Porter-Cologne Act), enacted in 1969, provides the legal basis for water quality regulation within California. This act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the state. It predates the CWA and regulates discharges to waters of the state.

[25] The U.S. EPA defines "effluent" as "wastewater, treated or untreated, that flows out of a treatment plant, sewer, or industrial outfall."

Waters of the state include more than just waters of the U.S., such as groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of "waste" as defined, and this definition is broader than the CWA definition of "pollutant." Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

State Water Resources Control Board and Regional Water Quality Control Boards

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA and regulating discharges to ensure compliance with the water quality standards. Details about water quality standards in a project area are included in the applicable RWQCB Basin Plan. In California, RWQCBs designate beneficial uses for all water body segments in their jurisdictions and then set criteria necessary to protect those uses. As a result, the water quality standards developed for particular water segments are based on the designated use and vary depending on that use. In addition, the SWRCB identifies waters failing to meet standards for specific pollutants. These waters are then state-listed in accordance with CWA Section 303(d). If a state determines that waters are impaired for one or more constituents and the standards cannot be met through point source or non-point source controls (NPDES permits or WDRs), the CWA requires the establishment of Total Maximum Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

The SWRCB administers water rights, sets water pollution control policy, and issues Water Board orders on matters of statewide application, and oversees water quality functions throughout the state by approving Basin Plans, TMDLs, and NPDES permits. RWQCBs are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

National Pollutant Discharge Elimination System (NPDES) Program

Municipal Separate Storm Sewer Systems (MS4)

Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of stormwater discharges, including MS4s. An MS4 is defined as "any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town,

county, or other public body having jurisdiction over stormwater, which is designed or used for collecting or conveying stormwater." The SWRCB has identified Caltrans as an owner/operator of an MS4 under federal regulations. Caltrans's MS4 permit covers all Caltrans rights of way, properties, facilities, and activities in the state. The SWRCB or the RWQCB issues NPDES permits for 5 years, and permit requirements remain active until a new permit has been adopted.

The Caltrans Statewide NPDES Permit (NPDES No. CAS000003, Order No. 2022-0033-DWQ) adopted on June 22, 2022, and effective on January 1, 2023, has four basic requirements:

1. Caltrans must comply with the requirements of the Construction General Permit (CGP) (see below);
2. Caltrans must implement a year-round program in all parts of the state to effectively control stormwater and non-stormwater discharges;
3. Caltrans stormwater discharges must meet water quality standards through implementation of permanent and temporary (construction) BMPs, to the maximum extent practicable, and other measures as the SWRCB determines to be necessary to meet the water quality standards; and
4. Caltrans must implement trash control measures to meet trash regulation compliance. This requirement is per the California Water Code Section 13383 Order issued by the SWRCB to Caltrans and is applicable to all Caltrans projects (SWRCB 2017). However, per the Caltrans *Statewide Trash Implementation Plan* (Caltrans 2019c), full trash capture BMPs are only considered for significant trash generating areas.

To comply with the permit, Caltrans developed the Statewide Storm Water Management Plan (SWMP) to address stormwater pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP assigns responsibilities within Caltrans for implementing stormwater management procedures and practices as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The SWMP describes the minimum procedures and practices Caltrans uses to reduce pollutants in stormwater and non-stormwater discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs.

The proposed project will be programmed to follow the guidelines and procedures outlined in the latest SWMP to address stormwater runoff.

Construction General Permit

The CGP (NPDES No. CAS000002, SWRCB Order No. 2022-0057-DWQ, adopted on September 8, 2022, and effective on September 1, 2023) regulates stormwater discharges from construction sites that result in a Disturbed Soil Area (DSA) of 1 acre or greater, and/or are smaller sites that are part of a larger common plan of development. By law, all stormwater discharges associated with construction activity where clearing, grading, and excavation result in soil disturbance of at least 1 acre must comply with the provisions of the CGP. Construction activity that results in soil disturbances of less than 1 acre is subject to this CGP if there is potential for significant water quality impairment resulting from the activity as determined by the RWQCB. Operators of regulated construction sites are required to develop Storm Water Pollution Prevention Plans (SWPPPs); implement sediment, erosion, and pollution prevention control measures; and obtain coverage under the CGP.

The CGP separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases and are based on potential erosion and transport to receiving waters. Requirements apply according to the Risk Level determined.

Risk Level 3 (highest risk) projects must follow water quality monitoring and reporting requirements for visual inspections listed in Attachment D of the adopted 2022 CGP. This includes compulsory stormwater runoff pH and turbidity monitoring during all qualifying precipitation events 0.5 inch or more and continues on subsequent 24-hour periods when 0.25 inch or more is forecast. Stormwater samples should be representative of the flow and characteristic of the discharge. If any samples exceed the applicable Numeric Action Levels, sampling results should be electronically reported to the SWRCB no later than 10 days after the conclusion of the storm event. More details on Risk Level 3 requirements for inspections, sampling, and reporting can be found in Attachment D of the 2022 CGP.

Section 401 Permitting

Under Section 401 of the CWA, any project requiring a federal license or permit that may result in a discharge to a water of the U.S. must obtain a 401 certification, which certifies that the project will be in compliance with state water quality standards. The most common federal permits triggering 401 certification are CWA Section 404 permits issued by the USACE. The 401 permit certifications are obtained from the appropriate RWQCB, dependent on the project location, and are required before the USACE issues a 404 permit.

In some cases, the RWQCB may have specific concerns with discharges associated with a project. As a result, the RWQCB may issue a set of requirements known as WDRs under the State Water Code (Porter-Cologne Act) that define activities, such as the inclusion of specific

features, effluent limitations, monitoring, and plan submittals, that are to be implemented for protecting or benefiting water quality. WDRs can be issued to address both permanent and temporary discharges of a project.

Regional and Local Requirements

RWQCB Basin Plan

The ESL is located entirely within the jurisdiction of the NCRWQCB, Region 1. The *Water Quality Control Plan for the North Coast Region* (Basin Plan) states the goals and policies, beneficial uses, and water quality objectives that apply to water bodies throughout the North Coast Region (NCRWQCB 2018), which includes the ESL. The Basin Plan has been adopted by the SWRCB, U.S. EPA, and the Office of Administrative Law.

Dewatering

The Caltrans MS4 Permit refers to the CGP for dewatering requirements for Caltrans' construction activities. Attachment J of the 2022 CGP lists the dewatering requirements. Shallow groundwater encountered within the project area would be collected during construction activities. Several options are available for use or disposal of the collected groundwater, including use for dust control, upland disposal, disposal at a publicly owned treatment works, and discharge to surface waters. Temporary dewatering would be necessary in areas where groundwater is encountered during geotechnical investigations and excavation activities, and Caltrans would have to obtain approval from the NCRWQCB, as stated in Caltrans' *Field Guide to Construction Site Dewatering* (Caltrans 2014a).

If groundwater were found to be contaminated, Caltrans would obtain the NCRWQCB *WDRs for Discharges of Highly Treated Groundwater to Surface Waters Following Extraction and Treatment of Groundwater Polluted with Petroleum Hydrocarbons and Volatile Organic Compounds* (NPDES No. CAG911001, Order No. R1-2016-0034). This Order covers construction groundwater dewatering of potentially contaminated groundwater that has been treated to avoid adverse impacts on beneficial uses of the receiving waters and to comply with all applicable water quality objectives listed within the Basin Plan (NCRWQCB 2016).

If groundwater were found to contain no potential contaminants of concern, Caltrans would obtain the NCRWQCB *WDRs for Low Threat Discharges to Surface Waters in the North Coast Region* (NPDES No. CAG024902, Order No. R1-2020-0006). This Order covers construction groundwater dewatering of low-threat, planned, short-term discharge of groundwater, provided that (1) the discharge does not contain pollutant quantities that could

adversely affect beneficial uses and (2) the discharge meets specific criteria listed in the Basin Plan (NCRWQCB 2020). The NCRWQCB may elect to issue an individual WDR to cover such construction period discharges and/or potential longer-term discharges.

Affected Environment

This section is based on the *Water Quality Assessment Report* (Caltrans 2023e) prepared for the project.

The project area is located within an undefined hydrologic subarea in the Wilson Creek Hydrologic Area (HA) of North Coast Hydrologic Region's Smith River Hydrologic Unit (HU) (Caltrans 2023e), and the project limits lie within areas not delineated as groundwater basins by the California Department of Water Resources (DWR).

Various aquatic resources are present within the ESL and the additional 100-foot buffer. Streams in this area drain either directly to the Pacific Ocean or indirectly through tributary systems and Wilson Creek (Caltrans 2023h, 2023i).

Under Section 303(d) of the CWA, states, territories, and authorized tribes are required to develop a list of water quality segments that do not meet water quality standards. The 303(d) List does not identify the Wilson Creek HA as impaired or having TMDLs (Caltrans 2023e); however, the HA has numerical water quality objectives for dissolved oxygen under the beneficial uses of marine habitat, cold freshwater habitat, and spawning, reproduction, and/or early development. Although the streams identified in the ESL do not have a confluence with Smith River, given they are in the Smith River HU they would have the same specific water quality objectives (Caltrans 2023e).

The project area does not extend into areas where accidental spills could discharge directly to municipal or domestic water supply reservoirs and/or groundwater percolation facilities. However, the Wilson Creek HA and all groundwaters of the North Coast Region have been identified as having the beneficial use of municipal and domestic supply (Caltrans 2023e).

The project limits are located along an Area of Special Biological Significance (ASBS). ASBS's are ocean areas monitored and maintained for water quality by the State Water Resources Control Board. ASBS's support an unusual variety of aquatic life, and often host unique individual species. Within the ESL, there are currently two ASBS discharge points identified along U.S. 101. No exceedances of natural water quality or toxicity were found at the outfalls within the ESL (Caltrans 2023e).

Environmental Consequences

Alternative X

Construction

Construction activities associated with Alternative X have the potential to result in temporary water quality impacts. These impacts can result from sediment discharge from DSAs and construction near water resources and drainage facilities. Estimates of the DSA and impervious surfaces are included in Table 3-4.

Table 3-4. Project DSA and Impervious Surface Areas for Alternative X

Disturbed Soil Area (acres)	Pre-Project Impervious Area (acres)	Post-Project Impervious Area (acres)	Replaced Impervious Surface (acres)	Net New Impervious Surface (acres)	Total New Impervious Surface (acres)	Post-Construction Treatment Area (acres)
20.85	5.11	7.46	2.50	2.35	4.85	4.85

Source: Caltrans 2023e

Proposed cut-and-fill, grading, and excavation activities have the potential to increase erosion, resulting in elevated turbidity of stormwater runoff. Additional sources of potential sediment include stockpiles, construction staging areas, and construction equipment that are not properly maintained or cleaned. As currently planned, except for two wetlands (one located near the drainage gallery and the other adjacent to the highway), there are no jurisdictional waters that would be impacted; however, the culverts to be modified/replaced may have connectivity with the ASBS. Impacts from potentially sediment-laden stormwater would be minimized through erosion control, soil stabilization, and sediment and tracking control BMPs. In addition, impacts on coastal water quality are not expected because the project would treat stormwater runoff prior to discharge to ASBS, as stated in Caltrans' ASBS Compliance Plan.

Although accidental spills or releases of potentially toxic materials from fueling or maintenance of construction vehicles are not expected to discharge directly to surface waters or groundwaters because of the project location, the potential threat to water quality from contaminants entering receiving water bodies would be avoided with Standard Measure WQ-1. This includes cleaning up any spills or leaks from construction equipment (e.g., fuel, oil, hydraulic fluid, grease) in accordance with applicable local, state, and/or federal regulations.

Temporary dewatering may be necessary in areas where groundwater is encountered. Varying groundwater hardness levels have the potential to affect resources. Per Standard Measure WQ-1, and the *Field Guide to Construction Site Dewatering* (Caltrans 2014a), groundwater hardness levels that exceed the ASBS effluent limitations would either be treated on-site prior to disposal or transported to a legally permitted off-site facility. Any potential impacts due to dewatering would be temporary and would be expected to be minimal and limited to the construction period.

Operation

The new impervious surface area would cause hydromodification which could increase stormwater pollution effects along the project's right of way. Hydromodification impacts can result from increases in flow velocity and volume, due to the added impervious area preventing runoff from naturally dispersing and infiltrating the ground. These effects can cause increased erosion and increased sediment transport and deposition. However, with the implementation of Standard Measures WQ-1 and WQ-2, the increase in impervious surfaces is not anticipated to result in substantial erosion or siltation either within or outside the ESL.

Alternative X would include the construction of an underground drainage system with a new outfall to the Pacific Ocean. The outfall would only contain groundwater. Groundwater hardness that exceeds ASBS effluent limitations would be addressed through the implementation of standard measures (see discussion above under Construction). Non-stormwater discharges to ASBS are prohibited except where specifically authorized as specified in SWRCB Resolution No. 2012-0012 and Section 3.9 of the Caltrans MS4 Permit. Per Section 3.9 of the permit, non-stormwater discharges to ASBS that are associated with slope stability are conditionally exempt if routed to an existing discharge. As currently planned, the new outfall would create a new discharge point. As a result, an exception to the California Ocean Plan discharge prohibitions to Areas of Special Biological Significance would be needed.

Alternative X would include the extension of existing culverts along the highway to match the new roadway widths. Ground disturbance associated with these activities has the potential to affect water quality; however, in accordance with Standard Measure WQ-1, the project would implement treatment BMPs to reduce pollutant loadings from stormwater runoff once construction is complete. Additional project features for Alternative X would include porous pavement for the access road to the underground drainage galleries and infiltration trenches within the roadway shoulder. With the implementation of these features and standard measures, long-term impacts during operation and maintenance are not anticipated.

The Basin Plan does not list the Wilson Creek HA as having the beneficial use of groundwater recharge. Alternative X improvements would result in additional impervious area, which would reduce the available unpaved area that previously allowed runoff to infiltrate the native soils. Alternative X also proposes a permanent underground drainage system that would capture and redirect groundwater from within the slope to the Pacific Ocean. The project would implement treatment BMPs that would allow stormwater infiltration, avoiding any potential adverse impacts on the basin's groundwater. Further, any potential groundwater drawdown is anticipated to be localized on the western slope right above the ocean and, based on modeling, there appears to be little connectivity between the western slope and the Wilson Creek watershed. Therefore, Alternative X would not be expected to interfere substantially with recharge of the Wilson Creek HA and, in turn, would not impede the basin's sustainable groundwater management.

As described above, Alternative X would have the potential to affect water quality temporarily and permanently; however, in accordance with Standard Measures WQ-1 and WQ-2 (Section 2.6), a SWPPP would be prepared, which requires the implementation of construction site BMPs, and would adhere to the latest *Standard Specifications* (Caltrans 2022g) for water pollution control. It is anticipated these measures would avoid and minimize potential effects to a negligible level.

A Section 404 Nationwide Permit, Section 401 Water Quality Certification, Waste Discharge Requirement, and Section 1602 Lake and Streambed Alteration Agreement would be required for Alternative X.

Alternative F

Construction

The temporary impacts associated with Alternative F would be similar to those under Alternative X (e.g., increased erosion and elevated stormwater turbidity associated with staging, cut/fill, grading, etc.). The anticipated DSA and changes to impervious surfaces are shown in Table 3-5). Alternative F would involve work within jurisdictional waters.

Before the start of construction, temporary dewatering of jurisdictional waters would be performed to avoid any potential negative impacts on water quality and aquatic species. The tunnel would be sealed during tunnel construction; however, any groundwater encountered during construction would be managed similar to that described under Alternative X, and would comply with the Caltrans *Field Guide to Construction Site Dewatering* (Caltrans 2014a).

Table 3-5. Project DSA and Impervious Surface Areas for Alternative F

Disturbed Soil Area (acres)	Pre-Project Impervious Area (acres)	Post-Project Impervious Area (acres)	Replaced Impervious Surface (acres)	Net New Impervious Surface (acres)	Total New Impervious Surface (acres)	Post Construction Treatment Area (acres)
29.57[1]	7.33	6.43	2.08	-0.90	1.18	1.18

[1] The DSA for Alternative F excludes the proposed tunnel because it would be constructed underground.
Source: Caltrans 2023e. The table includes the pavement acreage that would be removed through the decommissioning of the existing highway.

Alternative F would impact three perennial streams and six wetlands. Potential impacts from potentially sediment-laden stormwater would be minimized through erosion control, soil stabilization, and sediment and tracking control BMPs. Any potential impacts on coastal water quality are not expected because the project would treat stormwater runoff prior to discharge to ASBS, as stated in Caltrans' ASBS Compliance Plan.

As with Alternative X, standard measures would address accidental spills or releases of potentially toxic materials from discharging directly to surface waters or groundwaters.

Construction activities would have the potential to result in non-stormwater discharges to the ASBS; however, impacts on coastal water quality are not expected, as any discharge would be within an existing drainage and treatments would be required prior to any stormwater runoff to the ASBS.

Operation

Some of the potential permanent impacts under Alternative F would be similar to those under Alternative X, such as hydromodification associated with new impervious surface and culvert modifications; however, Alternative F would not alter the greater existing drainage pattern of the watersheds.

As described under Alternative X, non-stormwater discharges to ASBS are prohibited except where specifically authorized. As currently planned, Alternative F would route all runoff to existing discharge locations; therefore, once operational, this alternative would not be expected to affect coastal water quality.

Unlike Alternative X, Alternative F would result in a decrease in impervious area. The change in impervious area would result in only minimal impacts on the existing hydrograph, including minimal decreases in the flow velocity and volume for the receiving water bodies. Additionally, Alternative F does not propose construction of an underground drainage system. Therefore, no negative permanent impacts on groundwater or water quality are

expected for the operation of Alternative F. With the implementation of standard measures, long-term impacts during operation and maintenance are not anticipated.

As described above, Alternative F would have the potential to affect water quality temporarily and permanently; however, in accordance with Standard Measures WQ-1 and WQ-2 (Section 2.6), a SWPPP would be prepared, which requires the implementation of construction site BMPs, and would adhere to the latest *Standard Specifications* (Caltrans 2022g) for water pollution control. It is anticipated these measures would avoid and minimize potential effects to a negligible level.

A Section 404 Nationwide Permit, Section 401 Water Quality Certification, Waste Discharge Requirement, and Section 1602 Lake and Streambed Alteration Agreement would be required for Alternative F.

No-Build Alternative

Under the No-Build Alternative, regular maintenance and operations would continue, with emergency restoration projects conducted as needed to address landslides and roadway failures.

Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation measures for water quality and stormwater runoff are anticipated; however, there may be conditions associated with the special exception for discharges to the ASBS. Any such conditions would likely be similar or closely related to the standard measures already included as part of the project.

3.3.2 Geology, Soils, Seismic, Topography

Regulatory Setting

For geologic and topographic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects "outstanding examples of major geological features." Topographic and geologic features are also protected under CEQA.

This section also discusses geology, soils, and seismic concerns as they relate to public safety and project design. Earthquakes are prime considerations in the design and retrofit of structures. Structures are designed using Caltrans' Seismic Design Criteria (SDC). The SDC provides the minimum seismic requirements for highway bridges designed in California. A bridge's category and classification determines its seismic performance level and which methods are used for estimating the seismic demands and structural capabilities. For more information, please see Caltrans's Division of Engineering Services, Office of Earthquake Engineering, Seismic Design Criteria.

Affected Environment

This section is supported by the *Geology Summary Memorandum for the Last Chance Grade Permanent Restoration Project Memorandum* (Caltrans 2023f) and the *Initial Site Assessment for the Last Chance Grade Permanent Restoration Project* (Caltrans 2023i).

The project area is located within the Coast Ranges geomorphic province of California, near the Klamath Mountains, which lie about 10 miles to the east (California Geological Survey [CGS] 2002). The project limits are within steep terrain, sloping from east to west towards the Pacific Ocean. Along the U.S. 101 corridor, the highway slopes southerly from PM 16.5 to PM 12.7; elevations range from 1,000 feet at PM 16.5 to 80 feet at PM 12.7 near the Wilson Creek Bridge.

The project area is underlain by regionally extensive Mesozoic and Cenozoic age rocks of the Franciscan Complex, an assemblage of mostly marine sedimentary materials accreted to (added to) the continental margin from the subducting Gorda tectonic plate. The Franciscan Complex occurs in a series of elongated belts that define specific age materials, material types, and metamorphic grades. The project area lies within the Eastern belt of the Franciscan Complex, which is the oldest, least sheared, and most highly metamorphosed of the three belts. The complex contains two primary units: Mélange, which is composed of highly sheared shale and argillite, and the Broken Formation, which is composed of a grouping of "broken formation" units that consist mostly of interbedded sandstone and shale

beds. Due to the weak nature of the sheared Mélange unit, these areas have a high susceptibility to earthflows and erosion. Due to the preponderance of sandstone, Broken Formation rocks are relatively resistant to erosion such that drainages are well-defined and more mature topographic (and forest) conditions develop. Both units may experience rockfalls, and seismically and non-seismically induced landslides. A third unit is made up of landslides dating from the Pleistocene through to modern times that are derived from the Franciscan Complex deposits (Delattre and Rosinski, 2012). Figure 3-11 is a regional geology map of the project area showing the most extensive units.

The project limits are located about 90 miles north of the Mendocino Triple Junction, which is the crustal intersection of the Pacific, North American, and Gorda/Juan de Fuca tectonic plates. North of the triple junction, the Gorda/Juan de Fuca plate is being subducted eastward beneath the North America plate along the Cascadia Subduction Zone. The project site overlies the interface associated with this subducting crustal plate. The movement associated with this plate has the potential of generating large magnitude earthquakes; however, the nearest known faults are at least 37 miles south of the project area. As a result, a fault rupture would not likely occur within the project limits.

According to soil surveys, the project area is underlain by four soil complexes: Sisterrocks-Sasquatch-Footstep; Sisterrocks-Sasquatch-Houda; Sasquatch-Yeti-Footstep; and Sasquatch-Sisterrocks-Ladybird. These soil units are not on the United States Department of Agriculture (USDA) Highly Erodible Land (HEL) list. Groundwater and loose silty sands and gravels have the potential to exist within the upper 70-feet of the ground; therefore, there is potential for subsurface liquefaction and lateral spreading.

The project limits are not located within a 100-year floodplain, within tsunami or seiche zones, and are not underlain by soil or rock susceptible to subsidence, or the sinking of the ground, whether due to natural events or human activities.

There are no known construction minerals, industrial and chemical mineral materials, metallic minerals, rare minerals, or gemstone resources sites within the project area. In addition, there are no oil and gas wells, nor are there mineral hazards, including naturally occurring asbestos, in the project area.

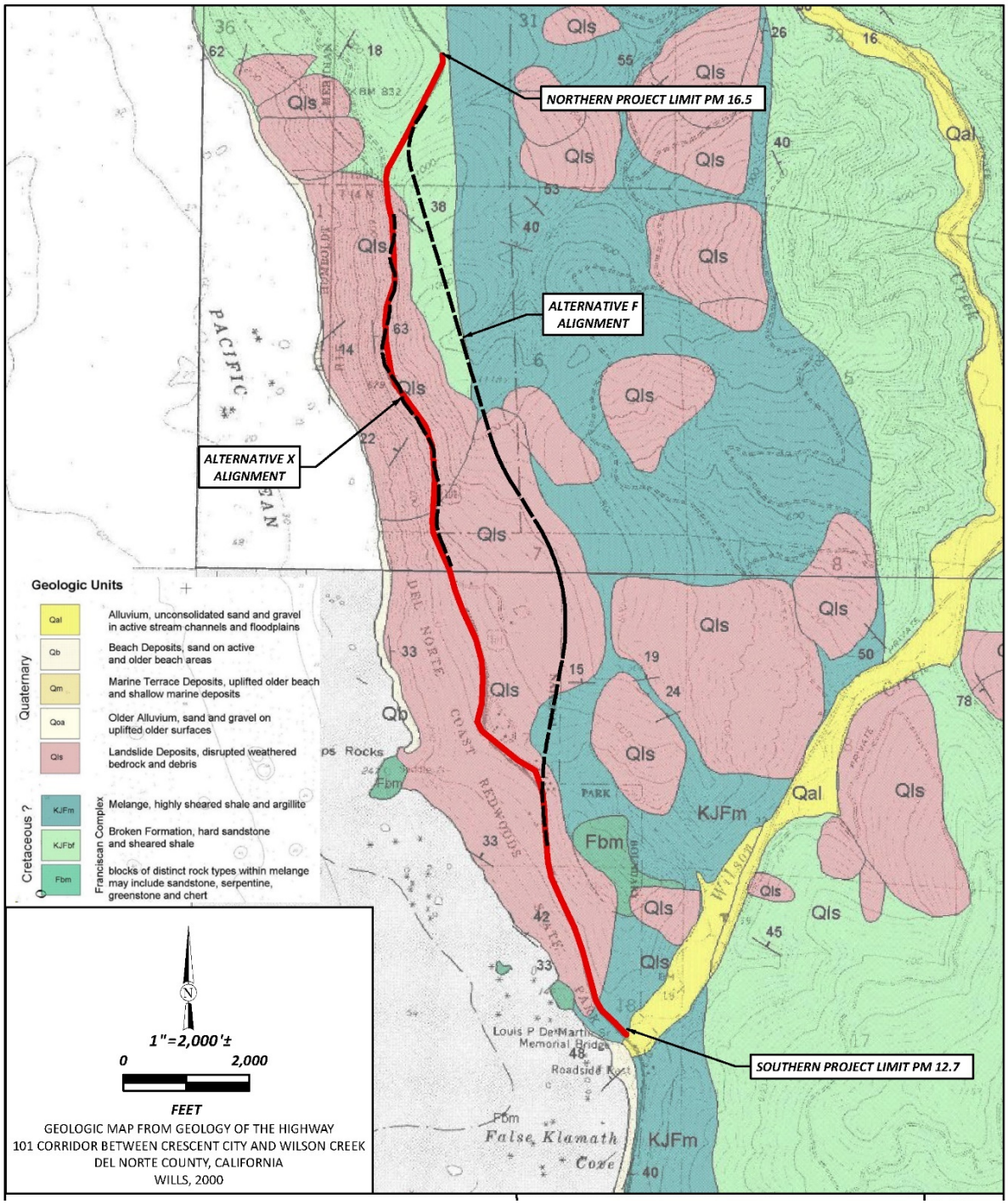


Figure 3-11. Regional Geology Map

Environmental Consequences

Build Alternatives

Construction

During construction, the drainage gallery component of Alternative X and tunnel component of Alternative F have the potential to encounter subsurface gases, which can include naturally occurring methane and hydrogen sulfide. To ensure worker and public safety, standard measures would be included, such as testing groundwater and subsurface air for dissolved gases, and the implementation of applicable Occupational Safety and Health Administration safety protocols.

Construction activities, including heavy vehicle use, excavation, and grading, could cause erosion. Standard measures GS-1, WQ-1, and WQ-2 (see Section 3.3.1 for water quality information) would require that the project be designed to minimize slope failure, settlement, and erosion using recommended construction techniques and BMPs, including vegetating exposed soil areas to reduce erosion potential.

With implementation of the standard measures, no adverse effects on geology, soils, seismic characteristics, or topography are expected during construction. Furthermore, construction of Alternatives X and F would not expose workers or the public to any geologic hazards.

Operation

The purpose of the project is to construct a safe, reliable, and geologically stable highway. Alternative X would accomplish this by stabilizing the landslide area, and Alternative F would accomplish this by avoiding the most active section of the landslide complex by directing the roadway through a tunnel extending inland behind the landslide complex. Given the project's purpose, both alternatives would be designed to meet all necessary criteria to address geological concerns. As a result, neither alternative would be expected to result (directly or indirectly) in loss, injury, or death associated with geologic conditions.

The following covers potential post-construction geological issues.

Seismic Hazards

The project is located in an area that is susceptible to large-magnitude earthquakes. Earthquakes pose potential ground-shaking and fault-rupture hazards to the project. The level of earthquake ground motion for the project would be dependent on the proximity, type, and activity of nearby faults and the shear wave velocity of soils underlying the site. Ground

motion parameters needed to assess possible ground failure and to design seismically resistant structures for this project were evaluated using Caltrans' Acceleration Response Spectrum (ARS) model in accordance with the *Caltrans Geotechnical Design Manual's* Design ARS module. Following this module, the project would use the Safety Evaluation Earthquake design ARS developed according to Caltrans' Seismic Design Criteria (SDC) Version 2.0 to characterize design ground motions for earth-retaining structures, embankments, slopes, sign structures, and other appurtenant roadway facilities. Calculated motions are included in the forces designed to be resisted by the proposed structures; therefore, the chance of strong seismic ground shaking resulting in substantial adverse effects is low.

Although the project is in a seismically active region, neither alternative would cross known active faults as delineated by an Alquist-Priolo Earthquake Fault Zone or the Uniform California Earthquake Rupture Forecast, Version 3 model. As a result, the potential for surface ground rupture is negligible.

Landslide and Rockfall

Alternative X proposes to address an existing landslide hazard by slowing the rate of landslide activity through groundwater drawdown and increasing the roadway's resistance to slope movement by eastward alignment retreat and structures. Alternative F would address the landslide hazard by constructing a tunnel, thus avoiding the most active sections of landslide activity. As a result, both alternatives would be expected to reduce potential for substantial adverse effects resulting from landslides and rockfalls.

Liquefaction and Lateral Spreading

The potential for liquefaction and lateral spreading to affect proposed structures associated with both alternatives would be assessed, and features (e.g., deep, additional, and/or more robust foundations) would be incorporated into the project design to address any issues. As a result, the project would not be expected to be affected by liquefaction and lateral spreading.

Subsidence

None of the structures proposed under either alternative would be underlain by soil or rock susceptible to subsidence; therefore, the project is not expected to result in, or be affected by, subsidence.

Soils

Because the soil complexes under both alternatives have low shrink-swell[26] potential, the project structures are not expected to be affected by expansive soils. In addition, proposed grading work within the mapped soil types, under either alternative, are not anticipated to result in either cuts or fills to native soils highly susceptible to erosion. Both alternatives would implement Standard Measure GS-1 (Section 2.6), which would require the project be designed to minimize slope movement, settlement, and erosion using recommended construction techniques and BMPs, and new earthen slopes would be vegetated to reduce erosion potential.

Mineral Resources

No mineral resources occur within the project area; therefore, no mineral resource impacts are anticipated under either alternative.

Visual Features and Coastal Hazards

Design elements would be included to reduce any potential visual impacts associated with topographic changes or introduced features (Section 3.2.9, *Visual/Aesthetics*). In addition, the project would not be anticipated to be affected by coastal hazards or to contribute to potential hazards. Further, there is no potential for the project to affect sensitive natural landmarks or landforms.

No-Build Alternative

Under the No-Build Alternative, regular maintenance and operations would continue, with emergency restoration projects conducted as needed to address landslides and roadway failures.

Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, and/or mitigation measures would be required because no adverse effects related to geology, soils, topography, or seismicity are anticipated.

[26] The volume change that occurs because of changes in the moisture content of clay-rich soils.

3.3.3 Paleontology

Regulatory Setting

Paleontology is a natural science focused on the study of ancient animal and plant life as it is preserved in the geologic record as fossils.

A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized projects.

16 USC 431–433 (the Antiquities Act) prohibits appropriating, excavating, injuring, or destroying any object of antiquity situated on federal land without the permission of the Secretary of the Department of Government having jurisdiction over the land. Fossils are considered "objects of antiquity" by the Bureau of Land Management, NPS, U.S. Forest Service, and other federal agencies. This regulation applies to the project because it would result in ground disturbance in Redwood National Park.

16 USC 470aaa (the Paleontological Resources Preservation Act) prohibits the excavation, removal, or damage of any paleontological resources located on federal land under the jurisdiction of the Secretaries of the Interior or Agriculture without first obtaining an appropriate permit. The statute establishes criminal and civil penalties for fossil theft and vandalism on federal lands. This regulation applies to the project because it would result in ground disturbance in Redwood National Park.

23 USC 1.9(a) requires that the use of federal-aid funds must be in conformity with all federal and state laws. This regulation applies to the project because the project would receive federal funding.

23 USC 305 authorizes the appropriation and use of federal highway funds for paleontological salvage as necessary by the highway department of any state, in compliance with 16 USC 431–433 above and state law. This regulation applies to the project because the project would receive federal funding.

Under California law, paleontological resources are protected by CEQA.

Affected Environment

This section is supported by the *Combined Paleontological Identification and Evaluation Report* that was prepared for the project (Caltrans 2022h).

Paleontological resources are considered to be scientifically relevant if they provide new data on fossil animals, their distribution and evolution, or other scientifically important information. Knowledge of geological formations is obtained from surveys and record searches and is the basis for determining the paleontological sensitivity of geologic units. Caltrans uses a tripartite scale, which defines sensitivity criteria for high potential, low potential, and no potential, to characterize the sensitivity of the units (Caltrans 2014b).

Three geologic units are present within the project area. Two of the units are part of the Middle Jurassic to Early Cretaceous Franciscan Complex: the "Mélange Unit of the Crescent City area" and the "Broken Formation." The third unit is made up of landslides dating from the Pleistocene through to modern times that are derived from the Franciscan Complex deposits (Delattre and Rosinski 2012) (Figure 3-11). Refer to Section 3.3.2, *Geology, Soils, Seismic, Topography*, for more information on the local and regional geology.

A records search obtained from the University of California, Museum of Paleontology Database (Holroyd pers. comm.), California Academy of Sciences Paleontology Database (California Academy of Sciences 2022), and the Paleobiology Database (2022) indicated no known fossils are present within the Mélange and Broken Formation units of the Franciscan Complex in Del Norte County. A field survey also did not identify any resources.

For the landslide unit, landslide deposits are directly derived from the underlying sediment; therefore, fossils from them are recorded as being from the original units and not the landslides. As a result, the paleontological sensitivity of the landslide deposits within the project limits is low, similar to the Franciscan Complex from which they originate.

Based on the paucity (scarcity) of fossils within the project area, the Franciscan Complex and associated landslides are assigned a low paleontological sensitivity (e.g., not likely to contain paleontological resources).

Environmental Consequences

Build Alternatives

For both Alternatives X and F, all project excavation would occur in the "Mélange of the Crescent City area" and "Broken Formation" units of the Franciscan Complex and the landslides derived from these units. These geologic units have a low sensitivity for paleontological resources. Because of the low sensitivity of the Franciscan Complex in Del Norte County, it is not anticipated that any fossils would be encountered during ground-disturbing construction activities. Should unanticipated vertebrate fossils be encountered, Standard Measure GS-2 would be implemented, which requires that all work within 60 feet

of an unanticipated discovery be halted until the find has been evaluated. As a result of there being a low probability of resources being present and with the implementation of standard measures, neither alternative is expected to adversely affect paleontological resources.

No-Build Alternative

Under the No-Build Alternative, erosion, landsliding, and emergency repairs would continue in the project area. However, the paleontological sensitivity of the geologic units within the project area is low, and the continued erosion and landsliding is not expected to have a substantial effect on paleontological resources.

Avoidance, Minimization, and/or Mitigation Measures

Avoidance, minimization, and mitigation measures would not be required because no substantial adverse effects on paleontological resources are anticipated.

3.3.4 Hazardous Waste/Materials

Regulatory Setting

Hazardous materials, including hazardous substances and wastes, are regulated by many state and federal laws. Statutes govern the generation, treatment, storage, and disposal of hazardous materials, substances, and waste, and also the investigation and mitigation of waste releases, air and water quality, human health, and land use.

The primary federal laws regulating hazardous wastes/materials are the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, and the Resource Conservation and Recovery Act (RCRA) of 1976. The purpose of CERCLA, often referred to as "Superfund," is to identify and clean up abandoned contaminated sites so that public health and welfare are not compromised. The RCRA provides for "cradle to grave" regulation of hazardous waste generated by operating entities. Other federal laws include:

- Community Environmental Response Facilitation Act of 1992
- Clean Water Act
- Clean Air Act
- Safe Drinking Water Act
- Occupational Safety and Health Act
- Atomic Energy Act

- Toxic Substances Control Act
- Federal Insecticide, Fungicide, and Rodenticide Act

In addition to the acts listed above, EO 12088, *Federal Compliance with Pollution Control Standards*, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

California regulates hazardous materials, waste, and substances under the authority of the California Health and Safety Code and is also authorized by the federal government to implement RCRA in the state. California law also addresses specific handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning of hazardous waste. The Porter-Cologne Act also restricts disposal of wastes and requires cleanup of wastes that are below hazardous waste concentrations but could affect ground and surface water quality. California regulations that address waste management and prevention and cleanup of contamination include Title 22 Division 4.5 Environmental Health Standards for the Management of Hazardous Waste, Title 23 Waters, and Title 27 Environmental Protection.

Worker and public health and safety are key issues when addressing hazardous materials that may affect human health and the environment. Proper management and disposal of hazardous material is vital if it is found, disturbed, or generated during project construction.

Aerially deposited lead (ADL) from the historical use of leaded gasoline exists along roadways throughout California. If encountered within the project limits, soil with elevated concentrations of lead as a result of ADL on the state highway system right of way would be managed under the July 1, 2016, ADL Agreement between Caltrans and the California Department of Toxic Substances Control. This ADL Agreement allows such soils to be safely reused within the project limits as long as all requirements of the ADL Agreement are met.

Affected Environment

The following sections are based on *the Initial Site Assessment* (ISA) (Caltrans 2023i) prepared for the project.

The project is located in a sparsely populated region, primarily within RNSP, with no residential or business structures. The SWRCB's GeoTracker database and the California Department of Toxic Substances Control's (DTSC) EnviroStor database did not list any known hazardous materials records in the project area, and the project site is not on the Hazardous Waste and Substances Sites List (Cortese List). A computerized search of

pertinent environmental regulatory databases, performed by Environmental Data Resources (EDR), did not identify any records within the project vicinity.

Naturally occurring asbestos (NOA) has been mapped less than 7 miles east of the project area; however, based on the substrate within the project limits, the project is not anticipated to encounter NOA.

There may be aerially deposited lead (ADL) in exposed soil along the roadway from historical vehicle emissions during the leaded gasoline era. Previous site investigations, performed in 2008 and 2021, indicated that ADL was present in shallow soil along U.S. 101 within the project limits.

Traffic striping along roadways may also contain Lead Based Paint (LBP). Additionally, there is a potential for residual lead and hexavalent chromium from LBP and chromium-based paint (CBP) to be in the soil at the OMC location from painted structures previously located at this site. Treated wood in the form of signposts and guardrail exists within the project limits.

Environmental Consequences

Alternative X

During construction, Alternative X has the potential to encounter soil containing ADL, LBP from traffic striping, and treated wood (signposts and guardrail). However, standard measures for ADL (HW-1), lead in paint stripes (HW-2), and treated wood (HW-3) would be implemented to ensure there would be no effects to workers or the environment from these materials (Section 2.6).

Once constructed, Alternative X would not disturb any known site that contains hazardous materials, nor would it expose the public or environment to any hazardous materials. It would not include any permanent elements that would result in the further disturbance of existing LBP, ADL, or any other potentially hazardous materials. Therefore, once operational, there would be no anticipated effects associated with hazardous wastes and materials.

Alternative F

During construction, Alternative F has the potential to encounter soil containing ADL, LBP from traffic striping, and treated wood (signposts and guardrail). Alternative F also has the potential to encounter lead from LBP and/or hexavalent chromium from CBP, which may have been used on structures previously located in the OMC footprint. Standard Measures

for aerially deposited lead (HW-1), lead in paint stripes (HW-2), treated wood (HW-3), and hexavalent chromium (HW-4) would be implemented to ensure there would be no effects to workers or the environment from these materials (Section 2.6).

Once constructed, Alternative F would not disturb any known site that contains hazardous materials, nor would it expose the public or environment to any hazardous materials. It would not include any permanent elements that would result in the further disturbance of existing LBP, ADL, CBP, or any other potentially hazardous materials. Therefore, once operational, there would be no anticipated effects associated with hazardous wastes and materials.

No-Build Alternative

Under the No-Build Alternative, the project would not be constructed; therefore, there would be no effects from hazardous wastes and materials. Emergency projects and enhanced maintenance would continue as needed, which would follow regulations regarding treatment of hazardous waste and materials.

Avoidance, Minimization, and/or Mitigation Measures

Neither alternative would result in adverse effects related to hazardous wastes and materials; therefore, no measures would be required.

3.3.5 Air Quality

Regulatory Setting

The Federal Clean Air Act (FCAA), as amended, is the primary federal law that governs air quality while the California Clean Air Act (CCAA) is its companion state law. These laws, and related regulations by the U.S. EPA and the California Air Resources Board (CARB), set standards for the concentration of pollutants in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). NAAQS and state ambient air quality standards have been established for six criteria pollutants that have been linked to potential health concerns: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM)—which is broken down for regulatory purposes into particles of 10 micrometers and smaller (PM_{10}) and particles of 2.5 micrometers and smaller ($PM_{2.5}$)—lead (Pb), and sulfur dioxide (SO_2). In addition, state standards exist for visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. The NAAQS and state standards are set at levels that protect public health with a margin of safety and are subject to periodic review and revision. Both federal and state regulatory schemes also cover toxic air

contaminants (air toxics); some criteria pollutants are also air toxics or may include certain air toxics in their general definition.

Federal air quality standards and regulations provide the basic scheme for project-level air quality analysis under NEPA. In addition to this environmental analysis, a parallel "Conformity" requirement under the FCAA also applies.

Conformity

The conformity requirement is based on the FCAA Section 176(c), which prohibits the U.S. Department of Transportation and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to State Implementation Plan (SIP) for attaining the NAAQS. "Transportation Conformity" applies to highway and transit projects and takes place on two levels: the regional (or planning and programming) level and the project level. The proposed project must conform at both levels to be approved.

Conformity requirements apply only in nonattainment and "maintenance" (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. U.S. EPA regulations at 40 CFR 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for NAAQS and do not apply at all for state standards regardless of the status of the area.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for CO, NO_2, O_3, PM_{10} and $PM_{2.5}$ and, in some areas (although not in California), SO_2. California has nonattainment or maintenance areas for all of these transportation-related criteria pollutants except SO_2, and also has a nonattainment area for Pb; however, Pb is not currently required by the FCAA to be covered in transportation conformity analysis. Regional conformity is based on emission analysis of RTPs and Federal Transportation Improvement Programs (FTIPs) that include all transportation projects planned for a region over a period of at least 20 years (for the RTP) and 4 years (for the FTIP). RTP and FTIP conformity uses travel demand and emission models to determine whether or not the implementation of those projects would conform to emission budgets or other tests at various analysis years showing that requirements of the FCAA and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization, FHWA, and Federal Transit Administration make the determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the FCAA. Otherwise, the projects in the RTP and/or FTIP must be modified until conformity is attained. If the design concept and scope and the "open-to-traffic" schedule of a proposed

transportation project are the same as described in the RTP and FTIP, then the proposed project meets regional conformity requirements for purposes of project-level analysis.

Project-level conformity is achieved by demonstrating that the project comes from a conforming RTP and TIP; the project has a design concept and scope[27] that has not changed significantly from those in the RTP and TIP; project analyses have used the latest planning assumptions and U.S. EPA-approved emissions models; and, in PM areas, the project complies with any control measures in the SIP. Furthermore, additional analyses (known as hot-spot analyses) may be required for projects located in CO and PM nonattainment or maintenance areas to examine localized air quality impacts.

Affected Environment

This section is based on the *Air Quality, Greenhouse Gas, and Climate Change Memo* prepared for the project (Caltrans 2023j).

The project is located in the North Coast Air Basin, which is characterized by a cool maritime climate with a seasonal distribution of precipitation. The recorded rainfall for the project area between January and December of 2022 was 55.02 inches, drier than the average of 79.99 inches (National Oceanic and Atmospheric Administration 2023). Most rain falls from October through April. The dry season, May through September, is typically marked by intrusions of low clouds and fog and sunny afternoons. Average daily high and low temperatures in January are 56 and 40 degrees Fahrenheit (°F) and in August are 64 and 51°F, respectively (Time and Date 2023).

The project is located in an attainment/unclassified area for all current NAAQS. Because Del Norte County attains all NAAQS, there are no applicable SIPs for attaining NAAQS (Caltrans 2020a). The project is also in attainment/unclassified for all state standards.

[27] "Design concept" means the type of facility that is proposed, such as a freeway or arterial highway. "Design scope" refers to those aspects of the project that would clearly affect capacity and thus any regional emissions analysis, such as the number of lanes and the length of the project.

Environmental Consequences

Build Alternatives

Transportation Conformity

The project is in an attainment/unclassified area for all current NAAQS. Therefore, transportation conformity requirements do not apply.

Construction

Short-term degradation of air quality is expected from the release of fugitive dust and equipment exhaust emissions, including ROG (reactive organic gases), nitrogen oxides (NO_X), CO, PM_{10}, $PM_{2.5}$, and SO_2. Paving activities would also generate evaporative ROG emissions. Alternative X is anticipated to take 3 to 5 years to complete, and Alternative F is anticipated to take 6 to 8 years. However, for both alternatives, annual emissions are expected to be greatest during the first three years of construction, when earthmoving, excavation, and tunneling occur concurrently. Alternative X is expected to have greater emissions overall due to the use of more heavy equipment and staff labor relative to Alternative F.

Compliance with standard measures related to air quality and greenhouse gas emissions would minimize impacts from construction activities, including GHG-1, which requires that the contractor comply with all applicable air-pollution-control rules, regulations, ordinances, and statutes; GHG-2, which restricts idling; and GHG-3, which ensures compliance with CARB emissions reduction regulations. Additionally, control measures for fugitive dust, which could result from earthmoving activities and soil disturbance, would be required to comply with the U.S. EPA Fugitive Dust Control Measures and Best Practices (U.S. EPA 2022a).

Construction would require short-term lane closures which may increase traffic congestion and related emissions. However, these emissions would be temporary and limited to the construction site. Moreover, it is expected that delays during construction and associated congestion-related emissions would be comparable to conditions in early 2023 and prior, where vehicle speeds in the area were low due to ongoing construction and frequent one-way traffic control. Traffic delays and associated emissions would be minimized by the implementation of a TMP (see Standard Measure GHG-4 and TT-1).

Construction activities would not last for more than 5 years at one general location, so construction-related emissions do not need to be included in regional and project-level conformity analysis (40 CFR 93.123(c)(5)).

Operation

Neither build alternative would materially change traffic volume, fleet mix, speed, or other factors that would cause an increase in emissions relative to the No-Build Alternative. Relative to existing conditions, mobile source emissions under either build alternative are expected to decrease because of improvements in vehicle efficiency and engine standards, which would occur with or without the project. Alternative F would require the construction of an OMC, which would generate emissions of all criteria air pollutants. However, these emissions would be minor.

The project has been determined to generate minimal air quality impacts for Federal Clean Air Act criteria pollutants and has not been linked with any special mobile source air toxic (MSAT) concerns, and the project would not cause a meaningful increase in MSAT impacts of the project from that of the No-Build Alternative. According to the FHWA's Interim Guidance, this project is classified as a Category 1 project (projects with no meaningful potential MSAT effects, or exempt projects).

Asbestos and Lead

Naturally occurring asbestos is not anticipated to be encountered in the project area, and there would be no demolition or modification of structures containing asbestos. If asbestos were to be uncovered during construction, compliance with CARB's (2015) *Asbestos Airborne Toxic Control Measures for Construction, Grading, Quarrying, and Surface Mining Operations* would limit asbestos emissions.

There may be aerially deposited lead in exposed soil along the roadway from historical vehicle emissions; previous site investigations have indicated ADL in shallow soil along U.S. 101 within the project limits. Standard measures, including HW-1, would be implemented to ensure there would be no effects to workers from ADL.

No-Build Alternative

Under the No-Build Alternative, enhanced maintenance and emergency repair would continue, which would, along with associated traffic, continue to generate emissions.

Avoidance, Minimization, and/or Mitigation Measures

Avoidance, minimization, or mitigation measures would not be required, as effects to air quality are minor.

Climate Change

Climate change is analyzed in Section 4.5, *Climate Change*.

Neither the U.S. EPA nor the FHWA has issued explicit guidance or methods to conduct project-level GHG analysis. FHWA emphasizes concepts of resilience and sustainability in highway planning, project development, design, operations, and maintenance. Because there have been requirements set forth in California legislation and executive orders on climate change, the issue is addressed in the CEQA chapter of this document. The CEQA analysis may be used to inform the NEPA determination for the project.

3.3.6 Noise and Vibration

Regulatory Setting

NEPA and CEQA provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement and/or mitigation, however, differ between NEPA and CEQA.

Federal Regulations

National Environmental Policy Act and 23 CFR 772

For highway transportation projects with FHWA involvement (and Caltrans, as assigned), the Federal-Aid Highway Act of 1970 and its implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations include noise abatement criteria (NAC) that are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 dBA) is lower than the NAC for commercial areas (72 dBA). Table 3-6 lists the NAC for use in the NEPA/23 CFR 772 analysis.

Table 3-6. Noise Abatement Criteria

Activity Category	NAC, Hourly A-Weighted Noise Level, $L_{eq}(h)$	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[1]	67 (Exterior)	Residential.
C[1]	67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.
F	No NAC—reporting only	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical, etc.), and warehousing.
G	No NAC—reporting only	Undeveloped lands that are not permitted.

[1] Includes undeveloped lands permitted for this activity category.

Key:

$L_{eq}(h)$ = 1-hour A-weighted equivalent sound level

Figure 3-12 lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise levels discussed in this section with common activities.

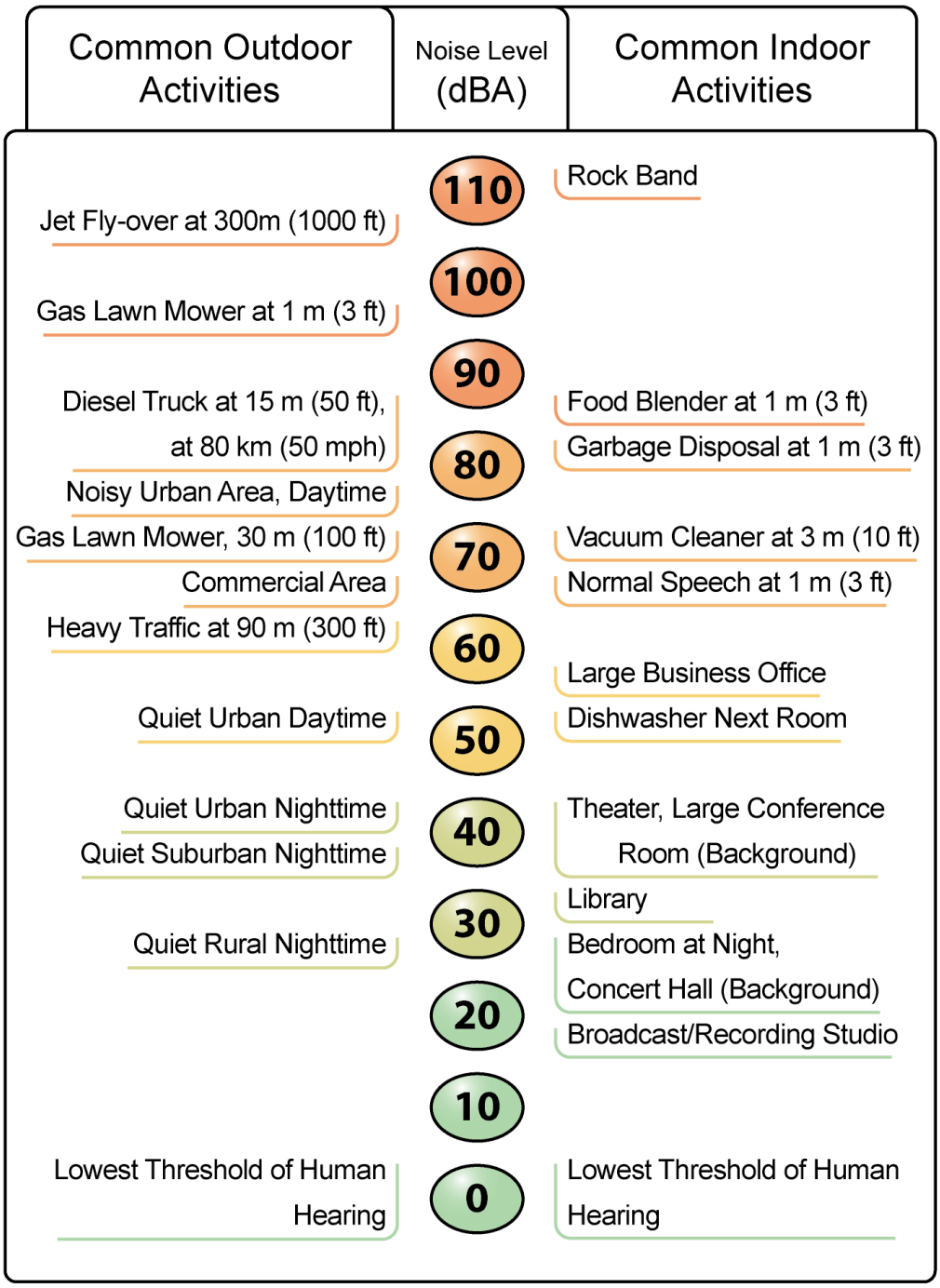


Figure 3-12. Noise Levels of Common Activities

According to Caltrans' *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (Caltrans 2020b), a noise impact occurs when the predicted future noise level of the project's build condition substantially exceeds the existing noise level (defined as 12 dBA or more) or when the future noise level with the constructed project approaches or exceeds the NAC. A noise level is considered to approach the NAC if it is within 1 dBA of the NAC.

If it is determined that the project would have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications. This document discusses noise abatement measures that would likely be incorporated in the project.

Caltrans' *Traffic Noise Analysis Protocol* sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. Noise abatement must be predicted to reduce noise by at least 5 decibels (dB) at an affected receptor to be considered feasible from an acoustical perspective. It must also be possible to design and construct the noise abatement measure for it to be considered feasible. Factors that affect the design and constructability of noise abatement include, but are not limited to, safety, barrier height, topography, drainage, access requirements for driveways, presence of local cross streets, underground utilities, other noise sources in the area, and maintenance of the abatement measure. The overall reasonableness of noise abatement is determined by the following three factors: (1) the noise reduction design goal of 7 dB at one or more affected or non-affected receptors; (2) the cost of noise abatement; and (3) the viewpoints of benefited receptors (including property owners and residents of the benefited receptors).

State Regulations

California Environmental Quality Act

CEQA requires a strictly baseline versus build analysis to assess whether a proposed project would have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless those measures are not feasible. The rest of this section will focus on the NEPA/23 CFR 772 noise analysis; please see Chapter 4, *California Environmental Quality Act Evaluation*, of this document for further information on noise analysis under CEQA.

Affected Environment

The following analysis was prepared using information from the *Noise Study Report* prepared for the project (Caltrans 2023k).

Outdoor uses near the study area include hiking trails in Redwood National Park and Del Norte Coast Redwoods State Park, beach access and picnic areas, and the DeMartin Backcountry Camp. Portions of the trails are in close proximity to U.S. 101, and highway noise can be heard at many locations. The DeMartin Backcountry Camp, the nearest location people would sleep at night, is more than 1,000 feet from U.S. 101, though some roadway noise is audible. The nearest residential use is more than 1 mile from the study area.

Traffic on U.S. 101 is the primary source of noise within the study area. The LCG segment of U.S. 101 had an average annual daily traffic volume of 4,200 vehicles per day, with 640 vehicles in the peak hour (Caltrans 2016). Traffic volumes were relatively consistent throughout the day during periods of observation, at 400 to 500 vehicles per hour. Aircraft overflights and heavy equipment from existing roadway repair work in the area intermittently contribute to ambient noise levels as well. The ocean and birds contribute to the background sound levels in the surrounding area.

A field investigation was conducted in September 2022 to characterize the traffic noise pattern in a typical day and night. Table 3-7 shows a summary of long-term monitoring data; Figure 3-13 shows the location of long-term monitoring sites. As shown in the table, noise levels range from the low 30s (in more protected areas) to substantially higher levels near the U.S. 101 roadway.

Table 3-7 Summary of Long-Term Monitoring Data

Measurement Site	Average Daytime L_{eq}	Average Daytime L_{max}	Overall Daytime L_{max}	Average Nighttime L_{eq}	Average Nighttime L_{max}	Overall Nighttime L_{max}	Average 24-hour L_{eq}	Average 24-hour L_{max}	Overall 24-hour L_{max}
M1-Coastal Trail	51.5	66.2	81.5	44.2	61.6	73.7	48.8	64.5	81.5
M2-Coastal Habitat	52.2	59.1	67.2	51.7	58.6	64.9	52.1	58.9	67.2
M3-DeMartin Camp	36.9	50.2	73.8	33.6	43.6	57.4	35.7	47.7	73.8
M4-Helicopter Flight Path	31.4	44.2	70.2	30.4	42.5	59.1	31.0	43.3	70.2
M5-Mature Forest	37.1	50.0	65.8	33.8	47.6	62.7	36.5	49.8	65.8
M6-State Park Trailhead	66.2	83.1	99.0	59.9	80.6	97.2	63.8	82.1	99.0

L_{eq} = equivalent sound level (average of the sound energy occurring over a specified period)

L_{max} = maximum sound level (the highest instantaneous sould level measured during a specified period)

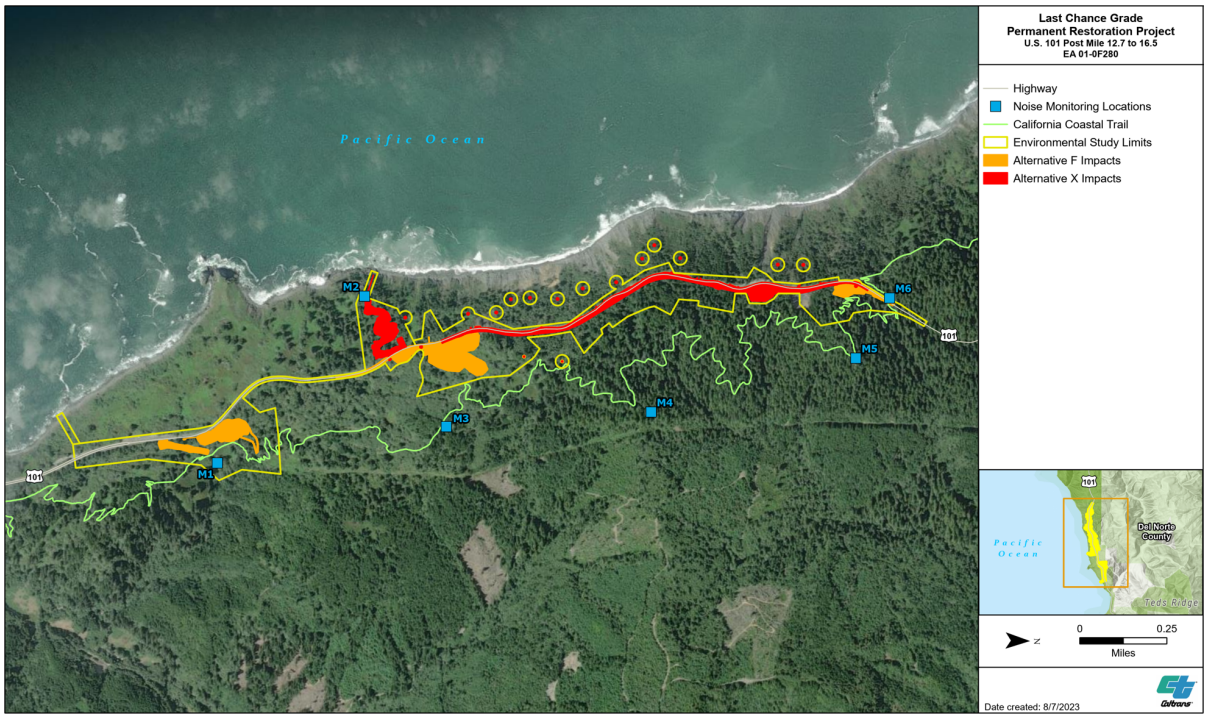


Figure 3-13. Location of Long-Term Monitoring Sites

Environmental Consequences

Build Alternatives

Noise

23 CFR Part 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. Under 23 CFR Section 772.7, projects are categorized as Type I, Type II, or Type III projects:

- **Type I**: The construction of a highway on a new location or the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment of the highway.
- **Type II:** The project is a noise barrier retrofit project that involves no changes to highway capacity or alignment.
- **Type III**: A project that does not meet the classifications of a Type I or Type II project and does not require a noise analysis.

Neither Alternative X nor Alternative F would increase capacity or add through lanes. Alternative X would follow the existing alignment and would not significantly alter the horizontal or vertical alignment of LCG relative to surrounding receptors. Alternative F would relocate the highway into a tunnel to the east of the existing alignment, with traffic noise only audible at tunnel approach roads and portals. Given the distance that the highway is shifted and that there are no sensitive receptors near these areas, Alternative F is not considered to have substantial horizontal alterations. Because of this, both alternatives are considered Type III projects. Therefore, a traffic operations noise analysis is not required, and consideration of noise abatement is not needed.

There would be noise during project construction. Noise levels produced by common pieces of equipment are summarized in Table 3-8. Noise levels at given receivers depends on the type of construction activity, distance from source, and intervening topography and ground type.

Table 3-8. Noise Emission Levels Generated by Heavy Construction Equipment

Equipment	Maximum Noise Level (dBA), at 50 Feet from the Source
Grader	85
Bulldozers	82
Truck, Dump	77
Truck, Flatbed	74
Loader	79
Roller	80
Paver	77
Air Compressor	78
Backhoe	80
Excavator	81
Auger Drill Rig	84
Crane, Mobile	81
Compactor (ground)	83
Concrete Mixer	85
Generator	71[1]
Pump	77
Ventilation Fan	79
Hammer, Mounted Impact (hoe ram)	90
Man Lift	75

Equipment	Maximum Noise Level (dBA), at 50 Feet from the Source
Shovel, Clam (dropping)	87
Tractor	84
Welder/Torch	74

[1] Sound level assuming attenuation from louvered acoustical enclosure.

dBA = A-weighted decibel.

Source: FHWA Roadway Construction Noise Model (FHWA RCNM) Version 1.0, 2006 (FHWA 2006).

Table 3-9 summarizes expected noise levels by alternative and construction phase. Modeling for the loudest-hour assumes that three of the loudest pieces of equipment would operate simultaneously during a given period of time.

Table 3-9. Overall Heavy Equipment Noise Levels by Construction Phase

Construction Phase by Alternative	Loudest Hour/ Maximum Level dBA L_{eq}	Daily Equivalent Sound Level dBA 8-hour L_{eq}	Phase Duration, Days
Alternative X			
Mobilization/Shaft Construction	93	89	364
Outfall Tunnel	87	87	124
Drainage Tunnels	89	89	266
Drainage Structure Fit-Out	88	88	570
Roadways and Road Structures	92	89	397
Demobilization	87	85	182
Alternative F			
Mobilization	91	85	182
Portals / Approaches	90	86	273
Roadway Tunnel Excavation	94	89	448
Tunnel Fit-Out	89	86	1,126
Roadways and Road Structures	89	86	397
Operations Maintenance Center	87	81	397
Demobilization	87	82	178

Note: Noise levels were modeled at a reference distance of 50 feet.

dBA = A-weighted decibel; L_{eq} = equivalent sound level.

Based on loudest-hour results for both alternatives, construction noise levels at each monitoring site were determined and compared to pre-project conditions (Table 3-10). Results indicate that noise levels could potentially increase by up to 27 dB for either alternative. However, work on roadways and the tunnel would progress in a linear path along the area of corridor improvements until construction is complete. Construction noise would affect different areas at different times, depending on the construction phase, active work locations, and type of work. The greatest noise would only represent a small fraction of construction and would be short-term and temporary at any location.

Table 3-10. Comparison of Temporary Construction Noise Levels between Project and Pre-Project Conditions at Monitoring Sites

Monitoring Site	Land Use	Pre-Project Sound Level, Daytime Average L_{eq}, [a] dBA	Construction Noise Level, Loudest-hour L_{eq}, dBA	Increase During Construction, dB [b]
M1	Coastal Trail	52	64	12
M2	Coastal Habitat	52	58	6
M3	DeMartin Camp	37	62	25
M4	Helicopter Flight Path	32	40 [c]	8
M5	Mature Forest	37	64	27
M6	State Park Trailhead	66	90	24

Notes:
dB = decibel; dBA = A-weighted decibel; L_{eq} = equivalent sound level.
[a] Based on monitoring data presented in Table 3-7 rounded to the nearest whole dB.
[b] The increase is due to heavy equipment and does not account for short-term noise from helicopters.
[c] This value is based on heavy equipment only and does not include helicopters, which are modeled separately.

In addition to construction of the alignments discussed above, a light-duty helicopter would be used for transporting equipment during geotechnical investigations (refer to Appendix A, *Project Layouts*, Figure 4). The maximum noise level from an overflight could possibly be 75 to 85 dBA, depending on helicopter altitude above ground. Helicopter noise would be the loudest in the areas under flight paths and would be expected to rise to 20 dBA or more above ambient levels. However, helicopter use would be short-term.

The nearest human receptors to noise would be on the California Coastal Trail and in the DeMartin Backcountry Camp. Under existing conditions, highway noise is audible to varying degrees within these areas. During construction, as described above, noise levels audible along trails and in the camp would depend on location and type of work, and would be short-term and temporary. In addition, those in the park are only present on a temporary basis, and those on the trail are generally moving; if present, individuals would only be

exposed to noise for short durations. For those staying at the campground, overall noise levels during construction aren't anticipated to be high (Table 3-10), and Caltrans Standard Specification 14-8.02 restricts the maximum instantaneous sound level of noise at night to 86 dBA and below at 50 feet.

Alternative X would not significantly alter the horizontal or vertical alignment relative to surrounding receptors and, once construction is complete, noise levels would be similar to existing conditions. As a result, this alternative would not be expected to cause substantial disturbance to the surrounding area.

Alternative F would relocate the highway into a tunnel, resulting in lower levels of traffic noise for the areas of bypassed highway. Traffic noise from the tunnel would only be audible on short sections of the highway near the tunnel portals and tunnel approaches. The operation of the OMC would require occasional use of maintenance vehicles and heavy equipment. Emergency generators would be enclosed and only used in the event of a power outage and when tested to confirm proper function (generally 30 minutes every 2–3 months). Noise levels from OMC operations are anticipated to be intermittent and short term. As a result, neither the tunnel nor the OMC would be expected to cause substantial disturbance to the surrounding area.

Vibration

For both alternatives, construction activities would involve the use of heavy equipment, such as bulldozers or vibratory rollers, which could generate groundborne vibration. Though some vibration levels may be above those produced by vehicles traveling on U.S. 101, vibration would occur for short durations and would be intermittent, and there are no vibration-sensitive receptors nearby.

Construction of the underground drainage system tunnels for Alternative X and construction of the tunnel for Alternative F could also cause vibration. However, below 25 feet, vibration would not be substantial, and below 50 feet, the vibration would barely be noticeable to a human receptor. As tunneling progresses in a linear fashion, and the tunnels for both alternatives are mostly deep underground, any vibration is anticipated to be short-term and intermittent. In addition, while groundborne vibration can affect occupants of buildings, it generally does not impact people in outdoor areas such as campgrounds.

As there are no structures in the project vicinity, it is anticipated that vibration from construction activities would not affect humans.

Vibration would only be associated with construction activities; it would be short-term and intermittent, and would cease once construction is complete. As a result, vibration is not anticipated to affect human receptors.

No-Build Alternative

The project would not be constructed under the No-Build Alternative. Existing conditions would remain, with noise and vibration associated with enhanced maintenance and emergency repair.

Avoidance, Minimization, and/or Abatement Measures

As effects from noise and vibration are anticipated to be minimal, and primarily temporary, no measures are proposed. However, Bio-5, implemented to minimize effects to biological resources, would further minimize temporary construction-related noise impacts through implementation of noise control practices. See Section 3.4.4, *Animal Species,* for additional information.

3.3.7 Energy

Regulatory Setting

Federal Regulations

NEPA (42 USC 4332) requires the identification of all potentially adverse impacts on the environment, including energy impacts.

State Regulations

CEQA Guidelines Section 15126.2(b) and Appendix F, Energy Conservation, require an analysis of a project's energy use to determine if the project may result in significant environmental effects due to wasteful, inefficient, or unnecessary use of energy, or wasteful use of energy resources.

Affected Environment

Information in this section is drawn from an *Energy Technical Memo* prepared for the project (Caltrans 2023l) which examined energy consumption associated with project construction and operation.

The project area traverses undeveloped portions of national and state parks. There have been traffic delays at LCG for many years due to emergency construction and maintenance

activities. Vehicles traveling through the area typically include local commuters between Klamath and Crescent City, light and heavy-duty freight trucks, tourists, and LCG construction-related equipment. Except where needed for construction related purposes, no highway lighting exists within the project limits. The ongoing threat of landslides and continual landslide mitigation efforts contribute to higher energy consumption—that is, shorter intervals between maintenance/repair activity.

These construction activities have entailed the use of various roadside advisory, warning, and regulatory signs, light poles, and luminaries, all of which consume energy.

Environmental Consequences

Build Alternatives

Construction

Both alternatives would use fossil fuels and electricity during construction. To assess potential energy use associated with each alternative, two soil disposal hauling distance scenarios were analyzed (70 miles and 200 miles roundtrip) (Table 3-11).

Table 3-11. Construction-Period Energy Consumption Estimates by Soil Disposal Hauling Scenario

Alternative	Diesel Use (gallons)	Gasoline Use (gallons)	Jet Fuel Use (gallons)	Electricity Use (MWh)	Total Energy (BTU)
Scenario 1 (70 miles roundtrip)					
Alternative X	1,396,012	175,274	18,374	23,773	296,449,862,834
Alternative F	1,309,358	177,598	4,593	15,600	201,903,947,985
Scenario 2 (200 miles roundtrip)					
Alternative X	1,653,451	175,274	18,374	23,773	331,817,077,839
Alternative F	1,872,438	177,598	4,593	15,600	279,260,414,617

MWh = megawatt-hours.

BTU = British thermal unit (BTU); a measure of the heat content of fuels or energy sources. One BTU is the quantity of heat required to raise the temperature of one pound of liquid water by 1° Fahrenheit (F) at the temperature that water has its greatest density (approximately 39°F).

As shown in Table 3-11, for diesel use, when truck trips associated with material are not taken into consideration, Alternative X would use more fuel than Alternative F due to the need for additional workers and more heavy equipment. When truck trips are added, for Scenario 1, Alternative X would still be expected to use more fuel. However, as hauling distances increase, Alternative F diesel fuel use would surpass Alternative F. The hauling

distance would likely be somewhere between 70- and 200-miles round trip, with multiple disposal locations at various distances being used. When taking the average hauling distance potentially traveled for each alternative, (e.g., [Scenario 1 + Scenario +2]/2), the overall diesel use would be expected to be higher for Alternative F (1,524,732 gallons for Alternative X and 1,590,898 gallons for Alternative F).

For gasoline, Alternatives X and F would have similar anticipated usage; however, Alternative X would have appreciably more jet fuel (for helicopters) and megawatt-hours use (for drainage gallery excavation through use of TBMs).

However, when fuels or energy sources are converted to a common unit of measurement, no matter the scenario, Alternative X would be expected to use more energy overall (BTU).

As described above, both alternatives would use fossil fuels and electricity. However, because construction activities are short term, the increases in energy consumption would also be short term. In addition, compliance with standard measures related to greenhouse gas emissions and air quality would also reduce energy consumption, including GHG-1, which requires compliance with all applicable laws and regulations related to air quality; GHG-2, which restricts idling; and GHG-3, which ensures compliance with CARB emissions reductions regulations.

In addition to energy consumption from construction activities, lane or facility closures may increase traffic congestion, resulting in more fuel combustion. However, it is expected that delays during construction and associated congestion-related emissions would be comparable to conditions in early 2023 and prior, where vehicle speeds in the area were low due to ongoing construction and one-way traffic control that was in place for decades. Traffic delays and associated emissions would be minimized by the implementation of a TMP (see Standard Measures GHG-4 and TT-1).

Operation

Neither build alternative is considered a capacity-increasing project; Alternatives X and F would not expand or substantially lengthen the roadway, nor would they change travel demands or traffic patterns when compared to the No-Build Alternative. Therefore, the project would not result in an increase in direct energy use associated with highway traffic operations.

Roadway maintenance for the build alternatives would require gasoline- and diesel-consuming equipment and vehicles; however, both build alternatives would provide a more reliable connection between Klamath and Crescent City, with longer intervals between

maintenance and rehabilitation activities and associated traffic delays, which would contribute to an overall decrease in indirect energy use.

Alternative F includes construction of an OMC for the tunnel, and the OMC and tunnel would use energy, consuming minor amounts of diesel, gasoline, electricity, and propane for maintenance and emergency response needs. However, the OMC includes energy-efficient design measures, including a green roof, and the fuel efficiency of equipment and vehicles used at the OMC is expected to increase over time due to improvements in technology and implementation of state regulations.

Based on the above, neither build alternative is anticipated to result in inefficient, wasteful, or unnecessary energy consumption from operation of either build alternative.

No-Build Alternative

Under the No-Build Alternative, no construction would be planned at LCG. However, enhanced maintenance and operations are expected to continue, including emergency restoration projects conducted as needed to address landslides and roadway failures, and their associated consumption of energy. Specific roadway maintenance activities and closures would be influenced by future conditions, which are unknown at this time.

Avoidance, Minimization, and/or Mitigation Measures

Avoidance, minimization, and mitigation measures would not be required because no substantial adverse effects on energy resources are anticipated.

3.4 Biological Environment

This section of the document discusses environmental resources within the project area. It is based on the Natural Environment Study (NES) (Caltrans 2023d) prepared for the project and is broken into six sections:

- Natural Communities (Section 3.4.1)
- Wetlands and Other Waters (Section 3.4.2)
- Plant Species (Section 3.4.3)
- Animal Species (Section 3.4.4)
- Threatened and Endangered Species (Section 3.4.5)
- Invasive Species (Section 3.4.6)

Two Biological Study Areas (BSAs) were used to assess environmental resources. Most field surveys were conducted within the Environmental Study Limits (ESL)[28] plus a 100-foot buffer to assess impacts on Coastal Zone resources. The ESL plus the buffer is referred hereinafter as BSA #1. To account for indirect impacts such as noise and visual, a larger survey area (the ESL plus a 0.25-mile buffer) was used. This area is referred to as BSA #2. The BSAs are shown in Figure 3-14.

[28] The ESL encompasses the project footprint where there could be direct and indirect disturbance during construction plus additional area beyond the project footprint to accommodate any future scope changes.

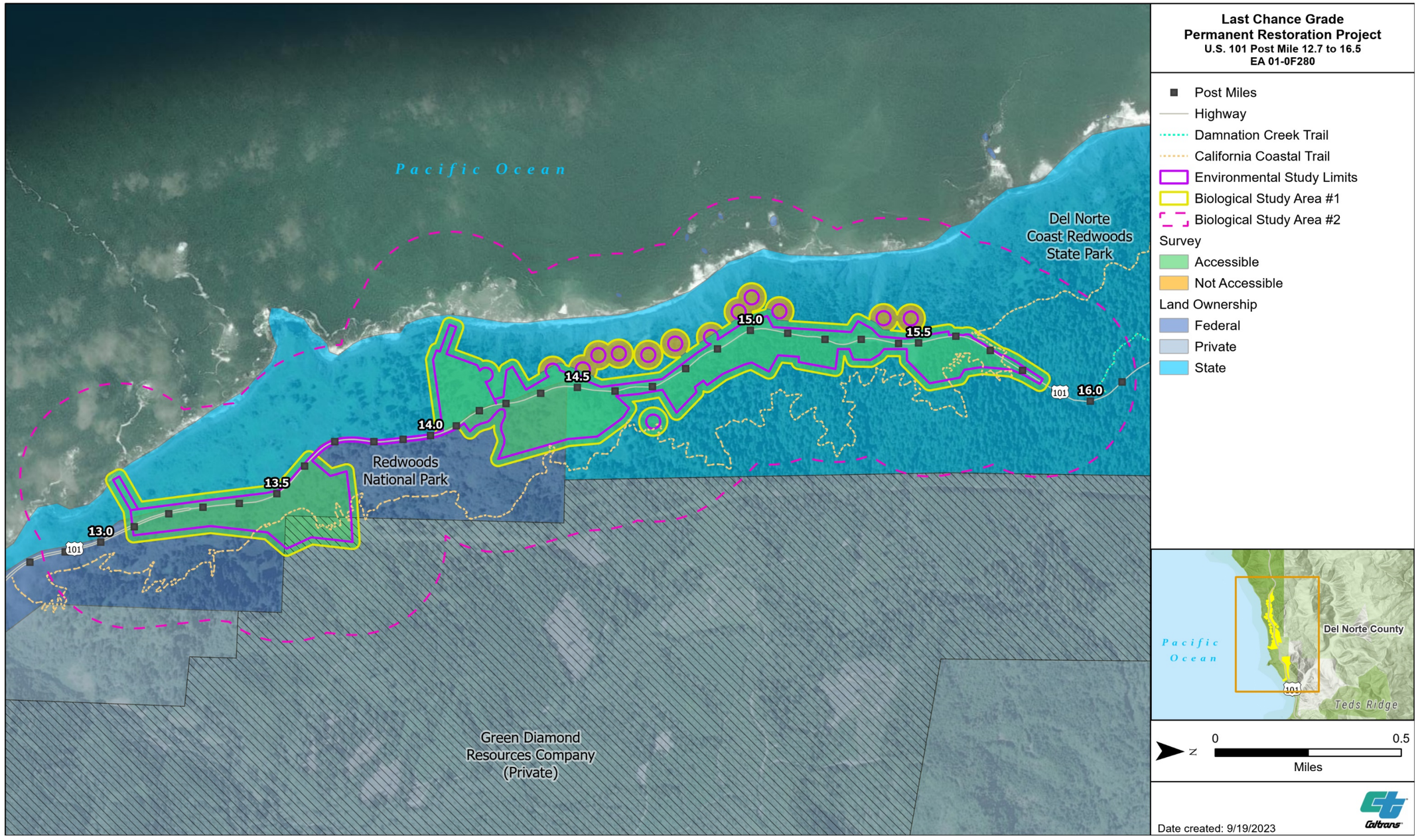


Figure 3-14. Environmental Study Limits and Biological Study Area

3.4.1 Natural Communities

This section of the document discusses natural communities. The focus of this section is on biological communities, not individual plant or animal species, and emphasizes the ecological function of the natural communities within the area. This section also includes information on wildlife corridors and habitat fragmentation. Wildlife corridors are areas of habitat used by wildlife for seasonal or daily migration. Habitat fragmentation involves the potential for dividing sensitive habitat and thereby lessening its biological value.

Habitat areas that have been designated as critical habitat (CH) under the federal Endangered Species Act (FESA) are discussed in Section 3.4.5, *Threatened and Endangered Species*. Wetlands and other waters are discussed in Section 3.4.2, *Wetlands and Other Waters*.

Regulatory Setting

Natural communities of concern are those habitats and vegetation types considered sensitive because of their high species diversity, high productivity, unusual nature, limited distribution, or declining status. Federal, state, and local agencies consider these habitats important. The California Department of Fish and Wildlife (CDFW) maintains a list of sensitive natural communities (SNCs) (CDFW 2022d). CDFW, USACE, and RWQCBs consider certain habitats, such as wetlands and riparian communities, important for water quality and wildlife. The California Coastal Commission (CCC) regulates additional areas within the Coastal Zone that qualify as coastal wetlands and Environmentally Sensitive Habitat Areas (ESHAs).

Wetlands, waters, riparian habitat, SNCs, special status species habitat, critical habitat (CH), habitat connectivity areas, and ESHAs are all present within BSA #1. This section covers SNCs, ESHAs, and habitat connectivity areas. Wetlands, watercourses, and riparian habitat are discussed in Section 3.4.2. Habitats for federal and state listed species, including CH, are discussed in Section 3.4.5.

Sensitive Natural Communities

California's natural communities are ranked based on standardized quantitative rarity and threat parameters. Those with a state rarity ranking of S1–S3 are considered SNCs (CDFW 2023b) and may warrant evaluation under CEQA Guidelines Section 15065(a)(1).

Riparian Habitat

Riparian habitat is considered sensitive based on its connectivity to aquatic resources and relative functional values for improving water quality and habitat for aquatic species. Riparian habitat may be evaluated as part of the Section 1602 permit. Some riparian habitat

is also potentially jurisdictional under the NCRWQCB and CCC. Riparian habitat is discussed in Section 3.4.2.

Habitat Connectivity

The California Essential Habitat Connectivity Project (CEHC) was commissioned by Caltrans and CDFW to identify and describe wildlife movement corridors in California (CDFW 2022c). The study aims to help Caltrans avoid, minimize, and mitigate impacts on habitat connectivity in compliance with Section 6001 of the Safe Accountable Flexible Efficient Transportation Equity Act of 2005, and to ensure CDFW complies with AB 2785 of 2008, which requires mapping of essential wildlife corridors and habitat linkages.

ESHA

The California Coastal Act (CCA) established the CCC to protect the coastline; policies include protection, enhancement, and restoration of natural resources. The CCA also delegates to local governments the power to enact and implement their own Local Coastal Programs (LCPs) upon formal certification by the CCC. Any development within the Coastal Zone requires a Coastal Development Permit from either the CCC or the local government if an LCP is in place. Refer to Section 3.2.3, *Coastal Zone*, for further discussion of relevant policies.

ESHAs are protected under Section 30240 of the CCA, and are defined under CCA Section 30107.5 as "…any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments." There are two parts to this definition. The first is whether a species or habitat is rare or especially valuable. The second is whether the species or habitat could easily be disturbed or degraded by human activities or developments.

Affected Environment

Numerous studies and surveys have been conducted to identify and characterize natural communities within the BSAs for the proposed project. Results of these studies are summarized in the project's NES (Caltrans 2023d). Supporting technical reports are listed below.

- Vegetation Types/Natural Communities: *Botanical Survey and Habitat Assessment Report for the Last Chance Grade Permanent Restoration Project* (Caltrans 2022i)

- Wetlands and non-wetland waters of the State: *State Aquatic Resources Delineation for the Last Chance Grade Permanent Restoration Project* (Caltrans 2023h)
- Wetlands and non-wetland waters of the U.S.: *Federal Aquatic Resources Delineation for the Last Chance Grade Permanent Restoration Project* (Caltrans 2023g)
- Trees: *Last Chance Grade Permanent Restoration Project Arborist Report* (Caltrans 2023m)
- Groundwater, vegetation: *Groundwater Drawdown Effects on Vegetation for the Last Chance Grade Permanent Restoration Project* (Caltrans 2023n)

Natural communities, potential ESHA, and wildlife corridors and habitat fragmentation are discussed in the following sections.

Natural Communities/Vegetation Types

Vegetation types (natural communities) and other land cover types within BSA #1were mapped according to CDFW protocols and a modified version of CDPR protocols, and identified according to the classification system of *A Manual of California Vegetation*, 2nd edition, online (California Native Plant Society [CNPS] 2021).

Vegetation within BSA #1 is typical of the coastal mountains of the North Coast bioregion of the California Floristic Province and is dominated by coast redwood forest, red alder forest, Sitka spruce forest, Douglas-fir forest, and cascara forest (Figures 3-15 to 3-17, Table 3-12). Stands of redwood, Douglas-fir, and Sitka spruce forests range in maturity from early (young forest) to late (mature and old-growth) successional forest, based on Powell's definitions of successional stages (1996). Common tree species include redwood (*Sequoia sempervirens*), Douglas-fir (*Pseudotsuga menziesii*), Sitka spruce (*Picea sitchensis*), red alder (*Alnus rubra*), western hemlock (*Tsuga heterophylla*), cascara (*Frangula purshiana* ssp. *purshiana*), and red elderberry (*Sambucus racemosa*). Dense tangles of coastal brambles grow in openings in the forest and along U.S. 101.

Ruderal vegetation dominated by nonnative species is common in disturbed areas along the shoulders of U.S. 101, small access roads off the highway, along trails, in erosional areas, and on disturbed coastal bluffs above the ocean. Large portions of the study area are characterized by steep slopes and coastal exposure, including frequent high winds and dense fog. Adjacent lands owned by GDRC are managed for timber production, where a variety of silvicultural practices are conducted, including clearcutting, selective thinning, and selection harvesting. Landslides caused by geologic instability create natural disturbance that alters

vegetation. These landslides have affected natural habitats, the Caltrans right of way, and U.S. 101.

In total, four SNCs and two non-sensitive natural communities were identified within BSA #1. Other land cover types within BSA #1 include ruderal habitat, non-vegetated areas, erosional areas, beaches, a rock outcrop, and the ocean. The land cover types within BSA #1 are shown in Figures 3-15 through 3-17 and acreages are in Table 3-12. An overview of the vegetation within BSA #1 and brief descriptions of each land cover types are provided below.

Table 3-12. Natural Communities/Land Cover Types in the Biological Study Area

Natural Community/Land Cover Type	Acres within BSA #1
Early successional redwood forest*	0.67
Late successional redwood forest*	18.84
Late successional active slide redwood forest*	10.70
Red alder forest*	93.41
Early successional Douglas-fir forest	3.69
Late successional Douglas-fir forest	26.86
Early successional Sitka spruce forest*	2.37
Late successional Sitka spruce forest*	24.07
Cascara forest and woodland	4.81
Coastal brambles*	46.78
Ruderal, Non-vegetated, Erosional, Other Areas	
Ruderal habitat	3.89
Non-vegetated	16.22
Erosional areas	6.17
Beaches	0.83
Rock outcrops	0.39
Ocean	0.73
Total	**260.43**

* This natural community is considered an SNC

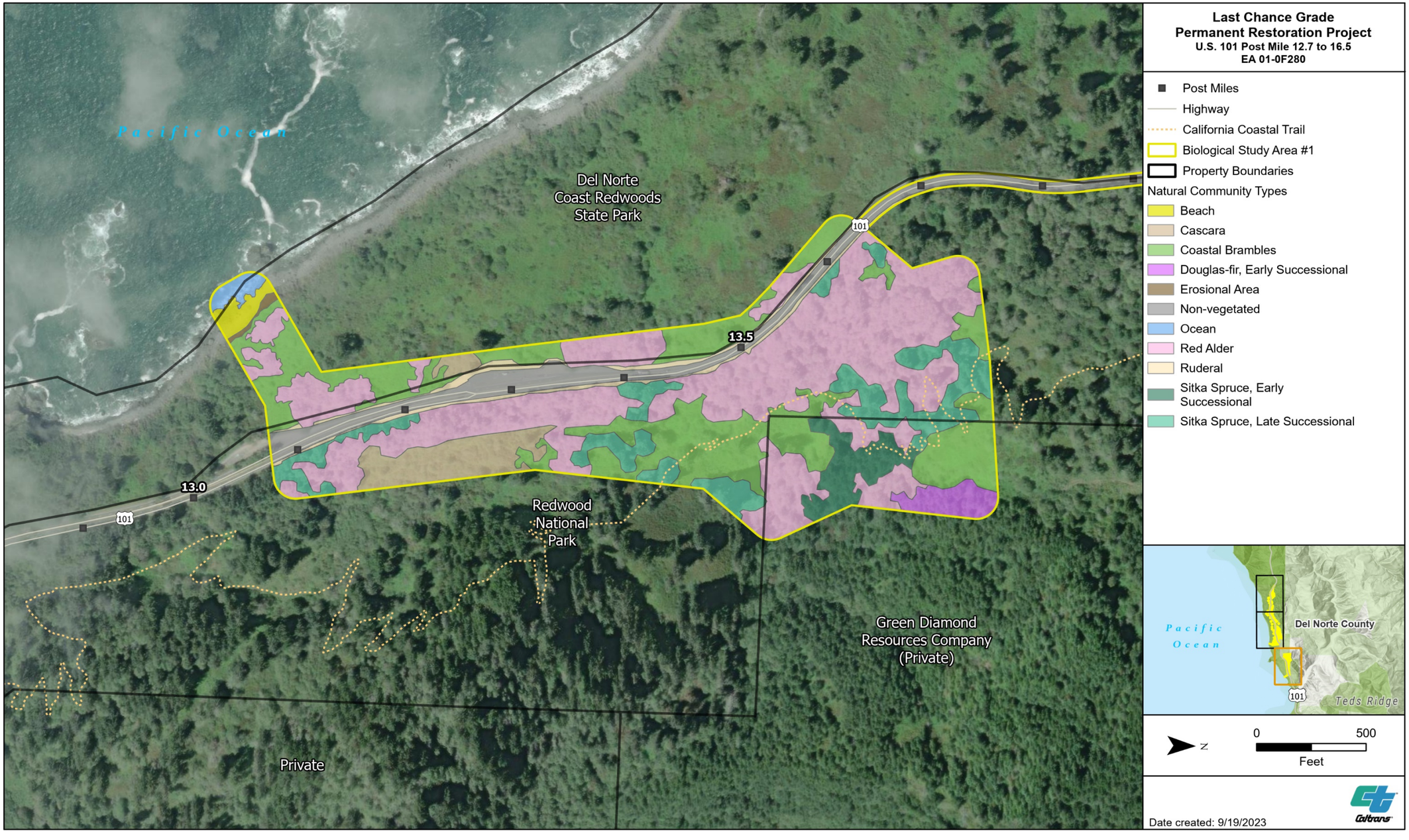


Figure 3-15. Natural Communities within Biological Study Area #1 (Sheet 1 of 3)

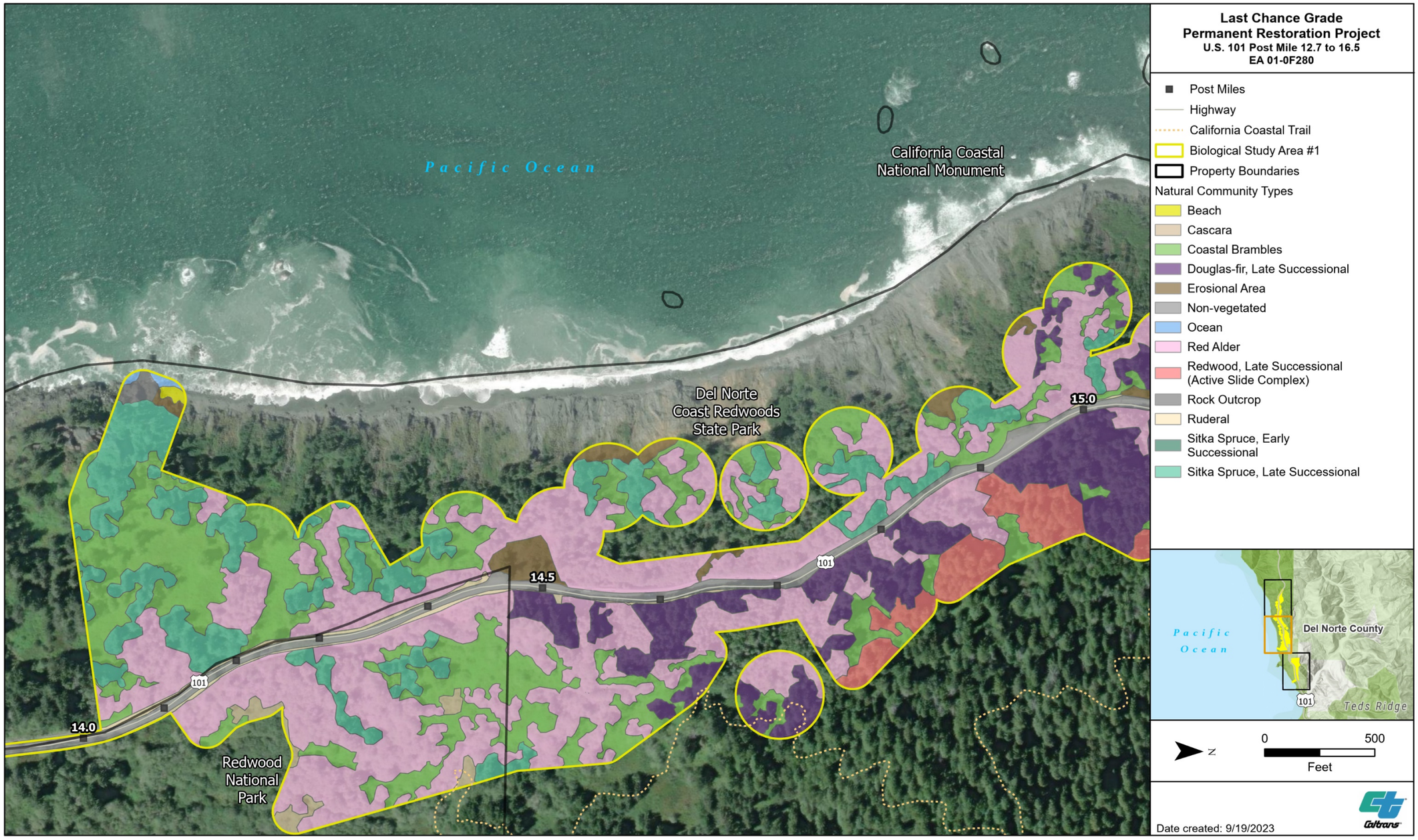


Figure 3-16. Natural Communities within Biological Study Area #1 (Sheet 2 of 3)



Figure 3-17. Natural Communities within Biological Study Area #1 (Sheet 3 of 3)



Redwood Forest and Woodland

Redwood forest and woodland (*Sequoia sempervirens* Forest and Woodland Alliance) (G3 S3.2) (hereinafter referred to as redwood forest) is an SNC in California (CDFW 2022d). The canopy is distinguished by the dominance or co-dominance of coast redwood trees. Other trees in the canopy can include Douglas-fir, western hemlock (*Tsuga heterophylla*), and California tanoak (*Notholithocarpus densiflorus* var. *densiflorus*) (CNPS 2021).

Early and late successional redwood forests are the dominant natural communities in the region. Within BSA #1, they are found primarily in the north, east of U.S. 101 (Figures 3-16 and 3-17).

Early successional redwood forest grows on a historical landslide on a steep, west-facing slope immediately east of U.S. 101 in the northern portion of BSA #1. Evidence of recent landslides includes recently uprooted trees and exposed soil. The understory consists of a sparse shrub layer and moderately dense herb layer.

Late successional redwood forest also occurs in the northern portion of BSA #1, including on the active landslide complex east of U.S. 101.

Outside the active slide complex, this forest is situated between two ridges on gentle to moderately steep, northwest- and southeast-facing slopes. This forest is characterized by a mostly continuous canopy of large-diameter coast redwood trees with a few canopy openings along streams. Scattered large-diameter Sitka spruce, western hemlock, and Douglas-fir are also present in the canopy, especially closer to streams. Large coast redwood trees in this area often have complex branching with multiple reiterations arising from the base and trunk. Large, fire-scarred snags are also present throughout this area. Smaller-diameter red alder and cascara trees grow in the sub-canopy.

Within the active slide complex, redwood forest is different in terms of forest distribution patterns, species composition, tree density, and forest structure, likely from differences in aspect, slope, geography, geology, and disturbance history. This forest is on steeper, windier, landslide-prone west- and southwest-facing slopes much closer to the ocean. Stumps, decaying logs, and large fallen branches are more frequent, and trees are less dense and smaller in diameter, especially along landslides and on steeper slopes, and some conifers tend to lean or bend. The forest is patchily distributed in a matrix of other communities, such as Douglas-fir forest, red alder forest, and coastal brambles. Landslides have likely contributed to lower tree densities in these areas and the creation of more frequent and larger gaps in the tree canopy have been colonized by early successional coastal brambles and red alder forest.

Red Alder Forest

Red alder forest (*Alnus rubra* Forest Alliance) is distinguished by the dominance or co-dominance of red alder trees in the canopy (CNPS 2021). It is not designated as an SNC, but the *Alnus rubra*/*Rubus spectabilis–Sambucus racemosa* Association (red alder with an understory of salmonberry and red elderberry) found within this community is considered sensitive (CDFW 2022d). Though the association itself was based on riparian red alder forests in Marin County with permanently saturated soils associated with bodies of water (Keeler-Wolf et al., 2003), most of the red alder forest within the study area is in upland habitat that lack saturated soils and are not associated with bodies of water. Red alder does grow in both riparian and upland habitats and is often an early seral community in moist conifer forests, quickly invading openings created by fires, logging, wind throws, landslides, and road cuts (Uchytil 1989; CNPS 2021).

Red alder forest is the most common vegetation type within BSA #1, and is found within RNSP, GDRC land, and the Caltrans right of way (Figures 3-15 to 3-17). Riparian stands grow along streams and upland stands are found in disturbed areas along the power line, U.S. 101, and old roads; on steep, eroding coastal bluffs; and on landslides. Large, continuous stands of red alder forest are the most common community along U.S. 101. Elsewhere, red alder forest is patchily distributed within a matrix of other communities, such as Douglas-fir forest, Sitka spruce forest, redwood forest, and coastal brambles.

The red alder forest within BSA #1 is characterized by moderately open to dense stands of red alder trees with occasional, typically young but sometimes large Sitka spruce, Douglas-fir, and cascara in the canopy or sub-canopy; along U.S. 101, large, mature Sitka spruce trees are occasionally scattered throughout red alder forest. Shrub and herb cover and species composition vary. Salmonberry, California blackberry (*Rubus ursinus*), and red elderberry cover is generally very high. Sword fern is an abundant species in the herbaceous layer, especially on upland sites.

Douglas-fir Forest and Woodland

Douglas-fir forest and woodland (*Pseudotsuga menziesii* Forest and Woodland Alliance, *Pseudotsuga menziesii* Association) (G5 S4) (hereinafter referred to as Douglas-fir forest) is not designated as an SNC (CDFW 2022d). This forest is dominated or co-dominated by Douglas-fir trees along with other conifers and hardwoods in the canopy (CNPS 2021). Hardwood trees such as tanoak may be common and coast redwood may be present (CNPS 2021).

In low- and middle-elevation moist coastal forests in Northern California, Douglas-fir is a long-lived, shade-intolerant, seral dominant that is replaced by Sitka spruce and western hemlock in the absence of stand-altering disturbance (Uchytil 1991).

Early successional Douglas-fir forest within BSA #1 is found on logged timberland on GDRC land or areas disturbed by landslides and is characterized by a moderately dense cover of young Douglas-fir with Sitka spruce present in the canopy. Patches of evergreen huckleberry and salmonberry dominate the shrub layer. Large trees include Douglas-fir, coast redwood, and Sitka spruce.

Stands of late successional Douglas-fir forest are generally found on steep ridges, slopes, and coastal bluffs along U.S. 101 in RNSP and the Caltrans right of way, and have moderately open to dense stands of Douglas-fir trees with coast redwood and Sitka spruce present in the canopy. The understory typically consists of a moderate to dense cover of salmonberry, evergreen huckleberry, thimbleberry, and red elderberry, often with salal and California red huckleberry.

Sitka Spruce Forest and Woodland

Sitka spruce forest and woodland (*Picea sitchensis* Forest and Woodland Alliance) (G5 S2) (hereinafter referred to as Sitka spruce forest) is considered an SNC (CDFW 2022d). Sitka spruce trees dominate the canopy, typically forming an intermittent to continuous canopy above a sparse to continuous shrub layer and an abundant herb layer often dominated by ferns (CNPS 2021). Sitka spruce is both an early successional or pioneer species on disturbed soils and a late successional or climax species in coastal forests (Griffith 1992; CNPS 2021). In California old-growth stands are rare because most have been logged and are in early successional stages (CNPS 2021).

Early successional Sitka spruce forest is present within RNSP, Caltrans right of way, and GDRC land within BSA #1 (Figures 3-15 and 3-16, Table 3-12). Early successional Sitka spruce forest occurs within RNSP and on GDRC land. Smaller-diameter Sitka spruce trees dominate the canopy, with Douglas-fir present as a minor co-dominant and scattered red alder and cascara in the sub-canopy.

Late successional Sitka spruce forest occurs within DNCRSP, RNSP, GDRC, and the Caltrans right of way. Stands of this forest occur as scattered, irregular or linear-shaped patches of forest in a matrix of other communities along U.S. 101, the California Coastal Trail, and on coastal bluffs. Scattered large-diameter Sitka spruce trees dominate the canopy, with occasional large-diameter Douglas-fir also present. Red alder and cascara are present in

the sub-canopy. Dense, nearly impenetrable thickets of salmonberry are widespread in the understory.

Cascara Forest and Woodland

Cascara forest is found in some areas of BSA #1 that were likely previously disturbed by human activities, such as logging and farming. Cascara forest and woodland (*Frangula purshiana* ssp. *purshiana* forest and woodland) (hereinafter referred to as cascara forest) has not been evaluated by VegCAMP (CDFW 2022d) and its rarity in California has not been assessed.

Cascara is a broadleaved, deciduous, shade-tolerant, native tree or shrub that can grow up to 40 feet (12 meters) in height (Sawyer 2012). Cascara is a long-lived, early successional, colonizing species of the understory of old-growth and second-growth coniferous forests and coastal scrub and riparian forests in the Pacific Northwest (Habeck 1992).

Cascara forest grows within RNSP and the Caltrans right of way, typically in previously disturbed areas (Figures 3-15 and 3-16, Table 3-12). Stands are patchily distributed, interspersed with coastal brambles and red alder forest along the power line and old roads and on coastal bluffs. Shrub diversity in cascara forests is the highest of any community within BSA #1 and includes salmonberry, thimbleberry, California blackberry, creambush ocean-spray (*Holodiscus discolor*), Pacific poison-oak (*Toxicodendron diversilobum*), and twinberry (*Lonicera involucrata* var. *ledebourii*). Herb diversity is also much higher in cascara forest compared to other communities within BSA #1, although sword fern typically dominates much of this layer. Occasional large Douglas-fir and Sitka spruce are present.

Coastal Brambles

Coastal brambles (*Rubus* [*parviflorus, spectabilis, ursinus*] Shrubland Alliance) (G4 S3) is considered an SNC (CDFW 2022d; CNPS 2021). As originally defined by VegCAMP and CNPS, this community is distinguished by the dominance of brambles, such as salmonberry, thimbleberry, and California blackberry (greater than 50% relative cover) in the shrub canopy (CNPS 2022). Usually, one or a mixture of these bramble species typically form an intermittent to continuous shrub canopy above a sparse to intermittent herb layer. The sensitive salmonberry (*Rubus spectabilis*) and thimbleberry (*Rubus parviflorus*) Associations were the most common associations present within BSA #1, as well as small areas of the sensitive California blackberry (*Rubus ursinus*) Association.

An update of the California Natural Community List split the coastal brambles community into two alliances: Salmonberry – Wax myrtle scrub (*Rubus spectabilis–Morella californica*

Shrubland Alliance and Salal – berry brambles (*Gaultheria shallon–Rubus* [*ursinus*] Shrubland Alliance) (CDFW 2022d; CNPS 2021). The Salmonberry – Wax myrtle scrub community includes the sensitive salmonberry association found within BSA #1, while the Salal – berry brambles community includes the sensitive thimbleberry Association (CDFW 2022d; CNPS 2021). Because these communities were mapped prior to the update of the California Natural Community List, these associations are grouped as coastal brambles and considered an SNC.

Coastal brambles are one of the most common natural communities within BSA #1 (Figures 3-15 to 3-17, Table 3-12), and grow in RNSP, DNCRSP, Caltrans right of way, and on GDRC land. Coastal brambles are often found in openings and along edges of forests and on disturbed sites along U.S. 101, the power line, and the California Coastal Trail and on eroding coastal bluffs and landslides. Coastal brambles are primarily dominated by dense, nearly impenetrable thickets of salmonberry, though thimbleberry is more prevalent in some areas. This community is also patchily distributed in forest habitats. Scattered large trees are occasionally present in the coastal brambles, including Douglas-fir, red alder, and Sitka spruce.

Ruderal Vegetation, Non-Vegetated, Erosional, and Other Areas

Ruderal vegetation occurs in disturbed areas along the shoulders and pullouts of U.S. 101 and on steep, eroding coastal bluffs and seacliffs in RNSP and Caltrans right of way (Figures 3-15 to 3-17, Table 3-12). Ruderal vegetation generally consists of a diverse flora of non-native and invasive plant species with a few native plants. Non-vegetated areas include U.S. 101 and paved or graveled pullouts in Del Norte Coast Redwoods State Park and Caltrans right of way.

Erosional areas are found on steep bluff faces and slopes adjacent to the ocean and U.S. 101 in Del Norte Coast Redwoods State Park and Caltrans right of way. These areas of recent landslide or erosional activity are typically colonized by mostly non-native vegetation, such as jubata grass (*Cortaderia jubata*). Small patches of native coastal bluff species grow in the erosional area and rock outcrop situated immediately above the ocean, but none of the patches were large enough to classify as vegetation types.

Other habitats in this category are rocky intertidal beaches, the ocean, and a rock outcrop.

Trees

BSA #1 contains many large trees, which are defined as trees 24 inches DBH or greater. Tree surveys and assessments were conducted over the 260-acre BSA #1; each large tree was tagged with a unique number and the following information recorded: accurate location, species, DBH, height, crown ratio (crown height to tree height), tree health, and notes on damage and other notable observations. Approximately 3,500 large trees were mapped and assessed within BSA #1; their locations are shown in Figure 3-18. Large tree species within BSA #1 include big leaf maple, Douglas-fir, red alder, redwood, Sitka spruce, and western hemlock.

In addition, all small trees (between 6 inches and 23.9 inches DBH) within potential impact areas and a small buffer were tallied by species, size class, and general location. Small trees within impact areas include the same species of large trees mapped plus cascara, willow, and red elderberry.

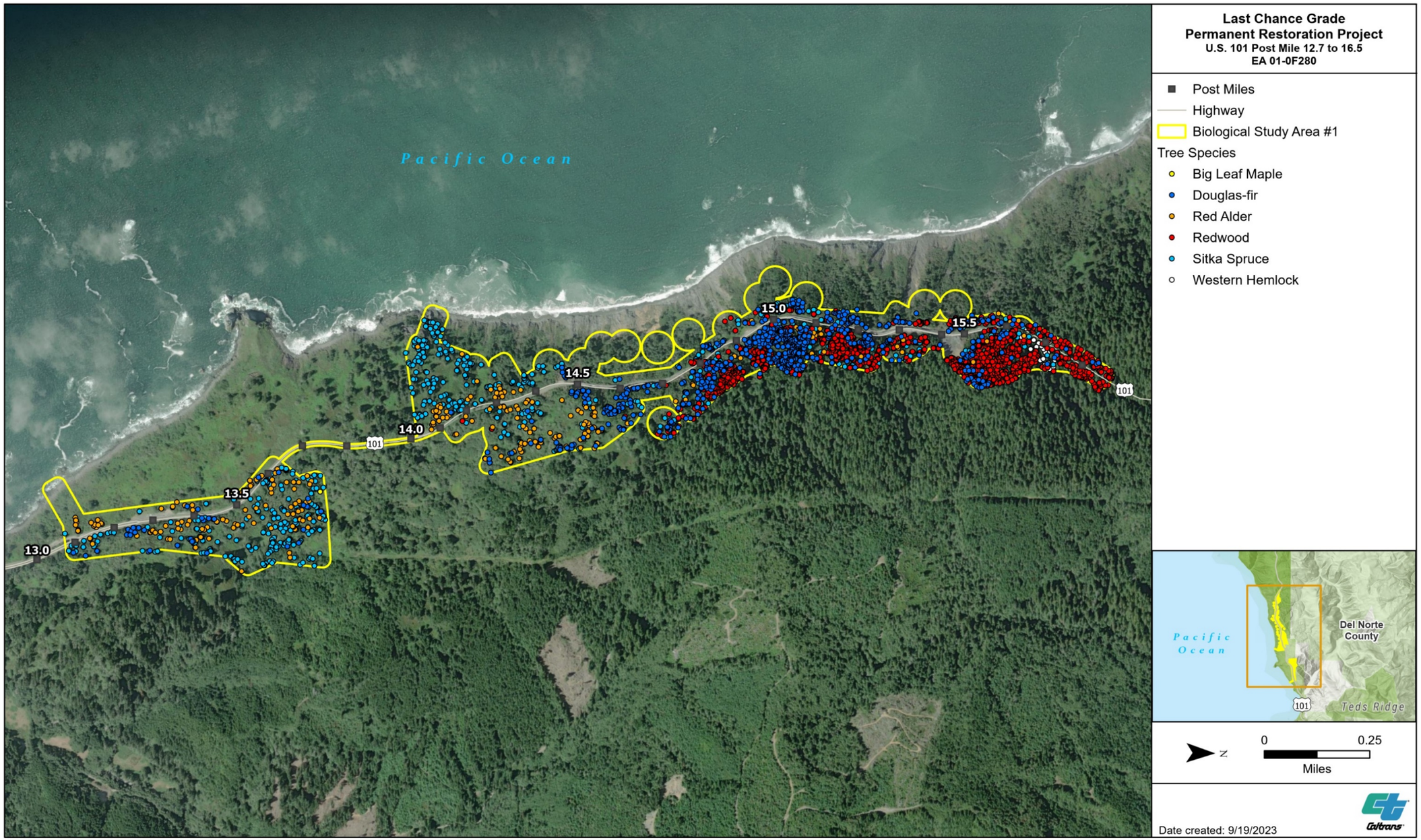


Figure 3-18. Large Tree Locations

Environmentally Sensitive Habitat Areas

There are 95.57 acres of potential ESHA features within BSA #1 pending consultation with the CCC.

Table 3-13 summarizes the potential ESHA and provides acreage present and a short rationale for why the features may be considered ESHA under the CCA.

Table 3-13. Potential ESHA Features in the Biological Study Area

Potential ESHA Feature	Acreage within BSA #1	Rationale
Early successional redwood forest	0.67	This community is an SNC and provides habitat for special status species.
Late successional redwood forest (slide and non-slide areas)[1]	29.54	This community is an SNC, provides habitat for special status species, and is sensitive to human disturbance.
Early successional Douglas-fir forest	3.69	This community provides habitat for special status species.
Late successional Douglas-fir forest[1]	26.86	This community provides habitat for special status species and is sensitive to human disturbance.
Early successional Sitka spruce forest	2.37	This community is an SNC and provides habitat for special status species.
Late successional Sitka spruce forest[1]	24.07	This community is an SNC, provides habitat for special status species, and is sensitive to human disturbance.
Beaches	0.83	This community provides habitat for special status species.
Ocean	0.73	This community provides habitat for special status species.
Wetlands and Non-Wetland Waters	2.40	These features provide habitat for special status species and are sensitive to human disturbance.
Riparian Habitat	4.41	This habitat provides habitat for special status species and is sensitive to human disturbance.
Total Potential ESHA	**95.57**	

[1] Portions of these habitats have also been mapped as critical habitat for marbled murrelet by USFWS.

Two natural communities within BSA #1 that are considered SNCs would not be considered ESHA: non-riparian red alder forest with a salmonberry and red elderberry understory and coastal bramble. Both communities are widespread in this region, tolerant of disturbance, and regrow quickly after disturbance. Though these communities do provide foraging habitat for a number of special status species, impacts on these communities would have negligible effects on these species' foraging success because there is a large quantity of suitable foraging habitat within and adjacent to BSA #1 that would not be affected by the project.

Habitat Connectivity

Wildlife movement corridors are established migration routes used by resident and migratory species. If corridors are degraded, habitat can become fragmented. Habitat fragmentation can lessen biological value, as habitat loss can result in the division of large, continuous habitats into smaller, more isolated remnants. Maintaining the continuity of established wildlife corridors is important to (1) sustain species with specific foraging requirements; (2) preserve a species' distribution potential; and (3) retain diversity among many wildlife populations.

The majority of the project area is identified as a natural landscape block (a block of contiguous natural habitat). The CDFW Areas of Conservation Emphasis (ACE) tool indicates that the area is important for connectivity, but it has not been identified as a species corridor or habitat linkage (CDFW 2019). The CEHC identifies BSA #1 and #2 as relatively permeable to wildlife movement, with the east of U.S. 101 being more permeable than the west, as the steep cliffs make wildlife movement more difficult (Figure 3-19).

While BSA #1 and the adjacent land contain suitable wildlife habitat, the retaining walls along the highway, the roadway itself, and the steep eroded slopes west of the road are existing barriers to wildlife movement within BSA #1. The presence of vehicle traffic, ongoing roadway maintenance activities, and steep topography may limit or alter wildlife dispersal and movement through segments of BSA #1.

Waterways within the BSA #1 do not support fish or fish passage.

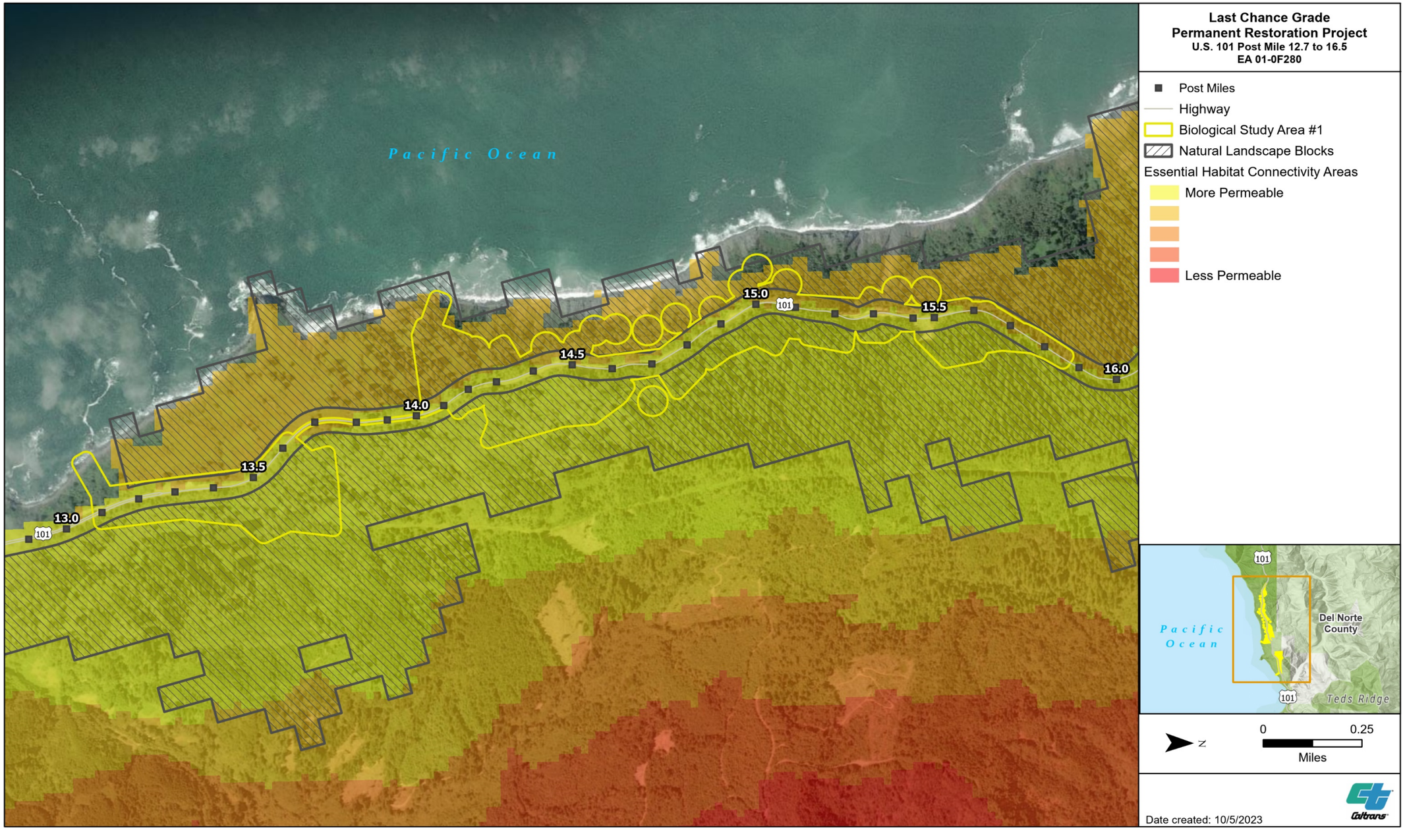


Figure 3-19. Wildlife Habitat Connectivity, Dispersal, and Migration Corridors within Biological Study Area #1

Environmental Consequences

Build Alternatives

This section evaluates potential effects of Alternative X and Alternative F on sensitive biological resources within the BSAs. Habitats are considered to be of special concern based on (1) federal, state, or local laws regulating their development; (2) limited distributions; and/or (3) the habitat requirements of special status plants or animals occurring on-site.

Impact acreages presented in this section are intended to provide conservative scenarios; actual impacts are expected to be less because trees and other vegetation in temporary work areas would be avoided to the greatest extent practicable through the project's construction Standard Measures/specifications and BMPs.

Project-related impacts on resources are discussed in the following three categories.

- ***Permanent impacts*** are impacts that, post-construction, would permanently prevent the area from functioning as it did preconstruction.
- ***Habitat conversion*** would occur in areas where the habitat would not function post-construction as it did preconstruction for a great number of years. These areas would be replanted with native vegetation; however, the area would not serve the same habitat values in the near term as it did pre-project. Habitat conversion was only considered for impacts within late successional redwood, Sitka spruce, and Douglas-fir forests within cut-and-fill areas under Alternatives X and F.
- ***Temporary impacts*** would occur in areas where habitat would continue to function post-construction as it had pre-project within a shorter period[29]. Post-construction these areas would be replanted with native vegetation. The habitat in these areas would be restored at different rates depending on the disturbance and the type of vegetation that was disturbed.

[29] Temporary impacts and Long-term Temporary One impacts are those that can be restored to a comparable age/size class by the end of established permit-driven monitoring periods intended to document success of restoration efforts, which is typically 5-10 years for coastal projects. Long-term Temporary Two impacts are those that would not reach a comparable age/size class within the established the monitoring period. For Long-term Temporary Two impacts, success of restoration efforts would be determined through long term monitoring that clearly demonstrates that the habitat is on a positive trajectory for reaching a comparable age/size class by the end of the monitoring period.

For the project, temporary impacts were broken into three different categories:

- *Temporary*: For the 15-foot buffer and other areas where no trees 24 inches DBH or greater are removed. These areas would function as they did pre-project within 1 year.
- *Long-term Temporary One*: Areas where coastal brambles are removed and replanted would function as they did pre-project within 3 to 5 years. Red alder forest that is removed and replanted would function as it did pre-project within 5 to 10 years. For both habitat types, functional equivalency would be restored within the monitoring period.
- *Long-term Temporary Two*: Early successional redwood and Douglas-fir forest that is cleared and replanted would function as it had pre-project within 20 to 40 years.

Table 3-14 summarizes the potential permanent and habitat conversion impact acreages for natural communities under Alternative X and Alternative F, while Table 3-15 summarizes temporary impacts. Potential impacts on aquatic resources and riparian habitat, which are present within the natural communities/land cover types listed below, are discussed in Section 3.4.2.

Table 3-14. Permanent and Habitat Conversion Impacts on Natural Communities and Other Land Cover Types

Natural Community/Land Cover	Permanent Impacts (acres)		Habitat Conversion (acres)	
	Alternative X	Alternative F	Alternative X	Alternative F
Redwood forest[1]				
Early successional redwood forest	0.06	0.02	-	-
Late successional redwood forest	0.03	0.62	0	0.47
Red alder forest[1]	1.57	2.98	-	-
Douglas-fir forest				
Early successional Douglas-fir forest	0.50	0.27	-	-
Late successional Douglas-fir forest	3.18	0	0.07	0.02
Sitka spruce forest[1]				
Early successional Sitka spruce forest	0	0	-	-
Late successional Sitka spruce forest	0.29	0.20	0.60	0.93
Cascara forest	0	0	-	-
Coastal brambles[1]	1.09	0.25	-	-
Ruderal, non-vegetated, erosional, and other areas				
Ruderal	0.27	0.43	-	-
Non-vegetated	0.63	1.77	-	-
Erosional	0.31	0	-	-
Total Impacts	**7.93**	**6.54**	**0.67**	**1.42**

[1] This natural community is considered an SNC

Table 3-15. Temporary Impacts on Natural Communities and Other Land Cover Types

Natural Community/Land Cover	Temporary Impacts (acres)		Long-term Temporary One Impacts (acres)		Long-term Temporary Two Impacts (acres)		Total Temporary Impacts (acres)	
	Alternative X	Alternative F	Alternative X	Alternative F	Alternative X	Alternative F	Alternative X	Alternative F
Redwood forest[1]								
Early successional redwood forest	0.08	0.16	-	-	0	0.13	**0.08**	**0.29**
Late successional redwood forest	0.06	0.31	-	-	-	-	**0.06**	**0.31**
Red alder forest[1]	1.14	2.06	0.92	6.48	-	-	**2.06**	**8.54**
Douglas-fir forest								
Early successional Douglas-fir forest	0.19	0.18	-	-	0.01	0.09	**0.20**	**0.27**
Late successional Douglas-fir forest	1.01	0.82	-	-	-	-	**1.01**	**0.82**
Sitka spruce forest[1]								
Early successional Sitka spruce forest	0	0	-	-	0	0	**0**	**0**
Late successional Sitka spruce forest	0.37	0.46	-	-	-	-	**0.37**	**0.46**
Cascara forest	0	0.01	0	0.19	-	-	**0**	**0.20**
Coastal brambles[1]	0.66	0.52	1.94	2.58	-	-	**2.60**	**3.10**
Ruderal, non-vegetated, erosional, and other areas								
Ruderal	0.21	0.52	-	-	-	-	**0.21**	**0.52**
Non-vegetated	0.39	0.78	-	-	-	-	**0.39**	**0.78**
Erosional	0.13	0.16	-	-	-	-	**0.13**	**0.16**

[1] This natural community is considered an SNC

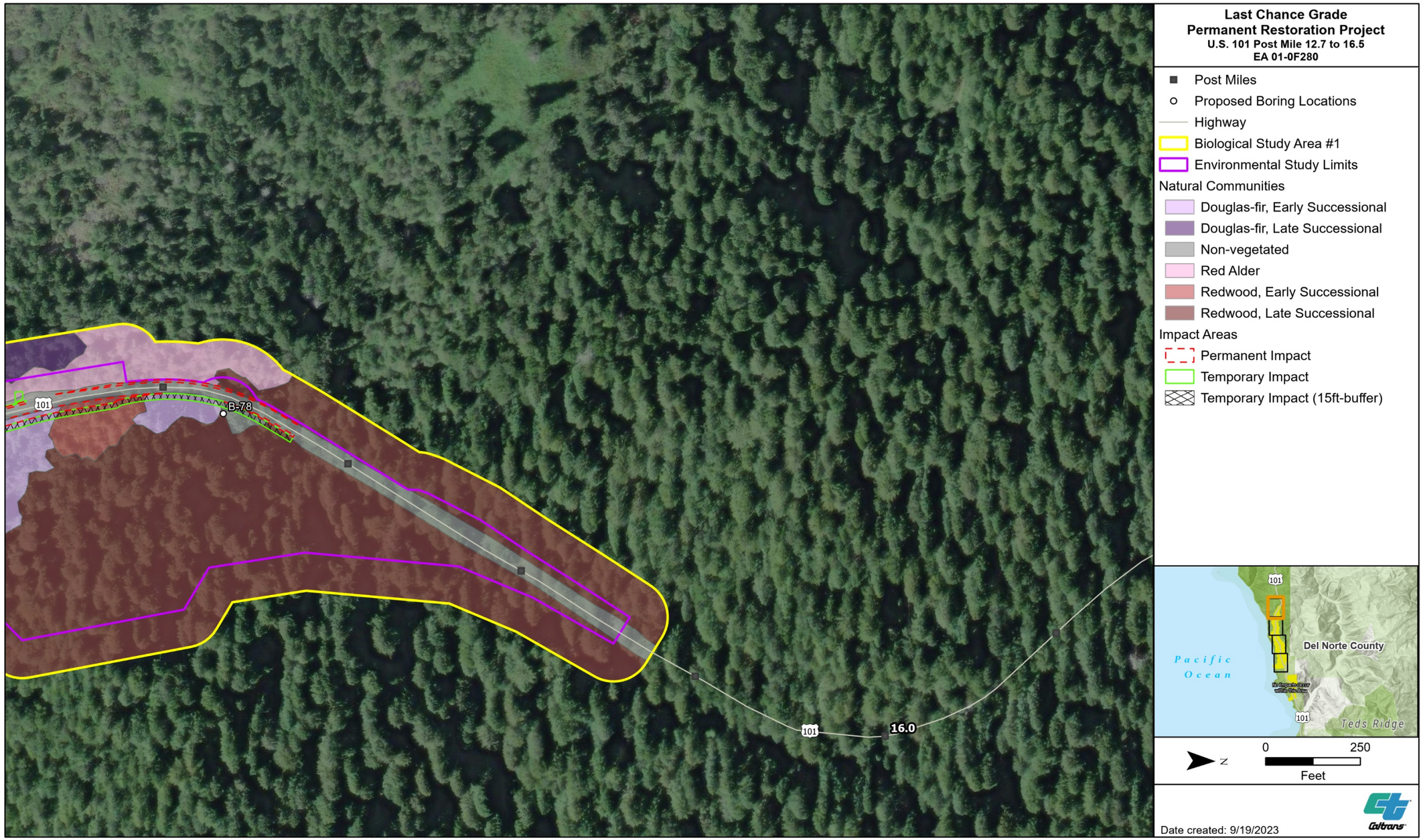


Figure 3-20. Alternative X Impacts on Natural Communities (Sheet 1 of 4)



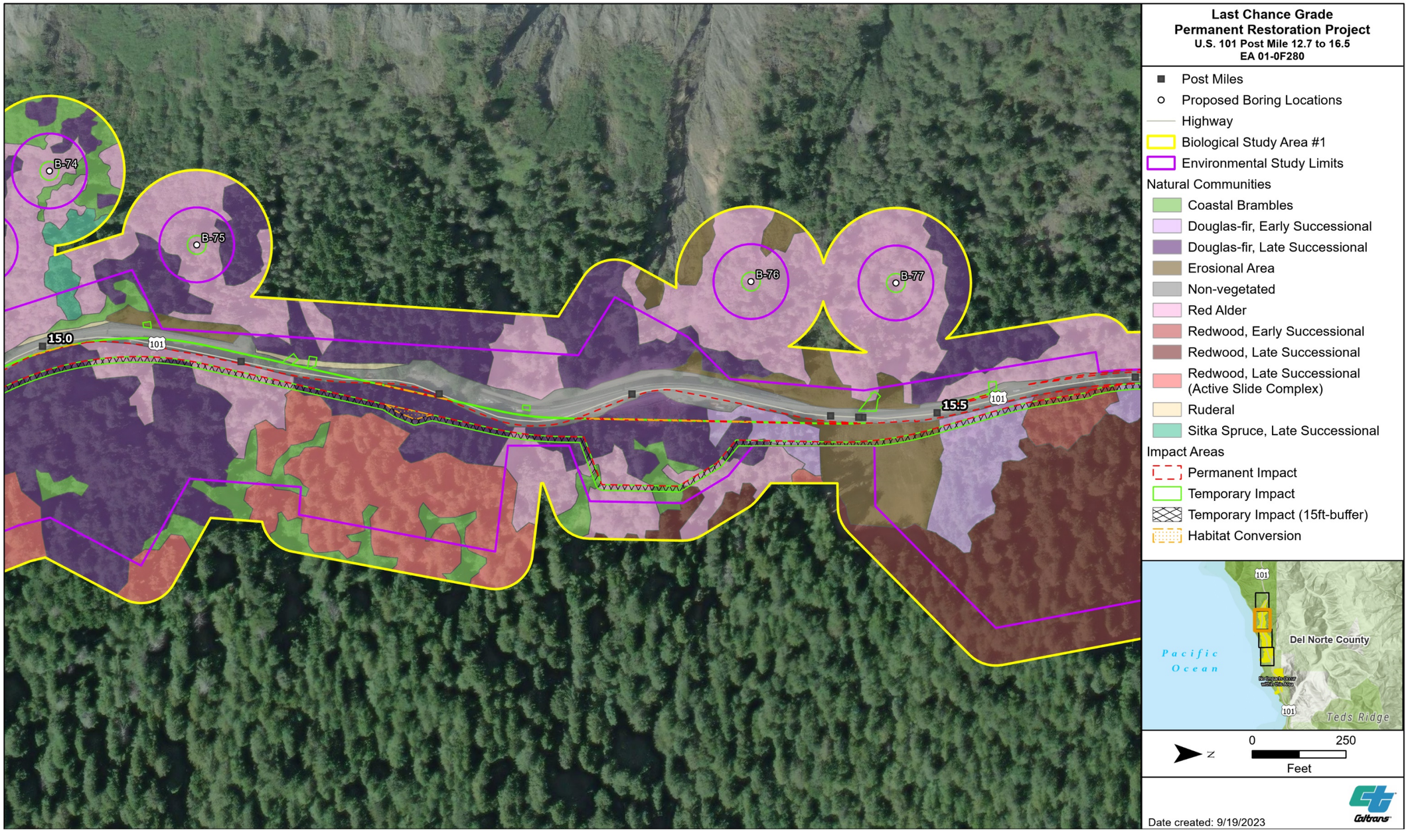


Figure 3-21. Alternative X Impacts on Natural Communities (Sheet 2 of 4)

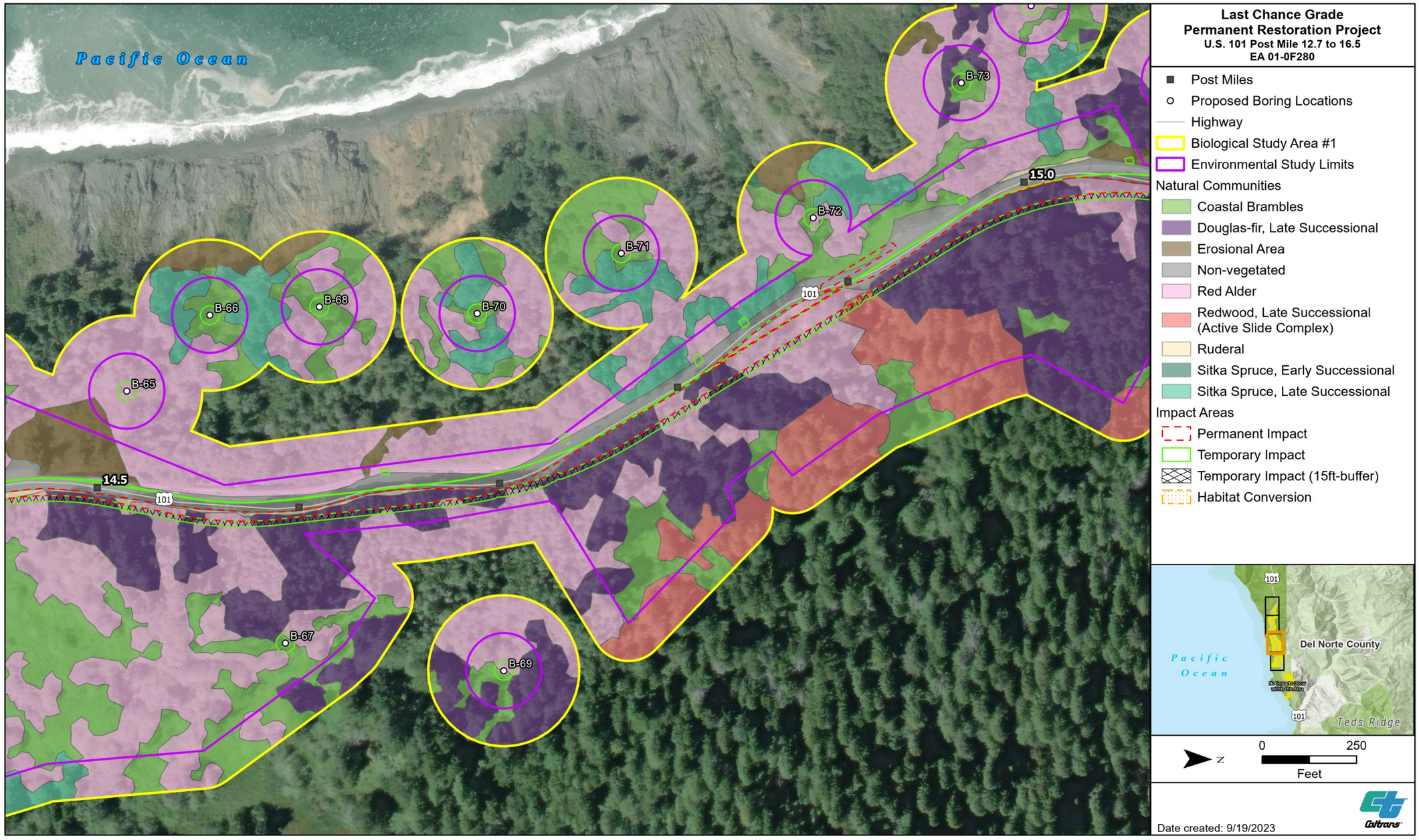


Figure 3-22. Alternative X Impacts on Natural Communities (Sheet 3 of 4)

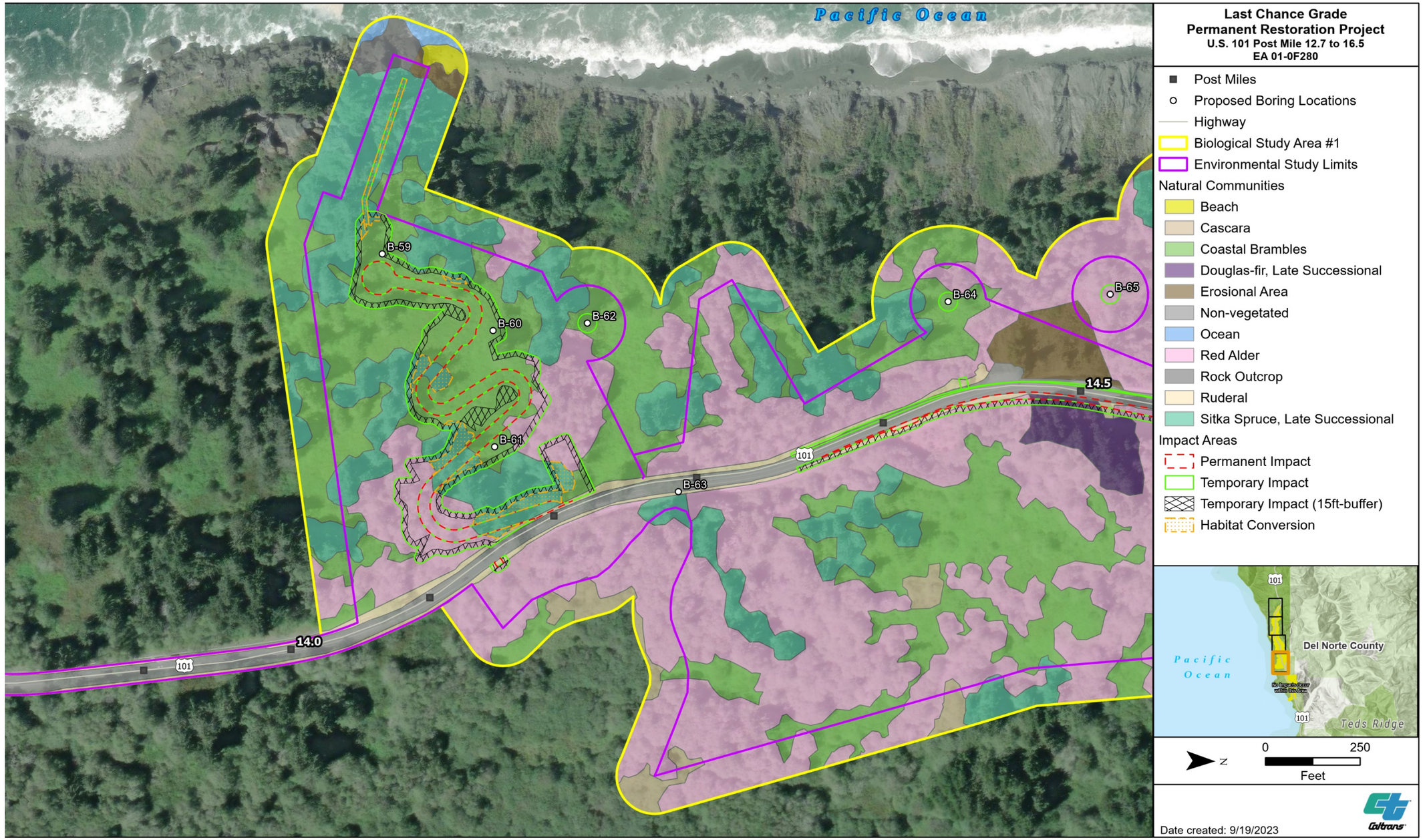


Figure 3-23. Alternative X Impacts on Natural Communities (Sheet 4 of 4)



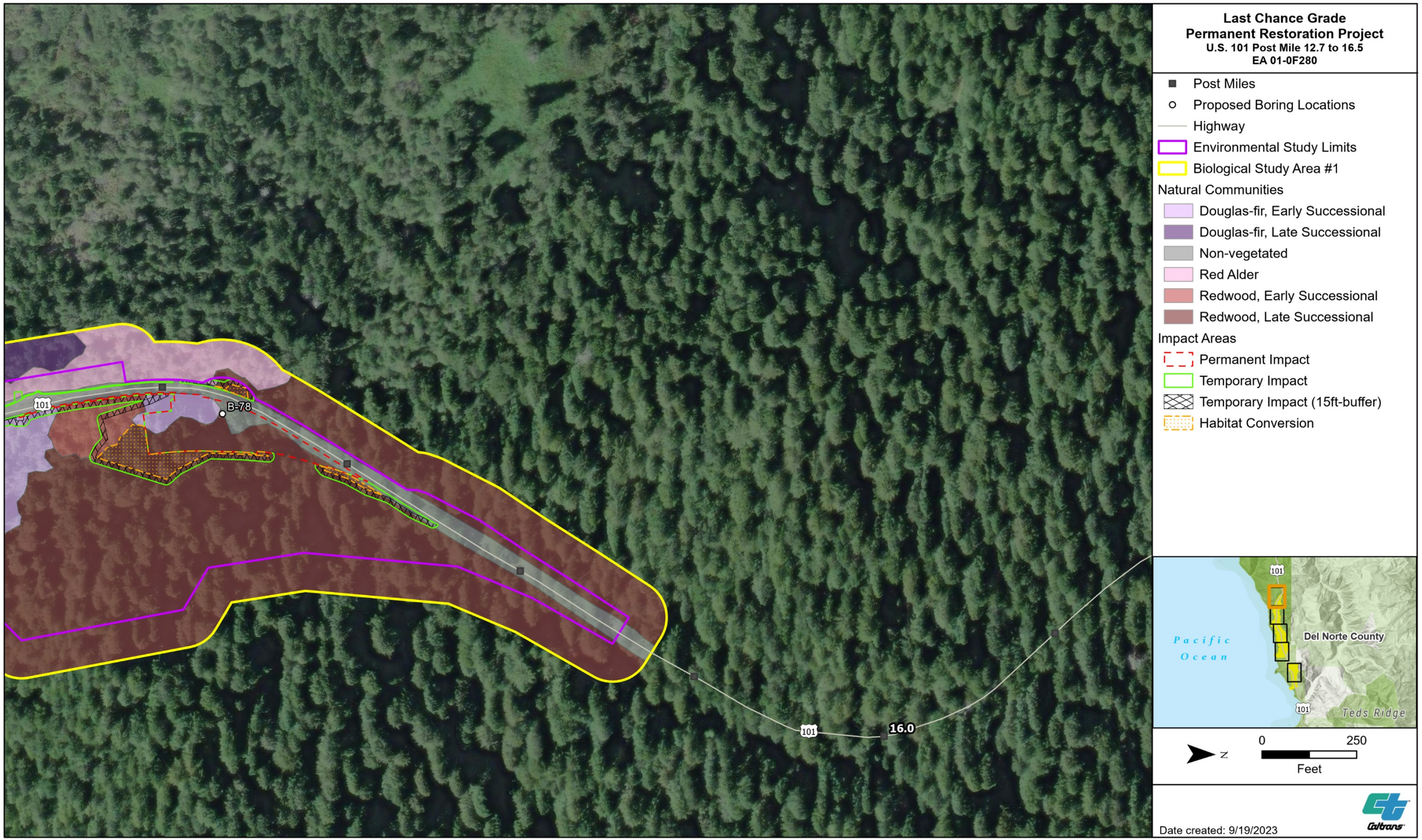


Figure 3-24. Alternative F Impacts on Natural Communities (Sheet 1 of 5)

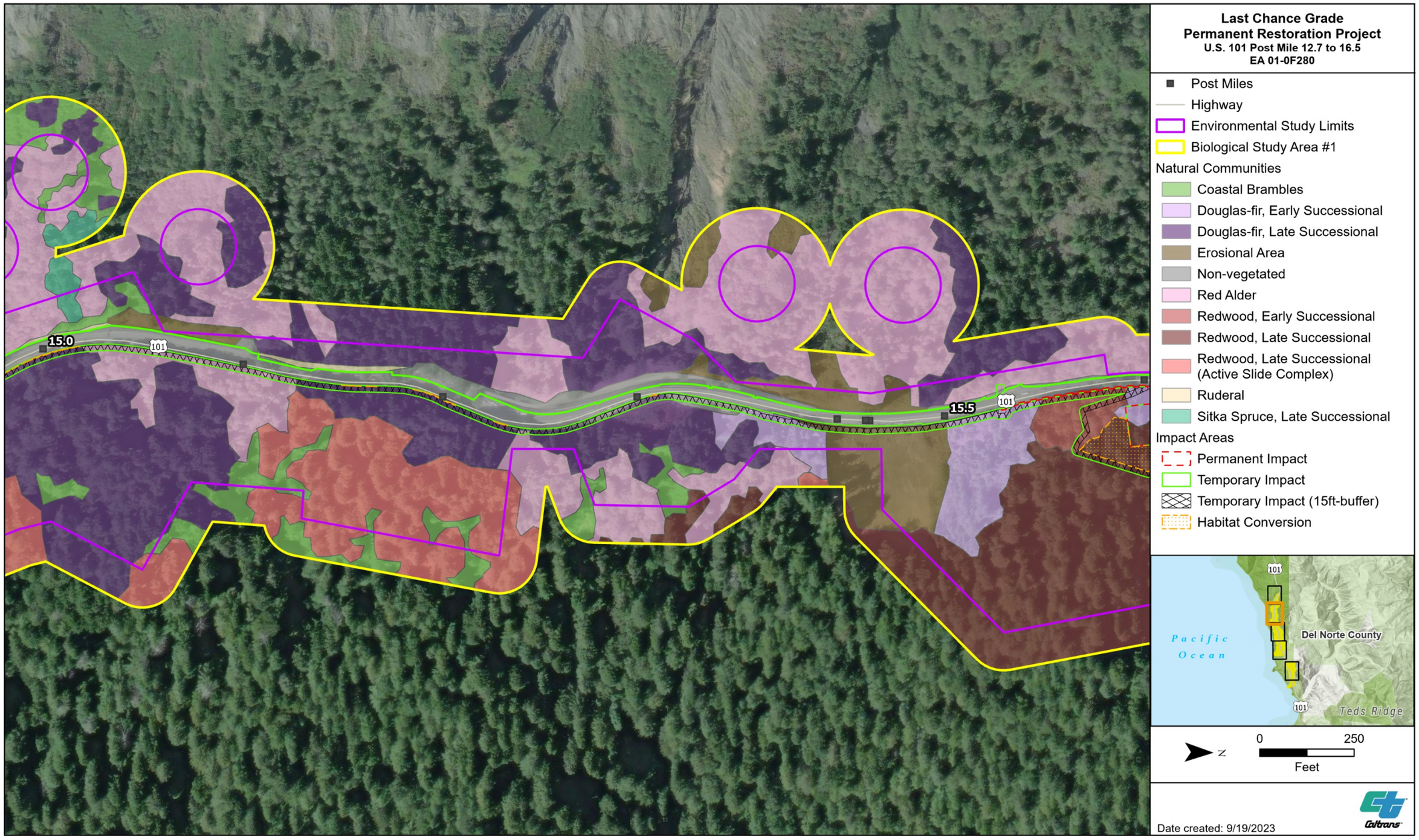


Figure 3-25. Alternative F Impacts on Natural Communities (Sheet 2 of 5)



Figure 3-26. Alternative F Impacts on Natural Communities (Sheet 3 of 5)



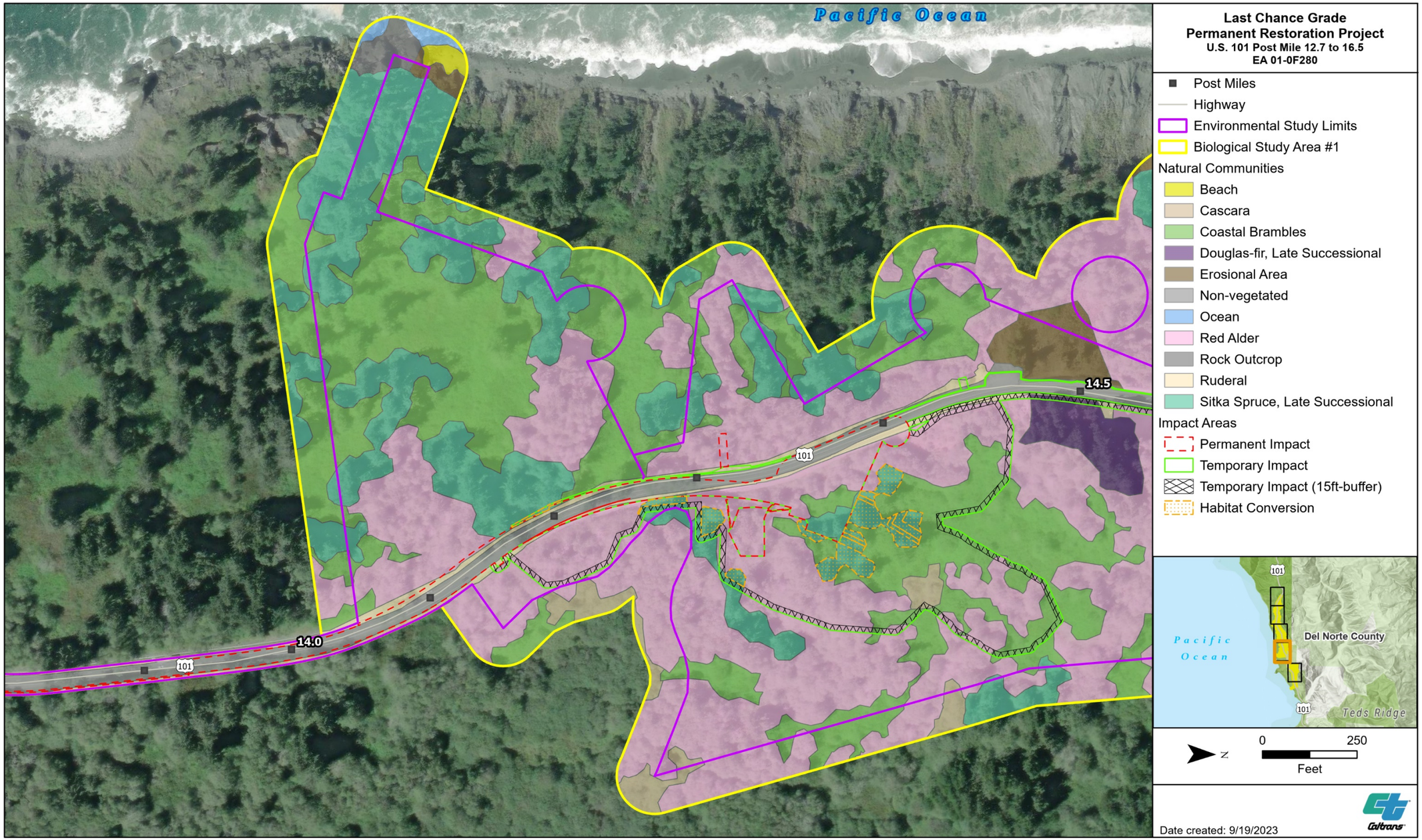


Figure 3-27. Alternative F Impacts on Natural Communities (Sheet 4 of 5)

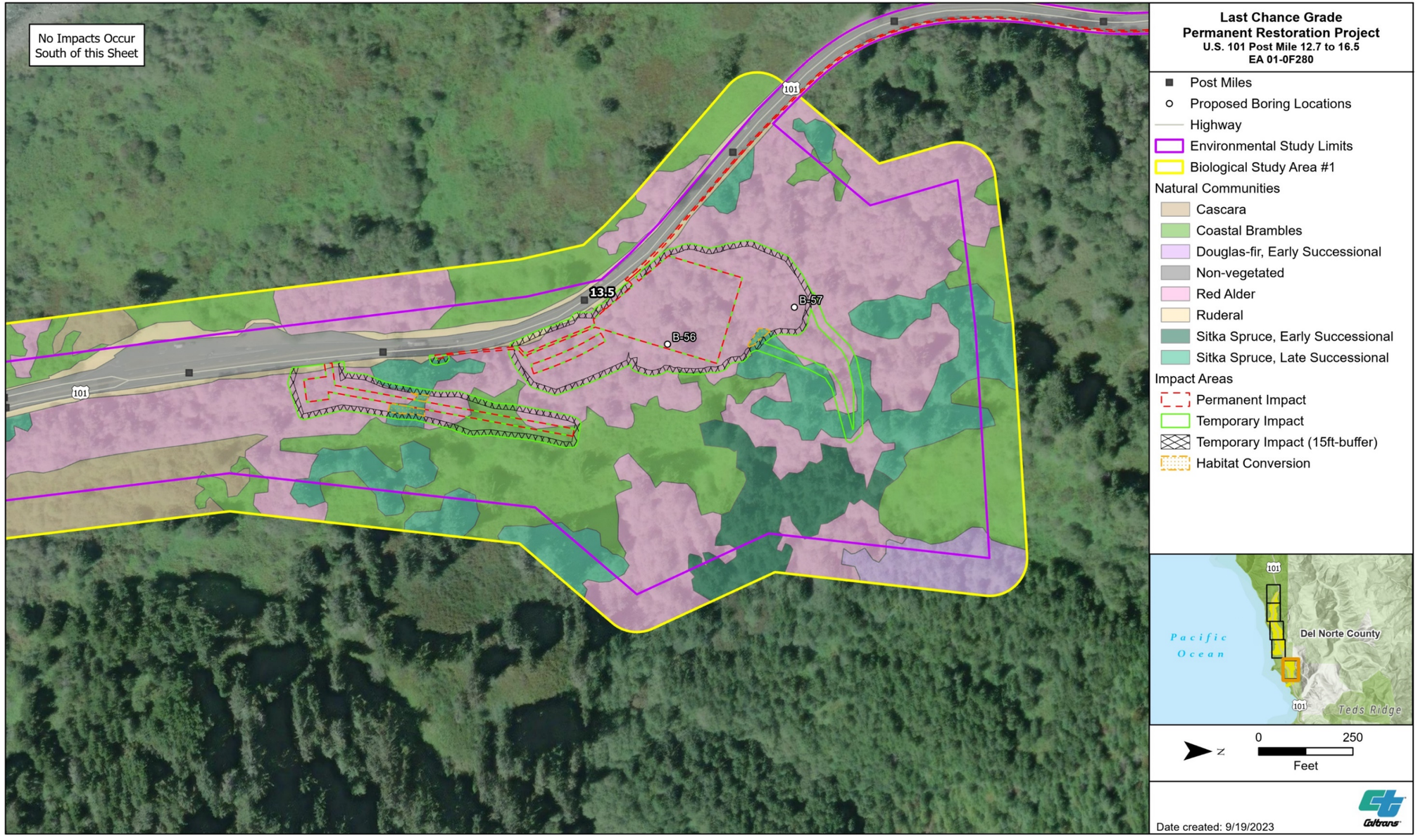


Figure 3-28. Alternative F Impacts on Natural Communities (Sheet 5 of 5)

Sensitive Natural Communities

Four of the natural communities within BSA #1 have been designated SNCs by CDFW (CDFW 2022d):

- redwood forest (early and late successional)
- red alder forest (*Alnus rubra*/*Rubus spectabilis–Sambucus racemosa* Association)
- Sitka spruce forest (early and late successional)
- coastal brambles

Impacts on the SNCs are quantified in Tables 3-14 and 3-15 and shown in Figure 3-20 through Figure 3-23 for Alternative X and Figure 3-24 through Figure 3-28 for Alternative F and described below.

Standard Measures and BMPs described in Section 2.6 would be implemented to minimize and avoid impacts to SNCs, including BR-1, BR-3, and BR-4 (items A, B, C, D, E, and F), which would minimize tree and vegetation impacts, require revegetation with appropriate native species, and control the spread of invasive species.

Effects Unique to Alternative X

Alternative X would result in impacts to all four SNCs within the project footprint (Tables 3-14 and 3-15, Figures 3-20 to 3-23). Potential habitat impacts include:

- **Permanent:** Alternative X would permanently impact 0.06 acre of early successional redwood forest, 0.03 acre of late successional redwood forest, 1.57 acres of red alder forest, 0.29 acre of late successional Sitka spruce forest, and 1.09 acres of coastal brambles. This habitat would be replaced with hardscaped features such as walls, highway features, and drainage gallery infrastructure.
- **Habitat Conversion:** Approximately 0.60 acre of late successional Sitka spruce forests would undergo habitat conversion. In this area, late successional forest would be removed to facilitate necessary cut and fill for the project, and although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- **Temporary:** Alternative X would temporarily affect a total of 0.08 acre of early successional redwood forest, 0.06 acre of late successional redwood forest, 2.06 acres of red alder forest, 0.37 acre of late successional Sitka spruce forest, and 2.60 acres of

coastal brambles. The types of temporary impacts are broken into the following categories:

- *Temporary:* Impacts include 0.08 acre of early successional redwood forest, 0.06 acre of late successional redwood forest, 1.14 acres of red alder, 0.37 acre of Sitka spruce forest, and 0.66 acre of coastal brambles. These would take place in the 15-foot equipment access buffer where habitat would be disturbed; some herbaceous vegetation, shrubs, and trees smaller than 24 inches DBH would potentially be removed, while trees over 24 inches DBH would remain and be protected in place. In the geotechnical areas, coniferous forest would only be disturbed with no tree removal. The habitat in these areas would continue to function as it had pre-project in less than a year.
- *Long-term Temporary One:* Impacts include 0.92 acre of red alder forest and 1.94 acres of coastal brambles. All vegetation would be removed to facilitate cut/fill and geotechnical work necessary for the project. These areas would be replanted and return to equivalent habitat within 3 to 10 years.

In addition to the impacts above, there is potential for the drainage gallery to indirectly impact SNCs within the project area. These potential impacts are discussed under *Groundwater Effects on Vegetation*.

Red Alder and Coastal Brambles

Both red alder forest and coastal bramble communities are tolerant of disturbance and restorable within a short amount of time. Temporary impact areas would be restored within 3 to 10 years.

Within the region, red alder forest and coastal brambles are both locally common. Within BSA #1 alone, 93.41 acres of red alder and 46.78 acres of coastal brambles were mapped (Table 3-12). Alternative X would permanently remove 1.57 acres (1.7%) of the red alder and 1.09 acres (2.3%) of the coastal brambles mapped just within BSA #1 (Table 3-14). In the surrounding landscape there are many more acres of these communities; therefore, impacts to these SNCs are anticipated to be minimal.

Sitka Spruce Forest

Alterative X would impact late successional Sitka spruce forest, which is locally and regionally rare. Within BSA #1 24.07 acres of this forest type were mapped (Table 3-12). Regionally, due to forest conversion and commercial timber practices, this vegetation community is uncommon. With combined permanent impacts and habitat conversion, this alternative would remove 0.89 acre of late successional Sitka spruce forest (Table 3-14). This community is intolerant of disturbance and would take many decades to reach a late successional state. It is anticipated that Alternative X would have a substantial impact on this community.

Redwood Forest

Alternative X would impact both late and early successional redwood forest. Early successional redwood forest is common both locally and regionally as timber practices have converted late successional stands to early successional stands. Although there was very little early successional redwood forest mapped within BSA #1 (0.67 acre) (Table 3-12) there are thousands of acres in the surrounding DNCRSP, RNP, and GDRC timber land (Parcel Quest 2023). Alternative X would permanently impact 0.06 acre of early successional redwood forest (Table 3-15). When compared to the vast amount of this community in the vicinity, this impact would be minimal.

Late successional redwood forest is rare locally and regionally. Due to logging and land conversion, less than 5% of the original late successional redwood forest remains. Within BSA #1 there are 29.54 acres of late successional redwood forest, which extends north within DNCRSP (Table 3-12). Alternative X would permanently affect 0.03 acre of this community within a very narrow strip (less than 15 feet wide) along the current highway alignment in the northernmost portion of the Alternative X footprint (Figure 3-20). No large trees are anticipated to be removed. As impacts would only affect understory vegetation, and due to the extremely small size of the impact, its shape, and the fact that this is directly adjacent to U.S. 101, impacts to late successional redwood forest as a whole are anticipated to be negligible.

Effects Unique to Alternative F

Alternative F would result in impacts to all four SNCs within the project footprint (Tables 3-14 and 3-15, Figures 3-24 to 3-28). Potential habitat impacts include:

- **Permanent:** Alternative F would permanently impact 0.02 acre of early successional redwood forest, 0.62 acre of late successional redwood forest, 2.98 acres of red alder

forest, 0.20 acre of late successional Sitka spruce forest, and 0.25 acres of coastal brambles (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, tunnel portals, and the OMC.

- **Habitat Conversion:** Approximately 0.47 acres of late successional redwood and 0.93 acres of late successional Sitka spruce forests would undergo habitat conversion (Table 3-14). Late successional forest would be removed to facilitate necessary cut and fill for the project, and although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- **Temporary:** Alternative F would temporarily affect a total of 0.29 acre of early successional redwood forest, 0.31 acre of late successional redwood forest, 8.54 acres of red alder forest, 0.46 acres of late successional Sitka spruce forest, and 3.10 acres of coastal brambles (Table 3-15). The types of temporary impacts are broken into the following categories:
    - *Temporary:* impacts include 0.16 acre of early successional redwood forest, 0.31 acre of late successional redwood forest, 2.06 acres of red alder, 0.46 acre of late successional Sitka spruce forest, and 0.52 acre of coastal brambles (Table 3-15). These would take place in the 15-foot equipment access buffer where habitat would be disturbed; some herbaceous vegetation, shrubs, and trees smaller than 24 inches DBH would potentially be removed, while trees over 24 inches DBH would remain and be protected in place. In the geotechnical areas, coniferous forest would only be disturbed, with no tree removal. Habitat in these areas would continue to function as it had pre-project in less than a year.
    - *Long-term Temporary One:* Impacts would include 6.48 acres of red alder forest and 2.58 acres of coastal brambles (Table 3-15). Vegetation would be removed to facilitate cut/fill and geotechnical work necessary for the project. These areas would be replanted and return to equivalent habitat within 3 to 10 years.
    - *Long-term Temporary Two:* Impacts include 0.13 acre of early successional redwood forest (Table 3-15). Trees would be removed to facilitate cut/fill. These areas would be replanted and would function as they had pre-project within 20 to 40 years.

In addition to the impacts above, impacts from alteration of groundwater from the tunnel was assessed, and determined to be unlikely to adversely affect vegetation in the area. See *Groundwater Effects on Vegetation* for additional information.

Red Alder and Coastal Brambles

Both red alder forest and coastal bramble communities are tolerant of disturbance and restorable within a short amount of time. Temporary impact areas would be restored within 3 to 10 years.

Red alder and coastal brambles are both locally common. Within BSA #1 alone, 93.41 acres of red alder and 46.78 acres of coastal brambles were mapped (Table 3-12). Alternative F would permanently remove 2.98 acres (3.2%) of the red alder and 0.25 acre (0.3%) of the coastal brambles mapped just within BSA #1. In the surrounding landscape, there are many more acres of these communities; therefore, impacts to these SNCs are anticipated to be minimal.

Sitka Spruce Forest

Alterative F would impact late successional Sitka spruce forest, which is locally and regionally rare. Within BSA #1, 24.07 acres of this forest type were mapped (Table 3-12). Regionally, due to forest conversion and commercial timber practices, this vegetation community is uncommon. With combined permanent impacts and habitat conversion, this alternative would remove 1.13 acres of late successional Sitka spruce forest (Table 3-14). This community is intolerant of disturbance and would take many decades to return to its late successional state. We anticipate Alternative F would have a substantial impact on this community.

Redwood Forest

Alternative F would impact both late and early successional redwood forest. Early successional redwood forest is common both locally and regionally as timber practices have converted late successional stands to early successional stands. Although there was very little early successional redwood forest mapped within BSA #1 (0.67 acre) there are thousands of acres in the surrounding DNCRSP, RNP and GDRC timber land (Parcel Quest 2023). Alternative F would temporarily impact 0.13 acre through tree removal to facilitate construction (long-term temporary two impacts); the area would be replanted post-construction (Table 3-15). It is anticipated that the area would function as it did pre-project within 20 to 40 years. The alternative would also permanently affect 0.02 acre of early successional redwood forest (Table 3-14). However, when compared to the vast amount of this community in the surrounding area, this impact would be minimal.

Late successional redwood forest is rare locally and regionally. Due to logging and land conversion, less than 5% of the original late successional redwood forest remains. Within BSA #1, there are 29.54 acres of late successional redwood forest, which extend north within DNCRSP. With combined permanent and habitat conversion, Alternative F would remove trees from 1.09 acres of late successional redwood forest (Table 3-15). The impact would mainly occur in a large block of undisturbed valuable habitat at the north F portal (Figure 3-24). Due to the size of the impact and where it occurs, it is anticipated that Alternative F would have a substantial impact on late successional redwood forest.

Conclusions

Both build alternatives would have minimal impacts on red alder, coastal brambles, and early successional redwood forest.

Both alternatives would have a substantial impact on late successional Sitka spruce forest.

Alternative X would have negligible impacts on late successional redwood forest, whereas Alternative F would have substantial impacts.

Large Trees

Construction can affect trees either directly or indirectly. Direct impacts include tree removal or damage to and/or removal of roots from excavation, while indirect impacts include post-impact decay caused by pathogens and insects entering wounded roots and stems, alteration of the microclimate from removal of adjacent trees (increased edge effects), altered hydrology due to impervious surfaces or altered drainage patterns reducing water availability, or soil compaction leading to death of absorbing roots.

To analyze potential project impacts on roots of large trees, impacts to the structural root zone (SRZ) and the root health zone (RHZ) were calculated.

The SRZ contains most of the tree's large supporting structural roots, which provide stability (Smiley et al., 2002). The SRZ is a circle with the tree trunk at the center with a radius three times the tree's DBH.

The RHZ contains structural and absorber roots. The RHZ was calculated as a circle with the tree trunk at the center with a radius five times the tree's DBH, specifically the size of the root ball necessary to include structural roots and enough absorber roots for tree recovery (CDPR 2011).

Effects Common to Alternatives X and F

Under the build alternatives, trees would be impacted either directly through removal or through activities that affect their roots (e.g., excavation or compaction).

Caltrans developed an effect severity ranking system based on the percentage of the RHZ and SRZ affected by construction. Table 3-16 provides a summary of the tree effect severity categories (ranging in increasing severity from 0 to 6) and the corresponding anticipated outcomes of survival of a tree.

Within permanent impact areas, trees within the footprint would be removed and roots from some trees with trunks located outside the footprint would be severed by earthwork; these areas would then be occupied by non-permeable fill such as retaining walls or pavement, which would not allow root regrowth.

In cut/fill areas (habitat conversion or temporary impact areas), it is assumed trees would be removed and tree roots would be severed by earthwork. In these areas, permeable fills allowing for root regrowth would be used and trees and/or other vegetation replanted.

Within the 15-foot construction buffer on the proposed permanent and temporary impact areas and the geotechnical work areas, some small trees may be cleared but no large trees would be cut. Construction equipment may periodically drive though the buffer area.

The locations of each tree and its SRZ and RHZ relative to the permanent and temporary impact areas are shown in Appendix J.

Trees ranked Minimal or Slight would be left in place with minimal effects on their health and vigor. Trees ranked Moderate would be left in place but may have some impacts to their health and vigor and would be monitored by the project arborist. Trees ranked Considerable or Severe would likely be removed; therefore, for the purposes of this evaluation, are assumed to be removed. Figure 3-29 shows the numbers of large (24 inches [2 feet] DBH and larger) trees removed for both alternatives, and Figure 3-30 shows just the very large (48 inches [4 feet] DBH and larger) trees.

Under Alternatives X and F, as per Standard Measure BR-4 (B, C, D, E, and F), Temporary High Visibility Fencing (THVF) would be installed around environmentally sensitive areas including large trees. A revegetation plan would be prepared to guide the replanting forested areas following project completion. Additionally, where feasible, root zones of large trees would be identified and disturbance in that zone limited. When possible, excavation of the roots of large trees would be severed using a combination of root-friendly excavation and severance methods (e.g., sharp-bladed pruning instruments or chainsaw). At a minimum,

jagged roots would be pruned away to make sharp, clean cuts. These measures would avoid and minimize impacts to large trees.

Table 3-16. Tree Effect Severity Categories

Effect Severity	Effect Description	Anticipated Outcome
0 – None	Negligible Effect	Tree left in place. No measurable effect.
1 – Minimal	Less than 10% of RHZ (5x DBH) affected	Tree left in place. Effects minimal.
2 – Slight	10%–20% RHZ affected	Tree left in place. Mild effects on health and vigor.
3 – Moderate	20%–30% of RHZ affected	Tree left in place. Effects on health, vigor, and disease susceptibility. On-site arborist recommended for work within the RHZ and monitoring post-construction.
4 – Considerable	30%–40% of RHZ affected, including some of the SRZ (3x DBH)	Tree may be removed. Substantial effects on health, vigor, and disease susceptibility. On-site arborist recommended for work within the RHZ and monitoring post-construction. Arborist to assess whether to remove tree or if other measures can be used to save tree, such as topping or limbing.
5 – Severe	>40% of RHZ affected, including SRZ	Tree likely to be removed. On-site arborist recommended to assess measures to save tree, such as topping or limbing.
6 – Remove	Trunk is within the footprint of the project; tree will need to be removed.	Tree will be removed.

Effects Unique to Alternative X

Alternative X would affect a total of 173 trees with a DBH of 24 inches (2 feet) or larger, as summarized by species in Table 3-17. Of these, it is anticipated 129 would be removed (Figure 3-29); 122 large trees would be within the project footprint, while the other 7 trees would incur considerable or severe root impacts. Twenty-one trees to be removed are large mature conifers 48 inches (4 feet) in DBH or greater, including seven redwoods (DBH of 49.1–99.5 inches [4.1–8.3 feet]), five Douglas-fir (DBH of 50.5–67.5 inches [4.2–5.6 feet]), and nine Sitka spruce (DBH of 52.6–82.1 inches [4.4–6.8 feet]) (Figure 3-30).

The majority of trees to be removed would be under 4 feet in DBH; this includes 89% of the Douglas-fir, 87% of the redwoods, and 55% of the Sitka spruce (Figure 3-29).

Table 3-17. Number of Trees Affected by Species and Effect Severity Rank for Alternative X

Species	Effect Severity Rank[1]						Total Affected
	1 – Minimal	2 – Slight	3 – Moderate	4 – Considerable	5 – Severe	6 – Remove	
Douglas-fir	6	4	2	3	1	40	56
Red alder	2	0	0	0	0	13	15
Redwood	6	4	0	0	0	52	62
Sitka spruce	11	5	3	2	1	17	39
Western hemlock	0	1	0	0	0	0	1
Total	**25**	**14**	**5**	**5**	**2**	**122**	**173**

[1] See Table 3-16 for effect severity rank descriptions and anticipated outcomes.

Effects Unique to Alternative F

Alternative F would affect a total of 193 trees with a DBH of 24 inches (2 feet) or larger, as summarized by species in Table 3-18. Of these, it is anticipated that 144 trees would be removed; 137 large trees would be within the project footprint and the other 7 trees would incur considerable or severe root impacts (Figure 3-29). Forty of the trees to be removed are large mature conifers 48 inches (4 feet) in DBH or greater, which includes 16 redwoods (DBH of 51.2–103.5 inches [4.3–8.6 feet]), 3 Douglas-firs (DBH of 48.2–61.1 inches [4.0–5.1 feet]), 18 Sitka spruces (DBH of 48.4–86.8 inches [4.0–7.2 feet]), and 3 western hemlocks (DBH of 55.8–60.9 inches [4.7–5.1 feet]) (Figure 3-30).

The majority of the trees to be removed would be under 4 feet in DBH; this includes 67% of the Douglas-fir, 59% of the redwoods, 63% percent of the Sitka spruce, and 57% of the western hemlock (Figure 3-29).

Table 3-18. Number of Trees Affected by Species and Effect Severity Rank for Alternative F

Species	Effect Severity Rank[1]						Total Affected
	1 – Minimal	2 – Slight	3 – Moderate	4 – Considerable	5 – Severe	6 – Remove	
Douglas-fir	8	1	0	0	0	9	18
Red alder	4	0	1	0	1	39	45
Redwood	14	8	4	2	2	35	65
Sitka spruce	4	1	2	1	1	47	56
Western hemlock	2	0	0	0	0	7	9
Total	**32**	**10**	**7**	**3**	**4**	**137**	**193**

[1] See Table 3-16 for effect severity rank descriptions and anticipated outcomes.

Conclusion

Overall, Alternative F would affect more large trees and would require the removal of more large trees than Alternative X (Tables 3-17 and 3-18). Alternative F would remove almost twice the number large mature conifers (four feet in DBH or greater) than Alternative X. Measures to offset potential impacts to trees are discussed in the Avoidance, Minimization, and Mitigation section at the end of this section.

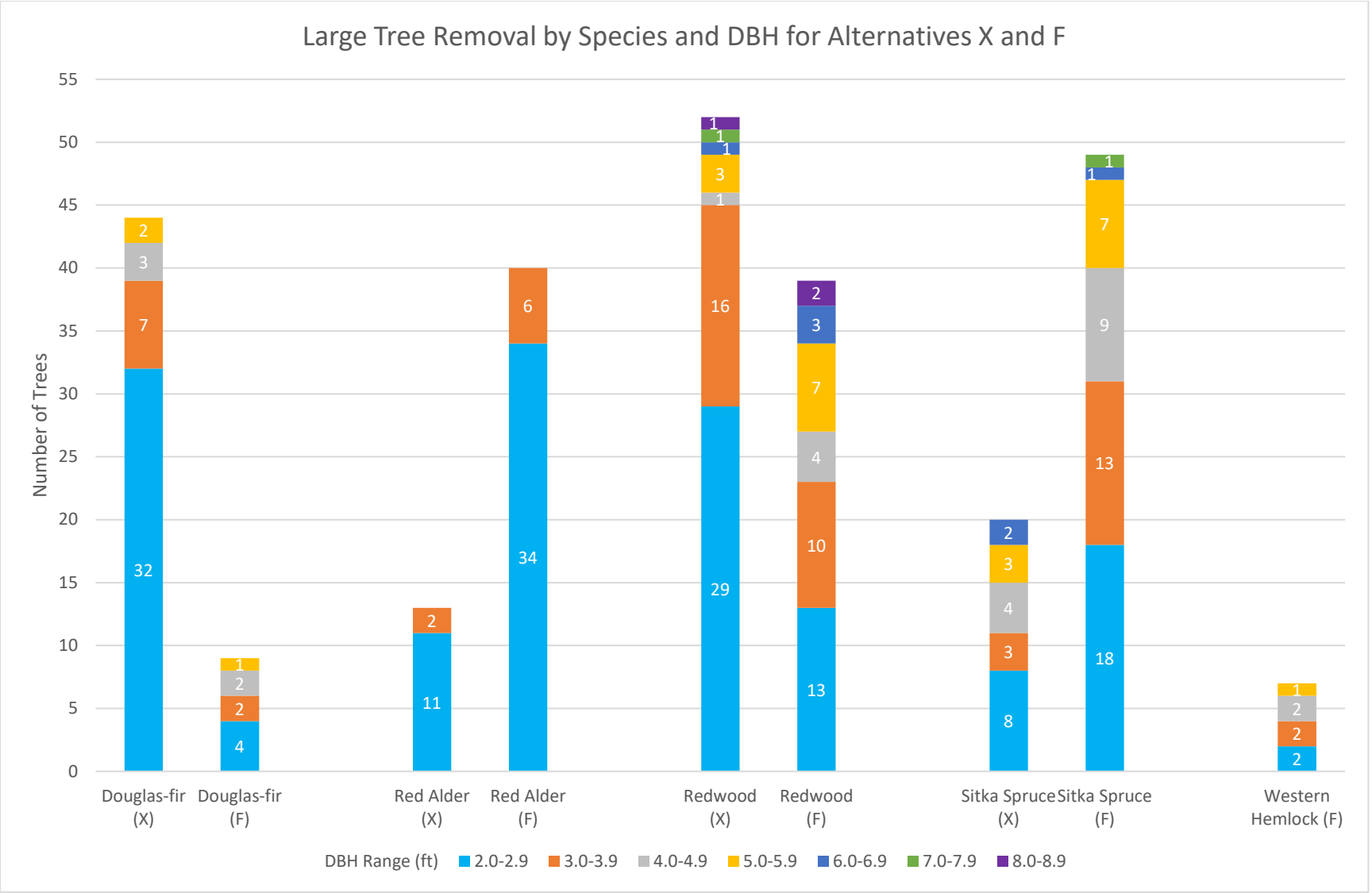


Figure 3-29. Number of Large Trees Removed by Species and Size (DBH) for each Alternative

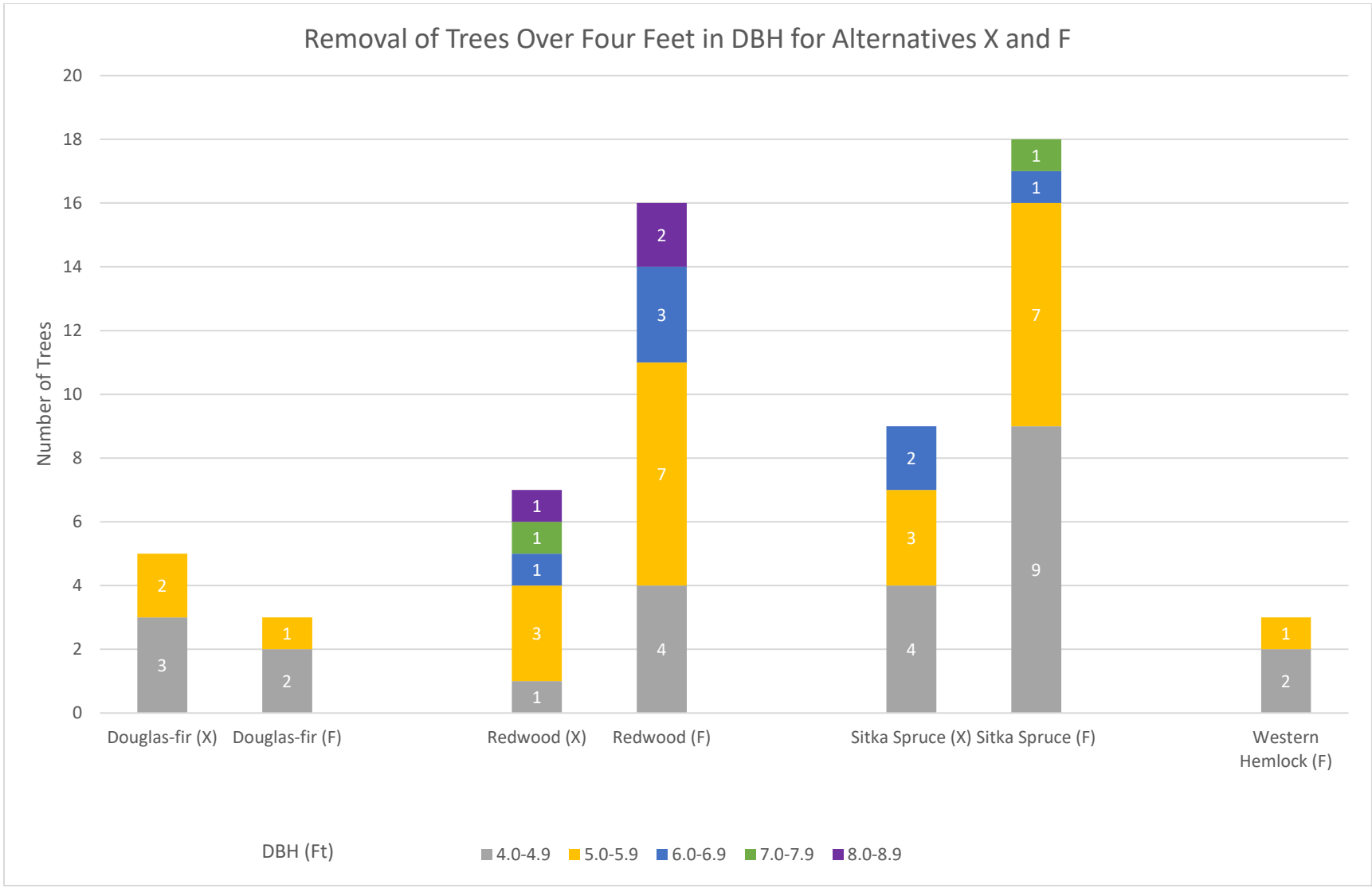


Figure 3-30. Number of Trees over 4 Feet in DBH Removed by Species of Each Alternative

Small Trees

Effects Common to Alternatives X and F

In the permanent and temporary impact areas, small trees (DBH less than 24 inches [2 feet]) would be removed to facilitate construction. In the 15-foot buffer around construction, some small trees may be removed and their SRZ and RHZ may be affected by construction.

Effects Unique to Alternative X

Construction of Alternative X would affect approximately 942 small trees, of which 497 would be removed and an additional 230 are located in the 15-foot buffer and may be removed for equipment access.

Most of the trees that would be affected are red alders (approximately 310), followed by redwoods (approximately 221), Douglas-firs (approximately 204), and Sitka spruces (approximately 104). Additionally, approximately 52 western hemlocks, 40 red elderberries, and 11 cascaras would be affected. The majority, approximately 546, of the trees affected are size 6 to 12 inches DBH. Approximately 257 trees 12.1 to 18.0 inches DBH would be affected. Approximately 139 trees 18.1 to 23.9 inches DBH would be affected.

Effects Unique to Alternative F

Construction of Alternative F may affect approximately 1,066 small trees, of which 759 would be removed and an additional 193 are located in the 15-foot buffer and may be removed for equipment access.

The vast majority of the trees that would be affected are red alders (approximately 742), followed by Sitka spruces (approximately 117). Additionally, approximately 65 red elderberries, 50 redwoods, 35 Douglas-firs, 40 cascaras, 12 western hemlocks, and 5 willows would be affected. Approximately 471 of the trees affected are 6 to 12 inches DBH. Approximately 418 trees 12.1 to 18 inches DBH would be affected. Approximately 177 trees 18.1 to 23.9 inches DBH would be affected.

Conclusion

Overall, Alternative F would remove more small trees (DBH 6.0- 23.9 inches) than Alternative X. However, Alternative X would remove far more small conifers than Alternative F. Measures to offset potential impacts to trees are discussed in the Avoidance, Minimization, and Mitigation section at the end of this section.

ESHAs

Effects Common to Alternatives X and F

Both build alternatives would result in impacts to potential ESHAs. A discussion of impacts under Alternatives X and F on the SNCs considered to be potential ESHAs is provided in *Sensitive Natural Communities* above. A discussion of impacts on wetlands, non-wetland waters, and riparian habitat considered to be potential ESHAs is provided in Section 3.4.2, while impacts to natural communities that provide habitat for special status plants are discussed in Section 3.4.3, special status animals in Section 3.4.4, and listed species in Section 3.4.5. The following table (Table 3-19) summarizes the impact acreages for the potential ESHA features under Alternatives X and F.

Table 3-19. Impacts on Environmentally Sensitive Habitat Areas

ESHA Feature	Permanent Impacts (acres)		Habitat Conversion (acres)		Temporary Impacts (acres)	
	Alternative X	Alternative F	Alternative X	Alternative F	Alternative X	Alternative F
Natural Communities						
Redwood forest						
Early successional redwood forest	0.06	0.02	0	0	0.08	0.29
Late successional redwood forest	0.03	0.62	0	0.47	0.06	0.31
Douglas-fir forest						
Early successional Douglas-fir forest	0.50	0.27	0	0	0.20	0.27
Late successional Douglas-fir forest	3.18	0	0.07	0.02	1.01	0.82
Sitka spruce forest						
Early successional Sitka spruce forest	0	0	0	0	0	0
Late successional Sitka spruce forest	0.29	0.20	0.60	0.93	0.37	0.46
Beaches	0	0	0	0	0	0
Ocean	0	0	0	0	0	0
Natural Communities Subtotal	**4.06**	**1.11**	**0.67**	**1.42**	**1.72**	**2.15**

ESHA Feature	Permanent Impacts (acres)		Habitat Conversion (acres)		Temporary Impacts (acres)	
	Alternative X	Alternative F	Alternative X	Alternative F	Alternative X	Alternative F
Wetlands and Non-Wetland Waters						
Palustrine emergent wetland	<0.001	0.005	0	0	0.005	0
Palustrine forested wetland	0	0.065	0	0	0	0
Palustrine scrub-shrub wetland	0.002	0.031	0	0	0.009	0.009
Human-induced palustrine forested wetland	0	0.012	0	0	0	<0.001
Marine intertidal shoreline	0	0	0	0	0	0
Ephemeral stream	0	0.001	0	0	0	0
Intermittent stream	0	0	0	0	0	0
Perennial stream	0	0.019	0	0	0	0.006
Other State waters	0	0	0	0	0	0
Wetlands and Non-wetland Waters Subtotal	**0.002**	**0.133**	**0**	**0**	**0.014**	**0.015**
Riparian Habitat						
Riparian	0	**0.214**	**0**	**0**	**0**	**0.038**
Total Impacts	**4.06**	**1.46**	**0.67**	**1.42**	**1.73**	**2.20**

Effects Unique to Alternative X

Alternative X would result in 4.06 acres of permanent impacts, 0.67 acre of habitat conversion, and 1.73 acres of temporary impacts on potential ESHA features.

Effects Unique to Alternative F

Alternative F would result in 1.46 acres of permanent impacts, 1.42 acres of habitat conversion, and 2.20 acres of temporary impacts on potential ESHA features.

Habitat Connectivity

Under Alternatives X and F, Standard Measures and BMPs described in Section 2.6 such as AR-2; AR-5; and BR-4 (items B, C, D, and F) would be implemented to avoid and minimize impacts on habitat connectivity. These measures would protect sensitive habitats and minimize removal, as well as revegetate with native species and control invasive species in areas disturbed by construction. Protecting and restoring wildlife habit would avoid and minimize impacts on habitat connectivity.

Effects Unique to Alternative X

Under Alternative X the proposed permanent roadway modifications would change the existing condition regarding species movement. The adjacent structures (retaining walls) would alter movement patterns for some wildlife species and make crossing the highway more difficult. The new retaining wall would extend for 6,000 feet along the eastern side of U.S. 101 and would be up to 50 feet high with additional walls tiered above that on one 300-foot-long section. This new wall would be a new barrier to wildlife movement compared to pre-project conditions. As shown in Figure 3-19, the area to the west is likely to be used less by species compared to habitat east of U.S. 101, as it is less permeable, with steep cliffs making movement through the area more difficult. The retaining walls would be directly adjacent to the existing roadway and would not extend substantially into the permeable areas east of U.S. 101 where highly suitable habitat for special status species is located. Therefore, Alternative X would have minimal impacts on wildlife connectivity.

Construction of the drainage gallery maintenance access road in the southern portion of BSA #1 could be a new barrier to wildlife movement. This road would be constructed within red alder forest, late successional Sitka spruce forest, and coastal brambles. However, this road would not be regularly traveled by traffic because it would be used only for routine maintenance, would not be open to the public, would not have retaining walls, and could be crossed by wildlife species much more readily than U.S. 101. The access road is not anticipated to impact wildlife connectivity.

Effects Unique to Alternative F

Under Alternative F, habitat would be affected along U.S. 101 by the construction of new infrastructure, such as the transformer access road, OMC, retaining walls, and tunnel portals and portal approaches, which would affect the way wildlife move, making some of these areas less permeable to wildlife movement. However, while new infrastructure may alter species local movement patterns, these features would occur in discrete locations and would

not create an impassable barrier throughout the entire BSA #1. In addition, the section of U.S. 101 to be bypassed would be relinquished, improving connectivity along this location as it would remove traffic as a barrier and reduce the risk of vehicle strike. This area located above the tunnel would function as a wildlife crossing for U.S. 101. Therefore, impacts are anticipated to be minimal, and may be beneficial overall.

Conclusions

New roadway infrastructure associated with both Alternatives X and F would have minimal impact on wildlife connectivity. Additionally, for Alternative F, the removal of the existing highway would have a beneficial impact on wildlife connectivity.

Groundwater Effects on Vegetation

The effects on vegetation from changes to groundwater was reviewed in all areas that could potentially be affected by the project, which extended to tributaries of Wilson Creek in the east, Wilson Creek in the south, the ocean in the west, and the watershed boundary in the north. Over the majority of this area, groundwater is located far below the rooting depths of vegetation; therefore, alterations to groundwater would be unlikely to cause negative effects (Caltrans 2023n). Furthermore, the climate is very wet, so modest increases in plant water stress potentially associated with Alternatives X and F would likely be buffered by ample rainfall and high relative humidity.

Effects Unique to Alternative X

Any potential alteration of groundwater associated with Alternative X is unlikely to adversely affect vegetation or surface water features, including wetlands and perennial streams (Caltrans 2023n). This includes effects associated with the proposed drainage galleries. Under Alternative X, the project is not expected to result in permanent impacts on riparian or riverine habitat through alteration of groundwater. Furthermore, it is expected that a lack of connectivity between the deep groundwater that would be targeted by Alternative X drainage galleries and the surface water features supporting the unnamed tributaries of Wilson Creek would prevent effects to surface flows in Wilson Creek. The project would be designed to minimize potential effects of groundwater drawdown on wetlands and other waters that may be reliant on groundwater, such as near the northern and southern limits of Alternative X. The project design would include measures such as having fewer or no perforated pipes at certain locations, sealing a portion of the drainage tunnels, or reducing the northern extent of the drainage galleries. Modeling done for the project shows the potential that groundwater drainage for Alternative X could negatively affect isolated

seeps situated at the base of west-facing slopes within BSA #2. These seeps are inaccessible but appear to mainly be vegetated by invasive jubata grass.

Effects Unique to Alternative F

Any potential alteration of groundwater associated with Alternative F is unlikely to adversely affect the vegetation (Caltrans 2023n). This includes effects associated with the proposed impermeable tunnel. Under Alternative F, the project is not expected to result in impacts on the vegetation communities, wetland, riparian, or riverine habitat through alteration of groundwater. During the tunnel boring process, the bore would be sealed progressively as the tunnel is excavated. This is expected to minimize or eliminate any potential negative effects on groundwater level associated with tunnel construction. There is a low probability that the impermeable tunnel could inhibit or slow water drainage, saturating soil and possibly negatively affecting plant root systems and increasing tree vulnerability to windthrow in the limited area (50 feet) near the portals where the tunnel is close to the surface.

Conclusions

The groundwater drainage galleries associated with Alternative X are not expected to impact vegetation communities or surface water features, with the exception of some small seeps located just above the ocean on the west cliff face. These seeps may be dewatered.

Tunnel construction for Alternative F is not expected to result in impacts on the vegetation communities, wetland, riparian, or riverine habitat through alteration of groundwater.

No-Build Alternative

Under the No-Build Alternative, no construction would be planned at LCG. Regular maintenance and operations would continue, with emergency restoration projects conducted as needed to address landslides and roadway failures.

Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation measures are needed for habitat connectivity or groundwater effects on vegetation.

Sensitive Natural Communities

Even with the consideration of standard measures and BMPs, impacts to late successional SNCs are anticipated to be substantial; this includes late successional Sitka spruce forest for Alternative X, and late successional redwood forest and late successional Sitka spruce for Alternative F. To offset and mitigate for impacts to these SNCs, Bio-1 (below) would be implemented.

ESHAs include late successional redwood forest and late successional Sitka spruce, which would be compensated for in the measures below. Bio-1 would also include late successional Douglas-fir forest which, while not considered a sensitive natural community, would potentially be considered an ESHA due to its use as habitat by special status species. This potential ESHA is discussed further in Section 3.4.5. Impacts to other potential ESHAs, including wetland and non-wetland waters, are discussed further in 3.4.2.

- **Bio-1:** Caltrans would undertake one or more mitigation projects to compensate for the loss of late successional (mature to old-growth) redwood, Douglas-fir, and Sitka spruce conifer forest and associated large trees. The mitigation project(s) would attempt to offset impacts based on acreage removed and temporal loss of function.

  Typically, mitigation for Caltrans projects is established by applying ratios to compensate for the temporal loss of function of impacted habitat (e.g., 2:1, 3:1, etc.). However, these ratios are for resources where functional equivalency can be achieved within the foreseeable future. Mitigating for late successional forests is more complex, as the unique character and qualities of these forests cannot be replaced in the near-term. These forests, particularly those that support long-lived species such as coast redwood, can take hundreds of years to establish on their own.

  Caltrans anticipates that the mitigation strategy for late successional forest communities would include one or both of the following options:

  - **Option One:** Fund forest restoration projects that accelerate the development of late successional characteristics in younger-aged stands.

    Funding thinning projects in dense, early successional stands would accelerate tree growth, increase tree vigor, increase biodiversity for botanical and wildlife species, buffer remaining late successional stands from high intensity stand-

damaging fires, and increase carbon sequestration. Current available research supports that thinning young stands could accelerate the formation of late successional characteristics and functions in approximately 100 years for Sitka spruce, 150 years for Douglas-fir, and 200 years for redwood stands, though this is highly variable based on the treated stand's age, location, and position within the landscape.

In addition to funding thinning projects, this mitigation option may include:

- An endowment for the long-term management of treated stands, including additional actions to accelerate the development of late successional characteristics such as additional thinning, crown modification to improve structural complexity, etc.
- A research endowment to fund studies to guide forest management, monitor the efficacy of the thinning treatments, and identify appropriate adaptive management strategies.

Specific objectives related to forest thinning treatments for mitigation include but are not limited to:

- Accelerate the recovery of previously logged young successional conifer stands to mature forest structure and function.
- Create connectivity between the remaining fragments of late successional forest communities.
- Improve stream habitat, reduce erosion, restore hydrology, and enhance landscape resiliency.

Impacts to sensitive natural communities and ESHA are typically mitigated at a 3:1 ratio; however, given that the time it may take for treated stands to reach functional equivalency of the stands impacted by the project, the amount of mitigation required may be based on the length of time it would take to restore functional equivalency of late-successional forest impacted by the proposed project, i.e., the number of years it would take for the treated stands to reach the functional equivalency of the impacted habitat. It is therefore anticipated that in-kind mitigation would be 100:1 for late successional Sitka spruce forest, 150:1 for late successional Douglas-fir forest, and 200:1 for late successional coast redwood forest, though these ratios may increase or decrease depending on various factors, such as quality and age of stands being impacted, or if selected mitigation stands

are off-site or out-of-kind. This is a preliminary review and final ratios would be determined through the permitting process and stakeholder coordination.

Current opportunities exist to provide funding to one or more organizations, such as Redwoods Rising, that are leading direct efforts to rehabilitate/restore late successional conifer forests using these methods in Del Norte and Humboldt counties.

- **Option Two:** Preservation of existing late successional forest habitat.

  Preservation would be accomplished through the purchase of existing late successional conifer forests in Del Norte or Humboldt counties that are threatened by logging or development, with the intent of conveying such acreage to an agency or organization that would manage it in perpetuity. Preservation ratios are typically greater than restoration ratios and would be coordinated with administering agencies.

  Preservation of existing late successional forest habitat for mitigation may also include:

  - An endowment for the long-term management/maintenance of preserved habitats.
  - A deed restriction or conservation easement that restricts future land use practices that could adversely affect the protected habitat, thereby ensuring protection of the habitat in perpetuity.

The final strategy for mitigating for late successional forest, using one or both of the options above, would be outlined in a Habitat Mitigation and Monitoring Plan. This plan would be established prior to application of project permits and would take into consideration input from project stakeholders and identification of requirements from federal/state regulators.

Trees

In addition to the Standard Measures and BMPs to avoid and minimize damage to large trees and Bio-1 above, which would offset impacts to late successional conifer forests and the associated large trees, the following avoidance and minimization measures would be implemented for both build alternatives. These measures may allow some of the trees ranked considerable or severe to be retained.

- **Bio-2:** During construction, when the roots of large diameter trees are being severed, an arborist shall be on-site to assess the extent of damage to the SRZ and RHZ to ensure that any roots damaged during grading or construction shall be exposed to sound tissue and cut cleanly with a saw, and to make a decision on tree removal.
- **Bio-3:** In temporary impacts areas, permeable fill materials would be used where feasible.

3.4.2 Wetlands and Other Waters

Regulatory Setting

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Federal Water Pollution Control Act, more commonly referred to as the Clean Water Act (CWA) (33 USC 1344), is the primary law regulating wetlands and surface waters. One purpose of the CWA is to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. Waters of the U.S. include navigable waters, interstate waters, territorial seas, and other waters that may be used in interstate or foreign commerce. The lateral limits of jurisdiction over non-tidal water bodies extend to the OHWM in the absence of adjacent wetlands. When adjacent wetlands are present, CWA jurisdiction extends beyond the OHWM to the upland boundary of the adjacent wetlands. To identify wetlands for the purposes of the CWA, a three-parameter approach is used that requires the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils formed during saturation/inundation). All three parameters must be present, under normal circumstances, for an area to be designated a potential jurisdictional wetland under the CWA.

Section 404 of the CWA establishes a regulatory program which provides that discharge of dredged or fill material cannot be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. The Section 404 permit program is run by USACE with oversight by U.S. EPA.

The USACE issues two types of 404 permits: General and Individual. There are two types of General permits: Regional and Nationwide. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to allow a variety of minor project activities with no more than minimal effects.

Ordinarily, projects that do not meet the criteria for a Regional or Nationwide Permit may be permitted under one of USACE's Individual permits. There are two types of Individual permits: Standard permits and Letters of Permission. For Individual permits, the USACE decision to approve is based on compliance with U.S. EPA's Section 404(b)(1) Guidelines (40 CFR Part 230), and whether permit approval is in the public interest. The Section 404 (b)(1) Guidelines (Guidelines) were developed by the U.S. EPA in conjunction with the USACE, and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative which would have less adverse effects. The Guidelines state that the USACE may not issue a permit if there is a LEDPA to the proposed discharge that would have lesser effects on waters of the U.S., and not have any other adverse environmental consequences.

The Executive Order for the Protection of Wetlands (EO 11990) also regulates the activities of federal agencies with regard to wetlands. Essentially, EO 11990 states that a federal agency, such as FHWA and/or Caltrans, as assigned, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: (1) that there is no practicable alternative to the construction and (2) the proposed project includes all practicable measures to minimize harm. A Wetlands Only Practicable Alternative Finding must be made.

At the state level, wetlands and waters are regulated primarily by SWRCB, the RWQCBs, and CDFW. In certain circumstances, the CCC may also be involved. Sections 1600-1607 of the California Fish and Game Code require any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify CDFW before beginning construction. If CDFW determines the project may substantially and adversely affect fish or wildlife resources, a Lake and Streambed Alteration Agreement (LSAA) would be required.

CDFW jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands under jurisdiction of the USACE may or may not be included in the area covered by an LSAA obtained from CDFW.

The RWQCBs were established under the Porter-Cologne Act to oversee water quality. Discharges under the Porter-Cologne Act are permitted by WDRs and may be required even

when the discharge is already permitted or exempt under the CWA. In compliance with Section 401 of the CWA, the RWQCBs also issue water quality certifications for activities which may result in a discharge to waters of the U.S. This is most frequently required in tandem with a Section 404 permit request. Refer to section 3.3.2, *Water Quality and Storm Water Runoff*, for more details.

Affected Environment

Potential waters of the U.S. and State were were delineated within BSA #1 (the ESL plus a 100-foot buffer) in 2021 (May 17 through June 4) and 2022 (January 13, and June 13 through July 11) following state and federal guidelines (Environmental Laboratory 1987; USACE 2005, 2010)[30]. These delineations were documented in the *Last Chance Grade Permanent Restoration Project State Aquatic Resources Delineation* (Caltrans 2023h) and *Last Chance Grade Permanent Restoration Project Federal Aquatic Resources Delineation* (Caltrans 2023g), and summarized in the NES (Caltrans 2023d). Riparian vegetation was also delineated, and the vegetative alliance documented based on the CDFW-CNPS protocol for rapid assessments (CDFW 2018b).

Wetlands and other waters within BSA #1 are present because of the high rainfall, proximity to the ocean, persistent fog, and geology of the area. Wetlands are abundant and typically small and supported by seeps and springs, which, in turn, provide flows for the streams. Several of the streams support riparian habitat. In total, 46 wetlands, 2 marine intertidal shoreline features, 27 streams, 6 Other Waters of the State, and 8 riparian habitat units potentially under the jurisdiction of the USACE, RWQCB, CDFW, and/or CCC were mapped within BSA #1 as summarized in the sections below, and shown on the maps in Figures 3-31 to 3-34 and summarized in Table 3-20.

[30] The jurisdiction of the wetlands is subject to USACE determination. One factor may be the Sackett decision (Sackett *v.* Environmental Protection Agency, May 25, 2023) which found that the Clean Water Act extends only to wetlands that have a continuous surface connection with "waters" of the United States. This reduces federal jurisdiction, although the magnitude of the reduction is currently unclear. Some of the wetlands mapped as Waters of the U. S. (USACE Jurisdictional Features) for this project are isolated with no above ground connectivity to a traditional navigable water and may no longer be USACE jurisdictional.

Table 3-20. Waters of the U.S., Waters of the State, Coastal Zone Wetlands, and Riparian Habitats Identified within the Biological Study Area

Feature Type and Name	Length (linear feet)	USACE Jurisdiction (acres)	RWQCB Jurisdiction (acres)	CDFW Jurisdiction (acres)	CCC Jurisdiction (acres)
Wetlands					
Palustrine emergent wetland	N/A	0.04	0.04	0.02	0.04
Palustrine forested wetland	N/A	0.98	0.98	0.83	0.98
Palustrine scrub-shrub wetland	N/A	0.22	0.22	0.19	0.22
Human-induced palustrine forested wetland	N/A	0	0.01	0	0.01
Wetlands Subtotal	**N/A**	**1.24**	**1.25**	**1.04**	**1.25**
Non-wetland Waters					
Marine intertidal shoreline	1,607	0.73	0.73	0	0.73
Ephemeral stream	312	0.01	0.01	0.01	0.01
Intermittent stream	513	0.02	0.02	0.02	0.02
Perennial stream	6,146	0.34	0.34	0.34	0.34
Other Waters of the State	N/A	0	0.02	0.02	0.05
Non-wetland Waters Subtotal	**8,578**	**1.10**	**1.12**	**0.39**	**1.15**
Total Waters of the State	**8,578**	**2.34**	**2.37**	**1.43**	**2.40**
Riparian Habitat	**N/A**	**0**	**4.41**	**4.41**	**4.41**

Wetlands

There are four wetland types within BSA #1: palustrine emergent wetlands, palustrine forested wetlands, palustrine scrub-shrub wetlands, and human-induced palustrine forested wetlands, as described below. A total of 46 wetlands (comprising 1.25 acres) were mapped (Figures 3-31 to 3-34). Of those, 44 (1.24 acres) are potentially jurisdictional under USACE; 32 (1.04 acres) are potentially jurisdictional under CDFW; and all 46 (1.25 acres) are potentially jurisdictional under RWQCB and CCC (Table 3-20).

Palustrine Emergent Wetlands

Five palustrine emergent wetlands—wetlands characterized by a well-developed herbaceous stratum with minimal tree or shrub cover—occur within BSA #1. All are small with a history of human disturbance. Three of the five wetlands are adjacent to U.S. 101 on cut banks, while the remaining two are on an infrequently used access road. Three of the five palustrine emergent wetlands are continuously saturated, one is seasonally saturated, and another is seasonally flooded. All palustrine emergent wetlands display some level of aboveground connectivity to streams.



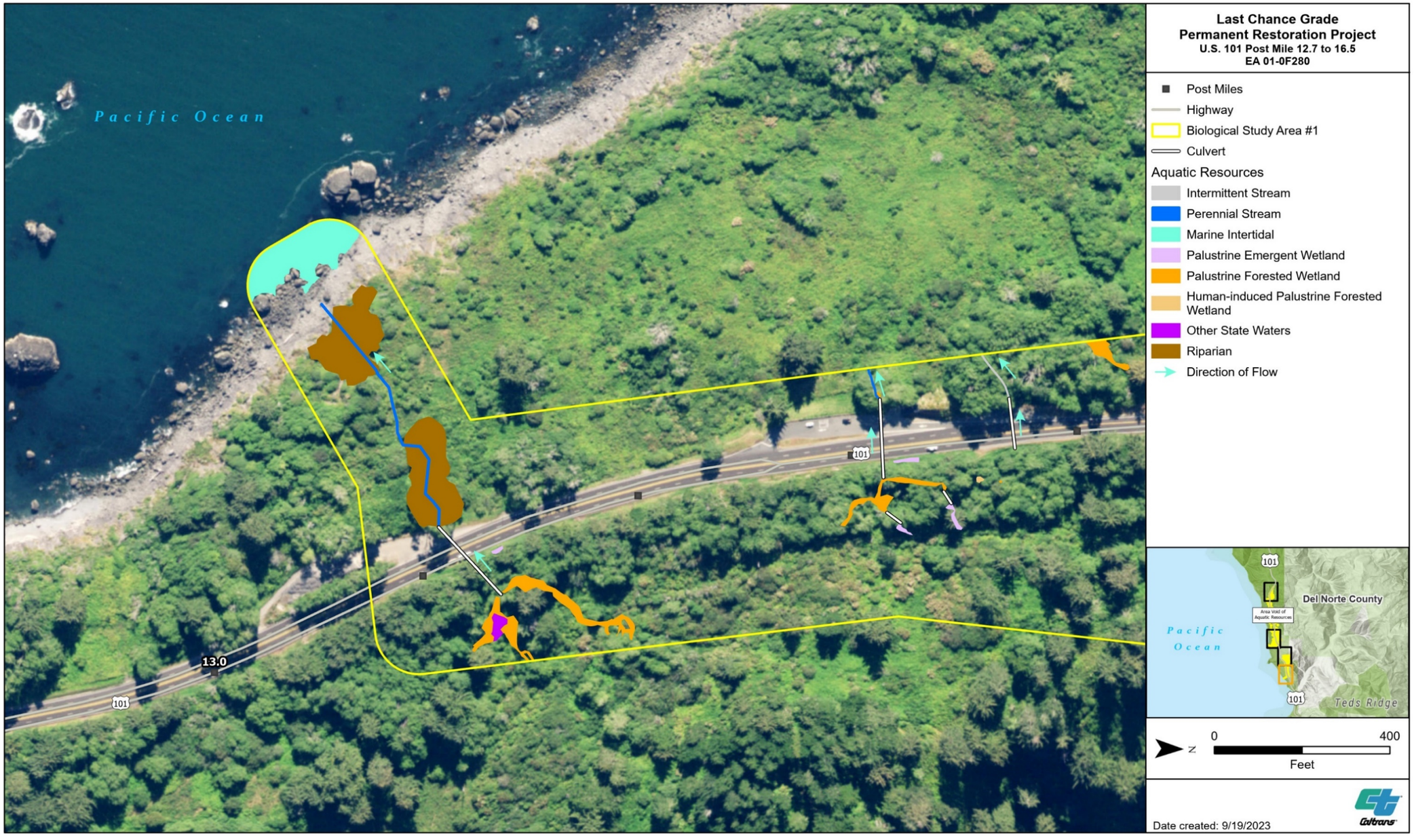


Figure 3-31. Aquatic Resources and Associated Riparian Habitat in Biological Study Area #1 (Sheet 1 of 4)





Figure 3-32. Aquatic Resources and Associated Riparian Habitat in Biological Study Area #1 (Sheet 2 of 4)





Figure 3-33. Aquatic Resources and Associated Riparian Habitat in Biological Study Area #1 (Sheet 3 of 4)





Figure 3-34. Aquatic Resources and Associated Riparian Habitat in Biological Study Area #1 (Sheet 4 of 4)



Palustrine Forested Wetlands

There are 29 palustrine forested wetlands—wetlands characterized by a forest overstory within BSA #1. These vary in size and have a wide range of hydrologic conditions and connectivity. One of the palustrine forested wetlands is seasonally saturated/flooded, and the rest are continuously saturated with varying depths of saturation.

Palustrine Scrub-Shrub Wetlands

Within BSA #1, there are 10 palustrine scrub-shrub wetlands—wetlands characterized by a shrub overstory without appreciable tree cover. These vary in size and have a wide range of hydrologic conditions and connectivity. Eight of the palustrine scrub-shrub wetlands have completely natural conditions present and two have evidence of past human disturbance. All of the palustrine scrub-shrub wetlands are either continuously saturated with varying depths of saturation or the saturation duration is unknown. Groundwater sources provide hydrology for 8 of the 10 scrub-shrub wetlands. The other two scrub-shrub wetlands have hydrology that is tied to nearby stream flows.

Human-induced Palustrine Forested Wetlands

Two human-induced wetlands occur within BSA #1; they exist as a result of human disturbance, which has created wetland conditions in an otherwise upland setting. Both wetlands are in compacted low points in otherwise well-drained soil.

Non-wetland Waters

Non-wetland waters within BSA #1 include marine intertidal shoreline, streams (ephemeral, intermittent, and perennial), and Other Waters of the State (seeps and coastal features) (Figures 3-31 to 3-34). A total of 35 of these features were mapped, covering 1.15 acres: 2 marine intertidal shoreline features (0.73 acre), 27 streams (0.37 acre), and 6 Other Waters of the State (0.05 acre) (Table 3-20). Both of the marine intertidal shoreline features and all 22 streams are potentially jurisdictional under USACE, RWQCB, and CCC. CDFW has potential jurisdiction over the 22 streams, as well as seeps associated with Other Waters of the State. The RWQCB also has jurisdiction over the seeps, while the CCC has jurisdiction of the seeps and the coastal feature.

Marine Intertidal Shoreline

The two intertidal features within BSA #1 are areas of rocky shoreline below the mean higher high-water mark, which is identified at the 6.87-foot elevation at this location using the Crescent City Station (National Oceanic and Atmospheric Administration 2022). The shoreline is steep and experiences rough wave action and erosive hydrodynamics throughout the year, eroding the adjacent steep bluff slope.

Ephemeral Streams

Ephemeral streams flow during and immediately after precipitation events and are dependent on rainfall rather than groundwater for flows. Five ephemeral streams occur within BSA #1, and all are first-order streams that flow to larger streams and are considered a tributary or headwater of the larger stream.

Intermittent Streams

Intermittent streams flow during portions of the year when the groundwater table is higher than the bed of the stream, allowing for longer-duration flows that are supplemented by storm events. Intermittent streams typically dry out at the beginning of the dry season and do not flow again until soils are saturated during the wet season.

Five intermittent streams occur within BSA #1 and are mostly first-order, short, seasonal drainages. Half of the intermittent streams flow into larger perennial streams; however, one of the intermittent streams is the upper reaches of a perennial stream and two of the streams flow out of BSA #1 and it is unknown what hydrologic connectivity they have. Two of the intermittent streams have artificial conditions present, while the remaining streams have natural conditions present with various levels of historical disturbance.

Perennial Streams

Perennial streams have a well-defined channel with year-round flows. Groundwater is the primary source of flows and is essential in maintaining flows during the dry season. Flows increase with increasing saturation and subsequent rising of the water table; additional flows are provided by stormwater during storm events. A number of perennial streams within BSA #1 are culverted under U.S. 101.

Seventeen perennial streams occur within BSA #1 and range from short, first-order, spring-fed tributaries to large, second- and third-order streams with abundant perennial flows provided by numerous springs, wetlands, and groundwater. Several of the perennial streams flow directly into the Pacific Ocean within or just outside of BSA #1.

Other State Waters

There are five features (0.02 acre) within BSA #1 that are ill-defined, but most closely resemble seeps/springs. The features only have hydrology present, and are the result of groundwater coming to the surface on steep embankments. This has resulted in OHWM-like conditions in places; however, these are not streams and they occur within discrete locations. The steep slopes, erosion, and well-drained soils have prevented formation of hydric soils and hydrophytic vegetation. The seeps all connect to streams within BSA #1.

One other feature, considered a coastal feature, was present within BSA #1. This feature is a slightly elevated area between two wetlands and is approximently 0.03 acres in size. This location does have hydric soils and hydrophytic vegetation. However, it does not have hydrology, likely due to its raised position, which is too high for wetland hydrology, but close enough to wetlands to develop hydric soils.

These Other Waters of the State are not potentially jurisdictional under USACE, but five (0.02 acre) are potentially jurisdictional under RWQCB, CDFW, and CCC, while the aquatic coastal feature (0.03 acre) is potentially jurisdictional under CCC (Table 3-20) .

Riparian Habitat

There are eight riparian habitat areas within BSA #1 that are potentially jurisdictional under the RWQCB, CDFW, and CCC (Table 3-20, Figures 3-31 to 3-33) covering 4.41 acres consisting of red alder forest along perennial streams. Overall, the riparian habitat is minimally disturbed, although U.S. 101 cuts through five of the eight riparian habitat areas, and two of the riparian habitat areas display evidence of historical logging activity that likely predates the current riparian habitat.

Environmental Consequences

Caltrans has been considering various alternatives to address the instability at LCG since the 1980s, as documented in Section 2.5, *Alternatives Considered but Eliminated from Further Discussion*. All of the alternatives considered, except Alternatives X and F, were deemed infeasible for engineering and/or cost reasons, and/or for having unacceptable environmental impacts, including to wetlands.

Since Alternatives X and F were brought forward for further review, numerous refinements to the alternatives have been made to minimize effects on environmental resources, including wetlands and other waters (Section 2.4, *Background on Refinements of Alternatives X and F*). However, both alternatives would still affect aquatic resources and riparian habitat, as summarized in Tables 3-21 to 3-23, which show impacts by agency jurisdiction.

Figure 3-35 depicts impacts on aquatic resources under Alternative X and Figures 3-36 to 3-38 depict impacts on aquatic resources under Alternative F.

Table 3-21. Impacts on Waters of the U.S. (U.S. Army Corps of Engineers Jurisdictional Features)

Feature Type	Permanent Impacts (acres)		Temporary Impacts (acres)	
	Alternative X	Alternative F	Alternative X	Alternative F
Wetlands				
Palustrine emergent wetlands	<0.001	0.005	0.005	0
Palustrine forested wetlands	0	0.065	0	0
Palustrine scrub-shrub wetlands	0.002	0.031	0.009	0.009
Wetlands Impacts Subtotal	**0.002**	**0.101**	**0.014**	**0.009**
Non-wetland Waters				
Marine intertidal shoreline	0	0	0	0
Ephemeral streams	0	0.001	0	0
Intermittent streams	0	0	0	0
Perennial streams	0	0.019	0	0.006
Non-wetland Waters Impact Subtotal	**0**	**0.020**	**0**	**0.006**
Total Impacts on Aquatic Resources	**0.002**	**0.121**	**0.014**	**0.015**

Table 3-22. Impacts on California Coastal Commission and Regional Water Quality Control Board Jurisdictional Features

Feature Type	Permanent Impacts (acres)		Temporary Impacts (acres)	
	Alternative X	Alternative F	Alternative X	Alternative F
Aquatic Resources				
Wetlands				
Palustrine emergent wetlands	<0.001	0.005	0.005	0
Palustrine forested wetlands	0	0.065	0	0
Palustrine scrub-shrub wetlands	0.002	0.031	0.009	0.009
Human-induced palustrine forested wetland	0	0.012	0	<0.001
Wetlands Impacts Subtotal	**0.002**	**0.113**	**0.014**	**0.009**
Non-wetland Waters				
Marine intertidal shoreline	0	0	0	0
Ephemeral streams	0	0.001	0	0
Intermittent streams	0	0	0	0
Perennial streams	0	0.019	0	0.006
Other State waters	0	0	0	0
Non-wetland Waters Impact Subtotal	**0**	**0.020**	**0**	**0.006**
Total Impacts on Aquatic Resources	**0.002**	**0.133**	**0.014**	**0.015**
Riparian Habitat				
Riparian	0	0.214	0	0.038
Total Impacts on Riparian Habitat	**0**	**0.214**	**0**	**0.038**

Table 3-23. Impacts on California Department of Fish and Wildlife Jurisdictional Features

Feature Type	Permanent Impacts (acres)		Temporary Impacts (acres)	
	Alternative X	Alternative F	Alternative X	Alternative F
Aquatic Resources				
Wetlands				
Palustrine emergent wetlands	0	0	0	0
Palustrine forested wetlands	0	0.064	0	0
Palustrine scrub-shrub wetlands	0.002	0.031	0.009	0.009
Wetlands Impacts Subtotal	**0.002**	**0.095**	**0.009**	**0.009**
Non-wetland Waters				
Ephemeral streams	0	0.001	0	0
Intermittent streams	0	0	0	0
Perennial streams	0	0.019	0	0.006
Other State waters	0	0	0	0
Non-wetland Waters Impact Subtotal	**0**	**0.020**	**0**	**0.006**
Total Impacts on Aquatic Resources	**0.002**	**0.115**	**0.009**	**0.015**
Riparian Habitat				
Riparian	0	0.214	0	0.038
Total Impacts on Riparian Habitat	**0**	**0.214**	**0**	**0.038**

Under both build alternatives, Caltrans Standard Measures and BMPs would be implemented to avoid and minimize impacts to wetlands and other waters and riparian habitat. These include measures BR-1, BR-2 (D and G), BR-4 (B and C) and BR-5 (A, B, C, and D), which require education of construction staff on project conditions, limited operating periods for instream work, monitoring of instream work activities, protection of wetlands and other waters and riparian habitat where appropriate, and revegetation of temporarily disturbed areas with appropriate native vegetation. In addition, WQ-1 and WQ-2 would be implemented, with measures that would protect water quality, such as erosion control and construction waste containment.

Effects Unique to Alternative X

Under Alternative X, two wetlands would be impacted: a palustrine emergent wetland (Wetland 32) and a palustrine scrub-shrub wetland (Wetland 19) (Tables 3-21 to 3-23; Figures 3-35[31]). Wetland 32 is on a cut bank just east of U.S. 101 and would be permanently impacted by the widening of the roadway; the entire wetland would be impacted by the project. Wetland 19 is located where the new road to access the drainage gallery outlet will be built; a portion of this wetland would be impacted by the project.

- ***Permanent:*** Alternative X would permanently fill a total of 0.002 acre of wetland. These areas would be replaced with permanent infrastructure or are within areas of cut and fill, where the change in topography may prevent resources from functioning as it did pre-project.
- ***Temporary:*** Alternative X would also result in temporary direct impacts to 0.014 acre of wetland. These impacts would be due to the need for construction access and movement of construction equipment, personnel, and materials. With implementation of the Standard Measures and BMPs detailed above, the aquatic resources in these areas would continue to function as they had pre-project in less than a year.

Construction activities in and around Wetlands 19 and 32 could potentially cause short-term water quality impacts, such as from sediment and/or pollutants entering the aquatic resource. However, with implementation of the standard measures mentioned above to protect water quality (WQ-1 and WQ-2), impacts to wetlands water quality are not anticipated.

In addition to the impacts noted above, the drainage gallery could potentially affect isolated seeps situated at the base of west-facing slopes within BSA #1. Impacts that may occur as a result of the operation of the drainage gallery are discussed in *Groundwater Effects on Vegetation*, under Section 3.4.1.

Both wetlands affected by Alternative X (Wetlands 19 and 32) are potentially under the jurisdiction of the USACE, CCC, and RWQCB, while only the palustrine scrub-shrub wetland would be CDFW-jurisdictional. Due to impacts on these potentially jurisdictional features, Alternative X would require permits from USACE, RWQCB, CDFW, and CCC.

[31] For Figure 3-35, wetland impacts are determined by the area where the project impacts overlap the wetlands.



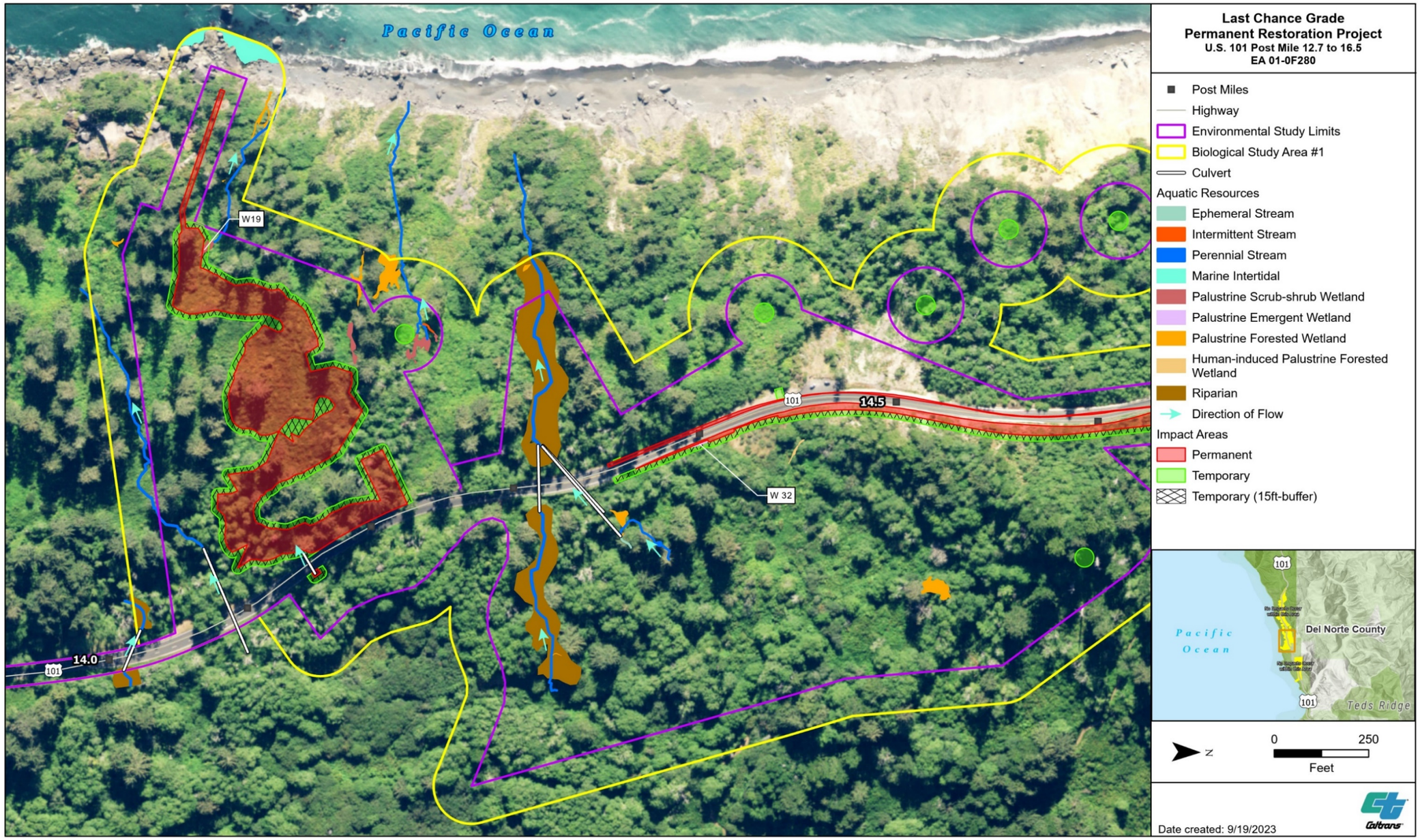


Figure 3-35. Alternative X Impacts on Aquatic Resources and Associated Riparian Habitat



Effects Unique to Alternative F

Under Alternative F, nine wetlands, one ephemeral stream, two perennial streams, and one riparian habitat would be impacted (Tables 3-21 to 3-23; Figures 3-36 to 3-38[32]). Wetlands that would be impacted include a palustrine emergent wetland (Wetland 32), five palustrine forested wetlands (Wetland 09, 29, 30, 31, and 37A), a palustrine scrub-shrub wetland (Wetland 37B), and two human-induced palustrine forested wetlands (Wetland 08 and 33). The ephemeral stream to be impacted is Stream 16, while the perennial streams include Stream 14 and 17. The riparian habitat to be affected is associated with Stream 14.

There would be both permanent and temporary impacts to these features:

- ***Permanent***: Alternative F would permanently fill 0.113 acre of wetland. This habitat would either be replaced with hardscaped features, or cut and fill within aquatic resources would alter the existing topography and prevent the portion of the aquatic resource within the cut-and-fill boundary from functioning as it did pre-project, resulting in a permanent impact. Alternative F would also permanently impact approximately 329.90 linear feet (0.019 acre) of perennial stream and 43.30 linear feet (0.001 acre) of ephemeral stream. Additionally, 0.214 acre of red alder riparian associated with stream 14 would be permanently removed. Each of the streams that would be permanently affected flow through tributary systems to the Pacific Ocean. Streams would be impacted by the permanent infrastructure and cut/fill for the south portal.
- ***Temporary:*** Alternative F would also result in temporary direct impacts to 0.009 acre of wetland, 65.65 linear feet (0.006 acre) of perennial stream, and 0.038 acre of red alder riparian habitat. These impacts would be due to the need for construction access and movement of construction equipment, personnel, and materials. With the implementation of the Standard Measures and BMPs, the aquatic resources in these areas would continue to function as they had pre-project in less than a year.

[32] For Figures 3-36 to 3-38, wetland and waters impacts are determined by the area where the project impacts overlap the wetland and stream features.

Construction activities in and around wetlands and streams could potentially have short-term water quality impacts, such as from sediment and/or pollutants entering the aquatic resource, as well as long-term water quality impacts from pollutants associated with stormwater runoff. However, with implementation of the Standard Measures and Best Management Practices stated above to protect water quality (WQ-1 and WQ-2), impacts to water quality are not anticipated.

All aquatic resources impacted by Alternative F, with the exception of the human-induced palustrine forested wetlands and riparian habitat, are potentially USACE jurisdictional features. CDFW would have potential jurisdiction over all of the aquatic resources affected by this alternative with the exception of the human-induced palustrine forested wetlands, the palustrine emergent wetland, and the palustrine forested wetland in the transformer footprint. All of the aquatic resources in Alternative F are considered RWQCB and CCC jurisdictional features. Due to the impacts on these potentially jurisdictional features, construction of Alternative F would require permits from USACE, RWQCB, CDFW, and CCC.

Conclusions

Alternative X would have minimal permanent and temporary impacts on wetlands and no impacts on streams or riparian habitat. Alternative F would also have relatively small permanent and temporary impacts, though wetland impacts are approximately 7.5 times greater than Alternative X, and this alternative would also affect streams and riparian habitat. The quality of habitat affected by Alternative F is greater than that of Alternative X.

No-Build Alternative

Under the No-Build Alternative, no construction would be planned at LCG. Regular maintenance and operations would continue, with emergency restoration projects conducted as needed to address landslides and roadway failures that have been ongoing for decades.

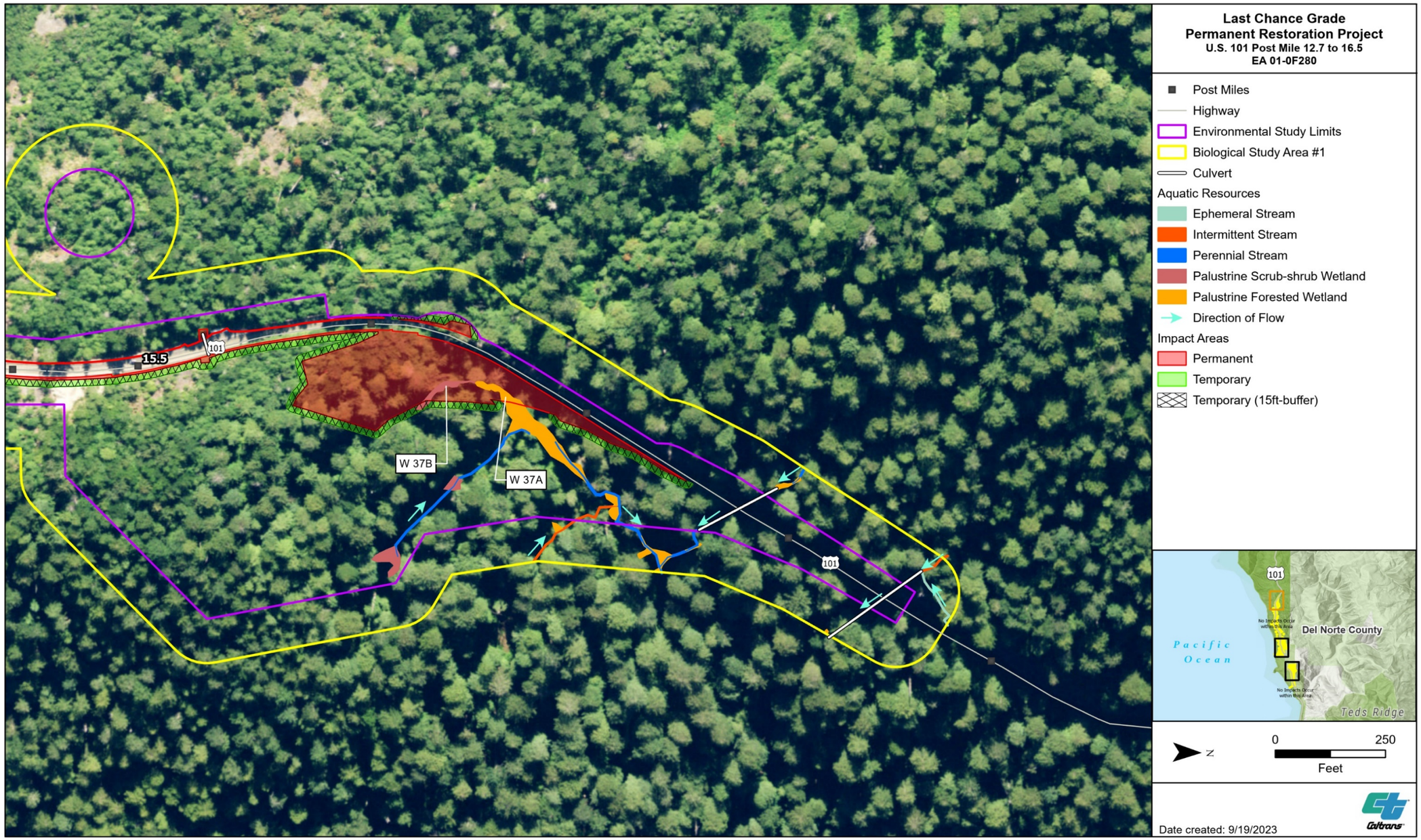


Figure 3-36. Alternative F Impacts on Aquatic Resources and Associated Riparian Habitat (Sheet 1 of 3)



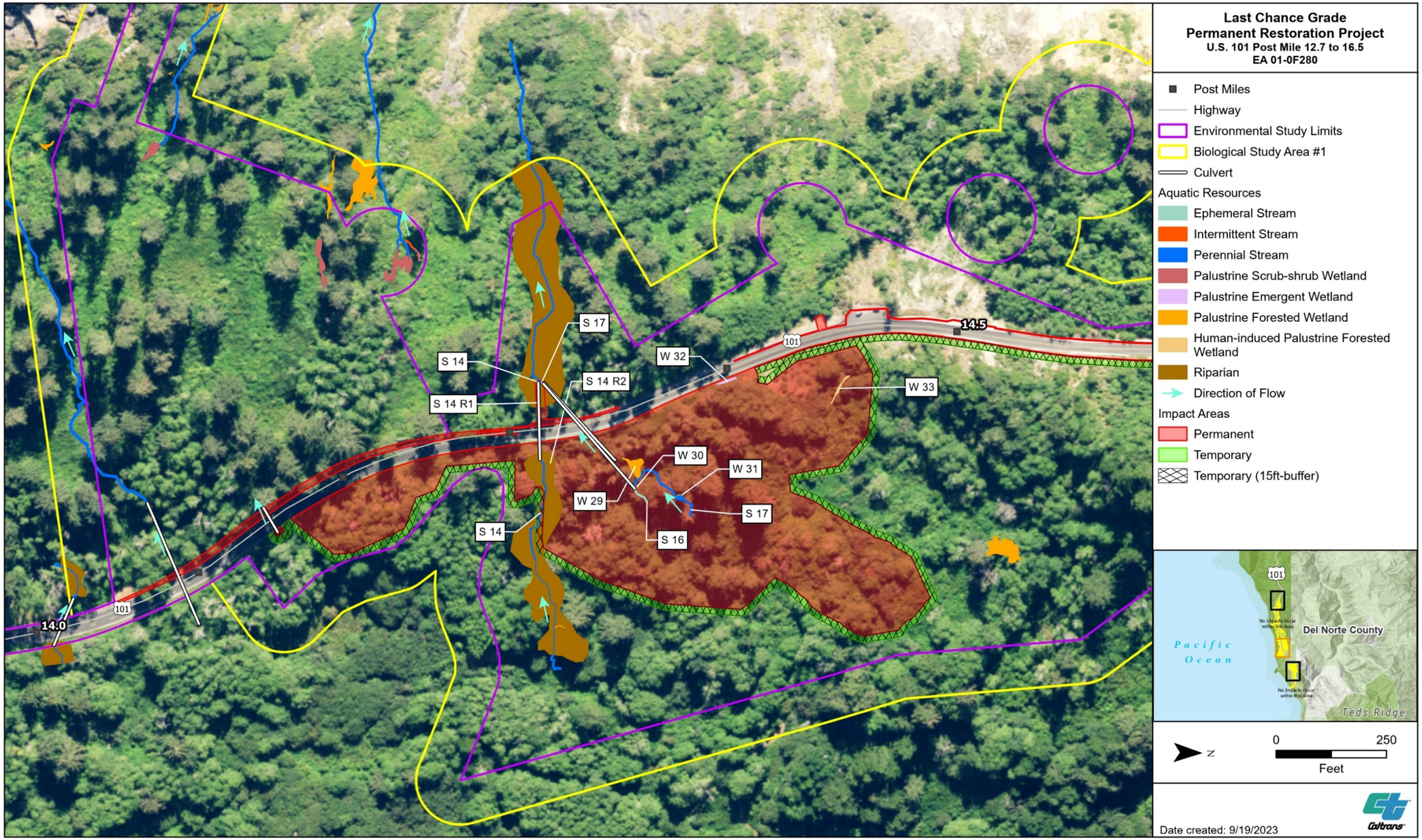


Figure 3-37. Alternative F Impacts on Aquatic Resources and Associated Riparian Habitat (Sheet 2 of 3)



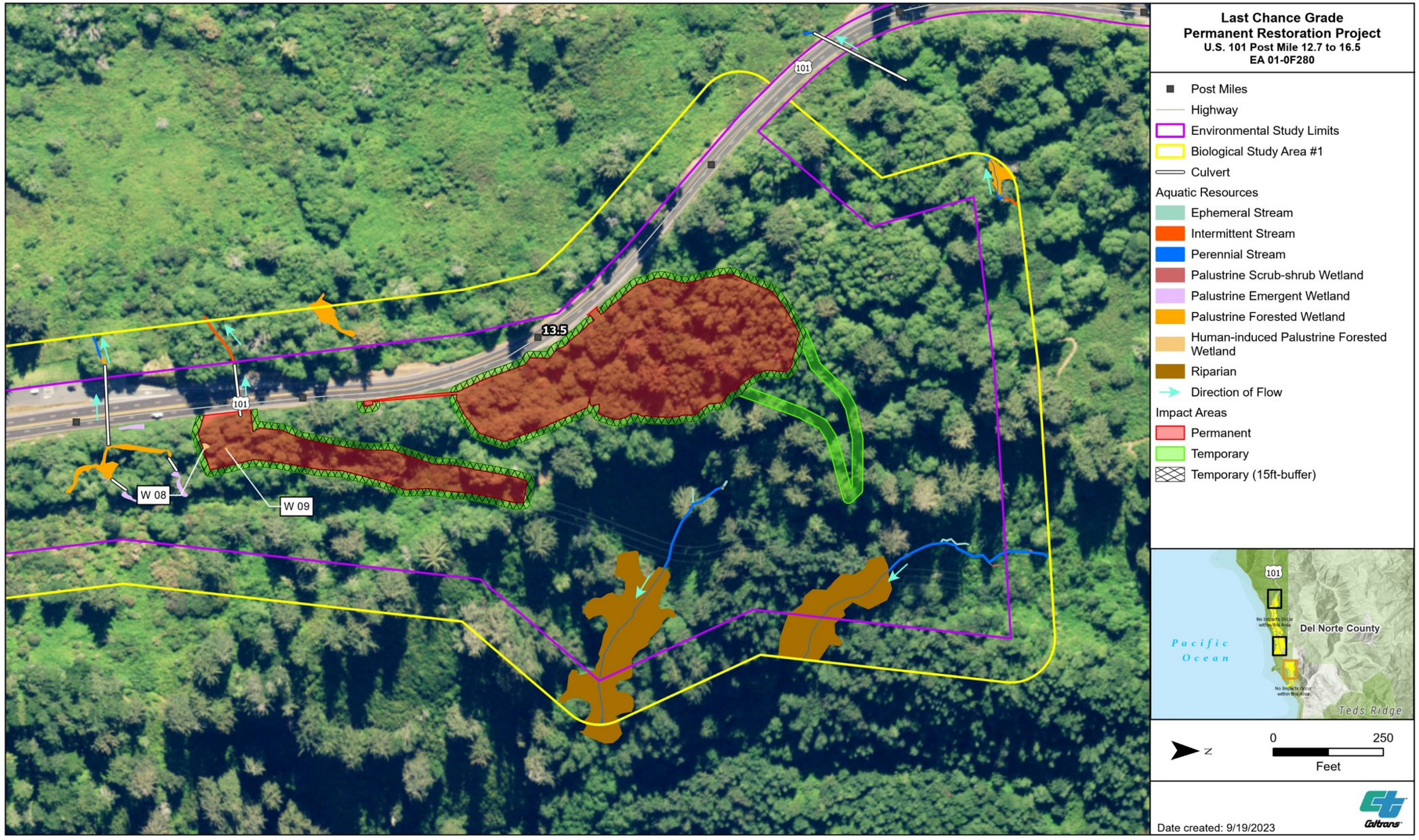


Figure 3-38. Alternative F Impacts on Aquatic Resources and Associated Riparian Habitat (Sheet 3 of 3)



Avoidance, Minimization, and/or Mitigation Measures

While the Standard Measures and BMPs that would be implemented as part of the project would help avoid and minimize effects on aquatic resources, Caltrans anticipates permit-driven compensation for impacts to these resources, including wetlands, streams, and riparian habitat, as described below in Bio-4.

Bio-4: In compliance with state and federal wetlands policies, which establish guidelines for wetland conservation (e.g., no net loss), Caltrans anticipates pursuing permit-driven compensation for impacts on wetlands, as well as on riparian and other waters. Compensation may include a combination of on- and off-site restoration efforts. Compensation efforts, and appropriate ratios, would be determined in coordination with appropriate agencies. Ratios are typically a minimum of 1:1, and are often dependent on the quality of the wetlands and whether an impact is temporary or permanent.

3.4.3 Plant Species

Regulatory Setting

Federal and State Regulations

USFWS and CDFW have regulatory responsibility for the protection of special status plant species. "Special status" species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are provided varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or threatened under FESA and/or the California Endangered Species Act (CESA). Please see Section 3.4.5, *Threatened and Endangered Species*, for detailed information about these species.

This section of the document discusses all other special status plant species, including USFWS candidate species, CDFW species of special concern, and California Native Plant Society (CNPS) rare and endangered plants.

The regulatory requirements for FESA can be found at 16 United States Code (USC) Section 1531, et seq. See also 50 Code of Federal Regulations (CFR) Part 402. The regulatory requirements for CESA can be found at California Fish and Game Code, Section 2050, et seq. Department projects are also subject to the Native Plant Protection Act, found at California Fish and Game Code, Section 1900-1913, and the California Environmental Quality Act (CEQA), found at California Public Resources Code, Sections 21000-21177.

Affected Environment

Several databases[33] were consulted to determine which special status plant species may occur within BSA #1, and botanical surveys in accordance with CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018a) were conducted within accessible areas of BSA #1 in 2021 and 2022.

All special status plant species which could potentially occur within the study area were in their blooming period during the range of dates that surveys were conducted or were otherwise evident and identifiable. Surveys were documented in a *Botanical Survey and Habitat Assessment Report* (Caltrans 2022i) and summarized in the project NES (Caltrans 2023d). Vascular plant nomenclature follows *The Jepson Manual* (*2nd Edition*) (Baldwin et al., 2012) and the Jepson eFlora online updates (Jepson Flora Project 2023).

Based on database searches, 90 special status plants were identified as potentially occurring within BSA #1, in addition to a large number of other potential special status species (i.e., California Rare Plant Rank [CRPR] 4). The list of these special status plants and all CRPR 4 plants, their listing status and their habitat affiliations can be found in Appendix H. This table also includes the rationale for their potential to occur based on the presence, quality, and habitat suitability in BSA #1.

Two special status plant species were observed within BSA #1: seaside bittercress (*Cardamine angulata*) and ghost pipe (*Monotropa uniflora*). Both species are ranked CRPR 2B.2, meaning they are rare, threatened, or endangered in California but more common in other states. There is suitable habitat for one state rare plant, leafy reed grass (*Calamagrostis foliosa*), but it was not found during the botanical surveys. These species are described below. There is also suitable habitat for one federally listed species, western lily (federal and state endangered), which was not found within BSA #1 and is discussed in Section 3.4.5.

In addition, five CRPR 4 species were also observed:

- Methuselah's beard lichen (*Usnea longissimi*) (CRPR 4.2)
- Pacific golden saxifrage (*Chrysosplenium glechomifolium*) (CRPR 4.3)

[33] Databases searched included the CNPS Rare Plant Inventory and the CNDDB (CDFW 2023b) for the following USGS quadrangles: Crescent City, Hiouchi, Gasquet, Sister Rocks, Childs Hill, Cant Hook Mountain, Requa, Klamath Glen, Fern Canyon, Ah Pah Ridge, Rodgers Peak and Orick. In addition, records provided by CDPR (CDPR 2019), RNP (NPS 2019), and GDRC (GDRC 2019), and previous surveys for the LCG Phase 2B Geotechnical Investigation (Caltrans 2019d) were reviewed.

- nodding semaphore grass (*Pleuropogon refractus*) (CRPR 4.2)
- Suksdorf's wood-sorrel (*Oxalis suksdorfii*) (CRPR 4.3)
- sea-watch (*Angelica lucida*) (CRPR 4.2)

CRPR 4 plants are uncommon with limited distribution in California but generally do not meet the definition of "rare, threatened, or endangered" under CEQA. Some occurrences of CRPR 4 species could be of local concern or rare or unique to a region for consideration under State CEQA Guidelines Sections 15380(d) and 15125(c) (i.e., if they are at the periphery of the species' range, are at the type locality, are in areas where they are especially uncommon or declining, are associated with unusual or declining habitats, and/or occur on unusual substrates (CNPS 2020)).

CRPR 4 plants found within BSA #1 were evaluated by reviewing distributional and habitat information from herbarium records (Consortium of California Herbaria [CCH1 Portal] 2022), Calflora (Calflora 2021), and records from the region. None qualify as species to be considered under CEQA because none met the conditions described above to be considered of local concern or rare or unique to a region. The other species listed in Appendix H either do not have habitat within BSA #1 and/or were not found to be present during surveys. Therefore, these species and the CRPR 4 plants located within BSA #1 are not discussed further in this document.

Seaside bittercress

Seaside bittercress is a perennial, rhizomatous herb in the mustard family (Brassicaceae) that blooms between March and July (CNPS 2023). Seaside bittercress typically grows in wet areas along streambanks in coniferous forest at elevations between 80 and 3,000 feet (15 and 915 meters) (CNPS 2023). Seaside bittercress is threatened primarily by logging and road/trail maintenance (CDFW 2023b).

Seaside bittercress occurs along the Pacific Coast from Marin County in Northern California to Alaska (Al-Shehbaz 2012) Locally, it has been documented in the Wilson Creek and Mill Creek watersheds adjacent to BSA #1 (CDPR 2019).

One occurrence of seaside bittercress was found within BSA #1 in riparian red alder forest and Sitka spruce forest along a stream. This population extended onto Redwood National Park land outside BSA #1.

Ghost-pipe

Ghost-pipe is a perennial non-photosynthetic herb in the heath family (Ericaceae) that lacks stems and leaves and consists only of clusters or individual white flowers between June and August (CNPS 2023). It grows in broadleaf upland and North Coast conifer forests at elevations between 35 and 1,805 feet (10 to 550 meters) (CNPS 2023). Ghost-pipe is a mycotroph, meaning it obtain nutrients from mycorrhizal fungi, likely *Russula* and related fungi (mushrooms), that are attached to tree roots (Yang and Pfister 2006). Ghost-pipe is threatened primarily by logging, road and trail maintenance, and foot traffic (CDFW 2023b).

Ghost-pipe occurs throughout many parts of the American continent and eastern Asia (Wallace 2012). In California, it is found only in Del Norte, Humboldt, and Siskiyou counties (CNPS 2023). Locally, it has been documented close to the project location in the Wilson Creek and Mill Creek watersheds in Del Norte Coast Redwoods State Park (CDPR 2019). One occurrence of ghost-pipe was found in the northern portion of BSA #1, and consisted of a single cluster near the base of a large Douglas-fir tree in late successional redwood forest.

Leafy Reed Grass

Leafy reed grass is state listed as rare and has a CRPR of 4.2, meaning it is uncommon and has limited distribution in California. Leafy reed grass is a perennial bunchgrass in the grass family (Poaceae) that grows to 2.3 feet (0.7 meter) tall (Peterson et al,. 2012). Leafy reed grass typically grows in rocky sites in coastal bluff scrub and North Coast coniferous forest from sea level up to 4,005 feet (1,220 meters) (CDFW 2023b; CNPS 2023).

Leafy reed grass is mostly known from coastal habitats in the King Range in southern Humboldt and northern Mendocino counties, but it has also been recorded in Del Norte and Siskiyou counties (CDFW 2023b; CNPS 2023). The nearest CNDDB occurrence is a historical (1964) record from east of Klamath Glen in southern Del Norte County, approximately 12 miles southeast of the ESL (CDFW 2023b).

Leafy reed grass was not found within BSA #1during the botanical surveys. BSA #1contains a small amount of suitable habitat on rocky cliffs and coastal bluffs in coniferous forest and coastal scrub. However, these areas are low-quality habitat for leafy reed grass because they are small in area and mostly restricted to disturbed coastal bluffs or are heavily encroached upon by non-native and invasive plants such as jubata grass.

Environmental Consequences

Build Alternatives

The population of seaside bittercress occurs more than 300 feet outside of the project footprint for both build alternatives.

The occurrence of ghost-pipe is more than 500 feet outside the project footprint of both build alternatives.

Leafy reed grass was not detected within BSA #1 and would therefore not be affected by either Alternative X or F.

While potential suitable habitat for all three species would be impacted by both build alternatives, the area of impact for each alternative is small compared to the vast amounts of suitable habitat in the project's vicinity. Impacts to potential suitable habitat would be minimal.

Focused and comprehensive botanical surveys were completed in 2021 and 2022. These surveys are considered by agencies to have a "shelf-life" of 3 to 5 years. In compliance with Standard Measure BR-4 A, botanical surveys would be updated by a qualified biologist prior to construction.

No-Build Alternative

Under the No-Build Alternative maintenance and emergency repairs would continue. As no construction is planned, there are no anticipated impacts to special status plant species.

Avoidance, Minimization, and/or Mitigation Measures

The known populations of seaside bittercress and ghost-pipe would not be affected by either alternative. No additional species-specific avoidance and minimization measures would be needed.

3.4.4 Animal Species

Regulatory Setting

Federal and State Regulations

Many federal and state laws regulate impacts on wildlife. USFWS, the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS), and CDFW are responsible for implementing these laws. This section discusses potential impacts and permit

requirements associated with animals *not* listed or proposed for listing under FESA or CESA; those species listed or proposed for listing as threatened or endangered are discussed in Section 3.4.5, *Threatened and Endangered Species*. All other special status animal species are discussed here, including USFWS or NMFS candidate species and CDFW fully protected species and species of special concern (SSC).

Federal laws and regulations relevant to wildlife include:

- NEPA
- Migratory Bird Treaty Act (MBTA)
- Bald and Golden Eagle Protection Act
- Fish and Wildlife Coordination Act
- Marine Mammal Protection Act
- Magnuson-Stevens Fishery Conservation and Management Act of 1976 (Magnuson-Stevens Act)

State laws and regulations relevant to wildlife include:

- CEQA
- California Fish and Game Code, Sections 3503, 3503.5, 3513 and 3800
- California Fish and Game Code, Sections 3511 and 4700
- California Fish and Game Code Sections 1600–1603
- California Fish and Game Code Sections 4150 and 4152

Affected Environment

Record searches[34] and habitat assessments were conducted to determine whether special status wildlife species have the potential to occur in the project area. In addition, several studies were conducted to assess the presence of special status animal species and their habitat. These included general wildlife surveys and habitat assessment; studies targeting northern spotted owl, forest carnivores (Humboldt marten and fisher), and bald eagles;

[34] Record searches for special status animal species were determined by reviewing natural resource agency databases, literature, and other relevant sources; these included official lists from the CNDDB for the Crescent City, Hiouchi, Gasquet, Sister Rocks, Childs Hill, Cant Hook Mountain, Requa, Klamath Glen, Fern Canyon, and Ah Pah Ridge USGS quadrangles (CDFW 2023b).

automated audio recordings for songbirds and frogs; and acoustic recorder bat surveys. Results of these studies were summarized in the NES prepared for this project (Caltrans 2023d).

Based on the record searches, habitat assessments, and field surveys, 12 special status animals could potentially occur or would have suitable habitat within the BSAs, including four amphibians, two birds, and six mammals. These species are discussed below. See Appendix I for the full list of special status wildlife species that are known to occur or have the potential to occur in the project vicinity, and the rationale for habitat presence or absence. Species with no habitat present in the project area are not discussed further.

Amphibians

Foothill yellow-legged frog (*Rana boylii*), northern red-legged frog (*Rana aurora*), Pacific tailed frog (*Ascaphus truei*), and southern torrent salamander (*Rhyacotriton variegatus*) are CDFW Species of Special Concern (SSC) that have suitable habitat within BSA #1.

The North Coast clade of foothill yellow-legged frog is associated with partly shaded, shallow streams and riffles with rocky substrate in a variety of habitats (California Herps 2020a). This species is rarely encountered far from permanent water. The nearest CNDDB occurrence is approximately 3.4 miles southeast of the ESL. No individuals were detected within BSA #1 during the general wildlife surveys.

The Northern red-legged frog is a medium to large frog often found in humid forests, woodlands, grasslands, and streamsides with dense riparian cover along the Coast Ranges from Del Norte County to Mendocino County (California Herps 2020b). It is frequently found in wooded areas adjacent to streams but can be wide ranging and highly terrestrial in damp wooded areas and meadows during the non-breeding season (California Herps 2020b). It requires permanent water sources, such as ponds and lakes, for breeding (California Herps 2020b). The nearest CNDDB occurrence abuts the eastern edge of the central portion of the ESL. This species was detected within BSA #1 during the general wildlife surveys.

Pacific tailed frog occurs in mature or late successional conifer-dominated habitats, including redwood and Douglas-fir forests along the Northern California coast (California Herps 2020c). The species can be found in cool, perennial streams with steep banks and dense vegetation. Tailed frogs are usually found in streams with large stones, cobbles, and stable boulders, which can be used for shelter from rapid currents (California Herps 2020c). Quieter side pools are also needed so eggs are not washed away (California Herps 2020c). The nearest CNDDB occurrence is approximately 0.3 mile southeast of the ESL.

Southern torrent salamander occurs in forested areas along the coast in cold and well-shaded rocky or gravelly perennial streams and seeps in Humboldt, Mendocino, Siskiyou, and Trinity counties (California Herps 2020d). It requires gravel or rock substrate for egg laying (California Herps 2020d), avoids open deep water (USFWS 2000), and does not travel more than 6 feet from aquatic habitats (USFWS 2000). The nearest CNDDB occurrence is within the ESL.

Purple Martin and Vaux's Swift

The purple martin (*Progne subis*) and Vaux's swift (*Chaetura vauxi*) are CDFW SSC birds with habitat in the project area.

The purple martin (*Progne subis*) occurs throughout the eastern U.S. and western U.S. Within California, the species is a summer resident and migrant occurring primarily from mid-March to late September. It is found in forest and woodland areas at low to intermediate elevations. In northwestern California, purple martins are concentrated in redwood forests near the coast but can occupy inland areas except for at the highest elevations of the inner coast ranges (Shuford and Gardali, 2008).

Purple martins require concentrations of nesting cavities, open air space above accessible nesting sites, and abundant large aerial insect prey such as dragonflies. The species will use a variety of nest substrates such as tree cavities and snags, bridges, and utility poles, but is selective about nearby habitat conditions. Because large aerial insects are a determining factor in distribution, purple martin tends to be found in mesic areas close to larger waterbodies and wetlands and at the upper portions of ridges and slopes, where insects are concentrated (Shuford and Gardali, 2008). There are no CNDDB occurrences within 10 miles of the ESL. However, purple martin was detected within the northern portion of BSA #1 within redwood forest during the automated audio recording surveys. Tree cavities in the redwood, Douglas-fir, and Sitka spruce forest community within BSA #1 provide suitable habitat for this species.

Vaux's swift breeds in western North America from southeastern Alaska down to central California. Along the coast, the species is closely tied to redwood forests. Adults forage in a wide variety of habitat types (especially over water), with small flying insects being the primary prey (Shuford and Gardali, 2008).

The species nests in cavities in a variety of trees and less frequently in artificial structures such as chimneys. Cavities must be large enough for the birds to fly while inside the cavity. Published details are limited; most California nests have been discovered in burned-out and hollow redwood snags or stumps (Shuford and Gardali, 2008). Nests have also been

discovered in basal hollows of large diameter living redwoods (Shuford and Gardali, 2008). Adults show strong site fidelity, returning to nesting locations year after year (Ehrlich et al., 1988).

There are no CNDDB occurrences within 10 miles of the ESL. However, Vaux's swift was detected within BSA #1 at all four audio recording sites. Trees with cavities in the redwood, Douglas-fir, and Sitka spruce forest within BSA #1 provide suitable habitat for this species.

Fisher

The North Coast population of the Pacific fisher (*Pekania pennanti*) is a CDFW SSC. The fisher is a medium-sized carnivore with a disproportionately large home range for its size (2,420-9,635 acres) (Zielinski 2004). Fishers are among the most habitat-specific mammals in North America, occurring primarily in contiguous mature conifer and mixed hardwood conifer forests with high canopy closure (Zielinski 2004). In California, they are associated with mature forest conditions, predominantly using large trees, snags, and logs as their daily resting sites (Zielinski 2004). Fisher are agile tree climbers (Green et al., 2019) that den in a variety of protected cavities in large trees, hollow logs, and snags. Prey primarily consists of rabbits and hares, smaller rodents, voles, reptiles, and birds. With the exception of breeding or when females are caring for their young, fishers are typically solitary animals that are active day and night throughout the year (CDFW 2015). Mating occurs February through April, with young born nearly a year later, from March through April due to delayed implantation by the female (CDFW 2015). There are no CNDDB occurrences of fisher within 10 miles of the ESL.

Fishers were detected during a project-specific survey for fishers and Humboldt marten (CDPR 2021). The survey was conducted within one mile of any of the alternative alignments; this included alignments in consideration prior to the reduction to Alternatives X and F. Fisher was the most frequent species to be detected, occurring at 7 of the 10 survey stations (exclusively at baited stations). One of these detections was within BSA #2, with the rest of the detections outside of both BSAs. Although no survey units were in BSA #1, the late successional Douglas-fir, Sitka spruce, and redwood forest communities within BSA #1 provide suitable habitat for fisher.

During the trail camera surveys conducted within BSA #1 (June–July 2022), a mesocarnivore (most likely a fisher) image was captured. This detection was within the northern portion of the ESL.

Ringtail

Ringtail (*Bassariscus astutus*) is designated as fully protected under CFGC Section 4700. This species is widely distributed in California (Yolo Natural Heritage Program [YNHP] 2009). Ringtail has an appearance similar to that of a small raccoon (*Procyon lotor*), but with a slender build and an extremely long tail and lacks the raccoon's characteristic "mask." Ringtail is a nocturnal carnivore that is non-migratory and is active year-around (Ahlborn 2005). This species is found in various shrub and forest habitats, in association with riparian areas and rocky areas, at elevations from sea level to 8,800 feet (2,682 meters) (YNHP 2009; Ahlborn 2005). Home ranges have been reported from as small as 12.4 acres in northern California to as large as 862 acres in northwestern California (YNHP 2009). It has been documented that ringtails tend to select trees near steep slopes and waters sources for diurnal rest sites (YNHP 2009). This species is usually not found more than 0.6 mile from a permanent water source (Ahlborn 2005). Ringtails mate in late winter and a litter of three or four young is born in May or June (Ahlborn 2005; YNHP 2009). Denning usually takes place among large boulders near canyon bottoms and in hollow trees or snags but can also occur in abandoned burrows or woodrat nests, and inside buildings and other human-made structures (Ahlborn 2005; Myers 2010).

There are no CNDDB occurrences of this species within a 10-mile radius of the ESL, and no species-specific surveys were conducted . The large logs, snags, and tree hollows found in the mature (late successional) redwood, Douglas-fir and Sitka spruce forests within BSA #1 provide suitable reproductive and diurnal rest habitats for ringtail, while the riparian habitats associated provide suitable foraging habitat. Presence is assumed within all suitable habitat.

Sonoma Tree Vole

The Sonoma tree vole (*Arborimus pomo*) is a CDFW SSC. This species and the red tree vole (*Arborimus longicaudus*) are two tree vole species that are ecologically similar but geographically isolated, with red tree voles occurring from the northern side of the Klamath River in northwestern California into western Oregon and Sonoma tree voles from the Klamath River south to southern Sonoma County in coastal California (Forsman et al., 2016). Prior to 1991, these species were considered a single species: the red tree vole (USFWS 2016b). CDFW does not recognize the split between the red tree vole and Sonoma tree vole species and identifies CNDDB occurrences north of the Klamath River as Sonoma tree voles (CDFW 2023b). The red tree vole is not listed as a special status species in California.

Tree voles are small nocturnal mammals that primarily inhabit coniferous forests dominated by Douglas-fir, but they also live where Douglas-fir co-occurs with other species, including

redwood, Sitka spruce, western hemlock, or grand fir. Tree voles build nests from 6–150 feet (2–45 meters) above the ground for resting and breeding and occupy them year-round. With their arboreal nature and diet almost entirely of Douglas-fir needles, tree voles are among the most unique and highly specialized rodents. A study in coastal Humboldt County (Chinnici et al., 2012) found Sonoma tree vole nests in all seral stages except young-growth Douglas-fir forests mixed with hardwood; however, the largest number of nests were in mature Douglas-fir stands, followed by mature redwood/Douglas-fir stands. The home range probably encompasses one to several fir trees, with females often living in one tree and males visiting several trees. Males nest most frequently in a tree nest constructed of fir needles, or less frequently in shallow burrows at the base of fir trees, beneath litter. Females seem to spend most of their lives in trees, constructing large, domed nursery nests of fir needles from 6 to 150 feet (2 to 45 meters) above the ground. Nests may be occupied by succeeding generations, increasing in size with each generation, and older nursery nests can encircle the entire tree. Breeding can take place year-round, but mostly from February through September. There are four CNDDB occurrences of this species within a 10-mile radius of the ESL. One of these occurrences overlaps with the southern portion of the ESL.

There were no species-specific survey efforts to determine the presence of this species within BSA #1. However, the late successional Douglas-fir forest and portions of the late successional redwood forest that contain concentrations of mature Douglas-fir trees within BSA #1 have potential to provide suitable habitat for this species. The majority of the suitable habitat occurs in the northern portion of BSA #1. Presence is assumed within all suitable habitat.

White-footed Vole

The white-footed vole (*Arborimus albipes*) is a CDFW SSC endemic to Humboldt and Del Norte counties. In California, this species is a rarely seen resident of humid coastal redwood, Douglas-fir, and riparian forests, from sea level to 3,500 feet (1,100 meters). Red alder leaves make up the majority of its diet, but it also feeds on the leaves of a variety of green plants. This species is generally found in the vicinity of small, clear streams, with a dense, multi-aged alder component. White-footed voles occupy the habitat from the ground to the tree canopy, feeding in all layers, and nesting on the ground. Nests are built under stumps, logs, or rocks within dense vegetation (Brylski and Duke, 1990). Although the species is thought to be at least partly arboreal, only a few nests have been found, and most have been on the ground. No home range data is available. This species is active year-round and is probably mostly nocturnal. Little is known about white-footed vole reproduction, but it is thought to occur from April to August, with females producing from two to four young

(Brylski and Duke, 1990). There are no CNDDB occurrences within a 10-mile radius of the ESL.

There were no species-specific survey efforts to determine the presence of this species in BSA #1. However, suitable habitat elements were observed throughout BSA #1. The red alder riparian areas within BSA #1 would provide high-quality habitat for the white-footed vole. Additionally, the upland red alder forest, Douglas-fir forest, and redwood forest within BSA #1 may also provide suitable habitat for this species. Presence is assumed within all suitable habitat.

Special Status Bats

The pallid bat (*Antrozous pallidus*) and Townsend's big-eared bat (*Corynorhinus townsendii*) are state SSC that have potential habitat in the project area.

The pallid bat is found throughout California and occupies a variety of habitats from arid deserts to grasslands, conifer forests, and riparian areas. Day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, trees (e.g., basal hollows of redwoods, deciduous trees in riparian areas) (Western Bat Working Group [WBWG] 2005a). With the majority of the pallid bat diet involving gleaning arthropod prey off surfaces and capturing insects on the wing, they are found foraging over open shrub and oak grasslands, open Ponderosa pine forests, talus slopes, gravel roads, and fruit orchards (WBWG 2005a). Pallid bats may roost alone or in larger groups (Oregon Wildlife Institute 2016; Harris 2021). Maternity colonies are formed in early April; young are born between April and July and are typically weaned in August, and maternity colonies disperse thereafter (WBWG 2005a; Harris 1990). While winter habits are poorly known, the species does not appear to migrate long distances between summer and winter sites, with roosts being in areas that have relatively cool, stable temperatures and are in protected structures beneath the forest canopy or on the ground, out of direct sunlight (WBWG 2005a).

Townsend's big-eared bat is known to occur throughout California in a variety of habitat types below 11,483 feet (3,300 meters) including coniferous forests, deserts, native prairies, riparian communities, active agricultural areas, and coastal areas (WBWG 2005b). Townsend's big-eared bat roosts in caves, abandoned mines, buildings, bridges, and other cave-like spaces, including rock crevices and basal cavities of trees (WBWG 2005b). This bat forages along edge habitats along intermittent streams, old fields, open areas of pastures, crops, and native grass in the proximity of woodlands and associated with forest habitats (Fellers and Pierson, 2002). Townsend's big-eared bats roost alone or in maternity colonies of upward of several hundred individuals. The maternity period extends from April through

mid-September (Pierson and Rainey, 1998). Maternity colonies form between March and June, with a single pup born between May and July (WBWG 2017). While born non-volant, the young bats are able to fly within three weeks and after two months many have left the nursery roost (NPS 2020b). This species overwinters near summer maternity roosts from November to February (Pierson and Rainey, 1998).

BSA #1 comprises mainly coastal forest habitat (redwood, Douglas-fir, red alder, and Sitka spruce forest) that contains open flyways and trees that support foraging and roosting habitat for bats, including pallid bat and Townsend's big-eared bat. The red alder natural community also provides suitable foraging habitat. While there were no CNDDB occurrences for the pallid bat within a 10-mile radius of the ESL, there is a known occurrence of Townsend's big-eared bat approximately 6.8 miles south-southeast of the ESL. Both of these species were detected during bat surveys. The pallid bat was detected in all four seasons—and in redwood forest, Douglas-fir, coastal brambles, and red alder forest sites. Townsend's big-eared bat was detected in a Douglas-fir site and red alder forest in spring and summer.

Migratory Birds

Numerous migratory and resident birds protected by the MBTA could nest on the ground, in shrubs, and in trees within BSA #1. The vegetation within BSA #1 is diverse and dense, providing a variety of suitable habitat for both resident and migratory species.

Area searches and automated audio recording surveys were conducted within BSA #1. A total of 59 species protected by the MBTA were detected during biological surveys of BSA #1. All the natural communities found within BSA #1 could potentially support breeding and foraging for species protected by the MBTA, as they contain suitable nesting substrates and ample food resources for a wide variety of species.

Environmental Consequences

Build Alternatives

Amphibians

Effects Unique to Alternative X

Alternative X would have no direct impacts to streams or riparian habitat, and therefore would have no direct impacts to Pacific tailed frogs or southern torrent salamanders.

Wetland and damp terrestrial forested habitat, which can be used by foothill yellow-legged frog and northern red-legged frog, would be impacted by construction activities. However, standard measures implemented as part of the project would minimize impacts to these species. These include Standard Measure BR-1, which would educate construction workers on identifying special status amphibians and what actions to take if they are encountered; BR-2 E, which requires an Aquatic Species Relocation Plan with pre-construction surveys and species relocation; and BR-4 and BR-5, which would protect adjacent habitat and revegetate temporarily affected areas.

Given the small amount of habitat affected, the abundance of adjacent habitat that individuals could move to if displaced or be relocated to, and with implementation of the Standard Measures and Best Management Practice identified above, it is anticipated that Alternative X would have minimal effects on foothill yellow-legged frog and northern red-legged frog.

The groundwater effects from the drainage gallery associated with Alternative X is not anticipated to have any impacts to streams or wetlands, with the exception of seeps at the toe of the cliff adjacent to the ocean. These seeps were not accessible but appear to be small and, in many cases, dominated by jubata grass, suggesting they are not providing habitat for special status amphibians. The drainage galleries are therefore not anticipated to affect special status amphibians.

Effects Unique to Alternative F

Alternative F could affect amphibians through habitat modification and direct impacts. Alternative F would permanently impact 0.113 acre of wetland, 329.90 linear feet (0.019 acre) of perennial stream, 43.30 linear feet (0.001 acre) of ephemeral stream, and 0.214 acres of red alder riparian forest, and would temporarily impact 0.009 acre of wetland, 65.65 linear feet (0.006 acre) of perennial stream, and 0.038 acre of red alder riparian forest. The wetlands to be impacted are present at both tunnel portals, while impacted streams and riparian would just be at the south portal (Figures 3-36 to 3-38). The perennial streams

impacted provide quality habitat for Pacific tailed frogs and southern torrent salamanders, while the wetlands, streams, riparian, and damp forest provide habitat for foothill yellow-legged frogs and northern red-legged frogs. Permanent impacts include the filling of wetlands, culverting of stream, and hardscaping of riparian areas. Temporary impacts include the 15-foot equipment access buffer where some vegetation may be removed; however, wetlands, streams, and riparian would be avoided to the greatest extent possible and would be revegetated upon project completion. While amphibian habitat would be affected by construction, there is sufficient wetland habitat in the vicinity of both the north and south portal which could be used by any displaced foothill yellow-legged frogs and northern red-legged frogs. Quality habitat for Pacific tailed frogs and southern torrent salamanders is available both up and down stream of the impacted portion of stream 14 (Figure 3-38).

Standard measures implemented for the project would reduce impacts to amphibians. This includes BR-2 D and E, which requires a biological monitor be present for all in-stream work, as well as an Aquatic Resource Relocation Plan with preconstruction surveys for amphibians. Additionally, BR-1 would educate construction workers on identifying special status amphibians and what actions to take if they are encountered; and BR-4 and BR-5 would protect adjacent riparian habitat and revegetate temporarily cleared riparian areas.

Given the small amount of habitat affected, the amount of habitat that individuals could move to if displaced or relocated to, and with implementation of the Standard Measures and Best Management Practices identified above, it is anticipated that Alternative F would not have substantial effects on special status amphibians.

Conclusion

Given the relatively small amount of habitat affected by the alternatives, the temporary nature of construction, the abundance of unaffected suitable habitat in the project vicinity to which individuals could relocate, or be relocated to, if necessary, and with implementation of Standard Measures and Best Management Practices, neither Alternative X or Alternative F would have a substantial effect on foothill yellow-legged frogs, northern red-legged frogs, Pacific tailed frogs, or southern torrent salamanders.

Purple Martin and Vaux's Swift

Common Features of Alternatives X and F Affecting Purple Martin and Vaux's Swift

Vegetation removal

Purple martin and Vaux's swift nesting habitat, which includes late successional redwood, Douglas-fir, and Sitka spruce forest, would be affected by both alternatives to facilitate construction as trees and vegetation would be removed from the project footprint. However, with standard measures incorporated, tree and vegetation removal would be done outside of the breeding bird season (Standard Measure BR-2 A). Therefore, no direct impacts to nesting purple martin or Vaux's swift are anticipated from vegetation removal.

Construction Impacts

During construction, purple martin and Vaux's swift nesting habitat surrounding the project footprint would be exposed to elevated noise levels. However, Standard Measure BR-2 I would limit construction noise between March 24 and September 15–the majority of the nesting season. Additionally, there is sufficient suitable nesting habitat in the vicinity for individuals to disperse to if disturbed; approximately 1,545 acres of suitable late successional forested habitat is adjacent to the project area and to the north. Therefore, minimal impacts to nesting purple martin and Vaux's swift from construction noise are anticipated.

Temporary lighting would be used during construction, exposing surrounding habitat to additional light at night. With Standard Measure BR-2 F incorporated, all lighting used would be directed specifically on the portion of the work area actively under construction, greatly limiting light in the surrounding habitat. Therefore, minimal impacts to purple martin or Vaux's swift from temporary lighting are anticipated.

Geotechnical Investigations

Geotechnical work would have the potential to temporarily affect purple martin and Vaux's swift habitat. Equipment delivery for 18 bore locations for Alternative X and 2 bore locations for Alternative F would require the use of a helicopter. To the extent feasible, the bore locations would be sited outside of coniferous forest and would be placed between gaps in the trees, if located within a forested canopy. At these bore locations some vegetation may be removed or trimmed; however, no large trees (trees with DBH 24 inches or greater) would be removed. Both species have habitat adjacent to the bore locations and helicopter staging areas and would be exposed to helicopter noise and rotor wash.

For Alternative X, it is estimated that it would take approximately 54 hours to deliver equipment to and from the bore locations over a time period of 18 weeks and, for Alternative F, approximately 15 hours to and from bore locations over a time period of 1 to 2 weeks. For the geotechnical phase, use of helicopters would be limited to the time between September 16 and January 31 (which is the non-nesting season) and helicopters would fly at a high enough altitude between staging areas and boreholes to reduce rotor wash on trees and the surrounding habitat. If any roosting or foraging purple martin or Vaux's swift were present, there is sufficient surrounding habitat to disperse to. Only minimal impacts to any roosting or foraging purple martin or Vaux's swift from the geotechnical work are anticipated.

Effects Unique to Alternative X

Habitat Impacts

Suitable habitat for purple martin and Vaux's swift, which includes trees with cavities in late successional redwood, Douglas-fir, and Sitka spruce forest, would be affected by Alternative X. Potential habitat impacts include:

- ***Permanent:*** Alternative X would permanently affect 3.5 acres of potentially suitable purple martin and Vaux's swift habitat (late successional redwood, Douglas-fir, and Sitka spruce forest) (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and drainage gallery infrastructure.
- ***Habitat Conversion:*** Approximately 0.67 acre of suitable habitat would undergo habitat conversion (Table 3-14). In these areas, late successional Douglas-fir and Sitka spruce forest would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative X would temporarily affect a total of 1.44 acres of potentially suitable nesting habitat (Table 3-15). These impacts are in equipment access buffer areas and geotechnical borehole areas, where vegetation would be disturbed; however, but trees over 24 inches DBH would remain in place. The habitat would continue to function as it had pre-project in less than a year.

The habitat is located within a large forest consisting of many acres of suitable habitat. Most of the redwood and Douglas-fir forest to be removed is within 50 feet of U.S. 101, and all is within 150 feet. The close proximity to the highway and associated exposure to elevated noise and disturbance lowers the quality of this habitat. Within DNCRSP there are at least 1,545 acres of suitable late successional forested habitat adjacent to the project area and to the north (Parcel Quest 2023). Within DNCRSP and RNP there is approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie Creek Redwoods State Park in the south. Both species have wide ranges, with purple martin occurring throughout the eastern and western U.S. and Vaux's swift breeding in western North America. Throughout their ranges, both species use a wide variety of habitats and nesting structures. Given this, and the relatively small impact to habitat from the project, it is anticipated that Alternative X would have minimal effects on purple martin and Vaux's swift habitat.

Effects Unique to Alternative F

Habitat Impacts

Suitable habitat for purple martin and Vaux's swift, which includes trees with cavities in late successional redwood, Douglas-fir, and Sitka spruce forest, would be affected by Alternative F. Potential habitat impacts include:

- ***Permanent:*** Alternative F would permanently affect 0.82 acre of potential nesting/roosting and foraging habitat (late successional redwood and late successional Sitka spruce forests) (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and tunnel portals.
- ***Habitat Conversion:*** Approximately 1.42 acres of suitable nesting habitat would undergo habitat conversion (Table 3-14). In these areas, late successional redwood, Douglas-fir, and Sitka spruce forests would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative F would temporarily affect a total of 1.59 acres of potentially suitable nesting habitat (Table 3-15). These impacts are in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed, but trees over 24 inches DBH would remain in place. The habitat would continue to function as it had pre-project in less than a year.

The majority of the habitat removed would be late successional redwood forest at the north portal. This area is part of a large, contiguous patch of late successional redwood forest that is high-quality habitat. The habitat to be removed, however, is all within 300 feet of U.S. 101 and therefore exposed to elevated noise and disturbance. Within DNCRSP there are at least 1,545 acres of suitable late successional forested habitat adjacent to the project area and to the north (Parcel Quest 2023). Within DNCRSP and RNP there is approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie Creek Redwoods State Park in the south. Both species have wide ranges, with purple martin occurring throughout the eastern and western U.S. and Vaux's swift breeding in western North America. Throughout their ranges both species use a wide variety of habitats and nesting structures. Given this, and the relatively small impact to habitat from the project, it is anticipated that Alternative F would have minimal effects on purple martin and Vaux's swift habitat.

Operational Impacts

Alternative F includes permanent lighting in the vicinity of the tunnel entrances and at the OMC. This lighting would be typical roadway lighting. It would be localized, directed down at the infrastructure, and would not extend far into the surrounding habitat. Therefore, effects to surrounding habitat from permanent lighting are not anticipated.

Because Alternative F would reroute the highway into a tunnel, noise levels from traffic along this section of U.S. 101 would be lower than existing conditions (Caltrans 2023k). The lower noise levels are anticipated to benefit purple martin and Vaux's swift residing in the area.

Conclusion

Alternative X would impact more habitat than Alternative F. However, Alternative F would impact much higher quality habitat and twice the number large mature conifers (48 inches in DBH or greater) than Alternative X would. Given the wide distribution of the species, the relatively small amount of habitat affected by the alternatives, the temporary nature of construction, the availability of suitable habitat in the project vicinity to which individuals could relocate to, if necessary, and the implementation of standard measures, neither Alternative X or Alternative F would have a substantial effect on purple martin or Vaux's swift.

Fisher

Common Features of Alternatives X and F Affecting Fisher

Vegetation Removal

Fisher habitat would be affected by the project to facilitate construction as trees and vegetation would be removed from late successional coniferous forest areas within the project footprint. However, Standard Measure BR-2 L, which does not allow suitable denning tree removal between March 1 and September 1, would avoid potential impacts to active dens. Therefore, no direct impacts to denning fisher are anticipated from tree removal.

Construction Impacts

During construction fisher habitat would be exposed to elevated noise levels, which can disrupt animal activities including denning, foraging, and resting. However, Standard Measure BR-2 I would limit construction noise between March 24 and September 15–the majority of the denning season. Additionally, there is sufficient surrounding denning habitat in the vicinity for individuals to disperse to. Implementation of Standard Measure BR-2 K, which would require preconstruction surveys of fisher, Humboldt marten, and ringtail, and coordination with appropriate agencies on buffers if active dens are located, would further reduce impacts from noise. Therefore, minimal impacts to fisher from construction noise are anticipated.

Temporary night lighting would be used during construction. However, Standard Measure BR-2 F would limit lighting to areas actively under construction or on areas needed for security. This would limit light exposure on surrounding habitat. Because of this, temporary lighting is not anticipated to affect fisher.

During construction, all trash would be deposited in a secure container and disposed of at an approved waste facility, as required by Standard Measure BR-2 C. While trash may increase the presence of fisher predators, such as coyotes, no impacts are anticipated with implementation of this measure.

Geotechnical Investigations

Geotechnical work would have the potential to temporarily affect fisher habitat. Equipment delivery for 18 bore locations for Alternative X and 2 bore locations for Alternative F would require the use of a helicopter. To the extent feasible, the bore locations would be sited outside of coniferous forest and would be placed between gaps in the trees, if located within

a forested canopy. At these bore locations some vegetation may be removed or trimmed; however, no large trees (trees with DBH 24 inches or greater) would be removed. There is fisher habitat adjacent to the bore locations and helicopter staging areas that would be exposed to helicopter noise and rotor wash. For Alternative X, it is estimated that it would take approximately 54 hours to deliver equipment to and from the bore locations over a time period of 18 weeks and, for Alternative F, approximately 15 hours to and from bore locations over a time period of 1 to 2 weeks. For the geotechnical phase, use of helicopters would be limited to the time between September 16 and January 31 (which is the non-denning season) and helicopters would fly at a high enough altitude between staging areas and boreholes to reduce rotor wash on trees and the surrounding habitat. If any fisher were present, there is sufficient surrounding habitat to disperse to. Only minimal impacts to fisher from the geotechnical work are anticipated.

Effects Unique to Alternative X

Habitat Impacts

Suitable habitat for fisher, which includes late successional redwood, Douglas-fir, and Sitka spruce forest, would be affected by Alternative X. Potential habitat impacts include:

- ***Permanent:*** Alternative X would permanently affect 3.50 acres of potentially suitable fisher habitat (late successional redwood, Douglas-fir, and Sitka spruce forests) by removing all vegetation, including trees with hollows and tree snags (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and drainage gallery infrastructure.
- ***Habitat Conversion:*** Approximately 0.67 acre of suitable habitat would undergo habitat conversion (Table 3-14). In these areas, late successional Douglas-fir and Sitka spruce forest would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative X would temporarily impact 1.44 acres of potentially suitable habitat (Table 3-15). These impacts are in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed, but trees over 24 inches DBH would remain in place. The habitat would continue to function as it had pre-project in less than a year.

The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are a least 1,545 acres of suitable late successional forested habitat adjacent to the project area and to the north (Parcel Quest 2023). Within DNCRSP and RNP there is approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie Creek Redwoods State Park in the south. Additional habitat is also present on surrounding timberland. By comparison, the amount of habitat to be removed by the project is relatively small. Additionally, most of the redwood and Douglas-fir forest to be removed is within 50 feet of U.S. 101, and all is within 150 feet. The close proximity to the highway and associated exposure to elevated noise and disturbance lowers the quality of the habitat. Given this, it is anticipated that Alternative X would have minimal effects on fisher habitat.

Effects Unique to Alternative F

Habitat Impacts

Suitable habitat for fisher, which includes late successional redwood, Douglas-fir, and Sitka spruce forest, would be affected by Alternative F. Potential habitat impacts include:

- ***Permanent:*** Alternative F would permanently affect 0.82 acre of potentially suitable fisher habitat (late successional redwood and Sitka spruce forests) by removing all vegetation, including trees with hollows and tree snags (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and tunnel portals.
- ***Habitat Conversion:*** Approximately 1.42 acres of suitable habitat would undergo habitat conversion (Table 3-14). In these areas late successional redwood, Douglas-fir, and Sitka spruce forests would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative F would temporarily impact 1.59 acres of potentially suitable habitat (Table 3-15). These impacts are in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed, but trees over 24 inches DBH would remain in place. The habitat would continue to function as it had pre-project in less than a year.

The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are a least 1,545 acres of suitable late successional forested habitat adjacent to the project area and to the north (Parcel Quest 2023). Within DNCRSP and RNP there is approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie Creek Redwoods State Park in the south. Additional habitat is also present on surrounding timberland. The overall amount of habitat to be removed by the project is relatively small. Additionally, the habitat to be removed is all within 300 feet of U.S. 101 and therefore exposed to elevated noise and disturbance. Given this, it is anticipated that Alternative F would have minimal effects on fisher habitat.

Operational Impacts

Alternative F includes permanent lighting in the vicinity of the tunnel entrances and at the OMC. This lighting would be typical roadway lighting. It would be localized, directed down at the infrastructure, and would not extend far into the surrounding habitat. Therefore, effects to surrounding habitat from the permanent lighting are not anticipated.

Because Alternative F would reroute the highway into a tunnel, noise levels from traffic along U.S. 101 would be lower than existing conditions (Caltrans 2023k). The lower noise levels, improved habitat connectivity, and reduced risk of vehicle strike are anticipated to benefit fisher residing in the area.

Conclusion

Alternative X would impact more habitat than Alternative F. However, Alternative F would impact much higher quality habitat and twice the number large mature conifers (48 inches in DBH or greater) that Alternative X would. However, given the relatively small amount of habitat affected by the build alternatives, the temporary nature of construction, the abundance of unaffected suitable habitat in the project vicinity to which individuals could relocate to, if necessary, and the implementation of standard measures, neither Alternative X nor Alternative F would have a substantial effect on fisher.

Ringtail

Common Features of Alternatives X and F Affecting Ringtail

Vegetation Removal

Ringtail habitat, which includes late successional coniferous forest and red alder riparian forest, would be affected by the project, as trees and vegetation would be removed from areas that are within the project footprint to facilitate construction. However, implementation of Standard Measure BR-2 L (which restricts tree removal between March 1 and September 15) would avoid potential impacts to active dens. Therefore, no impacts to breeding ringtail are anticipated from tree removal.

Construction Impacts

Ringtail habitat would be exposed to elevated noise levels during construction. However, Standard Measure BR-2 I would limit construction noise between March 24 and September 15—the majority of the denning season. Additionally, there is sufficient suitable habitat in the vicinity for individuals to disperse to if disturbed by construction noise. Standard Measure BR-2 K, which would require preconstruction surveys of ringtail and other species, and coordination with appropriate agencies if active dens are located, would further reduce impacts from noise. Therefore, it is anticipated there would be minimal impacts to ringtail from construction noise.

Temporary lighting would be used during construction, exposing surrounding habitat to additional light at night. With Standard Measure BR-2 F incorporated, all lighting would be directed specifically on the portion of the work area actively under construction, greatly limiting light in the surrounding habitat. Therefore, no impacts to ringtail from temporary lighting are anticipated.

During construction, all trash would be deposited in a secure container and disposed of at an approved waste facility, as required by Standard Measure BR-2 C. While trash may increase the presence of ringtail predators, such as coyotes, no impacts are anticipated with the implementation of this measure.

Geotechnical Investigations

Geotechnical work would have the potential to temporarily affect ringtail habitat. Equipment delivery for 18 bore locations for Alternative X and 2 bore locations for Alternative F would require the use of a helicopter. To the extent feasible, the bore locations would be sited

outside of coniferous forest and would be placed between gaps in the trees, if located within a forested canopy. At these bore locations some vegetation may be removed or trimmed; however, no large trees (trees with DBH 24 inches or greater) would be removed. There is ringtail habitat adjacent to the bore locations and helicopter staging areas that would be exposed to helicopter noise and rotor wash. For Alternative X, it is estimated that it would take approximately 54 hours over 18 weeks to deliver equipment to and from the bore locations and, for Alternative F, approximately 15 hours to over 1 to 2 weeks. For the geotechnical phase, use of helicopters would be limited to the time between September 16 and January 31 (which is the non-denning season) and helicopters would fly at a high enough altitude between staging areas and boreholes to reduce rotor wash on trees and the surrounding habitat. If any ringtail were present, there is sufficient surrounding habitat to disperse to. Only minimal impacts to ringtail from the geotechnical work are anticipated.

Effects Unique to Alternative X

Habitat Impacts

Suitable habitat for ringtail, which includes late successional redwood, Douglas-fir, and Sitka spruce forests, which is suitable reproductive, diurnal rest, and foraging habitat, would be affected by Alternative X. Potential habitat impacts include:

- ***Permanent:*** Alternative X would permanently affect 3.5 acres of potentially suitable fisher and ringtail habitat (late successional redwood, Douglas-fir, and Sitka spruce forests) by removing all vegetation, including trees with hollows and tree snags (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and drainage gallery infrastructure.
- ***Habitat Conversion:*** Approximately 0.67 acre of suitable habitat would undergo habitat conversion (Table 3-14). In these areas, late successional Douglas-fir, and Sitka spruce forests would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative X would temporarily impact 1.44 acres of potentially suitable habitat (Table 3-15). These impacts are in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed; however, trees over 24 inches DBH would remain in place. The habitat would continue to function as it had pre-project in less than a year.

The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are a least 1,545 acres of suitable late successional forested habitat adjacent to the project area to the north (Parcel Quest 2023). Within DNCRSP and RNP there is approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie Creek Redwoods State Park in the south. Additional habitat is also present on surrounding timberland. The amount of habitat to be removed by the project by comparison is relatively small. Additionally, most of the redwood and Douglas-fir forest to be removed is within 50 feet of U.S. 101, and all is within 150 feet. The close proximity to the highway and associated exposure to elevated noise and disturbance lowers the quality of this habitat. Given this, it is anticipated that Alternative X would have minimal effects on ringtail habitat.

Effects Unique to Alternative F

Habitat Impacts

Suitable habitat for ringtail, which includes suitable reproductive, diurnal rest, and foraging habitat (late successional redwood, Douglas-fir, and Sitka spruce forests) and foraging habitat (red alder riparian) would be affected by Alternative F. Potential habitat impacts include:

- ***Permanent:*** Alternative F would permanently affect 1.03 acres of potentially suitable ringtail habitat (late successional redwood, and Sitka spruce forests, and riparian red alder forests) by removing all vegetation including trees with hollows and tree snags. (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and tunnel portal infrastructure.
- ***Habitat Conversion:*** Approximately 1.42 acres of suitable habitat would undergo habitat conversion (Table 3-14). In these areas, late successional redwood, Douglas-fir, and Sitka spruce forests would be removed to facilitate necessary cut and fill for the project, and although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative X would temporarily affect a total 1.63 acres of suitable habitat (late successional redwood, Douglas-fir, Sitka spruce, and riparian red alder forests):
    - *Temporary:* Impacts include 1.59 acres of late successional redwood, Douglas-fir and Sitka spruce forests (Table 3-15). These impacts are in equipment access buffer areas and geotechnical borehole areas, where vegetation would be

disturbed, but trees over 24 inches DBH would remain in place. The habitat in these areas would continue to function as it had pre-project in less than a year.

- *Long-term Temporary One:* Vegetation within approximately 0.038 acre of red alder riparian forest could be removed (Tables 3-22 and 3-23). These areas would be replanted and return to equivalent habitat within 3 to 10 years.

The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are a least 1,545 acres of suitable late successional forested habitat adjacent to the project area to the north (Parcel Quest 2023). Within DNCRSP and RNP there is approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie Creek Redwoods State Park in the south. Additional habitat is also present on surrounding timberland. The overall amount of habitat to be removed by the project is relatively small. Additionally, the habitat to be removed is all within 300 feet of U.S. 101 and therefore exposed to elevated noise and disturbance. Given this, it is anticipated that Alternative F would have minimal effects on ringtail habitat.

Operational Impacts

Alternative F includes permanent lighting in the vicinity of the tunnel entrances and at the OMC. This lighting would be typical roadway lighting. It would be localized, directed down at the infrastructure, and would not extend far into the surrounding habitat. Therefore, effects to surrounding habitat from the permanent lighting are not anticipated.

Because Alternative F would reroute the highway into a tunnel, noise levels from traffic along U.S. 101 would be lower than existing conditions (Caltrans 2023k). The lower noise levels, improved habitat connectivity, and reduced risk of vehicle strike are anticipated to benefit ringtail residing in the area.

Conclusion

Per California Fish and Game Code Section 4700, ringtail is a fully protected species, meaning that no individual of this species may be taken or possessed at any time and no licenses or permits may be issued for its take (defined as to hunt, pursue, catch, capture, or kill). No take of this species is anticipated under either alternative.

Alternative X would impact more habitat than Alternative F. However, Alternative F would impact much higher quality habitat and twice the number large mature conifers (48 inches in DBH or greater) that Alternative X would. However, given the relatively small amount of habitat affected by the build alternatives, the temporary nature of construction, the abundance

of unaffected suitable habitat in the project vicinity to which individuals could relocate if necessary, and the implementation of Standard Measures and Best Management Practices, neither Alternative X nor Alternative F would have a substantial effect on ringtail.

Sonoma Tree Vole

Common Features of Alternatives X and F Affecting Sonoma Tree Vole

Vegetation Removal

Sonoma tree vole habitat, which includes late successional Douglas-fir forest and portions of the late successional redwood forest that contain concentrations of mature Douglas-fir trees, would be affected by the project as Douglas-fir trees and vegetation would be removed to facilitate construction. Sonoma tree voles den within the tree canopy year-round; tree removal could result in direct injury or mortality if an individual or active den is present and crushed.

Construction Impacts

During construction Sonoma tree vole habitat would be exposed to elevated noise levels. However, Standard Measure BR-2 I, would limit construction noise for half the year (between March 24 and September 15). During other times, Sonoma tree vole may be subjected to elevated noise levels if they are present in the areas surrounding construction. These impacts would be temporary and limited to the construction period.

Temporary lighting would be used during construction, exposing surrounding habitat to additional light at night. With Standard Measure BR-2 F incorporated, lighting used would be directed specifically on the portion of the work area actively under construction, greatly limiting light in the surrounding habitat. Therefore, no impacts to Sonoma tree vole from temporary lighting are anticipated.

Geotechnical Investigations

Geotechnical work would have the potential to temporarily affect Sonoma tree vole habitat. Equipment delivery for 18 bore locations for Alternative X and 2 bore locations for Alternative F would require the use of a helicopter. To the extent feasible, the bore locations would be sited outside of coniferous forest and would be placed between gaps in the trees, if located within a forested canopy. At these bore locations some vegetation may be removed or trimmed; however, no large trees (trees with DBH 24 inches or greater) would be

removed. There is Sonoma tree vole habitat adjacent to the bore locations and helicopter staging areas that would be exposed to helicopter noise and rotor wash. For Alternative X, it is estimated that it would take approximately 54 hours over 18 weeks to deliver equipment to and from the bore locations and, for Alternative F, approximately 15 hours to over 1 to 2 weeks. For the geotechnical phase, helicopters would fly at a high enough altitude between staging areas and boreholes to reduce rotor wash on trees and the surrounding habitat. If any Sonoma tree vole were present, the impacts from the noise and rotor wash would be periodic and temporary.

Effects Unique to Alternative X

Habitat Impacts

Suitable habitat for Sonoma tree vole, which includes late successional Douglas-fir forest and portions of the late successional redwood forest that contain concentrations of mature Douglas-fir trees, would be affected by Alternative X. Potential habitat impacts include:

- ***Permanent:*** Alternative X would permanently affect 3.21 acres of potentially suitable habitat (late successional redwood and Douglas-fir) (Table 3-14); this habitat would be replaced with hardscaped features, such as walls, highway features, and drainage gallery infrastructure.
- ***Habitat Conversion:*** Approximately 0.07 acre of suitable habitat would undergo habitat conversion (Table 3-14). In these areas, late successional Douglas-fir forest would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative X would temporarily affect 1.07 acres of potentially suitable habitat (Table 3-15). These impacts are in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed; however, trees over 24 inches DBH would remain in place. The habitat would continue to function as it had pre-project in less than a year.

The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are a least 1,545 acres of suitable late successional forested habitat adjacent to the project area to the north (Parcel Quest 2023). Within DNCRSP and RNP there is approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie

Creek Redwoods State Park in the south. Additional habitat is also present on surrounding timberland. Given this, it is anticipated that Alternative X would have minimal effects on Sonoma tree vole habitat.

Effects Unique to Alternative F

Habitat Impacts

Suitable habitat for Sonoma tree vole, which includes late successional Douglas-fir forest and portions of the late successional redwood forest that contain concentrations of mature Douglas-fir trees, would be affected by Alternative F. Potential habitat impacts include:

- ***Permanent:*** Alternative F would permanently affect 0.62 acre of potentially suitable habitat (late successional redwood forest) (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and tunnel portal infrastructure.
- ***Habitat Conversion:*** Approximately 0.49 acre of suitable habitat would undergo habitat conversion (Table 3-14). In these areas, late successional Douglas-fir and redwood forest would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative F would temporarily affect up to 1.13 acres of potentially suitable habitat (Table 3-15). These impacts are in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed, but trees over 24 inches DBH would remain in place. The habitat in these areas would continue to function as it had pre-project in less than a year.

The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are a least 1,545 acres of suitable late successional forested habitat adjacent to the project area to the north (Parcel Quest 2023). Within DNCRSP and RNP there is approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie Creek Redwoods State Park in the south. Additional habitat is also present on surrounding timberland. Given this, it is anticipated that Alternative F would have minimal effects on Sonoma tree vole habitat.

Operational Impacts

Alternative F includes permanent lighting in the vicinity of the tunnel entrances and at the OMC. This lighting would be typical roadway lighting. It would be localized, directed down at the infrastructure, and would not extend far into the surrounding habitat. Therefore, effects to surrounding habitat from the permanent lighting are not anticipated.

Because Alternative F would reroute the highway into a tunnel, noise levels from traffic along U.S. 101 would be lower than existing conditions (Caltrans 2023k). The lower noise levels, improved habitat connectivity, and reduced risk of vehicle strike are anticipated to benefit Sonoma tree vole residing in the area.

Conclusion

Both alternatives have the potential to adversely impact individual Sonoma tree voles during the tree removal stage, with Alternative X impacting a greater quantity and higher quality of habitat. However, the amount of habitat being removed for both alternatives is relatively small, which would limit the potential for impacts. Neither alternative would have a substantial effect on Sonoma tree voles given the minimal impacts to habitat, the temporary nature of construction, the abundance of suitable habitat in the project vicinity, and the implementation of standard measures.

White-footed Vole

Common Features of Alternatives X and F Affecting White-footed Vole

Vegetation Removal

White-footed vole habitat, which includes riparian and upland red alder forest, Douglas-fir forest, and redwood forest, would be affected by the project as trees and vegetation would be removed from within the project footprint. White-footed tree voles den on the forest floor and possibly within the tree canopy during the spring and summer months. All tree removal would be done outside of the denning season (Standard Measure BR-2 A). It is anticipated that once trees and vegetation are removed, the areas would no longer support white-footed voles. Therefore, no impacts to active white-footed vole dens from tree removal are anticipated.

Construction Impacts

White-footed vole habitat would be exposed to elevated noise levels during construction. However, Standard Measure BR-2 I would limit construction noise between March 24 and September 15–which covers the white-footed vole breeding season. Additionally, there is sufficient surrounding habitat in the vicinity for individuals to disperse to if disturbed by construction noise. Therefore, minimal impacts to white-footed vole from construction noise are anticipated.

Temporary night lighting would be used during construction. However, Standard Measure BR-2 F would limit lighting to areas actively under construction or on areas needed for security. This would limit light exposure on surrounding habitat. Because of this, temporary lighting is not anticipated to affect white-footed vole.

Geotechnical Investigations

Geotechnical work would have the potential to temporarily affect white-footed vole habitat. Equipment delivery for 18 bore locations for Alternative X and 2 bore locations for Alternative F would require the use of a helicopter. To the extent feasible, the bore locations would be sited outside of coniferous forest and would be placed between gaps in the trees, if located within a forested canopy. At these bore locations some vegetation may be removed or trimmed; however, no large trees (trees with DBH 24 inches or greater) would be removed. There is white-footed vole habitat adjacent to the bore locations and helicopter staging areas that would be exposed to helicopter noise and rotor wash. For Alternative X, it is estimated that it would take approximately 54 hours over 18 weeks to deliver equipment to and from the bore locations and, for Alternative F, approximately 15 hours to over 1 to 2 weeks. For the geotechnical phase, use of helicopters would be limited to the time between September 16 and January 31 (which is the non-denning season) and helicopters would fly at a high enough altitude between staging areas and boreholes to reduce rotor wash on trees and the surrounding habitat. If any white-footed vole were present, there is sufficient surrounding habitat to disperse to. Only minimal impacts to white-footed vole from the geotechnical work are anticipated.

Effects Unique to Alternative X

Habitat Impacts

Suitable habitat for white-footed vole, which includes redwood, Douglas-fir, and red alder forest, would be affected by Alternative X. Potential habitat impacts include:

- ***Permanent:*** Alternative X would permanently affect 5.34 acres of potentially suitable white-footed vole habitat (redwood, Douglas-fir, and red alder forest) (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and drainage gallery infrastructure.
- ***Habitat Conversion:*** Approximately 0.07 acre of potentially suitable habitat would undergo habitat conversion (Table 3-14). In these areas, late successional Douglas-fir forest would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative X would temporarily affect a total of 3.41 acres of potentially suitable habitat (Table 3-15).
    - *Temporary:* Impacts include 2.48 acres of redwood, Douglas-fir and red alder forests. These impacts are in equipment access buffer areas and geotechnical borehole areas, where vegetation would be disturbed, but trees over 24 inches DBH would remain in place. The habitat in these areas would continue to function as it had pre-project in less than a year.
    - *Long-term Temporary One:* Vegetation within approximately 0.92 acre of red alder forest would be removed to facilitate cut and fill and the geotechnical work necessary for the project. These areas would be replanted and return to equivalent habitat within 3 to 10 years.
    - *Long-term Temporary Two:* Impacts include 0.01 acre of early successional Douglas-fir forest, where trees would be removed to facilitate cut and fill. These areas would be replanted and would function as they had pre project within 20 to 40 years.

The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are a least 1,545 acres of late successional forested habitat to the north, with additional conifer and red alder forest habitat in RNP and surrounding timberland (Parcel Quest 2023). Given this, it is anticipated that Alternative X would have minimal effects on white-footed vole habitat.

Effects Unique to Alternative F

Habitat Impacts

Suitable habitat for white-footed vole, which includes redwood, Douglas-fir, and red alder forest, would be affected by Alternative F. Potential habitat impacts include:

- ***Permanent:*** Alternative F would permanently affect 3.89 acres of potentially suitable white-footed vole habitat (redwood, Douglas-fir, and red alder forest) (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and tunnel portal infrastructure.
- ***Habitat Conversion:*** Approximately 0.49 acre of potentially suitable habitat would undergo habitat conversion (Table 3-14). In these areas, late successional redwood and Douglas-fir forests would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative F would temporarily affect a total of 10.23 acres of potentially suitable habitat (Table 3-15).
    - *Temporary:* The project would impact 3.53 acres of redwood, Douglas-fir and red alder forests. These impacts are in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed; however, trees over 24 inches DBH would remain in place. The habitat in these areas would continue to function as it had pre-project in less than a year.
    - *Long-term Temporary One:* The project would affect 6.48 acres of red alder forest. Vegetation would be removed to facilitate cut and fill and the geotechnical work necessary for the project. These areas would be replanted and return to equivalent habitat within 3 to 10 years.

- *Long-term Temporary Two:* Impacts include 0.22 acre of early successional redwood and Douglas-fir forest. Trees would be removed to facilitate cut and fill. These areas would be replanted and would function as they had pre-project within 20 to 40 years.

The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are a least 1,545 acres of late successional forested habitat to the north, with additional conifer and red alder forest habitat in RNP and surrounding timberland (Parcel Quest 2023). Given this, it is anticipated that Alternative F would have minimal effects on white-footed vole habitat.

Operational Impacts

Alternative F includes permanent lighting in the vicinity of the tunnel entrances and at the OMC. This lighting would be typical roadway lighting. It would be localized, directed down at the infrastructure, and would not extend far into the surrounding habitat. Therefore, effects to surrounding habitat from the permanent lighting are not anticipated.

Because Alternative F would reroute the highway into a tunnel, noise levels from traffic along U.S. 101 would be lower than existing conditions (Caltrans 2023k). The lower noise levels, improved habitat connectivity, and reduced risk of vehicle strike are anticipated to benefit white-footed vole residing in the area.

Conclusion

Though Alternative X would remove more habitat than Alternative F, given the relatively small amount of habitat affected by both of the build alternatives, the temporary nature of construction, the abundance of unaffected suitable habitat in the project vicinity to which individuals could relocate to, if necessary, and the implementation of standard measures, neither Alternative X nor Alternative F would have a substantial effect on white-footed vole.

Special Status Bats

Common Features of Alternatives X and F Affecting Special Status Bats

Vegetation Removal

Under both build alternatives, tree removal has a potential to directly affect maternity or day-roosting colonies or individuals in a state of torpor (temporary hibernation; period of inactivity, lasts just a few hours during the daytime). Removing trees during the maternity season (March to September) would have the greatest potential to affect roosting bats. Maternity colonies could have high numbers of non-volant (unable to fly) young and removing an occupied tree could result in direct or indirect harm or mortality to individuals or a colony. Standard Measure BR 2-A would limit vegetation removal during the maternity season. Removing trees during the period of December through February, when bats may be in a state of torpor, would also have the potential to affect bats, as they may be unable to leave the roost. During the torpor state bats slow their metabolic rate to survive through low temperatures and low abundance of food, and if disturbed during this period, they may use limited energy reserves. Removing an occupied tree could result in direct or indirect harm or mortality to individuals in torpor.

Construction Impacts

Bat roosting habitat would be exposed to elevated noise levels during construction. However, Standard Measure BR-2 I would limit construction noise between March 24 and September 15–which covers the majority of the maternity season. If day roosting bats are disturbed by construction noise, there is sufficient suitable habitat in the vicinity for individuals to disperse to. Additionally, the tree cavities which bats roost in would also function to reduce noise. Impacts to bats from construction noise would be minimal.

Temporary night lighting would be used during construction. However, Standard Measure BR-2 F would limit lighting to areas actively under construction or on areas needed for security. This would limit light exposure on surrounding habitat. Because of this, temporary lighting is not anticipated to affect special status bats.

Geotechnical Investigations

Geotechnical work would have the potential to temporarily affect bat habitat. Equipment delivery for 18 bore locations for Alternative X and 2 bore locations for Alternative F would require the use of a helicopter. To the extent feasible, the bore locations would be sited

outside of coniferous forest and would be placed between gaps in the trees, if located within a forested canopy. At these bore locations some vegetation may be removed or trimmed; however, no large trees (trees with DBH 24 inches or greater) would be removed. There is bat habitat adjacent to the bore locations and helicopter staging areas that would be exposed to helicopter noise and rotor wash. For Alternative X, it is estimated that it would take approximately 54 hours over 18 weeks to deliver equipment to and from the bore locations and, for Alternative F, approximately 15 hours to over 1 to 2 weeks. For the geotechnical phase, use of helicopters would be limited to the time between September 16 and January 31 (which is the non-maternity season) and helicopters would fly at a high enough altitude between staging areas and boreholes to reduce rotor wash on trees and the surrounding habitat. If any bats in torpor were present, they would be insulated from noise within tree cavities. Minimal impacts to bats from the geotechnical work are anticipated.

Effects Unique to Alternative X

Habitat Impacts

Suitable habitat for bats, which includes redwood, Douglas-fir, Sitka spruce, and red alder forest, would be affected by Alternative X. Potential habitat impacts include:

- ***Permanent:*** Alternative X would permanently affect 5.63 acres of potentially suitable bat habitat (redwood, Douglas-fir, Sitka spruce, and red alder forest) (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and drainage gallery infrastructure.
- ***Habitat Conversion:*** Approximately 0.67 acre of suitable habitat would undergo habitat conversion (Table 3-14). In these areas, late successional Douglas-fir and Sitka spruce forest would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative X would temporarily affect a total of 3.78 acres of potentially suitable habitat (Table 3-15).
    - *Temporary:* Impacts include 2.85 acres of redwood, Douglas-fir, Sitka spruce, and red alder forests. These impacts are in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed; however, trees over 24 inches DBH would remain in place. The habitat would continue to function as it had pre-project in less than a year.

- *Long-term Temporary One:* The project would affect 0.92 acre of red alder forest. Vegetation would be removed to facilitate cut and fill and the geotechnical work necessary for the project. These areas would be replanted and return to equivalent habitat within 3 to 10 years.
- *Long-term Temporary Two*: Impacts include 0.01 acre of early successional Douglas-fir forest. Trees would be removed to facilitate cut and fill. These areas would be replanted and would function as they had pre-project within 20 to 40 years.

The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are a least 1,545 acres of late successional forested habitat to the north, with additional conifer and red alder forest habitat in RNP and surrounding timberland (Parcel Quest 2023). Given this, it is anticipated that Alternative X would have minimal effects on bat habitat.

Effects Unique to Alternative F

Habitat Impacts

Suitable habitat for bats, which includes redwood, Douglas-fir, Sitka spruce, and red alder forest, would be affected by Alternative F. Potential habitat impacts include:

- ***Permanent:*** Alternative F would permanently affect 4.09 acres of potentially suitable bat habitat (late and early successional redwood, early successional Douglas-fir, late successional Sitka spruce, and red alder forests). This habitat would be replaced with hardscaped features, such as walls, highway features, and tunnel portal infrastructure.
- ***Habitat Conversion:*** Approximately 1.42 acres of suitable habitat would undergo habitat conversion. In these areas late successional redwood, Douglas-fir, and Sitka spruce forests would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative F would temporarily affect a total of 10.69 acres of potentially suitable habitat.
  - *Temporary:* The project would affect 3.99 acres of redwood, Douglas-fir, Sitka spruce, and red alder forests. These impacts are in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed; however,

trees over 24 inches DBH would remain in place. The habitat would continue to function as it had pre-project in less than a year.

- *Long-term Temporary One:* Impacts include 6.48 acres of red alder forest. Vegetation would be removed to facilitate cut and fill and the geotechnical work necessary for the project. These areas would be replanted and return to equivalent habitat within 3 to 10 years.
- *Long-term Temporary Two*: Impacts include 0.22 acre of early successional redwood and Douglas-fir forest. Trees would be removed to facilitate cut and fill. These areas would be replanted and would function as they had pre-project within 20 to 40 years.

The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are a least 1,545 acres of late successional forested habitat to the north, with additional conifer and red alder forest habitat in RNP and surrounding timberland (Parcel Quest 2023). Given this, it is anticipated that Alternative F would have minimal effects on bat habitat.

Operational Impacts

Alternative F includes permanent lighting in the vicinity of the tunnel entrances and at the OMC. This lighting would be typical roadway lighting. It would be localized, directed down at the infrastructure, and would not extend far into the surrounding habitat. Therefore, effects to surrounding habitat from the permanent lighting are not anticipated.

Because Alternative F would reroute the highway into a tunnel, noise levels from traffic along U.S. 101 would be lower than existing conditions (Caltrans 2023k). The lower noise levels and improved habitat connectivity are anticipated to benefit bats residing in the area.

Conclusion

Alternative X would impact more habitat than Alternative F, although Alterative F would impact higher quality habitat that Alternative X. However, given the relatively small amount of habitat affected by the alternatives, the temporary nature of construction, the abundance of unaffected suitable habitat in the project vicinity to which individuals could relocate if necessary, and the implementation of Standard Measures and Best Management Practices, construction noise and light and habitat loss would not have a substantial effect on bats for either alternative.

Tree removal for both Alternatives X and F could result in direct harm or mortality to individuals if roosting within the tree. Therefore, tree removal for both Alternatives X and F has the potential to adversely impact special status bats.

Migratory Birds

Two special status birds (Vaux's swift and purple martin) were discussed above. Non-special status migratory birds are also addressed here because they may nest, roost, and forage in the area and be affected by the project.

Common Features of Alternatives X and F Affecting Migratory Birds

Tree Removal

Both Alternatives X and F would affect habitat for birds protected by the MBTA. To facilitate construction, trees and vegetation would be removed from project footprint (see acreages below). However, with implementation of Standard Measure BR-2 A, vegetation would either be removed outside of the nesting bird season or pre-construction surveys would be required. Therefore, impacts to nesting birds protected by the MBTA would be avoided.

Construction Impacts

Nesting migratory birds would be exposed to elevated noise during construction. However, Standard Measure BR-2 I would limit construction noise between March 24 and September 15–the majority of the nesting season. In addition, there is sufficient suitable nesting habitat in the vicinity for individuals to disperse should construction noise disturb individuals. Therefore, it is anticipated there would be minimal impacts to nesting migratory birds from construction noise.

Temporary night lighting would be used during construction. However, Standard Measure BR-2 F would limit lighting to areas actively under construction or on areas needed for security. This would limit light exposure on surrounding habitat. Because of this, temporary lighting is not anticipated to affect migratory birds.

Geotechnical Investigations

Geotechnical work would have the potential to temporarily affect migratory bird habitat. To the extent feasible, the bore locations would be sited outside of coniferous forest and would be placed between gaps in the trees, if located within a forested canopy. At these bore locations some vegetation may be removed or trimmed, however, no large trees (trees with DBH 24 inches or greater) would be removed. Areas would be revegetated following completion of the work. For the geotechnical phase, use of helicopters would be limited to the time between September 16 and January 31 (which is outside of the nesting season); therefore, no migratory birds would be present. No impacts to migratory birds from the geotechnical work are anticipated.

Effects Unique to Alternative X

Habitat Impacts

All native vegetation communities provide nesting habitat for migratory birds. Alternative X would permanently impact 6.72 acres of nesting habitat. Habitat conversion would take place on 0.67 acre of nesting habitat and there would temporary impacts on 6.38 acres (Tables 3-14 and 3-15). Thousands of acres of habitat are available in the surrounding landscape. It is anticipated habitat impacts would not impact migratory birds.

Effects Unique to Alternative F

Habitat Impacts

All native vegetation communities provide nesting habitat for migratory birds. Alternative F would permanently impact 4.34 acres of nesting habitat. Habitat conversion would take place on 1.42 acres of nesting habitat and there would be temporary impacts on 13.79 acres (Tables 3-14 and 3-15). Thousands of acres of habitat are available in the surrounding landscape. It is anticipated habitat impacts would not impact migratory birds.

Operational Impacts

Alternative F includes permanent lighting in the vicinity of the tunnel entrances and at the OMC. This lighting would be typical roadway lighting. It would be localized, directed down at the infrastructure, and would not extend far into the surrounding habitat. Therefore, effects to surrounding habitat from the permanent lighting are not anticipated.

Because Alternative F would reroute the highway into a tunnel, noise levels from traffic along U.S. 101 would be lower than existing conditions (Caltrans 2023k). The lower noise

levels and improved habitat connectivity are anticipated to benefit migratory birds in the area.

Conclusion

Neither Alternative would have a substantial effect on migratory birds given the protections for nests provided in the Standard Measures and Best Management Practices, the temporary nature of construction, and the abundance of suitable habitat in the project vicinity to which individuals could relocate. In addition, the revegetation and restoration measures in the Standard Measures (BR-4 B) would restore habitat temporarily affected by the project.

No-Build Alternative

Under the No-Build Alternative, no project would be constructed and existing conditions, with road maintenance and emergency repairs, would continue.

Avoidance, Minimization, and/or Mitigation Measures

For special status amphibians, impacts from both Alternatives X and F, with the incorporation of standard measures, would be minimal. No additional species-specific avoidance and minimization measures would be needed.

For purple martin, Vaux's swift, fisher, ringtail, Sonoma tree vole, white-footed vole, and migratory birds, impacts from Alternatives X and F would be minimal. However, Bio-5 (detailed below), which would reduce construction noise, would be implemented to further minimize impacts to these special status species.

For special status bats, tree removal for both Alternatives X and F has the potential to adversely impact roosting bats. Measures Bio-6, Bio-7, Bio-8, and Bio-9, detailed below, would be implemented to avoid and reduce impacts. Bio-6 would require tree removal be conducted outside of both the maternity and torpor seasons, Bio-7 would have a qualified bat biologist identify all suitable bat roosting trees prior to tree removal, Bio-8 would require all trees identified as bat roosting trees use site-specific means to modify and disturb the habitat to allow bats to wake and leave the roost prior to tree felling, and Bio-9 would have a qualified construction monitor onsite during removal of identified bat roosting trees. With these measures incorporated, tree removal would have minimal impacts on special status bats.

- **Bio-5:** Noise control practices would be followed to minimize construction noise and disturbance to sensitive habitat areas:
  - Require that all construction equipment powered by gasoline or diesel engines has sound control devices such as exhaust mufflers that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation.
  - Use equipment powered by electric motors instead of gasoline- or diesel-powered engines where feasible.
  - Prevent excessive noise by shutting down idling vehicles or equipment, when feasible.
- **Bio-6**: Tree removal would be conducted outside of the maternity season[35] (March 1 through September 1) and the winter torpor period (December 1 through February 28), to the extent possible. The limited operating periods may be modified at the recommendation of a biologist based on regional bat roosting data, site-specific roost status, and/or annual climate variation.
- **Bio-7**: Prior to tree removal, a qualified bat biologist would examine trees to be removed or trimmed for suitable bat roosting habitat. Trees greater than 24 inches DBH or any size with habitat features (e.g., tree cavities, basal hollows, loose or peeling bark, larger snags) would be further evaluated for the potential to support roosting habitat, and the area within accessible cavities (and on the outside of the tree, as feasible) for bat sign (e.g., guano, culled insect parts, staining), as feasible. The qualified bat biologist would be approved by Caltrans and be knowledgeable on bat life history, species identification, and identification of potential roosting habitat.

  Where suitable cavity bat roosting habitat is identified, the qualified bat biologist would further evaluate the potential use of the tree by bats by conducting an evening emergence survey and/or using a directional night-vision camera to view into the cavity to identify presence of bats at cavities accessible from the ground. Emergence surveys would be conducted no more than 2 weeks prior to start of tree removal activities. Surveys would be conducted 30 minutes before sunset to 1 hour after sunset (or until there is no visibility) and during favorable weather conditions (calm

[35] Maternity season for bats in California varies and may begin as early as early March through the end of August, in the hottest and coldest of environments, respectively (H. T. Harvey & Associates 2019).

nights with temperatures conducive to bat activity and no precipitation predicted). Acoustic detectors may be used to detect emerging bats and identify species.

If bats are documented and the site is conducive, the roost is safely accessible from the ground, and it is feasibly appropriate (limited access points), an exclusion device may be installed prior to tree removal. Any exclusion device would be installed under the guidance of a qualified bat biologist and when weather is fair. No exclusion would occur during the maternity season.

- **Bio-8**: If the bat biologist determines during the preconstruction tree surveys (Bio-7) that the tree is suitable for bat roosting, the biologist would use feasible site-specific means to modify and disturb the habitat to allow bats to wake and leave the roost prior to tree felling. These disturbances may include (1) modifying habitat conditions such as removing smaller non-habitat trees at least a day prior to removing habitat trees; (2) creating a vibrational disturbance over the course of a few minutes with a chainsaw, knocking the tree with a sledgehammer, using equipment to shake the tree, or removing the tree in pieces (sections or limbs) over the course of a few days; (3) changing the structure of the potential roost by lifting bark to modify temperature, wind, light, and precipitation; and/or (4) using ultrasound deterrents. The tree disturbance would be monitored by the construction monitor (Bio-9).
- **Bio-9**: A qualified construction monitor would be present on site to conduct monitoring during removal of the trees identified during preconstruction surveys (Bio-7) as having the potential to support bat roosting in tree cavities. Following tree removal, the construction monitor would search downed vegetation for dead and injured bats. Injured bats would be transported to the nearest wildlife rehabilitation facility (Humboldt Wildlife Care Center near Arcata). The qualified construction monitor would be approved by Caltrans and be knowledgeable on bat life history, species identification, and roosting habitat.

3.4.5 Threatened and Endangered Species

Regulatory Setting

The primary federal law protecting threatened and endangered species is FESA (16 USC 1531 et seq.). See also 50 CFR Part 402. This act, and later amendments, provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of this act, federal agencies, such as FHWA (and Caltrans, as assigned), are required to consult with USFWS and NMFS to ensure they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat (CH). CH is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of consultation under Section 7 may include a Biological Opinion with an Incidental Take Statement or a Letter of Concurrence. Section 3 of FESA defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or any attempt at such conduct."

California has enacted a similar law at the state level, California Endangered Species Act (CESA), under California Fish and Game Code Section 2050 et seq. CESA emphasizes early consultation to avoid potential impacts on rare, endangered, and threatened species and to develop appropriate planning to offset project-caused losses of listed species populations and their essential habitats. CDFW is the agency responsible for implementing CESA. Section 2080 of the California Fish and Game Code prohibits "take" of any species determined to be an endangered species or a threatened species. Take is defined in Section 86 of the California Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects; for these actions an Incidental Take Permit is issued by CDFW. For species listed under both FESA and CESA requiring a Biological Opinion under Section 7 of FESA, the CDFW may also authorize impacts on CESA species by issuing a Consistency Determination under Section 2080.1 of the California Fish and Game Code.

Another federal law, the Magnuson-Stevens Fishery Conservation Management Act of 1976, was established to conserve and manage fishery resources found off the coast, as well as anadromous species and Continental Shelf fishery resources of the United States, by exercising (A) sovereign rights for the purposes of exploring, exploiting, conserving, and managing all fish within the exclusive economic zone established by Presidential Proclamation 5030, dated March 10, 1983, and (B) exclusive fishery management authority

beyond the exclusive economic zone over such anadromous species, Continental Shelf fishery resources, and fishery resources in special areas.

Affected Environment

Record searches[36] and habitat assessments were conducted to determine whether threatened and endangered species have the potential to occur within the project area (Appendix G). In addition, several studies were conducted to assess the presence of threatened and endangered species and their habitat within the BSAs. Studies included general wildlife surveys and habitat assessments and studies targeting northern spotted owl, forest carnivores, and bald eagles. Results of these studies were summarized in the NES prepared for this project (Caltrans 2023d).

Coordination with federal and state agencies conducted to date is included in Chapter 5, *Comments and Coordination*. It is anticipated that Section 7 consultation with USFWS and NMFS would be conducted prior to the final environmental document.

See Appendices H and I for lists of special status plant and animal species, including threatened and endangered species, which are known to occur or have the potential to occur in the project vicinity, and the rationale for habitat presence or absence.

Based on the record searches, habitat assessments, and field surveys, six threatened and endangered species could potentially occur or would have suitable habitat and/or critical habitat (CH) within the BSAs, including three birds (bald eagle, marbled murrelet and northern spotted owl); one fish (Southern Oregon/Northern California Coast Evolutionarily Significant Unit of coho salmon); one mammal (Humboldt marten); and one plant (western lily).

Species with potential to occur in the project area are discussed below; species with no habitat present in the project area are not discussed further. Essential Fish Habitat (EFH), protected under the Magnuson-Stevens Act, is present in BSA #1 in the Pacific Ocean to the west of the project for various species. However, there would be no impacts to EFH, and EFH is not considered further. A summary of FESA and CESA conclusions for all listed species is included under the *Environmental Consequences* section.

[36] Record searches for threatened and endangered species were determined by reviewing natural resource agency databases, literature, and other relevant sources; these included official lists provided by USFWS (2023); NMFS (2023); and the CNDDB for the Crescent City, Hiouchi, Gasquet, Sister Rocks, Childs Hill, Cant Hook Mountain, Requa, Klamath Glen, Fern Canyon, and Ah Pah Ridge USGS quadrangles; for plant species, an additional two quadrangles—Rodgers Peak and Orick—were used (CDFW 2023b).

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is a state listed as endangered. It was once federally listed under FESA, but was delisted in 2007. However, it is still federally protected under the MBTA and the Bald and Golden Eagle Protection Act. Bald eagles are found throughout California near lakes, reservoirs, rivers, rangelands, and some coastal wetlands (CDFW 2022a). Most breeding territories are found in northern California (CDFW 2022a). Territories can be large, ranging in size from 2–15 square miles depending on food availability (Polite and Pratt, 1999). Typically, a pair constructs a large stick nest in the upper canopy of large trees near water (CDFW 2022a). Nests may be reused (CDFW 2022a). Breeding takes place from January through July or August (CDFW 2022a). One or two eggs are laid in late winter or early spring, with incubation lasting around 35 days (CDFW 2022a; Polite and Pratt 1999). Nestlings remain in the nest until approximately 11 or 12 weeks of age before they fledge (CDFW 2022a). Resident breeding pairs remain in California, often near their breeding area, although some may make altitudinal movements to lower-elevation areas where conditions are more temperate. Numerous migratory bald eagles spend the winter in California, arriving in late fall or early winter before departing in early spring (CDFW 2022a).

The nearest known CNDDB occurrence is a nesting pair approximately 7.5 miles southeast of the ESL. An aerial survey from a helicopter (during geotechnical investigations) was conducted for the project. While this survey was done in November of 2020 (outside of the breeding season), due to the high degree of nest fidelity shown by bald eagles, previous nests and nesting signs were assumed to be indicative of potential future nesting. However, while a bald eagle was observed flying over U.S. 101 and the Pacific Ocean during northern spotted owl surveys, no raptors, nests, or other nesting bird signs were observed during the helicopter survey.

Although no nests were observed, suitable nesting habitat is found throughout BSA #2 in the form of large trees near water (Pacific Ocean), and foraging habitat is present along the western portion of the ESL near the ocean.

Marbled Murrelet

Marbled murrelet (*Brachyramphus marmoratus*) is federally listed as threatened and state listed as endangered. In addition, USFWS has designated critical habitat for this species.

Marbled murrelet is a small Pacific seabird that breeds along the Pacific coast of North America from the Aleutian Archipelago and southern Alaska south to Monterey Bay in central California (USFWS 2022). Marbled murrelets are generally found on calm, protected

ocean waters near the coast, foraging mostly in shallow water (i.e., waters less than 100 feet deep), usually within 1.2 to 3 miles of shore (USFWS 2022). This species is a solitary nester and, in the continental U.S., breeds inland, generally within 50 miles from the coast, nesting in old-growth forests characterized by large trees, multiple canopy layers, and moderate to high canopy closure. Nest stands vary in size from several acres to thousands of acres. Large, unfragmented stands are high-quality nesting habitat for this species. In part, this is because fragmentation of forests can create changes in microclimate, vegetation species, and predator-prey dynamics. Research has shown that predation is a significant cause of marbled murrelet nest failure (USFWS 2016a).

In California, nest stands are dominated by late successional redwood and Douglas-fir forests but can also include Sitka spruce, western hemlock, and western red cedar (*Thuja plicata*) forests (USFWS 2016a, 2022). Nest trees typically have a 19-inch DBH or greater (USFWS 2016a). Marbled murrelets typically nest in old-growth trees because there is a higher likelihood that suitable nest platforms will be present (USFWS 2016a). Nest sites are close enough to the marine environment for the birds to fly to and from their foraging grounds (USFWS 2022). Marbled murrelets nest from late March to late September (USFWS 2020 and 2022). During the fledging period, adults feed the chick at least once per day, flying in, primarily at dawn and dusk, from feeding on the ocean (USFWS 2022).

USFWS published the marbled murrelet critical habitat determination final rule in 1996 (USFWS 1996) and revised the extent of the critical habitat in 2011 (USFWS 2011a). The current designation includes approximately 3.7 million acres of federal and non-federal land in Washington, Oregon, and California (USFWS 2016a). This includes the approximately 6,662-acre unit of designated critical habitat that overlaps the majority of BSA #1 and #2.

There are 20 CNDDB occurrences of marbled murrelet within a 10-mile radius of the ESL; the nearest is 0.16 mile east of the ESL (CDFW 2023a). In addition, marbled murrelet was audibly detected six times on GDRC and DNCRSP land during northern spotted owl surveys (Caltrans 2021b) and was detected at all four avian acoustic recorder stations. Of the recorder locations, marbled murrelet was most prominently detected at the northernmost station, which was in the late-successional redwood forest.

No protocol-level survey was conducted for the project; marbled murrelet presence is assumed within all suitable habitat within BSA #1, including redwood forest, Douglas-fir forest, and Sitka spruce forest. These forests have multiple canopy layers and large trees with suitable nesting platforms. While suitable habitat does occur throughout BSA #1, the quality is higher in the northern portion of BSA #1.

Northern Spotted Owl

The northern spotted owl (*Strix occidentalis caurina*) is federally and state listed as threatened. In northern California, the northern spotted owl is an uncommon permanent resident in suitable coniferous habitats from sea level to approximately 7,600 feet (2,300 meters). In California, its range runs south along the coast from the Oregon border to Marin County, across the Klamath Mountains east to the Cascade Range. Populations of northern spotted owl are declining throughout the range of the subspecies, with annual decline rates estimated at 3.8 percent per year since 1985 (CDFW 2016).

Northern spotted owl nesting and roosting habitat on the coast of California often consists of younger forests, more than for northern spotted owl in the interior forests, due to more rapid growth and structural development of coastal redwood forests (CDFW 2016). Foraging habitat is largely a function of prey abundance and availability and occurs across a variety of forest and non-forest vegetation types within the species' home range (CDFW 2016). Coastal northern spotted owl nesting/roosting habitat is defined as 60 percent or greater conifer or hardwood canopy closure and a basal area of at least 100 square feet per acre of trees 11 inches or greater in DBH (USFWS 2019b). Coastal foraging habitat is defined as 40 percent or greater conifer or hardwood canopy closure and a basal area of at least 75 square feet per acre of trees 11 inches or greater DBH (USFWS 2019b). The general breeding season for northern spotted owl is February 1 to July 31 (USFWS 2020).

The nearest known CNDDB occurrences are approximately 0.93 miles east of the ESL, along Wilson Creek. There is no designated critical habitat for northern spotted owl within the ESL; the closest critical habitat is approximately 1.5 miles to the south-southeast, near High Prairie Creek.

Protocol-level surveys for northern spotted owl were conducted in 2020 and 2021 at 38 stations, extending 0.7 mile from the footprints of the existing build alternatives and the alternatives removed from further study between 2020 and 2021. Survey efforts resulted in two northern spotted owl detections, once in April 2020 and once in April 2021. However, no northern spotted owls were detected in follow-up surveys; however, barred owls were detected in the vicinity of the original calls. While there are three historical northern spotted owl activity centers (ACs) on adjacent GDRC land, GDRC biologists did not detect northern spotted owls in daytime searches conducted in 2020 and 2021.

There are no known northern spotted owl ACs within 0.7 mile of the Alternative X or Alternative F project footprints. Suitable nesting, roosting, and foraging habitat is present within BSAs #1 and #2. Suitable nesting and roosting habitat includes early and late successional redwood forest, late successional Douglas-fir forest, and early and late

successional Sitka spruce forest, while suitable foraging habitat is present within early successional Douglas-fir forest.

Coho Salmon–Southern Oregon/Northern California Coast ESU

The Southern Oregon/Northern California Coast (SONCC) Evolutionarily Significant Unit (ESU) of coho salmon (*Oncorhynchus kisutch)* is federally and state listed as threatened, and NMFS has also designated critical habitat for this ESU.

The SONCC coho salmon ESU includes all naturally spawned populations of coho in coastal streams between Cape Blanco, Oregon, and Punta Gorda, California, as well as salmon produced by three artificial propagation programs: the Cole River Hatchery near the Rogue River in Oregon and the Trinity River and Iron Gate (Klamath River) hatcheries in California (NMFS 2014).

Critical habitat for the SONCC coho salmon was designated in 1999 (64 Federal Register 24049) as encompassing accessible reaches of all rivers (including estuarine areas and tributaries) between the Mattole River in California and the Elk River in Oregon. It includes all waterways, substrate, and adjacent riparian zones below long-standing, naturally impassable barriers but excludes (1) areas above specific dams, (2) areas above long-standing, naturally impassible barriers, and (3) tribal lands.

While BSA #1 contains tributaries to Wilson Creek, which has SONCC coho salmon, the stream reaches within BSA #1 are above the limits of anadromy. Therefore, this species is not present within BSA #1.

In addition, while there is designated critical habitat and EFH for SONCC coho salmon within Wilson Creek and portions of its tributaries, the stream reaches within BSA #1 are not accessible to SONCC coho salmon due to long-standing, naturally impassible barriers (GDRC 2023); therefore, the portions of streams within BSA #1 do not meet the definition of EFH or critical habitat.

Humboldt (Pacific) Marten

The Coastal Distinct Population Segment (DPS) of Pacific marten (*Martes caurina*) is federally listed as threatened within northwestern California and coastal Oregon. The Humboldt marten (*Martes caurina humboldtiensis*), a recognized subspecies of Pacific marten, is state listed as endangered. BSAs #1 and #2 are within the range of the Humboldt marten subspecies. While critical habitat has been proposed by USFWS, it has not yet been finalized. None of the proposed CH falls within BSA #1 or BSA #2.

Historically, Humboldt marten occurred throughout the coastal forests of northwestern California and Oregon. This subspecies has been extirpated from greater than 95 percent of its historical range in California. Contemporary detections of Humboldt marten have occurred in three habitat types: moist Douglas-fir forest types, moist forest types on serpentine soils, and shore-pine associated dune forests. The elevation range of this species is from sea level to 5,000 feet (1,524 meters). The majority of marten detections have occurred in largely unmanaged moist Douglas-fir forest types, within large patches of late successional forest. In addition, there have been numerous Humboldt marten detections in late successional redwood and Douglas-fir habitats within Prairie Creek Redwoods State Park, south of the project area (USFS 2019b). Humboldt marten has been shown to select habitat with specific structures for foraging or resting, such as large logs or cavities in snags. Female martens den exclusively in cavities and are solely responsible for raising young. Mating occurs from late June to early August; due to delayed implantation by the female, two to three young on average are typically born in approximately March or April. The young disperse between 4 and 6 months of age (Delheimer et al., 2021). The home range for Humboldt marten is estimated at 740 to 988 acres (300 to 400 hectares) (USFS 2019b). There are three CNDDB occurrence records of Humboldt marten within 10 miles of the ESL. The nearest Humboldt marten record is approximately 6.8 miles east of the ESL.

Surveys for Humboldt marten, fisher, and other carnivores were conducted within one marten home range (one mile) of the project alternatives still in consideration in 2020 (CDPR 2021). These surveys, completed in 2021, resulted in no detections of Humboldt marten, though two major predators of marten—coyote and bobcat—were detected. The late successional Douglas-fir, Sitka spruce, and redwood forest communities within BSA #1 provide suitable habitat for Humboldt marten.

Western Lily

Western lily (*Lilium occidentale*) (CRPR 1B.1) is federally and state listed as endangered and is seriously threatened in California. It is a perennial, bulbiferous herb in the lily family (Liliaceae) that blooms in June and July (USFWS 1998; CNPS 2023; Jepson Flora Project 2022).

Western lily typically grows in association with Sitka spruce and Pacific reed-grass (*Calamagrostis nutkaensis*) within openings and edge habitats of early successional bogs and coastal scrub with moderate shrub cover (less than 3 feet or 1 meter tall) (USFWS 1998). It is generally found within old beach washes, bogs, fens, coastal bluff scrub, coastal prairie,

coastal scrub, freshwater marshes and swamps, and North Coast coniferous forests at elevations between 5 and 605 feet (3 and 185 meters) (CDFW 2023b; CNPS 2023).

In California, western lily is found along the immediate coast within Del Norte and Humboldt counties (CNPS 2023). The nearest CNDDB occurrences of this species are in Crescent City approximately 7 miles north-northwest of the ESL (CDFW 2023b).

Western lily was not found during botanical surveys. BSA #1 is close to the coast (less than 4 miles); however, only a small portion of potential habitat within BSA #1 is suitable for western lily. Primary habitats within BSA #1 where western lily could potentially occur are edges, openings, and mesic sites within Sitka spruce forests, coastal brambles, and cascara forests[37]. However, habitat quality for western lily in these natural communities is low because they either (1) lack or contain only a few indicator species, such as Sitka spruce and slough sedge, (2) lack poorly drained soils, such as those in the Hutsinpillar and Hookton series, (3) are within mid- or late-successional habitats and thus lack openings in the canopy or have tall (i.e., greater than 3 feet [1 meter]), dense layers of understory shrubs, (4) are situated within or adjacent to disturbed or ruderal areas, such as along U.S. 101 or in previously logged areas, or (5) lack appropriate site hydrology.

Environmental Consequences

Bald Eagle

Common Features of Alternatives X and F Affecting Bald Eagle

Vegetation Removal

Bald eagle nesting habitat, which includes early and late successional redwood and Douglas-fir forest, and late successional Sitka spruce forest, would be affected by the project as trees within the construction footprint would be removed to facilitate construction. However, all tree removal would be done outside of the breeding season (Standard Measure BR-2 A). Therefore, no impacts to nesting bald eagles are anticipated from tree removal.

[37] Coastal brambles historically belonged to Northern Coastal Bluff Scrub (Holland 1986), whereas species composition within cascara forest shares similarities with coastal scrub.

Construction Impacts

Prior to the start of construction, surveys for active raptor nests would be conducted within the 0.25-mile buffer around the project area (Standard Measure BR-2 B). If any active raptor nests are identified, appropriate conservation measures, such as buffers or monitoring, would be implemented. Therefore, no impacts to nesting bald eagles are anticipated from construction noise.

Temporary night lighting would be used during construction. However, Standard Measure BR-2 F would limit lighting to areas actively under construction or on areas needed for security. This would limit light exposure on surrounding habitat. Because of this, temporary lighting is not anticipated to affect bald eagle.

Geotechnical Investigations

Geotechnical work would have the potential to temporarily affect bald eagle habitat. Equipment delivery for 18 bore locations for Alternative X and 2 bore locations for Alternative F would require the use of a helicopter. To the extent feasible, the bore locations would be sited outside of coniferous forest and would be placed between gaps in the trees, if located within a forested canopy. At these bore locations some vegetation may be removed or trimmed, however, no large trees (trees with DBH 24 inches or greater) would be removed. There is bald eagle habitat adjacent to the bore locations and helicopter staging areas and would be exposed to helicopter noise and rotor wash. For Alternative X, it is estimated that it would take approximately 54 hours over 18 weeks to deliver equipment to and from the bore locations and, for Alternative F, approximately 15 hours to over 1 to 2 weeks. For the geotechnical phase, use of helicopters would be limited to the time between September 16 and January 31 (which is the non-nesting season) and helicopters would fly at a high enough altitude between staging areas and boreholes to reduce rotor wash on trees and the surrounding habitat. If any roosting or foraging bald eagle were present, there is sufficient surrounding habitat to disperse to. Only minimal impacts to any roosting or foraging bald eagle from the geotechnical work are anticipated.

Effects Unique to Alternative X

Habitat Impacts

Suitable habitat for bald eagle, which includes early and late successional redwood and Douglas-fir forest, and late successional Sitka spruce forest, would be affected by Alternative X. Potential habitat impacts include:

- ***Permanent:*** Alternative X would permanently affect 4.06 acres of potentially suitable bald eagle nesting/roosting habitat (early and late successional redwood and Douglas-fir forest, and late successional Sitka spruce forest) (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and drainage gallery infrastructure.
- ***Habitat Conversion:*** Approximately 0.67 acre of suitable nesting and roosting habitat would undergo habitat conversion (Table 3-14). In these areas, late successional Douglas-fir and Sitka spruce forest would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative X would temporarily affect a total of 1.72 acres of potentially suitable nesting and roosting habitat (Table 3-15).
    - *Temporary:* The project would impact 1.71 acres of redwood, Douglas-fir and Sitka spruce forest. These impacts would be in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed; however, trees over 24 inches DBH would remain in place. The habitat would continue to function as it had pre-project in less than a year.
    - *Long-term Temporary Two:* Impacts include 0.01 acre of early successional Douglas-fir forest as trees would be removed to facilitate cut and fill. These areas would be replanted and would function as they had pre-project within 20 to 40 years.

The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are a least 1,545 acres of late successional forested habitat adjacent to the project area to the north. Within DNCRSP and RNP there are approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie Creek Redwoods State Park in the south. Additionally, there are thousands of acres of early successional conifer forest within the parks and on surrounding timberland (Parcel Quest 2023). Given this, it is anticipated that Alternative X would have minimal effects on bald eagle habitat.

Effects Unique to Alternative F

Habitat Impacts

Suitable habitat for bald eagle, which includes early and late successional redwood and Douglas-fir forest, and late successional Sitka spruce forest, would be affected by Alternative F. Potential habitat impacts include:

- ***Permanent:*** Alternative F would permanently affect 1.11 acres of potentially suitable bald eagle nesting/roosting habitat (early and late successional redwood, early successional Douglas-fir, and late successional Sitka spruce forest) (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and tunnel portal infrastructure.
- ***Habitat Conversion:*** Approximately 1.42 acres of suitable nesting and roosting habitat would undergo habitat conversion (Table 3-14). In these areas, late successional redwood, Douglas-fir, and Sitka spruce forest would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative F would temporarily affect a total of 2.15 acres of potentially suitable nesting and roosting habitat (Table 3-15).
    - *Temporary*: The project would temporarily impact 1.93 acres of redwood forest, Douglas-fir and Sitka spruce forests. These impacts would be in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed; however, trees over 24 inches DBH would remain in place. The habitat would continue to function as it had pre-project in less than a year.
    - *Long-term Temporary Two:* Impacts include 0.22 acres of early successional redwood forest and Douglas-fir forest. Trees would be removed to facilitate cut and fill. These areas would be replanted and would function as they had pre-project within 20 to 40 years.

The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are a least 1,545 acres of late successional forested habitat adjacent to the project area to the north. Within DNCRSP and RNP there are approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie Creek Redwoods State Park in the south. Additionally, there are thousands of acres of early successional conifer forest

within the parks and on surrounding timberland (Parcel Quest 2023). Given this, it is anticipated that Alternative F would have minimal effects on bald eagle habitat.

Operational Impacts

Alternative F includes permanent lighting in the vicinity of the tunnel entrances and at the OMC. This lighting would be typical roadway lighting. It would be localized, directed down at the infrastructure, and would not extend far into the surrounding habitat. Therefore, effects to surrounding habitat from the permanent lighting are not anticipated.

Because Alternative F would reroute the highway into a tunnel, noise levels from traffic along U.S. 101 would be lower than existing conditions (Caltrans 2023k). The lower noise levels and improved habitat connectivity are anticipated to benefit bald eagle residing in the area.

Conclusion

Alternative X would impact more habitat than Alternative F, though Alterative F would impact higher quality habitat. However, neither Alternative X nor F would have a substantial effect on bald eagle given the minimal impacts the alternatives have on habitat, the temporary nature of construction, and the abundance of suitable nesting habitat in the project vicinity to which individuals could relocate, and with implementation of Standard Measures and Best Management Practices.

Per CESA, the project would have ***no "take"*** of bald eagle.

Marbled Murrelet

Common Features of Alternatives X and F Affecting Marbled Murrelet

Tree Removal

Marbled murrelet nesting habitat, which includes early and late successional redwood and Douglas-fir forest, and late successional Sitka spruce forest, would be affected by the project as trees within the construction footprint would be removed to facilitate construction. However, all potential marbled murrelet nest trees would be removed outside of the marbled murrelet breeding season (Standard Measure BR-2 I). Tree removal could result in the cutting of a tree containing an inactive nest. However, while marbled murrelets exhibit high nest site fidelity at the stand level (Divoky and Horton, 1995), most individual nest trees are not used for multiple years consecutively. Because trees would be removed outside of the

breeding season, marbled murrelets would not be present, and would likely find a new nest tree within the stand the following season. Therefore, no impacts to nesting marbled murrelets are anticipated from tree removal.

Construction Impacts

Project-related construction noise could temporarily affect marbled murrelet if present within the area. To assess impacts on marbled murrelet, Caltrans relied on *Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owl and Marbled Murrelets in Northwestern California* (USFWS 2020). With the implementation of Standard Measure BR-2 I, which limits construction noise between March 24 and September 15, it is anticipated construction-related noise would not impact nesting marbled murrelets.

Temporary night lighting would be used during construction. However, Standard Measure BR-2 F would limit lighting to areas actively under construction or on areas needed for security. This would limit light exposure on surrounding habitat. Because of this, temporary lighting is not anticipated to affect marbled murrelet.

During construction, all trash would be deposited in a secure container and disposed of at an approved waste facility, as required by Standard Measure BR-2 C. While trash may increase the presence of marbled murrelet predators, such as corvids, no impacts to marbled murrelet are anticipated with the implementation of this measure.

Geotechnical Investigations

Geotechnical work would have the potential to temporarily affect marbled murrelet habitat. Equipment delivery for 18 bore locations for Alternative X and 2 bore locations for Alternative F would require the use of a helicopter. To the extent feasible, the bore locations would be sited outside of coniferous forest and would be placed between gaps in the trees, if located within a forested canopy. At these bore locations some vegetation may be removed or trimmed, however, no large trees (trees with DBH 24 inches or greater) would be removed. There is marbled murrelet habitat adjacent to the bore locations and helicopter staging areas; therefore, marbled murrelet would be exposed to helicopter noise and rotor wash. For Alternative X, it is estimated that it would take approximately 54 hours over 18 weeks to deliver equipment to and from the bore locations and, for Alternative F, approximately 15 hours to over 1 to 2 weeks. For the geotechnical phase, use of helicopters would be limited to the time between September 16 and January 31 (which is the non-nesting season), and therefore no marbled murrelets should be present. No impacts to marbled murrelet from the geotechnical work are anticipated.

Effects Unique to Alternative X

Habitat Impacts

Suitable habitat for marbled murrelet, which includes early and late successional redwood, early and late successional Douglas-fir, and late successional Sitka spruce forest, would be affected by Alternative X Potential habitat impacts include:

- ***Permanent:*** Alternative X would permanently affect 4.06 acres of potentially suitable marbled murrelet nesting habitat (early and late successional redwood, early and late Douglas-fir, and late successional Sitka spruce forest) (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and drainage gallery infrastructure.
- ***Habitat Conversion:*** Approximately 0.67 acre of suitable nesting habitat would undergo habitat conversion (Table 3-14). In these areas, late successional Douglas-fir and Sitka spruce forest would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative X would temporarily affect a total of 1.72 acres of potentially suitable nesting habitat (Table 3-15).
    - *Temporary:* Impacts include 1.71 acres of redwood, Douglas-fir and Sitka spruce forests. These impacts would be in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed; however, trees over 24 inches DBH would remain in place. The habitat would continue to function as it had pre-project in less than a year.
    - *Long-term Temporary Two:* Impacts include 0.01 acre of early successional Douglas-fir forest. Here, trees would be removed to facilitate cut and fill. These areas would be replanted and would function as they had pre project within 20 to 40 years.

Overall, of the habitat acreage, Alternative X would remove trees, which could be used for nesting, from 4.74 acres—this includes areas with permanent impacts, habitat conversion, and long-term Temporary Two impacts.

The project is located within a large forest consisting of many acres of suitable marbled murrelet habitat. Marbled murrelet's preferred nesting habitat consists of late successional forest, where nesting platforms are common, and located within 50 miles of the ocean.

Within the project region, 6,662 acres have been designated critical habitat for this species. Within DNCRSP there are a least 1,545 acres of late successional forested habitat adjacent to the project area to the north. Within DNCRSP and RNP there are approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie Creek Redwoods State Park in the south.

Range-wide, however, late successional forest is uncommon due to logging and habitat conversion. A recent status review of the species by the Oregon Department of Fish and Wildlife (ODFW) found that within Oregon, while quantities of late successional habitat on federal and state lands had increased since 1993, on all other private lands this habitat has decreased (ODFW 2021).

The majority of the nesting habitat (areas where trees would be removed) affected by Alternative X would be late successional Douglas-fir forest. It is mainly distributed in a narrow strip along the existing highway (Figures 3-20 to 3-23), with the exception of the tiered wall area where 0.73 acre would be removed. The habitat's location directly adjacent to U.S. 101 increases the ambient noise levels in this area, lowering the quality of the habitat. Even though this late successional Douglas-fir habitat close to the highway is lower quality, the surrounding habitat is high quality and occupied by marbled murrelet. In the southern portion of the project area, where the outfall would be built (Figure 3-23), late successional Sitka spruce forest patches would be bisected (with trees removed) for the outfall access road. This late successional forest, which supports large Sitka spruce trees, is patchily distributed within a matrix of coastal brambles and red alder forest. The large individual Sitka spruce trees provide habitat, but the fragmentation of the stands may reduce the overall quality of this habitat. Given the restrictive habitat requirements of the species and the presence of the species within BSA #1, it is anticipated that Alternative X would have adverse effects on marbled murrelet habitat.

Critical Habitat

Per discussions with USFWS, critical habitat maps are not refined; it may include vegetation community types and other areas that are not necessarily suitable habitat for the species, including non-vegetated areas such as parking lots and roadways. As such, in addition to coniferous communities that are suitable for the species, it also includes unsuitable habitat, like red alder forest, coastal bramble, ruderal vegetation, etc. Under Alternative X, approximately 11.27 acres of USFWS-designated critical habitat for marbled murrelet would be permanently affected through tree removed (Figure 3-39), though only 4.07 acres of this area is within conifer forest. In addition, approximately 4.51 acres of designated marbled murrelet critical habitat would be temporarily affected through vegetation removal (where no large trees would be removed); however, only 1.71 acres is found in coniferous forest community types.

Effects Unique to Alternative F

Habitat Impacts

Suitable habitat for marbled murrelet, which includes early and late successional redwood, early and late successional Douglas-fir, and late successional Sitka spruce forest, would be affected by Alternative F. Potential habitat impacts include:

- ***Permanent:*** Alternative F would permanently affect 1.11 acres of potentially suitable marbled murrelet habitat (early and late successional redwood, early successional Douglas-fir, and late successional Sitka spruce forest) (Table 3-14). This habitat would be replaced with hardscaped features, such as walls, highway features, and tunnel portal infrastructure.
- ***Habitat Conversion:*** Approximately 1.42 acres of suitable nesting habitat would undergo habitat conversion (Table 3-14). In these areas, late successional redwood, Douglas-fir, and Sitka spruce forests would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative F would temporarily affect a total of 2.15 acres of potentially suitable nesting habitat (Table 3-15).
    - *Temporary*: Impacts include 1.93 acres of redwood forest, Douglas-fir and Sitka spruce forest. These impacts are in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed; however, trees

over 24 inches DBH would remain in place. The habitat in these areas would continue to function as it had pre-project in less than a year.

- *Long-term Temporary Two:* Impacts include 0.22 acre of early successional redwood forest and Douglas-fir forest. Here, trees would be removed to facilitate cut and fill. These areas would be replanted and would function as they had pre-project within 20 to 40 years.

Overall, of the impacted habitat, Alternative F would remove trees, which could be used for nesting, from 2.75 acres—this includes areas with permanent impacts, habitat conversion, and long-term temporary two impacts.

The project is located within a large forest consisting of many acres of suitable marbled murrelet habitat. Marbled murrelet's preferred nesting habitat consists of late successional forest, where nesting platforms are common, and located within 50 miles of the ocean. Within the project region, 6,662 acres have been designated critical habitat for this species. Within DNCRSP there are a least 1,545 acres of late successional forested habitat adjacent to the project area to the north. Within DNCRSP and RNP there are approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie Creek Redwoods State Park in the south. Range-wide, however, late successional forest is uncommon due to logging and habitat conversion. A recent status review of the species by the Oregon Department of Fish and Wildlife found that within Oregon, while quantities of late successional habitat on federal and state lands had increased since 1993, on all other private lands this habitat has decreased (ODFW 2021).

The majority of the habitat removed would be late successional redwood forest at the north portal (Figures 3-24 and 3-25). This area is part of a large, contiguous patch of late successional redwood forest and is high-quality nesting habitat with a high concentration of known marbled murrelet nests. The habitat to be removed is all within 300 feet of the existing highway and is exposed to higher levels of noise and disturbance. At the southern portal, late successional Sitka spruce forest would be removed (Figure 3-27). This forest, which supports large Sitka spruce trees, is patchily distributed within a matrix of coastal brambles and red alder forest. The large individual Sitka spruce trees provide habitat, but the fragmentation of the stands may reduce the overall quality of this habitat. Given the restrictive habitat requirements of the species, the presence of the species within BSA #1, and the high quality of the habitat being removed, it is anticipated that Alternative F would have adverse effects on marbled murrelet habitat.

Critical Habitat

Per discussions with USFWS, critical habitat maps are not refined; it may include vegetation community types and other areas that are not necessarily suitable habitat for the species, including non-vegetated areas such as parking lots and roadways. As such, in addition to coniferous communities that are suitable for the species, it also includes unsuitable habitat, like red alder forest, coastal bramble, ruderal vegetation, etc. Under Alternative F, approximately 9.58 acres of USFWS-designated critical habitat for marbled murrelet would be permanently affected through trees removed (Figure 3-40), though only 2.01 acres of this area is within conifer forest. In addition, approximately 3.96 acres of designated marbled murrelet critical habitat would be temporarily affected through vegetation removal (where no large trees would be removed); however, only 1.65 acres is found in coniferous forest community types.

Operational Impacts

Once construction is completed, Alternative F would have permanent lighting in the vicinity of the tunnel entrances and at the OMC. This lighting would be standard lighting; it would be localized, directed down at the infrastructure, and would not extend far into the surrounding habitat. Therefore, effects to surrounding habitat from the permanent lighting are not anticipated.

Because Alternative F would reroute the highway into a tunnel, noise levels from traffic along U.S. 101 would be lower than existing conditions (Caltrans 2023k). The lower noise levels are anticipated to benefit marbled murrelet residing in the area.

Conclusion

While Alternative X would impact a greater number of acres, Alternative F would impact much higher quality habitat and twice the number conifers (21 for Alternative X and 40 for Alternative F) 48 inches in DBH or greater. The five-year status review completed by USFWS found that, as of 2016, in the northernmost portion of their range, the marbled murrelet population has declined, and throughout most of the rest of their range the trends are uncertain. In Conservation Zone 4, which overlaps with this project, there is evidence of a positive population trend (USFWS 2019a). This underscores the importance of the habitat at LCG. Marbled murrelet has strict habitat requirements; it requires late successional forest—a limited resource—within 50 miles of the ocean. The project vicinity is known for high levels of marbled murrelet activity and is in an area where the population may be trending up, rather than down (USFWS 2019a). Given this, and the concentration of detections in late

successional forest in and near the northern portion of BSA #1, it is anticipated that both alternatives may result in substantial impacts to marbled murrelet and their critical habitat.

For both Alternatives X and F per FESA, it is anticipated the project ***may affect, is likely to adversely affect*** marbled murrelet and their critical habitat, pending consultation with USFWS.

For both Alternatives X and F per CESA, it is anticipated the project would have **no *"take"*** of marbled murrelet.



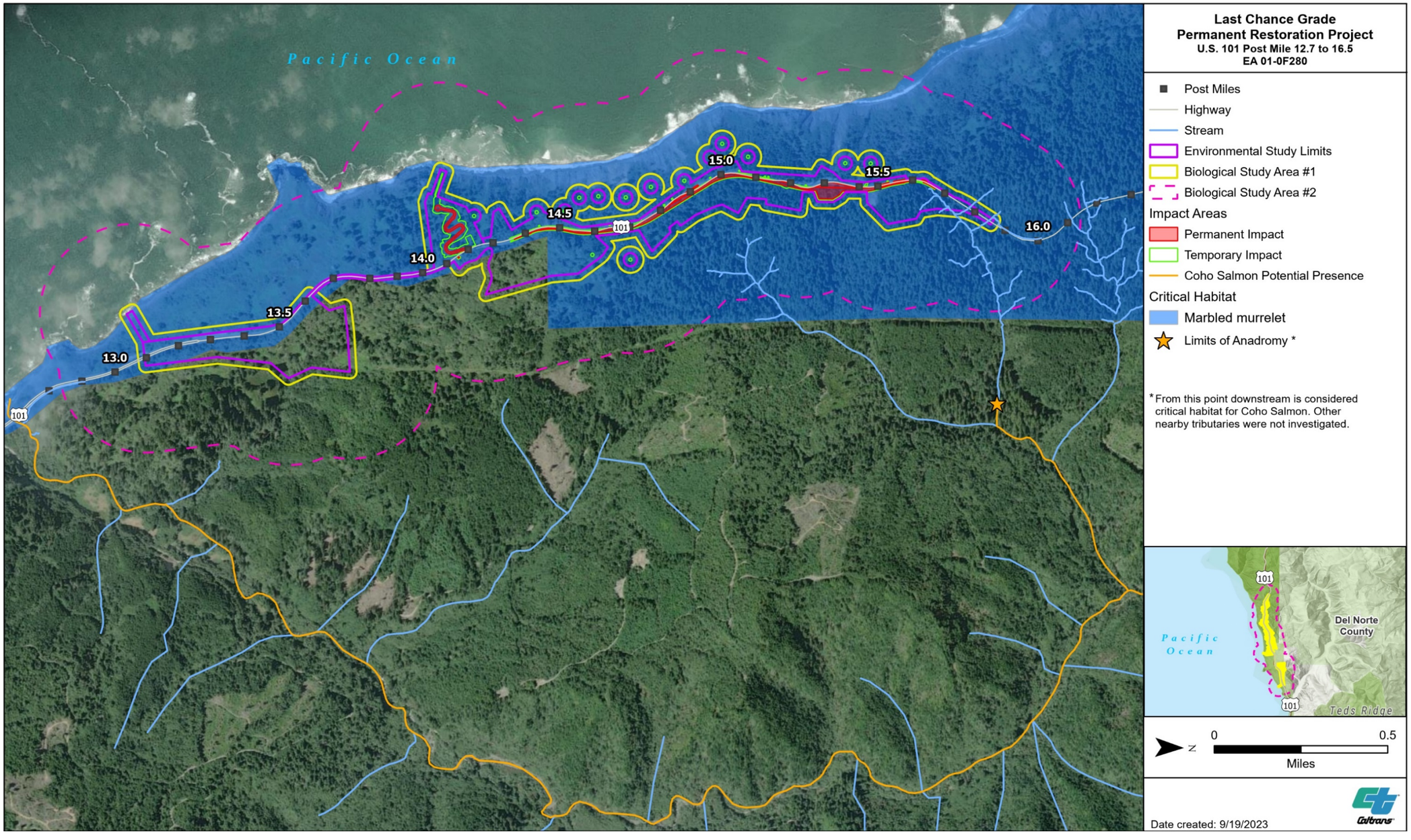


Figure 3-39. Alternative X Impacts on Critical Habitat



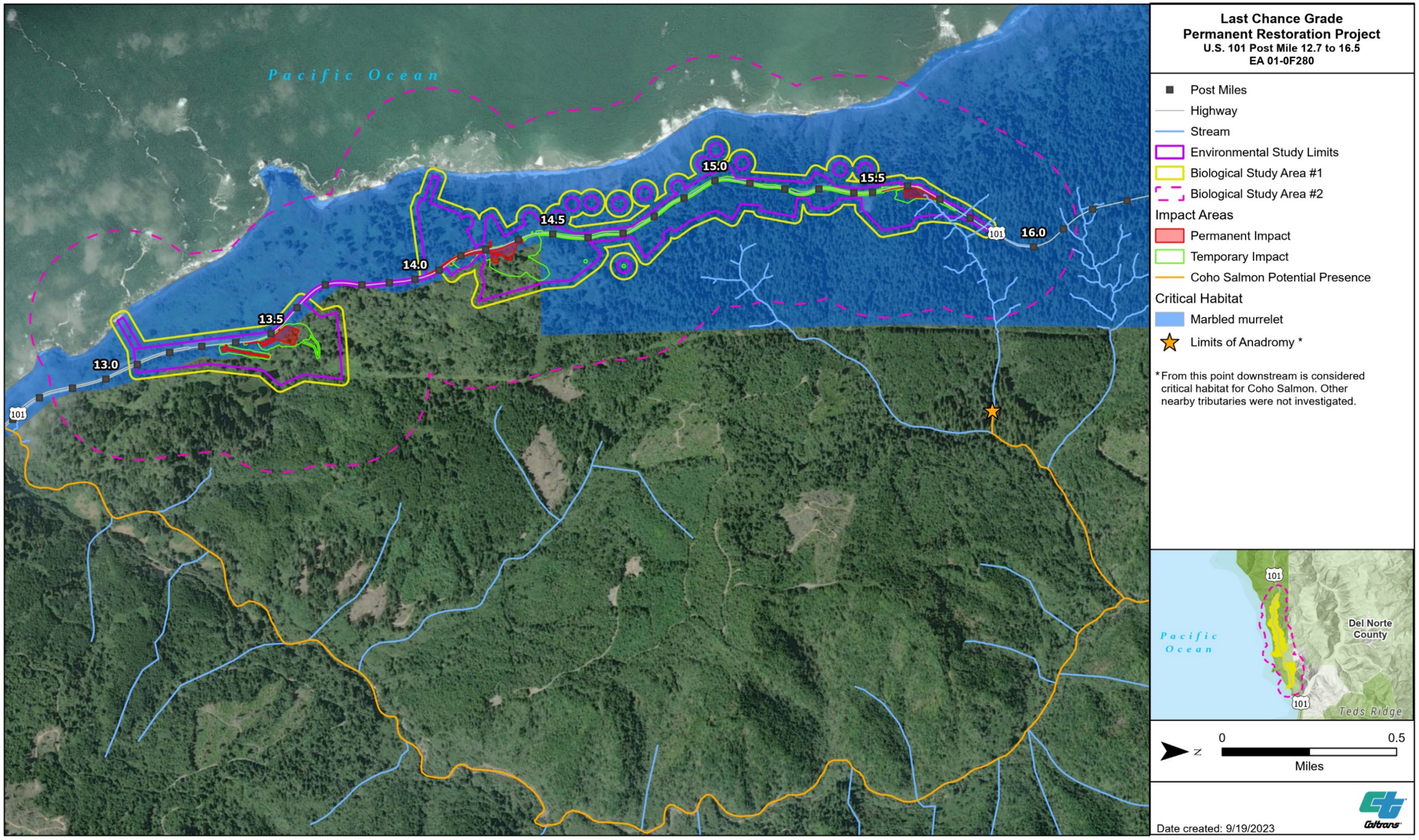


Figure 3-40. Alternative F Impacts on Critical Habitat



Northern Spotted Owl

Common Features of Alternatives X and F Affecting Northern Spotted Owl

Tree Removal

Northern spotted owl nesting habitat, which includes early and late successional redwood, early and late successional Douglas-fir, and late successional Sitka spruce forest, would be affected by the project. Trees would be removed to facilitate construction with the project footprint (see acreages below). Surveys for northern spotted owl found no nest trees within 0.7 miles of Alternatives X or F project footprint. Northern spotted owls generally show high nest tree fidelity, returning to the same nest tree for many years. Additionally, all tree removal would be done outside of the breeding season (Standard Measure BR-2 J). Therefore, no impacts to nesting northern spotted owl are anticipated from tree removal.

Construction Impacts

Project-related construction noise could affect northern spotted owl habitat surrounding the construction areas. However, prior to the start of construction, surveys for northern spotted owl would be conducted, and protective measures put in place if nesting northern spotted owl are found (Standard Measure BR-2 J). Therefore, no impacts to nesting northern spotted owl are anticipated from construction noise.

Temporary night lighting would be used during construction. However, Standard Measure BR-2 F would limit lighting to areas actively under construction or on areas needed for security. This would limit light exposure on surrounding habitat. Because of this, temporary lighting is not anticipated to affect northern spotted owl.

Geotechnical Investigations

Geotechnical work would have the potential to temporarily affect northern spotted owl habitat. Equipment delivery for 18 bore locations for Alternative X and 2 bore locations for Alternative F would require the use of a helicopter. To the extent feasible, the bore locations would be sited outside of coniferous forest and would be placed between gaps in the trees, if located within a forested canopy. At these bore locations some vegetation may be removed or trimmed, however, no large trees (trees with DBH 24 inches or greater) would be removed. There is northern spotted owl habitat adjacent to the bore locations and helicopter staging areas; therefore, northern spotted owl would be exposed to helicopter noise and rotor wash. For Alternative X, it is estimated that it would take approximately 54 hours over 18

weeks to deliver equipment to and from the bore locations and, for Alternative F, approximately 15 hours to over 1 to 2 weeks. For the geotechnical phase, use of helicopters would be limited to the time between September 16 and January 31 (which is the non-nesting season) and helicopters would fly at a high enough altitude between staging areas and boreholes to reduce rotor wash on trees and the surrounding habitat. If any roosting or foraging northern spotted owl were present, there is sufficient surrounding habitat to disperse to. Only minimal impacts to any roosting or foraging northern spotted owl from the geotechnical work are anticipated.

Effects Unique to Alternative X

Habitat Impacts

Suitable habitat for northern spotted owl, which includes early and late successional redwood, early and late Douglas-fir, and late successional Sitka spruce forest, would be affected by Alternative X. Potential habitat impacts include:

- ***Permanent:*** Alternative X would permanently affect 4.06 acres of potential nesting/roosting and foraging habitat (early and late successional redwood, early and late successional Douglas-fir, and late successional Sitka spruce forest) (Table 3-14); this habitat would be replaced with hardscaped features, such as walls, highway features, and drainage gallery infrastructure.
- ***Habitat Conversion:*** Approximately 0.67 acre of suitable nesting habitat would undergo habitat conversion (Table 3-14). In these areas, late successional Douglas-fir and Sitka spruce forests would be removed to facilitate necessary cut and fill for the project, and although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative X would temporarily affect a total of 1.72 acres of potentially suitable nesting habitat (Table 3-15).

- *Temporary:* Impacts include 1.71 acres of redwood, Douglas-fir and Sitka spruce forests. These impacts are in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed; however, trees over 24 inches DBH would remain in place. The habitat would continue to function as it had pre-project in less than a year.
- *Long-term Temporary Two:* Impacts include 0.01 acre of early successional Douglas-fir forest. Here, trees would be removed to facilitate cut and fill. These areas would be replanted and would function as they had pre-project within 20 to 40 years.

Overall, of the impacted habitat, Alternative X would remove trees, which could be used for nesting, from 4.74 acres—this include areas with permanent impacts, habitat conversion, and long-term Temporary Two impacts.

The closest known AC, which is currently inactive, is approximately 0.93 mile east of the ESL, and 1.2 miles from Alternative X. As the AC is more than 0.7 mile from the construction area, it would not be affected by habitat removal. The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are a least 1,545 acres of late successional forested habitat adjacent to the project area to the north. Within DNCRSP and RNP there are approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie Creek Redwoods State Park in the south. Additionally, there are thousands of acres of early successional conifer forest within the parks and on surrounding timberland (Parcel Quest 2023). The amount of habitat to be removed by the project by comparison is relatively small. Additionally, most of the redwood and Douglas-fir forest to be removed is within 50 feet of U.S. 101, and all is within 150 feet; exposure to elevated noise and disturbance lowers the quality of this habitat. Given this, it is anticipated that Alternative X would have minimal effects on northern spotted owl habitat.

Effects Unique to Alternative F

Habitat Impacts

Suitable habitat for marbled murrelet, which includes early and late successional redwood, early and late Douglas-fir, and late successional Sitka spruce forest, would be affected by Alternative F. Potential habitat impacts include:

- ***Permanent:*** Alternative F would permanently affect 1.11 acres of potential nesting/roosting and foraging habitat (early and late successional redwood, early

successional Douglas-fir, and late successional Sitka spruce forest). This habitat would be replaced with hardscaped features, such as walls, highway features, and tunnel portal infrastructure.

- ***Habitat Conversion:*** Approximately 1.42 acres of suitable nesting habitat would undergo habitat conversion. In these areas, late successional redwood, Douglas-fir, and Sitka spruce forests would be removed to facilitate necessary cut and fill for the project. Although trees would be replanted after project completion, it would take many years for equivalent habitat to return.
- ***Temporary:*** Alternative F would temporarily affect a total of 2.15 acres of potentially suitable nesting habitat.
    - *Temporary:* Impacts include 1.93 acres of redwood forest, Douglas-fir and Sitka spruce forest. These impacts are in equipment access buffer areas and geotechnical borehole areas where vegetation would be disturbed; however, trees over 24 inches DBH would remain in place. The habitat in these areas would continue to function as it had pre-project in less than a year.
    - *Long-term Temporary Two:* Impacts include 0.22 acre of early successional redwood forest and Douglas-fir forest. Here, trees would be removed to facilitate cut and fill. These areas would be replanted and would function as they had pre-project within 20 to 40 years.

Overall, of the impacted habitat, Alternative F would remove trees, which could be used for nesting, from 2.75 acres—this includes areas with permanent impacts, habitat conversion, and long-term Temporary Two impacts.

The closest known AC, which is currently inactive, is approximately 1.5 miles southeast of the ESL, and 1 mile from Alternative F. As the AC is more than 0.7 mile from the construction area, it would not be affected by habitat removal. The habitat is located within a large forest consisting of many acres of suitable habitat. Within DNCRSP there are at least 1,545 acres of late successional forested habitat adjacent to the project area to the north. Within DNCRSP and RNP there are approximately an additional 37,400 acres of late successional forest habitat in the local region, which includes Jedediah Smith Redwoods State Park in the north to Prairie Creek Redwoods State Park in the south. Additionally, there are thousands of acres of early successional conifer forest within the parks and on surrounding timberland (Parcel Quest 2023). The amount of habitat to be removed by the project by comparison is relatively small. Additionally, the habitat to be removed is all

within 300 feet of U.S. 101 and therefore exposed to elevated noise and disturbance. Given this, it is anticipated that Alternative F would have minimal effects on northern spotted owl habitat.

Operational Impacts

Alternative F includes permanent lighting in the vicinity of the tunnel entrances and at the OMC. This lighting would be typical roadway lighting. It would be localized, directed down at the infrastructure, and would not extend far into the surrounding habitat. Therefore, effects to surrounding habitat from the permanent lighting are not anticipated.

Because Alternative F would reroute the highway into a tunnel, noise levels from traffic along U.S. 101 would be lower than existing conditions (Caltrans 2023k). The lower noise levels and improved habitat connectivity are anticipated to benefit northern spotted owl residing in the area.

Conclusion

While Alternative X would impact a greater number of acres, Alternative F would impact much higher quality habitat and twice the number of conifers four feet in DBH or greater. However, as no northern spotted owl appear to be using this habitat (there are no ACs within 0.7 miles of the project), the relatively small amount of habitat affected by the alternatives, the temporary nature of construction, the abundance of unaffected suitable habitat in the project vicinity to which individuals could relocate, if necessary, and the implementation of Standard Measures and Best Management Practices, neither Alternative X nor Alternative F would have a substantial effect on northern spotted owl.

For both alternatives, per FESA, it is anticipated the project ***may affect, but is not likely to adversely affect*** northern spotted owl pending consultation with USFWS. There is no northern spotted owl CH present within BSA #1, therefore the project would have ***no effect*** on northern spotted owl CH.

For both alternatives, per CESA, the project would have **no *"take"*** of northern spotted owl.

Coho Salmon–Southern Oregon/Northern California Coast ESU

Effects Unique to Alternative X

Under Alternative X, no direct or indirect impacts on coho salmon are expected to occur because there are no streams within the project footprint, and wetlands within the project

footprint do not connect to coho habitat. Potential impacts that may occur due to the drainage gallery are expected to be outside of the Wilson Creek watershed (coho habitat).

Effects Unique to Alternative F

Under Alternative F, there would be no direct impacts to critical habitat. Project activities within tributaries to Wilson Creek are limited to wetland work at the north portal, approximately 3,100 feet (0.59 miles) upstream of coho critical habitat (Figure 3-40). Alternative F would result in approximately 0.070 acre of permanent impacts and approximately 0.009 acre of temporary impacts to these wetlands. The small amount of loss of vegetation would likely have no effect on water temperature or on cover/shelter, food, and other functions of potentially occupied critical habitat 0.59 miles downstream.

Construction activities that disturb soil and sediment in these wetlands could increase erosion and mobilization of sediments, resulting in increased turbidity and suspended sediment in streams and potential adverse effects on aquatic species and their habitat (Bisson and Bilby 1982; Sigler et al., 1984). Although these wetlands are connected to tributaries of Wilson Creek, project Standard Measures and Best Management Practices, including BR-5 which restricts instream work to the period between June 15 and October 15, and WQ-1 and WQ-2, which include measures to protect water quality, such as control of sedimentation, erosion, and potential chemical pollutants, would protect water quality downstream. The project is expected to have minimal water quality impacts and the concentration of suspended sediment and duration of exposure to fish are expected to be well below the thresholds for physiological stress.

No measurable long-term increases in pollutant loading from roadway runoff over the existing condition is expected, as the existing roadway drainage systems would be modified to accommodate increases in stormwater discharge resulting from additional impervious area.

Under Alternative F, impacts on coho salmon and its designated critical habitat are expected to be so small that they are not measurable.

Conclusion

Alternative X is anticipated to have no direct or indirect effects to coho or its critical habitat, while Alternative F is anticipated to have discountable effects on coho and its critical habitat and EFH due to distance from habitat and implementation of standard measures.

Under Alternative X, per FESA, it is anticipated the project would have ***no effect*** on coho salmon–Southern Oregon/Northern California Coast ESU, pending consultation with NMFS.

Under Alternative F, per FESA, it is anticipated the project ***may affect, but is not likely to adversely affect*** coho salmon–Southern Oregon/Northern California Coast ESU, pending consultation with NMFS.

Under both Alternatives X and F, per FESA, it is anticipated the project would have ***no effect*** on coho salmon–Southern Oregon/Northern California Coast ESU critical habitat, pending consultation with NMFS.

Per CESA, both alternatives would have **no *"take"*** of coho salmon.

Humboldt (Pacific) Marten

Under Alternatives X and F, project-related activities that could affect Humboldt marten are identical to those for fisher, as discussed in Section 3.4.4. Vegetation, including trees, from denning and resting habitat would not be removed during the denning season, and the amount of habitat to be removed for either alternative is anticipated to be small. Noise would be restricted for the majority of the denning season, and temporary lighting during construction and permanent lighting for Alternative F, are not anticipated to affect this species. Helicopter work associated with geotechnical investigations would be conducted outside of the denning season, and, with inclusion of elements of the project description and standard measures, are not anticipated to affect Humboldt marten. For Alternative X, conditions for this species are anticipated to be similar to existing conditions after construction. For Alternative F, as a portion of the road would be underground (in the tunnel), the species may benefit from lower traffic noise, improved habitat connectivity, and reduced risk of vehicle strike.

Conclusion

Alternative X would impact more habitat than Alternative F, though Alternative F would impact much higher quality habitat and twice the number large mature conifers (48 inches in DBH or greater) that Alternative X would. However, given the relatively small amount of habitat affected by the build alternatives, the temporary nature of construction, the abundance of unaffected suitable habitat in the project vicinity to which individuals could relocate, if necessary, and the implementation of standard measures, neither Alternative X nor Alternative F would have a substantial effect on Humboldt marten.

Per FESA, it is anticipated that both Alternatives X and F ***may affect, but are not likely to adversely affect*** Humboldt marten, pending consultation with USFWS.

Per CESA, both Alternatives X and F would have **no *"take"*** of Humboldt marten.

Western Lily

No western lily individuals were detected within BSA #1 during the 2021–2022 botanical surveys; therefore, neither build alternative is expected to directly or indirectly affect this species.

Conclusion

Per FESA, it is anticipated the project would have ***no effect*** on western lily.

Per CESA, both Alternatives X and F would have **no *"take"*** of western lily.

Summary of FESA and CESA Conclusions

Coordination with state and federal agencies conducted to date is included in Chapter 5, *Comments and Coordination.*

Anticipated effects findings under FESA for the species and critical habitats potentially in the project area are included in Table 3-24. It is anticipated that Section 7 consultation with USFWS and NMFS would be conducted prior to the final environmental document.

It is anticipated that there would be **no "*take*"** under CESA of any threatened or endangered species potentially within the project area, which include bald eagle, marbled murrelet, northern spotted owl, SONCC coho salmon, Humboldt marten, or western lily.

Table 3-24. FESA Preliminary Effects Findings

Common Name	Scientific Name	Federal Status[1]	Effect Finding	Effect Finding for Critical Habitat (if applicable)
Birds				
Marbled murrelet	*Brachyramphus marmoratus*	FT	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Northern spotted owl	*Strix occidentalis caurina*	FT	May Affect, Not Likely to Adversely Affect	N/A
Fish				
Coho salmon–Southern Oregon/Northern California Coast ESU	*Oncorhynchus kisutch*	FT	*Alternative X:* No Effect *Alterative F*: May Affect, Is Not Likely to Adversely Affect	No Effect No Effect
Mammals				
Humboldt (Pacific) marten	*Martes caurina humboldtensis*	FT	May Affect, Not Likely to Adversely Affect	N/A
Plants				
Western lily	*Lilium occidentale*	FE	No Effect	N/A

[1]**Status Definitions**: FE = Endangered; FT = Threatened

The following are federally listed species and critical habitats identified as potentially occurring in the project vicinity. However, given they do not have the potential to occur within BSA #1 (Appendix H and I), they were not discussed in the sections above. As a result, per FESA, the project would have ***no effect*** on these species and habitats: McDonald's rockcress (*Arabis mcdonaldiana*); beach layia (*Layia carnosa*); sand dune phacelia (*Phacelia argentea*); green sea turtle (*Chelonia mydas*)–East Pacific DPS; leatherback sea turtle (*Dermochelys coriacea*); olive ridley sea turtle (*Lepidochelys olivacea*); Hawaiian petrel (*Pterodroma sandwichensis*); short-tailed albatross (*Phoebastria albatrus*); western snowy plover (*Charadrius nivosus nivosus*)–Pacific Coast DPS and critical habitat; yellow-billed cuckoo (*Coccyzus americanus*)–Western U.S. DPS; Chinook salmon-California Coastal ESU (*Oncorhynchus tshawytscha*) and critical habitat; Chinook salmon (*Oncorhynchus tshawytscha*)–upper Klamath and Trinity Rivers ESU and critical habitat; eulachon (*Thaleichthys pacificus*) and critical habitat; green sturgeon (*Acipenser medirostris*)–southern DPS and critical habitat; longfin smelt (*Spirinchus thaleichthys*) and critical habitat; steelhead (*Oncorhynchus mykiss irideus*)–Northern California DPS and critical habitat;

tidewater goby (*Eucyclogobius newberryi*) and critical habitat; blue whale (*Balaenoptera musculus*); fin whale (*Balaenoptera physalus*); humpback whale (*Megaptera novaeangliae*); North Pacific right whale (*Eubalaena japonica*); sei whale (*Balaenoptera borealis*) and critical habitat; southern resident killer whale (*Orcinus orca*); southern sea otter (*Enhydra lutris nereis*); sperm whale (*Physeter catodon*); monarch butterfly (*Danaus plexippus*); Oregon silverspot butterfly (*Speyeria zerene hippolyta*).

The following state listed or state candidate species were identified as potentially occurring in the project vicinity. However, given they do not have habitat within BSA #1, they were not discussed in the sections above. As a result, per CESA, the project would not result in ***"take"*** of the following: McDonald's rockcress; beach layia (*Layia carnosa*); bank swallow (*Riparia riparia*); little willow flycatcher (*Empidonax traillii*); yellow-billed cuckoo–Western U.S. DPS; Chinook salmon–Upper Klamath and Trinity ESU; longfin smelt; Suckley's cuckoo bumble bee (*Bombus suckleyi*) and western bumble bee (*Bombus occidentalis*).

Avoidance, Minimization, and/or Mitigation Measures

For western lily and coho salmon, Alternatives X and F would have no impact or, with the standard measures incorporated, impacts would be minimal. No additional species-specific avoidance and minimization measures would be needed.

For bald eagle, northern spotted owl, and Humboldt marten impacts from Alternatives X and F would be minimal. Bio-5 (detailed in Section 3.4.4), which would reduce construction noise, would be implemented to further minimize impacts to these special status species.

Implementation of Bio-1 (detailed in Section 3.4.1) would benefit marbled murrelet and its critical habitat, as restoration and enhancement of forests would provide essential physical and biological features for this species. However, impacts to marbled murrelet would remain adverse, as proposed mitigation measures may take multiple centuries to result in replacement of lost habitat.

3.4.6 Invasive Species

Regulatory Setting

On February 3, 1999, President William J. Clinton signed EO 13112 requiring federal agencies to combat the introduction or spread of invasive species in the United States. The order defines invasive species as "any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." FHWA guidance issued August 10, 1999, directs the use of the State's invasive species list, maintained by the California Invasive Species Council, to define the invasive species that must be considered as part of the NEPA analysis for a proposed project.

Affected Environment

Invasive Plants

Comprehensive botanical surveys were conducted throughout BSA #1 in 2021 and 2022 (Caltrans 2022i; Caltrans 2023d). Many invasive plant species were found within the BSA, primarily in human-disturbed areas along U.S. 101, the power line and its access road, the California Coastal Trail, old disused roads, and also on naturally disturbed sites such as steep, eroding coastal bluffs, sea cliffs, and landslides. These invasive plants are generally more abundant within the Caltrans right of way and in Redwood National Park than elsewhere within BSA #1. In DNCRSP, invasive plants are less common, except in disturbed areas (e.g., ruderal and erosional areas) west of U.S. 101, such as coastal bluffs and sea cliffs where jubata grass, English ivy, and other species are abundant. The California Invasive Plant Council (Cal-IPC) provides an overall rating for all plants listed on the Invasive Plant Inventory for California. Table 3-25 lists Cal-IPC invasive plant species identified within BSA #1 during surveys conducted in 2021 and 2022. Other non-Cal-IPC-rated species within the right of way that are listed as target invasive species by the California Department of Parks and Recreation include three-cornered leek (*Allium triquetrum*), Robert's herb (*Geranium robertianum)*, and white sweet-clover (*Melilotus albus*).

Table 3-25. Invasive Plant Species within Biological Study Area #1

Scientific Name	Common Name	Cal-IPC Rating[1]
Avena barbata	Slender wild oat	Moderate
Brassica nigra	Black mustard	Moderate
Bromus diandrus	Rip-gut brome	Moderate
Bromus madritensis	Foxtail chess	High
Carduus pycnocephalus ssp. *pycnocephalus*	Italian thistle	Moderate
Carpobrotus chilensis	Sea fig iceplant	Moderate
Cirsium vulgare	Bull thistle	Moderate
Conium maculatum	Poison hemlock	Moderate
Cortaderia jubata	Jubata grass	High
Cotoneaster lacteus	Cotoneaster	Moderate
Cynosurus echinatus	Hedge-hog dog-tail grass	Moderate
Delairea odorata	Common cape-ivy	High
Ehrharta erecta	Panic veldtgrass	Moderate
Festuca arundinacea	Tall fescue	Moderate
Festuca myuros	Rat-tailed fescue	Moderate
Festuca perennis	Perennial rye-grass	Moderate
Foeniculum vulgare	Fennel	Moderate
Genista monspessulana	French broom	High
Hedera helix	English ivy	High
Hirschfeldia incana	Summer mustard	Moderate
Holcus lanatus	Velvet grass	Moderate
Hordeum murinum	Wall barley	Moderate
Hypochaeris radicata	Rough cat's-ear	Moderate
Leucanthemum vulgare	Ox-eye daisy	Moderate
Mentha pulegium	Pennyroyal	Moderate
Rubus armeniacus	Himalayan blackberry	High
Rumex acetosella	Sheep sorrel	Moderate
Senecio glomeratus	Cutleaf coast burnweed	Moderate
Vinca major	Greater periwinkle	Moderate

[1] **California Invasive Plant Council ratings:**

High – These plants have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate – These plants have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Invasive Pathogens

Chytridiomycosis is an emerging infectious disease of amphibians caused by an aquatic fungal pathogen, *Batrachochytrium dendrobatidis* (Daszak et al., 2004) that was first reported causing mass mortality and population declines in Central America and Australia (Berger et al., 1998). Outbreaks of chytridiomycosis are often characterized by simultaneous die-offs of multiple amphibian species. The fungus infects and thickens the superficial, keratin-containing layers of amphibian skin (Berger et al., 1998), which is one of the most important organs, involved in respiration, hydration, osmoregulation, and thermoregulation.

Batrachochytrium dendrobatidis appears to be affecting frogs more than salamanders. A Citizen Science project surveyed sites where infected frogs had been detected (in RNSP and Humboldt Bay National Wildlife Refuge), tested buccal swabs from four species of frogs and toads, and found that 25 of 155 (17%) samples were positive for *Batrachochytrium dendrobatidis* (Pope et al., 2016). It is unknown whether *Batrachochytrium dendrobatidis* is present in amphibian populations in the project area because surveys have not been conducted.

Invasive Wildlife

One invasive wildlife species, the barred owl, a close relative of the spotted owl, was observed in the project area. The barred owl is an eastern species that has expanded its range westward into California, throughout the entire range of the northern spotted owl (NPS 2020a; CDFW 2022b). Barred owls are larger and more aggressive than northern spotted owls and have a broader range of prey items and habitat preferences (NPS 2020a; CDFW 2022b). Research has demonstrated that the presence of barred owls has negative impacts on northern spotted owl populations at a range-wide level (CDFW 2022b). These negative impacts include altered behavior (e.g., reduced calling of spotted owls), displacement from preferred high-quality habitat, decreased survival and occupancy rates, hybridization, and increased extinction rates (CDFW 2022b). Barred owl is now considered to be a major factor contributing to declines in populations of northern spotted owls (Barred Owl Science Team 2018).

During northern spotted owl surveys, biologists detected barred owls 15 times in 2020 and 8 in 2021. Three of the detections were on Del Norte Coast Redwoods State Park land and the remainder were on GDRC land. Barred owls are well-established in northwest California and in the project area; they now outnumber northern spotted owls (Caltrans 2021b).

Although not observed during biological surveys, New Zealand mud snail (*Potamopyrgus antipodarum*) has been observed in the Klamath region and could occur in perennial streams in the project area.

Environmental Consequences

Build Alternatives

Invasive Plants

The project area contains many non-native invasive plant species that can have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure (Cal-IPC 2022). Under both build alternatives, construction of the project would disturb soil and remove vegetation, potentially creating suitable conditions for invasive plants to establish. Construction vehicles could transport plant seeds and other propagules in soil and debris attached to the vehicle and can introduce new invasive plant species and/or spread invasive plant species already present. Non-native plants can spread and displace native plants and alter the functioning of natural communities.

In compliance with EO 13112 and guidance from FHWA, landscaping and erosion control used in the project would not use plant species listed as invasive. In areas of particular sensitivity, extra precautions would be taken if invasive species are found in or next to the construction area. Standard Measure BR-3, which requires invasive species control during construction (including the cleaning of equipment) and revegetation and Standard Measure BR-4 B, which requires a revegetation plan (including monitoring requirements), would ensure there are no impacts from invasive plants from either alternative.

Invasive Pathogens

No surveys have been conducted to detect *Batrachochytrium dendrobatidis* in the streams and aquatic resources within the project footprint. Equipment used in aquatic resources could potentially introduce *Batrachochytrium dendrobatidis* into the project area where it could infect amphibian populations; if already present, equipment use could further spread *Batrachochytrium dendrobatidis,* especially if equipment is used in wet conditions. However, with implementation of Standard Measure BR-3, which requires invasive species control during construction (including the cleaning of equipment) and compliance with aquatic invasive species decontamination protocols, it is anticipated there would be no impacts.

Invasive Wildlife

Barred owls have become established in the project region and no northern spotted owl nesting activity was detected within BSA #1 or within a 0.25-mile buffer during protocol surveys conducted in 2020 and 2021. Construction and operation of either build alternative would not encourage the further proliferation of barred owls.

Construction of either build alternative could result in the introduction and/or spread of invasive species already present. Although presence of New Zealand mud snail in the streams and aquatic resources in the project footprint is unknown, equipment used in aquatic resources could potentially result in the spread of this species. However, implementation of Standard Measure BR-3, which requires invasive species control during construction (including the cleaning of equipment), would minimize possible impacts. In addition, Standard Measure BR-2 (item D) would require a qualified biologist to monitor in-stream work. This monitor would verify that CDFW decontamination protocols are followed.

No-Build Alternative

Under the No-Build Alternative, no construction is planned, and maintenance and emergency repairs would continue; existing conditions would not change.

Avoidance, Minimization, and/or Mitigation Measures

With implementation of the Standard Measures and BMPs noted above, no further avoidance, minimization, or mitigation measures would be required for invasive plants, pathogens, or wildlife.

3.5 Relationship Between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

Construction and operation of either of the build alternatives would result in the attainment of short-term and long-term transportation goals—developing a long-term solution to the instability and potential roadway failure at LCG—but at the expense of some long-term impacts, including biological and cultural resources.

Alternatives X and F would have largely similar impacts in terms of types of resources affected.

Short-term losses: Short-term losses include impacts associated with construction, such as noise from construction activities, views of construction and associated elements, and traffic delays.

Short-term benefits: Short-term benefits include an increase in jobs and revenue generated during construction.

Long-term losses: Long-term losses include the removal of late successional conifers, adverse effects to historic properties, effects to habitat, including critical habitat for threatened and endangered species, impacts to wetlands, and acquisition of park lands.

Long-term gains: Long-term gains include a more stable and reliable connection between Klamath and Crescent City. Benefits associated with this include reduced risk of economic ramifications associated with potential roadway failures, less risk of delays to the traveling public, and reduced maintenance and emergency project costs.

Under the No-Build Alternative, enhanced maintenance and emergency repairs would likely continue as needed, with short-term losses and benefits similar to the build alternatives, as described above. As no construction is planned with the No-Build Alternative, the long-term losses associated with the build alternatives would be avoided. However, it would not realize the long-term gains associated with a long-term solution to the instability and potential roadway failure at LCG.

3.6 Irreversible and Irretrievable Commitments of Resources that would be Involved in the Proposed Project

The proposed project would involve a commitment of a range of natural, physical, human, and fiscal resources. Park lands used in the construction of either build alternative would be considered an irreversible commitment once converted to a transportation use. If a greater need arises for the use of the land, or if the highway facility is no longer needed, it can be converted to another use. However, there is no reason to believe such a conversion would ever be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials, such as cement, aggregate, and bituminous material, would be used. Additionally, large amounts of labor and natural resources would be used in the making of construction materials. These materials are generally not retrievable. However, they are not in short supply statewide; their use would not have an adverse effect upon continued availability of these resources. Any construction would also likely require a substantial one-time use of federal and state funds, which are not retrievable, though savings in energy, time, and air/noise emissions associated with ongoing emergency construction/landslide repairs would in part offset this. In addition to the costs of construction and right of way would be costs for roadway maintenance including pavement, roadside signs and markers, and electrical and storm maintenance. Alternative F would require the additional outlay of resources to construct and operate the OMC to ensure the tunnel can operate safely.

The commitment of these resources is based on the concept that residents in the area, region, and state would benefit from the improved quality of the transportation system. A closure of LCG would effectively sever Crescent City from points south in California, requiring a lengthy detour through Oregon to access other parts of the state. The benefits of the project would consist of improved accessibility and safety, which are expected to outweigh the commitment of these resources.

3.7 Cumulative Impacts

Regulatory Setting

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of the proposed project. A cumulative effect assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor but collectively substantial impacts taking place over a period of time.

Cumulative impacts on resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, disruption of migration corridors, changes in water quality, and introduction or promotion of predators. They can also contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

CEQA Guidelines Section 15130 describes when a cumulative impact analysis is necessary and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts under CEQA can be found in Section 15355 of the CEQA Guidelines. A definition of cumulative impacts under NEPA can be found in 40 CFR Section 1508.7.

Affected Environment

The LCG Project has the potential to impact several resources. To determine whether the project has the potential to cumulatively impact these resources, a Resource Study Area (RSA) was defined, and all known past, present, and reasonably foreseeable projects were identified. The north and south boundaries of the RSA are located along U.S. 101 at PMs 12.6 and 18.0, and the west and east boundaries are the Pacific Ocean and Wilson Creek, respectively. The northern boundary was determined using the National Park Service Vegetation Mapping and Classification Project which identifies the area located approximately near PM 18.0 as the boundary where the large contiguous large block of "*Sequoia sempervirens* Mature forest" ends and younger, previously logged forest begins. The southern and eastern boundaries were determined based on the western portion of the

Wilson Creek watershed, and the western boundary was based on the Pacific Ocean. Cumulative impacts were evaluated for resources that the LCG project has the potential to cumulatively impact, including, visual/aesthetics, water quality, cultural, natural communities, wetlands and other waters, and special status species. An evaluation of the resources that would not be potentially cumulatively impacted is not included.

The project is located within Redwood National and State Parks (est. October 1968). Given the type of habitat, zoning, and having been under direct RNSP management for over 50 years, the resources within this portion of the RSA are considered of high value. The area located between Wilson Creek and the RNSP boundary is owned by Green Diamond Resource Company (GDRC). This area is zoned for timber harvest production. This area is composed of timber harvest operations consisting of areas of varying aged forest.

There are four known Caltrans projects along U.S. 101 in the vicinity of LCG. These projects are currently in the early design and planning phases but are anticipated to be completed prior to construction of LCG. The projects would be reviewed for environmental effects and would be required to implement Standard Measures and BMPs. In addition, avoidance, minimization, and mitigation measures would be used to offset impacts, as necessary. The Caltrans projects include:

- Klamath Capital Preventive Maintenance (CAPM) (PMs 3.9/23.6): A project to rehabilitate pavement and roadway features.
- Damnation Creek Safety (PMs 15.6/16.2): A project to reduce collisions.
- Wilson Creek Wall (PMs 12.6/13.2): A project to stabilize the roadway.
- Del Norte 101 Drainage (PMs 0.0/46.5): A project to remediate drainage systems.

In addition to Caltrans projects, GDRC land is adjacent to the project area, where timber harvest operations are conducted. Timber harvest activities are regulated under Timber Harvesting Plans (THPs), which provide site specific operational and environmental details needed to implement harvest operations (GDRC 2020). The THP process serves as the functional equivalent of an EIR under CEQA. Each THP contains restrictions and protection measures and are also used to implement GDRCs permits and agreements, including Habitat Conservation Plan (HCP) measures that are above and beyond what state regulations require.

The LCG Project is located within an active slide area and has experienced numerous roadway failures over the past two decades; this has resulted in the need for frequent emergency construction activities. Emergency activities to keep the highway open are ongoing as of 2023.

Environmental Consequences

Of the resources described in this document, there would be no cumulatively considerable impacts to parks and recreational facilities, environmental justice, equity, utilities/emergency services, traffic and transportation, geology, paleontology, hazardous waste, air quality, noise and vibration, energy, plant species, and invasive species, in conjunction with past, present, or reasonably foreseeable future actions. Either there are no impacts to these resources, effects are localized and temporary (associated with construction), and/or impacts are minor and other projects do not affect these resources. In addition, the known Caltrans projects would be completed prior to construction of the LCG Project; therefore, temporary impacts would not be compounded. For timber harvest operations, any effects would also be temporary, and would be minimized through compliance with applicable environmental laws.

Potential cumulative direct impacts are discussed in further detail below for visuals/aesthetics, water quality, cultural resources, natural communities, wetlands and other waters, and special status species. Given no potential indirect impacts have been identified with the project, there are no anticipated cumulative indirect impacts.

Impacts associated with these resources for past and current emergency projects at LCG are not included in the discussion, as any impacts were the result of a naturally occurring event, rather than a planned project. In addition, potential impacts would be associated with slide debris, making any evaluation of resources potentially affected difficult to quantify. Since the roadway has been repaired in place, potential impacts would have mainly been limited to road infrastructure (roadbed, shoulders, culverts), and all drainage ditches and drainage crossings would have been replaced in kind.

Visuals/Aesthetics

The LCG Project would affect the visual environment of the project area; see Section 3.2.9, *Visual/Aesthetics*, for more information. Of the proposed projects in the vicinity, only Wilson Creek Wall would introduce new constructed features that may be visible from the highway corridor; the other projects are not anticipated to have visual impacts to this area. Wilson Creek Wall includes a wall below the road, which would not be visible from the highway, and guardrail along road, which would be a minor visual change.

As with other Caltrans projects, Wilson Creek Wall would include standard measures and design features, such as context-sensitive solutions, that would minimize visual impacts. With the inclusion of standard highway design practices, it is not anticipated there would be a cumulatively considerable effect on visual resources.

Water Quality

The LCG project would have negligible effects on water quality; see Section 3.3.1, *Water Quality and Stormwater Runoff,* for more information.

Of the four other planned highway projects within the project area, the Klamath CAPM and Damnation Creek Safety projects do not include planned drainage work. Three of the projects, Klamath CAPM, Damnation Creek, and Wilson Creek Wall, are expected to increase the impervious surface of U.S. 101, potentially increasing runoff. However, the Wilson Creek and Damnation Creek projects would provide on-site post-construction stormwater treatment BMPs, and all four projects would follow all other adopted standards and permit requirements for stormwater runoff. GDRC harvesting and other covered activities would comply with all applicable state and regional regulations, and protection measures within their THPs.

Any potential cumulative impacts attributable to the LCG project would be addressed through standard measures (Section 2.6). Likewise, BMPs would be implemented for the reasonably foreseeable highway projects, and the GDRC HCP contains protection measures that would minimize impacts on water quality. Therefore, the LCG project's potential effect on water quality would not be cumulatively considerable.

Cultural Resources

Cultural resources are present in the project area. Two historic properties—the Crescent City to Trinidad Wagon Road and a Traditional Cultural Landscape (TCL)—would be affected by the project. See Section 3.2.10, *Cultural Resources,* for additional information on these resources.

An approximately 3,000-acre Cultural Resource Study Area was designed to encompass all alternatives under consideration and to assist in defining a broader cultural landscape. An Area of Potential Effects (APE) will be defined upon selection of a preferred alternative and will encompass a large area to protect cultural resources in the project's vicinity.

Of the build alternatives, only Alternative F would affect contributing segments of the Crescent City to Trinidad Wagon Road. However, none of the other reasonably foreseeable projects, as listed above, are anticipated to affect the wagon road. Therefore, there would be no cumulative impacts on this resource.

Both of the build alternatives would affect old-growth redwoods and other old-growth conifers, a contributing element of the TCL. None of the other reasonably foreseeable projects, as listed above, are anticipated to affect old-growth conifers, and therefore would not contribute to a cumulative impact on this contributing element. However, two of the projects—Wilson Creek Wall and Del Norte 101 Drainage—may affect other contributing elements of the TCL. Depending on the impacts of the other projects—the projects are in early stages of planning—there may be a cumulative impact on the TCL overall, rather than on an individual contributing element. However, it is anticipated that these impacts, should they occur, would not be cumulatively considerable, as the TCL would retain enough integrity to convey its historical significance.

Natural Communities

Of the four highway projects in the area, the Wilson Creek Wall Project would be the only project with the potential to impact sensitive natural communities (SNCs); specifically, Sitka spruce and red alder forest. Currently the Wilson Creek Wall alternative with the most impacts would remove less than a dozen Sitka spruce and red alder trees from a narrow strip adjacent to U.S. 101. The relatively small size of this impact should result in minimal impacts to Sitka spruce and red alder forest. Additionally, any impacts associated with the Wilson Creek Wall Project would be offset with the implementation of avoidance, minimization, and mitigation measures. GDRC operations would occur in planned timber harvest areas. Some GDRC activities might have the potential to affect SNCs. It is not routine for GDRC to impact late successional forest. GDRC lands are managed for timber on

an approximately 50 year cutting rotation. While they routinely cut early successional redwood forest stands, they replant these stands. Additionally, timber harvest plans are subject to protections for habitat included in the California Forest Practice Rules (California Department of Forestry and Fire Protection 2023).

Given the minimal to no impacts associated with the other highway projects, and with the implementation of the Standard Measures and BMPs associated with the highway projects and GDRC operations, the LCG project's incremental effect on natural communities is not cumulatively considerable.

Wetlands and Other Waters

Of the four planned highway projects, only the Wilson Creek Wall and Del Norte 101 Drainage projects would include drainage work. Because the projects are in the early stages of design and planning, impacts to wetlands and waters and associated riparian vegetation is unknown. However, all projects, including the LCG Project, would implement standard measures and BMPs, and ensure that there is no net loss of wetlands, in accordance with regulations. GDRC activities have the potential to impact wetlands and other waters; however, they would also be subject to protections for waters included in the California Forest Practice Rules (California Department of Forestry and Fire Protection 2023).

With the implementation of standard measures, BMPs, and mitigation to offset potential impacts through on-and off-site habitat creation (Bio-4), the project's potential effect on wetlands and other waters would not be cumulatively considerable.

Special Status Species

Of the four planned highway projects, the Wilson Creek Wall Project would be the only project with the potential to impact special status species habitat. This project is early in the planning phase; however, it is anticipated any potential impacts would be limited to the removal of less than a dozen red alder and Sitka spruce trees. These trees would be located immediately adjacent to the highway and impacts are anticipated to be minimal. Special status species that may use this habitat include bald eagle, northern spotted owl, purple martin, Vaux's swift, marbled murrelet, fisher, Humboldt marten, ringtail, white-footed vole, pallid bat, and Townsend's big-eared bat. However, the lower quality of the habitat, directly adjacent to the highway and exposed to disturbance and noise, reduces the usability of this habitat and any use by these special status species would likely be transitory. Some GDRC activities might have the potential to affect special status species; however, GDRC also follows a HCP for northern spotted owl, and a safe harbor agreement for Humboldt marten,

and timber harvest plans are subject to protections for listed species in the California Forest Practice Rules (California Department of Forestry and Fire Protection 2023).

Given the minimal to no impacts associated with the Wilson Creek Wall Project and with the implementation of the Standard Measures and BMPs associated with the highway projects and GDRC operations, the LCG Project's incremental effect on bald eagle, northern spotted owl, purple martin, Vaux's swift, fisher, Humboldt marten, ringtail, white-footed vole, pallid bat, and Townsend's big-eared bat is not cumulatively considerable.

Although both LCG alternatives would have a substantial impact to marbled murrelet and its critical habitat, Wilson Creek Wall would likely have minimal impacts, based on the small amount of tree removal and low quality of the habitat. Therefore, impacts to marbled murrelet are not cumulatively considerable.

Avoidance, Minimization, and/or Mitigation Measures

The project is not anticipated to result in an incremental cumulative effect on any resources; however, where appropriate, the project would implement measures to off-set impacts to each resource, as described within the relevant sections of this document. As a result, no additional avoidance, minimization, or mitigation measures are proposed.

CHAPTER 4. California Environmental Quality Act Evaluation

4.1 Determining Significance under the California Environmental Quality Act (CEQA)

The proposed project is a joint project by Caltrans and the FHWA and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both CEQA and NEPA. FHWA's responsibility for environmental review, consultation, and any other actions required by applicable federal environmental laws for this project are being, or have been, carried out by Caltrans pursuant to 23 USC 327 and the MOU dated May 27, 2022, and executed by FHWA and Caltrans. Caltrans is the lead agency under CEQA and NEPA.

One of the primary differences between NEPA and CEQA is the way significance is determined. Under NEPA, significance is used to determine whether an Environmental Impact Statement (EIS), or a lower level of documentation, will be required. NEPA requires that an EIS be prepared when the proposed federal action (project) *as a whole* has the potential to "significantly affect the quality of the human environment." The determination of significance is based on context and intensity. Some impacts determined to be significant under CEQA may not be of sufficient magnitude to be determined significant under NEPA. Under NEPA, once a decision is made regarding the need for an EIS, it is the magnitude of the impact that is evaluated and no judgment of its individual significance is deemed important for the text. NEPA does not require that a determination of significant impacts be stated in the environmental documents.

CEQA, on the other hand, does require Caltrans to identify each "significant effect on the environment" resulting from the project and ways to mitigate each significant effect. If the project may have a significant effect on any environmental resource, then an Environmental Impact Report (EIR) must be prepared. Each and every significant effect on the environment must be disclosed in the EIR and mitigated if feasible.

In addition, the CEQA Guidelines list a number of mandatory findings of significance, which also require the preparation of an EIR. There are no types of actions under NEPA that parallel the mandatory findings of significance of CEQA. This chapter discusses the effects of this project and CEQA significance.

4.2 Significant Irreversible Environmental Changes

Both build alternatives would result in significant and unavoidable environmental impacts under CEQA, even after feasible mitigation measures:

- Biological Resources:
    - Sensitive Natural Communities: late successional redwood forest (Alternative F only) and Sitka spruce forest
    - Marbled murrelet and its critical habitat

4.3 CEQA Environmental Checklist

The CEQA Environmental Checklist identifies physical, biological, social, and economic factors that might be affected by the proposed project. In many cases, background studies performed in connection with the project will indicate that there are no impacts to a particular resource. A NO IMPACT answer in the last column reflects this determination. The words "significant" and "significance" used throughout the following checklist are related to CEQA, not NEPA, impacts. The questions in this form are intended to encourage the thoughtful assessment of impacts and do not represent thresholds of significance.

Project features/measures, which can include both design elements of the project and standard measures that are applied to all or most Caltrans projects, such as BMPs and measures included in the Standard Plans and Specifications or as Standard Special Provisions (SSPs), are considered to be an integral part of the project and have been considered prior to any CEQA significance determinations documented below; see Chapter 2, *Project Alternatives*, and Chapter 3, *Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures*, for a detailed discussion of these features. The annotations to this checklist are summaries of information contained in Chapter 3 in order to provide the reader with the rationale for significance determinations; for a more detailed discussion of the nature and extent of impacts, please see Chapter 3. This checklist incorporates by reference the information contained in Chapters 2 and 3.

Avoidance, minimization, and mitigation measures specifically prescribed for this project to address potential resource impacts are discussed throughout the document within their relevant sections. These measures are also summarized in Appendix D, *Avoidance, Minimization, and/or Mitigation Summary*.

4.3.1 Aesthetics

Except as provided in Public Resources Code Section 21099, would the project:	Significant and Unavoidable 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) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			✓	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			✓Alt F	✓Alt X

CEQA Significance Determinations for Aesthetics

This section was prepared using information from the *Visual Impact Assessment* prepared for the project (Caltrans 2023c). See Section 3.2.9, *Visual/Aesthetics,* for additional information on visual resources.

Except as provided in Public Resources Code Section 21099, would the project:

a) Have a substantial adverse effect on a scenic vista?

No Impact. A scenic vista is a publicly accessible viewpoint that provides expansive views of a highly valued landscape. Southbound U.S. 101 offers periodic scenic overlooks with expansive views of the coastline and Pacific Ocean. However, the closest scenic overlook is approximately 0.25 mile south of the project area. Based on this, neither alternative would affect access to, or views from, existing scenic vistas.

The highway corridor includes several maintenance pullouts. Existing pullouts near areas of retreat may be removed under Alternative X, and pullouts would be bypassed under Alternative F. However, maintenance pullouts are used for temporary/emergency vehicle parking and not as public access for scenic views. Based on this, impacts on maintenance pullouts were not considered.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Less Than Significant Impact. Within the project limits, U.S. 101 is an officially designated scenic highway. Scenic resources in the area include the views of the Pacific Ocean, steep coastal bluffs, and forested inland slopes.

Both alternatives would affect scenic resources. However, the project features incorporated into the project design, as well as standard measures, would minimize impacts. Context-sensitive project features for Alternative X include revegetating areas of the existing roadbed that would be removed as the highway alignment is shifted to the east, while Alternative F would include features such as planting native plants between the OMC and the highway, installing a green "living" roof on the OMC to help it blend in, and see-through railing on the bridge. In line with Standard Measure AR-1, both alternatives would use context-sensitive forms, colors, and textures on structures within the project area. In addition, Standard Measures AR-2 and AR-5, would be implemented; these restrict vegetation to be removed, restoring temporarily used areas to a natural contour and revegetating with native species.

Alternative X would affect scenic resources by shifting the alignment to the east at some locations and installing an extensive retaining wall system. However, views of the Pacific Ocean would be maintained, and replanting in areas of highway retreats would be done in a manner that protects current views. Views of the wooded ridge to the east would be reduced due to the retaining wall. However, context-sensitive treatments along the wall (timber lagging and stained concrete walers) would reduce impacts through natural colors and textures, which would be visually compatible with other walls along the corridor. In addition, once construction is complete, there would be a benefit to the visual environment by the reduction of frequent construction in the area. Views would not change existing conditions in terms of a human-made versus natural setting, as similar elements would remain the same: ocean views to the west would be maintained, and existing walls and active construction elements would be replaced by a more extensive wall. Overall, though viewers would be sensitive to the changes, duration of viewer exposure would be short, and reduced through project features and standard measures.

The project would not change the scenic designation for this section of U.S. 101 and would be consistent with highway protection measures. Based on the above, Alternative X would have a less than significant effect on scenic resources within the designated scenic highway.

Alternative F would affect scenic resources through the construction of a tunnel and associated features. The tunnel would bypass a section of U.S. 101, changing views from a natural to a human-made setting that is not typical of the region. In addition, construction around the north portal would require the removal of late successional redwood trees and, though the road would still be within redwood forest, trees would be further from the road, modifying the visual character. As mentioned above, effects would be reduced through context-sensitive design features and standard measures. Overall, Alternative F is not anticipated to change the scenic designation for this section of highway; the presence of a tunnel itself does not disqualify a highway from scenic designation or eligibility, as exemplified by other tunnels on the state highway system, such as Devil's Slide Tunnel on Highway 1 in San Mateo County and Robin Williams Tunnel on U.S. 101 in Marin County, and the alternative would be consistent with the scenic highway corridor protection measures. In addition, the tunnel itself would be memorable in terms of trip anticipation and marking progression on a journey, and the duration to exposure to the tunnel would be relatively short. Based on the above, Alternative F would have a less than significant effect on scenic resources within a designated scenic highway.

Although the project does not require mitigation under CEQA, additional minimization measures have been included for both alternatives to reduce impacts. This includes Visual-1 and Visual-2, which require replanting with a variety of techniques and saving and using topsoil, which would help restore a natural setting, and Visual-3, which requires a landscape architect or other appropriate specialist on-site and/or on call, as needed, to ensure compliance with context-sensitive treatments and standard measures.

c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

Less Than Significant Impact. The project is located in a rural area, within Redwood National and State Parks. Both alternatives would affect public views, with changes to visual character and visual quality.

During construction, visual impacts would be similar to existing conditions, where construction and associated elements are visible to highway users. However, these impacts would be temporary, and would be minimized by standard measures used for the project, such as those for revegetation, and for directing any night lighting at areas needed for work or security.

After construction, Alternative X would maintain periodic views of the Pacific Ocean to the west. While the proximity and height of the retaining wall would decrease visual diversity of the area, and decrease views of the wooded slope to the east, it would also add continuity, with consistent design and condition compared to existing walls. This alternative would also remove the need for frequent construction, which would remove elements that have reduced the visual environment of the area. With the inclusion of context-sensitive design features and standard measures, as discussed under Question b), Alternative X is not anticipated to substantially degrade public views of the project area and its surroundings.

Alternative F would bypass a section of the highway, changing highway views from a natural setting to a human-made one. While the tunnel would remove scenic views for highway users, there would be some anticipated positives as tunnels are unique features and can be memorable, acting as a landmark. For users of the California Coastal Trail (CCT), there would also be visual impacts, primarily with the proximity of built features at certain locations and the removal of vegetation. However, as with the tunnel, duration of exposure would be low, and in some areas, partially blocked by existing vegetation. With the inclusion of context-sensitive design features and standard measures, Alternative F is not anticipated to substantially degrade public views of the project area and its surroundings.

Although the project does not require mitigation under CEQA, minimization measures Visual-1, Visual-2, and Visual-3 would help reduce project impacts.

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

No Impact (Alternative X) / Less than Significant Impact (Alternative F). Under Alternative X, no lighting would be added along U.S. 101. While tree and vegetation clearing along the eastern side of the highway would reduce canopy cover and increase natural light allowance along the project corridor, the large scale of the proposed retaining walls would minimize this change in any potential new light source from the east. Therefore, there would not be adverse changes associated with light and glare due to tree removal work.

In addition, in accordance with Standard Measure AR-1, context-sensitive coloring of barrier rails and other human-made structures would be selected to minimize glare. As a result, Alternative X is not anticipated to create any new source of light or glare that would affect views in the area.

Alternative F would introduce new sources of light, including lighting within the proposed tunnel and exterior lighting at the OMC. All lighting would be directed downward and placed to minimize light intrusion. Like Alternative X, tree and vegetation clearing would reduce canopy cover along U.S. 101, which would allow additional natural light at some locations, but would not be considered a substantial new source of light. New sources of glare would be minimized by selecting a non-reflective color for barrier rails and other human-made structures. While Alternative F would introduce new light sources, these are not anticipated to be substantial, and impacts would be less than significant.

4.3.2 Agriculture and Forest Resources

In determining whether impacts on 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. In determining whether impacts on forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and the forest carbon measurement methodology provided in Forest Protocols adopted by CARB.

Would the project:	Significant and Unavoidable 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 (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?				✓
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?				✓

CEQA Significance Determinations for Agriculture and Forest Resources

See Section 3.2.1, *Existing and Future Land Use* for information about land use in the project area.

Would the project:

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?

No Impact. No farmland is present within the project area; therefore, there would be no conversion of farmland to non-agricultural use.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. The project area does not contain land zoned for agricultural use and there are no parcels enrolled in a Williamson Act contract.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?

No Impact. While there is timberland within the study area and there would be staging of helicopters for geotechnical investigations within timberlands, this use would be temporary, and be conducted on existing graveled areas. Therefore, the project would not conflict with existing zoning for forest land, timberland, or timberland zoned Timberland Production.

d) Result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. While there is timberland in the study area, other than temporary staging, no project-related work would occur within areas zoned as forest land, timberland, or Timberland Production land. Consequently, no forest land would be converted 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?

No Impact. No farmland or forest land would be converted as a result of the project; therefore, there would be no impact.

4.3.3 Air Quality

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations.				
Would the project:	**Significant and Unavoidable 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) 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?				✓
c) Expose sensitive receptors to substantial pollutant concentrations?			✓	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?				✓

CEQA Significance Determinations for Air Quality

This section was prepared using information from a technical memorandum (*Air Quality, Greenhouse Gas, and Climate Change Memo*) prepared for the project (Caltrans 2023j). See Section 3.3.5, *Air Quality,* for additional information on air quality.

Refer to Section 4.5, *Climate Change*, for more information on GHG emissions analysis.

Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

No Impact. The project would not conflict with or obstruct implementation of air quality plans.

b) 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?

No Impact. The project is located in an attainment/unclassified area for all current NAAQS. Because Del Norte County attains all NAAQS, there are no applicable State Implementation Plans (SIPs). The project is also in attainment/unclassified areas for all state standards. As such, the project would not have a net increase of pollutants in a non-attainment region.

The project would implement standard measures that would reduce short-term air quality impacts. Once complete, the OMC constructed for Alternative F would have operational emissions, but these are anticipated to be negligible. In addition, the project would reduce emissions from emergency repairs and maintenance activities when compared to existing conditions. It is therefore not anticipated that the project would create a violation that could put the project area into nonattainment.

c) Expose sensitive receptors to substantial pollutant concentrations?

Less than Significant Impact. While the project would have emissions from criteria pollutants during construction, and for operation of the OMC, these emissions would be minor and, in the case of construction, short-term. In addition, there are no sensitive receptors (i.e., those at heightened risk of negative health outcomes from air pollution) within the immediate vicinity (i.e., 500 feet) of the project area. Therefore, the project would not expose sensitive receptors to substantial pollutant concentrations.

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

No Impact. There are no residences near the project site, and the parks in the area are low use. Therefore, any odors associated with project construction would not impact a substantial number of people.

4.3.4 Biological Resources

Would the project:	Significant and Unavoidable 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 Wildlife, U.S. Fish and Wildlife Service, or NOAA Fisheries (NMFS)?	✓			
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	✓			
c) Have a substantial adverse effect on state or federally protected wetlands (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?				✓

CEQA Significance Determinations for Biological Resources

This section was prepared using information from the Natural Environment Study (NES) prepared for the project (Caltrans 2023d). See Section 3.4, *Biological Environment,* for additional information on biological resources.

Would the project:

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 Wildlife, U.S. Fish and Wildlife Service, or NOAA Fisheries (NMFS)?

Record searches and habitat assessments were conducted to determine whether special status species have the potential to be present in project area. Federal and state lists of potential species in the vicinity are included in Appendix G. The presence of potential habitat for each species and potential to occur are documented in Appendix H for plants and Appendix I for wildlife species and critical habitat (CH). Special status plant and animal species with the potential to occur are discussed further below. The project would have no impact under CEQA on species with no potential habitat.

Special Status Plants: No Impact.

Two special status plant species were detected during seasonally appropriate floristic surveys. Both species—seaside bittercress and ghost-pipe—occur well outside the project footprints for both Alternatives X and F. Therefore, the build alternatives would have ***no impact*** on special status plants. See Section 3.4.3 for detailed discussion of special status plants.

Special Status Amphibians: Less than Significant Impact.

There are four amphibians considered state species of special concern (SSC) that have suitable habitat in the project area: foothill yellow-legged frog, northern red-legged frog, Pacific tailed frog, and southern torrent salamander.

Alternative X would have no direct impacts to streams or riparian habitat, and therefore would have no impacts to Pacific tailed frogs or southern torrent salamanders. However, Alternative X would impact wetlands and damp terrestrial forested habitat, which can be used by foothill yellow-legged frog and northern red-legged frog. With Standard Measures and Best Management Practices incorporated (including BR-1, which would require education of construction workers; BR-2 D and E, which require an Aquatic Species Relocation Plan; BR-4 and BR-5, which would protect adjacent riparian habitat and

revegetate temporarily disturbed areas; and BR-2 G, WQ-1, WQ-2 which protects the water quality), and given the small size of the impacts, temporary nature of construction, and the large quantities of available habitat in the vicinity that individuals could relocate to, Alternative X would have a ***less than significant impact*** on special status amphibians.

Alternative F would impact perennial streams and riparian areas that provide habitat for Pacific tailed frogs and southern torrent salamanders. This alternative would also impact wetlands and damp terrestrial forested habitat which can be used by foothill yellow-legged frog and northern red-legged frog. With standard measures incorporated, as noted above, and given the small size of the impacts and the large quantities of available habitat in the vicinity, Alternative F would have a ***less than significant impact*** on special status amphibians.

See Section 3.4.4 for detailed discussion of special status amphibians.

Special Status Birds, including, bald eagle, purple martin, Vaux's swift, and northern spotted owl: Less than Significant Impact.

The project area has suitable habitat for bald eagle (state endangered), purple martin (SSC), Vaux's swift (SSC), and northern spotted owl (federally and state threatened). Marbled murrelet is discussed separately below.

Both Alternatives X and F require tree and vegetation removal, and would require noise and night lighting during construction, all of which could affect special status bird species and their habitat. Additionally, geotechnical work for both alternatives would expose surrounding habitat to noise and rotor wash from helicopter flights. However, standard measures incorporated into the project, such as BR-2 A, F, I, and J, would minimize impacts associated with these activities by requiring that trees and vegetation be removed outside of the nesting season of these species, limiting construction noise for the majority of the nesting season, and minimizing night lighting. Additionally, for the geotechnical phase, the use of helicopters would be limited to the non-breeding season, and helicopters would fly at a high enough altitude between staging areas and boreholes to reduce rotor wash on trees and the surrounding habitat.

Alternatives X and F would remove habitat for special status birds. Some areas would be permanently impacted, and the habitat would be replaced with highway infrastructure. In other areas, late successional forest would be removed to facilitate the cut and fill for the project and then would be replanted. However, the areas impacted are small, and there is adequate suitable habitat in the project vicinity to which individuals could relocate.

Alternative F would require permanent lighting at the tunnel entrances and OMC. This lighting would be typical roadway lighting. It would be localized, directed down at the

infrastructure, and would not extend far into the surrounding habitat. Post construction, because the highway would be realigned into a tunnel, there would be reduced traffic noise in the surrounding habitat.

Given the abundance of suitable habitat in the vicinity, the relatively small size of the impact, the temporary nature of construction, and the standard measures detailed above, Alternatives X and F would have a ***less than significant impact*** on bald eagle, purple martin, Vaux's swift, and northern spotted owl. Although the project does not require mitigation under CEQA, an additional minimization measure has been included for both alternatives to reduce impacts. Bio-5 would require practices to further reduce noise from construction.

In addition, for bald eagle, a state endangered species, it is anticipated that there would be ***no "take"*** under CESA, and for northern spotted owl, a federally and state threatened species, it is anticipated that the project ***may affect, but is not likely to adversely affect*** the species under FESA, pending consultation with USFWS, and the project would have ***no "take"*** under CESA.

See Sections 3.4.4 and 3.4.5 for detailed discussions of special status birds.

Marbled Murrelet: Significant and Unavoidable.

Marbled murrelet, a federally threatened and state endangered species, and its critical habitat, are present in the project area.

Alternatives X and F would remove suitable nesting trees from marbled murrelet habitat. Standard Measure BR-2 K would ensure all tree removal is done outside of the marbled murrelet nesting season. As a result, there would be no destruction of active nests or injury to individuals from tree removal.

Construction impacts for both Alternatives X and F, including noise and lighting, could impact nesting marbled murrelets. However, Standard Measure BR-2 K would ensure that construction noise is below the USFWS threshold during the nesting season, and Standard Measure BR-2 F would limit any construction lighting in the surrounding habitat. Geotechnical work for both Alternatives X and F requires the use of helicopters. For the geotechnical phase, use of helicopters would be limited to September 16 to January 31, which is outside the nesting season, and helicopters would fly at a high enough altitude between staging areas and boreholes to reduce rotor wash on trees and the surrounding habitat. Standard Measure BR-2 C would control project generated trash, thereby avoiding attracting predators to the area.

Both alternatives would permanently remove marbled murrelet critical habitat through construction of highway infrastructure and habitat conversion (tree removal to facilitate cut

and fill needed for construction). Alternative X would remove more acres of habitat than Alternative F, though the quality would be lower. Though the area is primarily late successional Douglas-fir forest, and it does have some large redwood and Douglas-fir trees, it is mainly distributed in a narrow strip along the existing highway. Alternative F, particularly at the north portal, would remove high quality occupied habitat, which is part of a large, contiguous patch of late successional redwood forest. Alternative F would also remove twice the number of conifers 48 inches (4 feet) feet in DBH or greater than Alternative X.

Late successional coniferous forest, which provides high quality nesting habitat for marbled murrelet, is uncommon due to logging and habitat conversion in the region. Marbled murrelets have restrictive habitat requirements (prefer larger trees with suitable branch size on which to nest and that is within flying distance of the ocean). A recent status review of the species by the Oregon Department of Fish and Wildlife found that within Oregon, while quantities of late successional habitat on federal and state lands had increased since 1993, on all other private lands this habitat has decreased (ODFW 2021). The five-year status review completed by USFWS found that, as of 2016, in the northernmost portion of their range, the marbled murrelet population has declined, and throughout most of the rest of their range the trends are uncertain. In Conservation Zone 4, which overlaps with this project, there is evidence of a positive population trend (USFWS 2019a). This underscores the importance of the habitat at LCG.

The removal of marbled murrelet critical habitat under both Alternatives X and F is unavoidable. Because of the restrictive habitat requirements of this species and the rarity of this habitat, even with standard measures incorporated, habitat removal would have a significant impact on marbled murrelet.

Mitigation measure Bio-1, which would use restoration techniques to put early successional forests on an accelerated timeline to develop late successional characteristics or would preserve existing late successional forest (or some combination of these) would lessen impacts to marbled murrelet. However, impacts from the removal of late successional forest would remain significant, as proposed mitigation measures may take multiple centuries to result in replacement of lost habitat.

Therefore, under CEQA, Alternatives X and F would have a ***significant and unavoidable impact*** on marbled murrelet and their critical habitat.

Under FESA, it is anticipated that Alternatives X and F ***may affect, is likely to adversely affect*** marbled murrelet and their critical habitat, pending consultation with USFWS.

Under CESA, Alternatives X and F are anticipated to result in ***no "take"***.

See Section 3.4.5 for a detailed discussion of marbled murrelet.

Special Status Mammals, including Pacific fisher, Humboldt marten, ringtail, and voles: Less than Significant Impact.

Special status mammals include Pacific fisher (SSC), Humboldt marten (federally threatened, state endangered), ringtail (state fully protected), Sonoma tree vole (SSC), and white-footed vole (SSC).

Alternatives X and F would impact special status mammal habitat. Some areas would be permanently impacted, and the habitat would be replaced with highway infrastructure. In other areas, coniferous and red alder forest would be removed to facilitate the cut and fill for the project and then replanted. However, with the implementation of Standard Measure BR-2 K, which requires surveys for fisher, Humboldt marten, and ringtail prior to the start of construction, and removal of trees outside of the denning season for all mammals but the Sonoma tree vole (which can breed year-round), impacts to mammals would be minimized. Impacts to special status mammal habitat are small, and there is an abundance of suitable habitat in the project vicinity to which individuals could relocate.

Construction impacts for both Alternatives X and F include noise and lighting in the habitat surrounding construction areas. These impacts would be minimized by the standard measures incorporated into both alternatives including BR-2 I, which limits construction noise for the majority of the denning season and BR-2 F, which minimizes night lighting. Additionally, for the geotechnical phase, use of helicopters would be limited to September 16 to January 31, which is in the non-denning season, and helicopters would fly at a high enough altitude between staging areas and boreholes to reduce rotor wash on trees and the surrounding habitat. Standard Measure BR-2 C would control project-generated trash, thereby avoiding attracting predators to the area.

Alternative F would require permanent lighting at the tunnel entrances and OMC. This lighting would be typical roadway lighting. It would be localized, directed down at the infrastructure, and would not extend far into the surrounding habitat. Post construction, because the highway would be realigned into a tunnel, there would be reduced traffic noise in the surrounding habitat, improved habitat connectivity, and a reduced risk to wildlife of vehicle strike.

Given the abundance of suitable habitat in the vicinity, the relatively small size of the impact, the temporary nature of construction, and the standard measures detailed above, Alternatives X and F would have a ***less than significant impact*** on special status mammals including Pacific fisher, Humboldt marten, ringtail, Sonoma tree vole, and white-footed vole.

Although the project does not require mitigation under CEQA, an additional minimization measure has been included for both alternatives to reduce impacts. Bio-5 would require practices to further reduce noise from construction.

In addition, for Humboldt marten, a federally threatened and state endangered species, it is anticipated that the project ***may affect, but is not likely to adversely affect*** the species under FESA, pending consultation with USFWS, and the project would have ***no "take"*** under CESA.

See Sections 3.4.4 and 3.4.5 for detailed discussions of special status mammals.

Special Status Bats: Less than Significant Impact with Mitigation.

Special status bats in the project area include the pallid bat and Townsend's big-eared bat, both state SSC.

Alternatives X and F would require tree removal in special status bat habitat. This includes removing trees that may be functioning as roosts for maternity or day-roosting colonies or individuals in a state of torpor. Some areas would be permanently impacted, and the habitat would be replaced with highway infrastructure. In other areas, coniferous and red alder forest would be removed to facilitate the cut and fill for the project and then replanted. Amounts of habitat are small, and there is an abundance of suitable habitat in the project vicinity to which individuals could relocate if disturbed. However, if bats are inside the tree when it is removed, they could be injured or killed.

Construction impacts for both Alternatives X and F include noise and lighting in the habitat surrounding the construction areas. However, roosting bats within cavities are insulated from noise and there is sufficient surrounding habitat to disperse to. In addition, Standard Measure BR-2 I limits construction noise over most of the bat maternity season, and BR-2 F would limit lighting. For the geotechnical investigations, use of helicopters would be limited to September 16 to January 31, which is the non-maternity season, and helicopters would fly at a high enough altitude between staging areas and boreholes to reduce rotor wash on trees and the surrounding habitat. If any bats in torpor were present, they would be insulated from noise within tree cavities.

Alternative F would require permanent lighting at the tunnel entrances and OMC. This lighting would be typical roadway lighting. It would be localized, directed down at the infrastructure, and would not extend far into the surrounding habitat. Post construction, because the highway would be realigned into a tunnel, there would be reduced traffic noise in the surrounding habitat.

For both alternatives, it is anticipated that impacts from light, noise, and loss of habitat would be less than significant given the abundance of suitable habitat in the vicinity, the relatively small size of the impact, the temporary nature of construction, and the standard measures detailed above. However, even with these standard measures incorporated, tree removal has the potential to significantly impact special status bat species by injuring or killing them when trees are felled. Mitigation measures Bio-6, Bio-7, Bio-8 and Bio-9 would be implemented, where Bio-6 would require tree removal be conducted outside of both the maternity and torpor season, Bio-7 would have a qualified bat biologist identify all suitable bat roosting trees prior to tree removal, Bio-8 would, for all trees identified as bat roosting trees, use site-specific means to modify and disturb the habitat to allow bats to wake and leave the roost prior to tree felling, and Bio-9 would have a qualified construction monitor onsite during removal of identified bat roosting trees. These measures would reduce impacts by not felling trees when bats can't leave (maternity and torpor) and getting day roosting bats to leave the tree prior to felling. Therefore, these measures would reduce impacts to a less than significant level. Therefore, Alternatives X and F would have a ***less than significant impact with mitigation incorporated*** on special status bats.

See Section 3.4.4 for a detailed discussion of special status bats.

Special Status Fish: Alternative X: No Impact / Alternative F: Less Than Significant Impact.

There are no Southern Oregon/Northern California Coast (SONCC) coho salmon (federally and state threatened) or their critical habitat located within the project area; there is a natural fish barrier (based on the stream gradient) approximately 3,100 feet (0.59 mile) downstream from the Alternative F footprint (GDRC 2023).

Alternative X would have, per CEQA, ***no impact*** on SONCC coho salmon and its CH because it would not impact any wetlands or tributaries that connect to occupied habitat in Wilson Creek. Under FESA, this alternative would have ***no effect*** on this species or its CH, and for CESA this alternative would have ***no "take"***.

Alternative F would not directly impact SONCC coho salmon or its designated CH; however, this alternative would impact wetlands at the north portal that have direct connectivity with potentially occupied habitat (3,100 feet downstream). This connectivity has the potential for constituents within the project limits to travel into tributaries; however, with standard measures incorporated, such as BR-5, which restricts the instream work period to protect water quality, and WQ-1 and WQ-2, which include measures to protect water quality through control of sedimentation, erosion, and potential chemical pollutants, Alternative F would have a ***less than significant impact*** on SONCC coho salmon under CEQA.

Under FESA, this alternative is anticipated to have ***no effect*** on this species' critical habitat, and ***may affect, but is not likely to adversely affect*** the species itself, pending consultation with NMFS.

Under CESA, this alternative would have ***no "take"***.

See Section 3.4.5 for a detailed discussion on impacts to SONCC coho salmon.

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

Riparian Habitat: Less than Significant Impact.

Riparian forest mapped within BSA #1 consists of red alder forest adjacent to streams. This forest is considered riparian habitat based on connectivity to the streams and functions for improving water quality and habitat for aquatic species. This riparian habitat is also likely to be considered an environmentally sensitive habitat area (ESHA) by the CCC.

For Alternative X, there would be ***no impact*** to riparian habitat.

Alternative F would permanently impact 0.214 acres of riparian habitat, where highway infrastructure would be built. This alternative would temporarily impact an additional 0.038 acre, where vegetation may be removed to facilitate construction. Standard measure BR-4 B would require a revegetation plan for any temporarily impacted areas.

Given the relatively small impact, the abundance of similar habitat (red alder riparian forest is a common vegetation community within the region), and the standard measures incorporated into the project, Alternative F would have a ***less than significant impact*** on riparian habitat. Although the project does not require mitigation under CEQA, Bio-4 would be implemented. Under this measure, in line with agency policies, permit driven compensation would offset impacts to riparian habitat.

See Section 3.4.2 for a detailed discussion of riparian habitat.

Sensitive Natural Communities and Large Trees: Significant and Unavoidable Impact.

Redwood forest, Sitka spruce forest, red alder forest with salmonberry-elderberry understory, and coastal brambles are considered CDFW SNCs. Of these, redwood forest and Sitka spruce forest would also possibly be considered an ESHA, while upland red alder and coastal brambles are not considered ESHAs as they are common in the region and resilient to disturbance. Douglas-fir forest, a common natural community in the area, is not considered an SNC but is possibly an ESHA because it provides habitat for marbled murrelet. Impacts to Douglas-fir forest are discussed in the marbled murrelet section under Question a).

Impact acreages for each community by alternative and the numbers of trees to be removed can be found in Section 3.4.1. Standard Measures BR-4 B, C, D, and E which call for revegetation plans for temporary disturbed areas, Temporary High Visibility Fencing (THVF) and/or flagging around sensitive communities prior to construction, and methods to protect tree roots would be incorporated into both alternatives to minimize impacts.

Within the region, red alder forest and coastal brambles are both locally common. Both communities are tolerant of disturbance and restorable within a short amount of time. Temporarily impacted areas would be restored with a revegetation plan via Standard Measure BR-4 B. Alternative X would permanently remove approximately 1.7% of the red alder and 2.3% of the coastal brambles mapped just within BSA #1. Alternative F would permanently remove 3.2% of the red alder and 0.3% of the coastal brambles mapped just within BSA #1. In the surrounding landscape there are many more acres of these communities. Given the relatively small impacts, the abundance of these communities, and their high tolerance for disturbance, both Alternatives X and F would have a ***less than significant impact*** on red alder forest and coastal brambles.

Alternatives X and F would impact early and late successional redwood forest. Early successional redwood forest is common in the region with thousands of acres in the surrounding DNCRSP, RNP, and GDRC timberland. As the impact areas are small and the forest type is abundant, the build alternatives would have a ***less than significant impact*** to early successional redwood forest.

Late successional redwood forest is rare locally and regionally. Due to logging and land conversion, less than 5% of the original late successional redwood forest remains. Alternative X has minor impacts to late successional redwood as it would impact 0.03 acres. This impact would occur as a very narrow strip (less than 15 feet wide) along the current highway in the northernmost portion of the Alternative X footprint, and no large trees would be removed for this area. As a result, Alternative X would have a ***less than significant impact*** on late successional redwood forest. To build the north portal, Alternative F would

remove all trees (including large mature redwoods) from 1.09 acres of late successional redwood forest. Given that late successional redwood forest is rare, and this alternative removes large trees from quality habitat, Alternative F would have a ***significant and unavoidable impact*** on late successional redwood forest.

Alternatives X and F would impact late successional Sitka spruce forest, which is rare in California. This vegetation community is uncommon regionally due to forest conversion and commercial timber practices, which replace Sitka spruce with redwood—a more valuable commercial species. Both alternatives would impact around an acre of this community and include the removal of large mature trees. Given the magnitude of the impact and rarity of late successional Sitka spruce forest, Alternatives X and F would have a ***significant and unavoidable impact*** on late successional Sitka spruce forest.

Mitigation measure Bio-1 would use restoration techniques to put early successional redwood and Sitka spruce forests on an accelerated timeline to develop late successional characteristics or would preserve existing late successional forest (or some combination of these). However, impacts from the removal of late successional forest would remain significant, as proposed mitigation measures may take multiple centuries to result in replacement of lost habitat.

See Section 3.4.1 for additional discussion of impacts.

c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Less than Significant Impact.

Both build alternatives would have temporary and permanent impacts on wetlands and Waters of the U.S. and State.

Alternatives X and F would have relatively small impacts to wetlands. Alternative X would permanently fill approximately 0.002 acre of wetland and temporarily impact 0.014 acre. Alternative F would permanently impact approximately 0.113 acre of wetland, 329.90 linear feet (0.019 acre) of perennial stream, and 43.30 linear feet (0.001 acre) of ephemeral stream. An additional 0.009 acre of wetland and 65.65 linear feet (0.006 acre) of perennial stream would be temporarily impacted with vegetation possibly removed and the channel possibly modified.

Standard Measures BR-4 B, C, F and BR-5 A, B, C, D would be implemented as part of the project to minimize and avoid impacts to wetlands and waters. These measures require THVF and/or flagging, as appropriate, to protect wetlands and waters, revegetation of

temporary impact areas with appropriate native vegetation, a limited operating period for work within waters, and the use of mats to protect wetlands (as feasible) to protect the surrounding wetlands. Given these measures and the relatively small impacts, Alternatives X and F would have a ***less than significant impact*** on wetlands. Although the project does not require mitigation under CEQA, there are federal and state policies for "no net loss" for wetlands, and agencies have requirements for offsetting loss of wetlands and other waters. Therefore, in addition to on-site restoration of temporary impacts, Bio-4 would be implemented; wetlands and other waters would be offset at a minimum ratio of 1:1.

See Section 3.4.2 for additional discussion of impacts to wetlands.

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?

Less than Significant Impact.

There are no officially designated wildlife corridors or native wildlife nursery sites within BSA #1.

There are no fish bearing streams within the project footprint of Alternative X or F; all streams within BSA #1 are above the limits of anadromy. Therefore, Alternatives X and F would have ***no impact*** on migratory fish.

Alternative X proposes permanent roadway modifications that would change the existing condition regarding species movement. While the project footprint is within an area that naturally has lower permeability to wildlife movement due to the steep cliffs and the existing highway and numerous retaining walls which adversely impact wildlife movement, the proposed retaining walls may make crossing the highway even more difficult. In addition, construction of the drainage gallery maintenance access road would be new infrastructure, which could be a new barrier to movement. However, this road would not be regularly traveled because it would only be used for routine maintenance and would not be open to the public. This road would not have retaining walls and could generally be easily crossed by wildlife species. Standard Measures such as AR-2, AR-5, and BR-4 B, C, D, F, would require revegetation with native species, control invasive species in areas disturbed by construction, would restore wildlife habitat, and thereby avoid and minimize impacts on habitat connectivity. Given this and the current baseline conditions, Alternative X would have a ***less than significant impact*** on wildlife movement.

Because Alternative F would reroute the highway into a tunnel, and the existing highway would be decommissioned and revegetated, habitat connectivity would be improved and

animal mortality from vehicle strike would be reduced. Therefore, Alternative F would have ***no impact*** on wildlife connectivity.

See Section 3.4.1 for additional discussion of wildlife movement.

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

No Impact.

Alternatives X and F would not conflict with any local policies or ordinances protecting biological resources. See Section 3.2.2, *Consistency with State, Regional, and Local Plans and Program,* for additional information.

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?

No Impact.

The footprint for the project build alternatives would be located entirely within state and national parks. There are no conservation plans adopted for any portion of the project; therefore, the project would not conflict with any such plans.

4.3.5 Cultural Resources

Would the project:	Significant and Unavoidable 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 pursuant to §15064.5?			✓	
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?				✓
c) Disturb any human remains, including those interred outside of dedicated cemeteries?				✓

CEQA Significance Determinations for Cultural Resources

See Section 3.2.10, *Cultural Resources*, for additional information on cultural resources.

Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

Less than Significant Impact. There are two historical resources that would be affected by the project—the Traditional Cultural Landscape (TCL) and the Crescent City to Trinidad Wagon Road. As these resources are being treated as eligible for inclusion in the NRHP, they would also be considered eligible for listing in the CRHR.

Both alternatives would have impacts on old-growth redwood trees and other old-growth conifers—potential contributing elements of the TCL. Though the project is anticipated to have an adverse effect on this resource under Section 106 of the NRHP, it is not anticipated that impacts would alter the ability for the TCL to continue to convey its historical significance. This is in part due to the size of the landscape itself. Because of this, impacts would be less than significant under CEQA. Standard measures implemented for the project would help minimize project impacts to the contributing elements of the TCL, including measures under BR-4, which require protection of environmentally sensitive areas, such as redwood forests, and measures to reduce impacts to large trees. In addition, though no mitigation is required under CEQA, Cultural-1 would be implemented, under which a Historic Property Treatment Plan (HPTP) would be prepared to address potential effects to

contributing elements of the TCL. Measures would be developed in consultation with appropriate tribes and agencies.

In addition to potential impacts on the TCL, Alternative F would have some impacts on the Crescent City to Trinidad Wagon Road (Segments 1, M, 10). However, given the impacts would only occur on a few short segments, it is anticipated the impacts would not alter the ability for the wagon road to continue to convey its historical significance. Because of this, impacts would be less than significant under CEQA. Though no mitigation would be required under CEQA, Cultural-1 would be implemented, under which an HPTP would be prepared to address potential effects on the wagon road. Measures would be developed in consultation with appropriate agencies.

See Section 3.2.10, *Cultural Resources*, for additional details regarding Cultural-1.

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

No Impact. No archaeological resources were identified within the ADI for Alternative X or F during cultural resource studies. Therefore, the project is not anticipated to impact archaeological resources. In the unlikely event that resources are identified during construction, Standard Measure CR-3 would be applied, in which all work in the vicinity of the discovery would be stopped until the resource is assessed.

c) Disturb any human remains, including those interred outside of dedicated cemeteries?

No Impact. No human remains were identified during cultural resource studies for this project. Therefore, the project is not anticipated to impact archaeological resources. In the unlikely event that human remains are discovered during construction, Standard Measure CR-4, which relates to treatment of human remains, would be applied.

4.3.6 Energy

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation?			✓	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?				✓

CEQA Significance Determinations for Energy

This section was prepared using information from the *Energy Technical Memo* prepared for the project (Caltrans 2023l). See Section 3.2.7, *Energy,* for additional information on energy.

Would the project:

a) Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation?

Less than Significant Impact. As discussed in Section 3.3.7, both alternatives would require the use of diesel fuel, jet fuel, gasoline, and electricity. However, once construction is complete, both build alternatives would partially offset energy consumption to some degree by the longer intervals between maintenance and rehabilitation activities that have been associated with the No-Build Alternative. In addition, neither build alternative is considered a capacity-increasing project; they would not expand or substantially lengthen the roadway, nor would they change travel demands or traffic patterns when compared to the No-Build Alternative. As such, the project is unlikely to increase direct energy consumption through increased highway fuel usage.

Alternative F includes operation of an OMC associated with tunnel maintenance. Operation of the OMC would consume minor quantities of diesel, gasoline, electricity, and propane for maintenance and emergency response needs. The OMC also includes energy-efficient design measures, including a green "living" roof. The fuel efficiency of equipment and vehicles used at the OMC is expected to increase over time due to improvements in technology and

implementation of state regulations. Accordingly, operation of the OMC is not anticipated to result in inefficient, wasteful, or unnecessary direct energy consumption.

Overall, the project design features eliminate wasteful, inefficient, or unnecessary consumption of energy resources during construction or operations; therefore, the impact would be less than significant.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

No Impact. For both alternatives, design features would be implemented during construction and post-construction that would conserve energy, consistent with state and local policies and plans to reduce energy consumption. In addition, with innovations such as longer pavement life, improvement in traffic management, and changes in materials, energy consumption can be offset to some degree by longer intervals between maintenance and rehabilitation activities. Thus, the proposed project does not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

4.3.7 Geology and Soils

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Directly or indirectly cause 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 in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?				✓
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				✓

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				✓

CEQA Significance Determinations for Geology and Soils

This section was prepared using information from the *Geology Summary Memorandum* (Caltrans 2023f) and *Combined Paleontological Identification and Evaluation Report* (Caltrans 2022h) that were prepared for the project. See Section 3.3.2, *Geology, Soils, Seismic, Topography*, and Section 3.3.3, *Paleontology*, for additional information on geological and paleontological resources.

Would the project:

a) Directly or indirectly cause 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.)

No Impact. Neither alternative would cross known active faults as delineated by an Alquist-Priolo Earthquake Fault Zone or the Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3) model; therefore, the project would not be expected to directly or indirectly cause potential substantial adverse effects associated with any potential ruptures of a known earthquake fault.

ii. Strong seismic ground shaking?

No Impact. Ground motion parameters needed to assess possible ground failure and to design seismically resistant structures for this project were evaluated using Caltrans' Acceleration Response Spectrum (ARS) model in accordance with the *Caltrans Geotechnical Design Manual's* Design ARS module. The project would use the Safety Evaluation Earthquake design ARS developed per Caltrans' Seismic Design Criteria Version 2.0 to characterize design ground motions for earth-retaining structures, embankments, slopes, sign

structures, and other appurtenant roadway facilities. Under both build alternatives, calculated motions are included in the forces designed to be resisted by the proposed structures; therefore, strong seismic ground shaking is not anticipated to cause substantial adverse effects.

iii. Seismic-related ground failure, including liquefaction?

No Impact. There is potential for liquefaction and lateral spreading to affect proposed structures under both build alternatives; however, features would be incorporated into the project design to address any potential issues from liquefaction and lateral spreading; therefore, the project would not be expected to directly or indirectly cause potential substantial adverse effects associated with seismic-related ground failure, including liquefaction.

iv. Landslides?

No Impact. Both build alternatives are designed to respond to an existing landslide hazard connected to a large landslide complex. Alternative X proposes to address the landslide hazard by slowing the rate of landslide activity through groundwater drawdown and increasing the roadway's resistance to slope movement by eastward alignment retreat and structures. Alternative F proposes to avoid the most severe section of the landslide complex by re-routing the roadway though a tunnel continuing inland behind the landslide. Given the purpose of the project is to either avoid or address the landslide hazard, the project would not be expected to directly or indirectly cause potential substantial adverse effects associated with landslide activity.

b) Result in substantial soil erosion or the loss of topsoil?

Less than Significant Impact. Construction activities, including heavy vehicle use, excavation, and grading, have the potential to cause erosion. The project would implement Standard Measure GS-1, which would require the project be designed to minimize slope failure, settlement, and erosion using recommended construction techniques and BMPs. New earthen slopes would be vegetated to reduce erosion potential.

The project would also implement measures WQ-1 and WQ-2, which would require temporary and permanent pollution prevention BMPs, including erosion control measures to achieve slope stabilization.

With the implementation of measures GS-1, WQ-1 and WQ-2, the project is not anticipated to 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?

No Impact. The project is not located on a geologic unit or soil that is unstable or that would become unstable as a result of the project. Considering the design features to be incorporated into the project, Alternative X and Alternative F would not be expected to result (directly or indirectly) in impacts associated with liquefaction or lateral spreading. Both build alternatives would provide further stabilization to the roadway in response to an existing landslide.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

No Impact. There are no soil complexes under Alternative X that have shrink-swell potentials with moderate or high classifications. Under Alternative F, all but one of the soil complexes have low shrink-swell potential; the outlying soil complex has a moderate shrink-swell potential. Although Alternative F has one soil complex with a shrink-swell potential classified as moderate, neither alternative would involve structures with shallow foundations, which would be affected by expansive soils.

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

No Impact. If septic tanks or wastewater disposal systems are to be included as part of the project, design features to ensure soils would adequately support the use of such systems would be included.

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

No Impact. No unique paleontological resources or sites or unique geologic features have been identified in the project area. All excavation would be in geologic units that have a low potential for paleontological sensitivity. Given this, it is not anticipated that fossils would be encountered or damaged during construction; therefore, the project is not expected to impact paleontological resources. In the unlikely event that paleontological resources are encountered, GS-2 would be implemented, stopping work in the vicinity of the discovery until appropriate measures are taken.

4.3.8 Greenhouse Gas Emissions

Would the project:	Significant and Unavoidable 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 an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?				✓

CEQA Significance Determinations for Greenhouse Gas Emissions

This section was prepared using information from the analysis of GHG emissions provided in Section 4.5, *Climate Change*.

Would the project:

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

Less than Significant with Mitigation Incorporated. *Caltrans Interim Guidance: Determining CEQA Significance for Greenhouse Gas Emissions for Projects on the State Highway System* (Caltrans 2019e) directs that a project that increases GHG emissions over existing levels would have a significant impact on the environment. Given the project would not increase vehicle miles traveled (VMT)—there would be no increase in capacity or change in travel demands or traffic patterns— neither alternative would result in an increase in GHG emissions from post-construction highway traffic operations. Alternative F would include an OMC. This stationary operations and maintenance facility would generate less than 1,000 metric tons CO_2e per year. Design features, construction, and operation would be as energy efficient as feasible and OMC construction and operations would comply with EOs B-18-12 (requires new state buildings be designed to have zero net energy) and N-79-20 (California's goal to transition to 100% zero-emission off-road vehicles and equipment by 2035). The benefits of the project include eliminating the construction emissions resulting from ongoing and indefinitely continuing emergency repairs. Additionally, traffic delays are anticipated to offset and outweigh the relatively small increase in annual GHG emissions from the OMC.

However, during construction, both alternatives need helicopter-assisted geotechnical investigations in addition to substantial tunneling and off-site disposal of tunnel spoils, which would likely result in relatively high GHG emissions during construction. Standard measures and BMPs, including BR-4, TT-1, AR-2, and GHG-1, 2, 3, 4, 5, in addition to energy-efficient design features, would reduce and minimize impacts. These measures include protecting and replanting vegetation, which would protect and restore carbon sequestration capacity in the long term; the preparation of a TMP, which would minimize GHG emissions from traffic delays; and requirements to comply with air quality laws and regulations and compliance with emissions reductions regulations, among others.

Despite these measures, emissions during construction would be relatively high, and are therefore considered a potentially significant impact. However, the benefits of the project include eliminating the construction emissions resulting from current frequent emergency repairs. Additionally, traffic delays, improving road reliability, and avoiding a lengthy detour should the roadway fail due to landslide, are anticipated to offset and outweigh the short-term increase in GHG emissions. In addition, avoidance, minimization, and mitigation measures developed to address impacts to biological resources (see Section 3.4, *Biological Resources*) would co-benefit GHG reduction in the long term, as protecting forests and enhancing growth of trees works to sequester carbon. Young forests grow rapidly and sequester carbon more quickly than older forests, which store more carbon (National Council for Air and Stream Improvement, Inc. 2021).

With the measures included and benefits associated with the build alternatives, impacts are anticipated to be less than significant with mitigation.

b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

No Impact. With Standard Measures and construction BMPs, energy-efficient building design features, and considering the project benefits in reducing emissions from indefinitely continuing emergency repairs and traffic delays, neither build alternative is anticipated to conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

4.3.9 Hazards and Hazardous Materials

Would the project:	Significant and Unavoidable 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 compiled 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 or excessive noise for people residing or working in the project area?				✓
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				✓
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?				✓

CEQA Significance Determinations for Hazards and Hazardous Materials

The following sections are based on the *Initial Site Assessment* (ISA) (Caltrans 2023i) prepared for the project. See Section 3.3.4, *Hazards and Hazardous Materials,* for additional information on hazardous substances.

Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

No Impact. Project construction and maintenance activities are expected to involve the transport, use, and disposal of hazardous materials (e.g., fuels, lubricants, solvents, and other possible contaminants). However, hazardous materials would be handled safely and securely according to applicable local, state, and federal regulations. In addition, during construction, measures would be implemented for the handling and disposal of potentially hazardous waste encountered onsite, including aerial deposited lead (HW-1) and lead in painted traffic stripes (HW-2), treated wood waste, (HW-3), and hexavalent chromium (HW-4). With the implemented measures, neither alternative would be expected to 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?

No Impact. Both alternatives have the potential to encounter 1) aerially deposited lead (ADL) that might occur in soil along the roadway from historical vehicle emissions during the leaded gasoline era, 2) lead based paint (LBP) in traffic striping along roadways, and 3) chemicals associated with treated wood (signposts and guardrail). Alternative F also has the potential to encounter lead from LBP and/or hexavalent chromium from CBP, which may have been used on structures previously located within the OMC footprint.

Any potential release of hazardous materials into the environment would be avoided by incorporating Standard Measures HW-1, HW-2, HW-3, HW-4 and WQ-1 (Section 2.6.). As a result, with the included measures, neither alternative is anticipated to create a significant hazard to the public or the environment through 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?

No Impact. There are no existing or proposed schools within 0.25 mile of the project. Consequently, there would be no project impacts on existing or proposed schools.

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

No Impact. Database reviews did not list any known hazardous materials records in the project area, and the project site is not on the Hazardous Waste and Substances Sites List (Cortese List).

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?

No Impact. There are no public airports within 2 miles of the project area and the project area is not included in an airport land use plan. Therefore, the proposed project would have no impacts related to airport uses.

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

No Impact. The project would comply with applicable federal, state, and local regulations and requirements for emergency response and evacuation during project construction and maintenance. Compliance with applicable regulations is mandatory; therefore, proposed construction and maintenance activities are not expected to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

No Impact. The California Department of Forestry and Fire Protection's Fire and Resource Assessment Program (2022) identifies the project area as being within a *moderate* Fire Hazard Severity Zone. The project would comply with applicable federal, state, and local regulations and requirements for wildfire safety during project construction and maintenance. Compliance with applicable regulations is mandatory; therefore, proposed construction and maintenance activities are not expected to expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires.

4.3.10 Hydrology and Water Quality

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			✓	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			✓ Alt X	✓ Alt F
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i) result in substantial erosion or siltation on- or off-site;			✓	
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;				✓
iii) 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; or				✓
iv) impede or redirect flood flows?				✓
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?				✓
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?				✓

CEQA Significance Determinations for Hydrology and Water Quality

The following sections are based on the *Water Quality Assessment Report* (Caltrans 2023e) prepared for the project. See Section 3.3.1, *Water Quality and Stormwater Runoff*, for additional information on these resources.

Would the project:

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Less than Significant Impact. Construction activities associated with both alternatives have the potential to result in temporary water quality impacts. These impacts can result from sediment discharge from disturbed soil areas (DSAs) and construction near water resources and drainage facilities. Impacts from potentially sediment-laden stormwater would be minimized through standard measures that include erosion control, soil stabilization, and sediment and tracking control BMPs (WQ-1 and WQ-2). These measures would also avoid any potential impacts on coastal water quality during construction.

Under Alternative X, the project would reduce slope movement and improve overall slope stability by constructing an underground drainage system that captures and redirects groundwater from within the slope to the Pacific Ocean. Non-stormwater discharges to an Area of Biological Significance (ASBS) that are associated with slope stability may be allowable with discretion from the NCRWQCB. Therefore, groundwater discharges associated with the underground drainage system could be conditionally exempt if routed to an existing discharge point and may be approved by the NCRWQCB and SWRCB if water discharge requirements (WDRs) are met and natural water quality is not altered. Coordination with the NCRWQCB and SWRCB would occur to ensure design features and water quality measures meet all applicable standards.

For both alternatives, temporary dewatering may be necessary in areas where groundwater is encountered. Varying groundwater hardness levels have the potential to affect resources. Per Standard Measure WQ-1, and the *Field Guide to Construction Site Dewatering* (Caltrans 2014a), groundwater hardness levels that exceed the ASBS effluent limitations would either be treated on-site prior to disposal or transported to a legally permitted off-site facility. Any potential impacts due to dewatering would be temporary and are expected to be minimal and limited to the construction period.

With the implementation of standard measures and agency coordination, the project is anticipated to be in compliance with all applicable water quality standards and waste discharge requirements and would not be expected to substantially degrade surface or ground water quality.

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Less than Significant Impact (Alternative X) / No Impact (Alternative F). The *Water Quality Control Plan for the North Coast Region* (Basin Plan) does not list groundwater recharge as a beneficial use for the Wilson Creek Hydrologic Area (HA) (NCRWQCB 2018).

Alternative X improvements would result in the addition of impervious area and would thereby reduce the available unpaved area that previously allowed runoff to infiltrate the native soils. In addition, Alternative X features drainage galleries specifically intended to draw groundwater in an effort to reduce the potential for landslides along the roadway. The project would implement treatment BMPs (WQ-2) that would allow stormwater infiltration, avoiding any potential adverse impacts on the basin's groundwater. Further, any potential groundwater drawdown is anticipated to be localized on the western slope right above the ocean and, based on modeling, there appears to be little connectivity between the western slope and the Wilson Creek watershed. Therefore, Alternative X would not be expected to interfere substantially with recharge of the Wilson Creek HA and, in turn, would not impede the basin's sustainable groundwater management.

In contrast, Alternative F would reduce impervious surfaces; therefore, it would not be expected to affect groundwater recharge nor the basin's sustainable groundwater management.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

The project would result in an increase in impervious surface under Alternative X and a decrease under Alternative F. While the project may impact the existing hydrograph, including increases/decreases in low flow and peak flow velocity and volume to the receiving water bodies, it would not change the overall existing drainage patterns. For Alternative X, drainage work would involve the construction of an underground drainage system with an outfall to the Pacific Ocean, as well as the extension of existing culverts to match roadway

widths, while Alternative F also proposes to extend existing culverts, and new culverts would connect to existing culverts.

i. result in substantial erosion or siltation on- or off-site;

Less than Significant Impact. As neither alternative would alter existing drainage patterns or substantially alter impervious surface area, with the implementation of Standard Measures WQ-1 and WQ-2 the project is not expected to result in substantial erosion or siltation either within or outside the project ESL.

ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;

No Impact. The change in impervious surface area associated with each alternative could result in a change to the existing hydrograph, including increases/decreases in low flow and peak flow velocity and volume to the receiving water bodies. Given multiple drainages cross through the project area for both alternatives, the project would include a rapid stability assessment and would implement any necessary hydromodification measures to prevent any potential on and offsite flooding; therefore, the project is not expected to result in flooding on- or offsite.

iii. 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; or

No Impact. Although the added impervious area could increase sediment-laden flow directly discharging to receiving water bodies under Alternative X, stormwater impacts would be minimized through the proper implementation of permanent stormwater treatment measures and design pollution prevention BMPs (WQ-1 and WQ-2). Therefore, it is not anticipated that either alternative would create or contribute to runoff that would exceed the capacity of stormwater drainage systems or provide substantial polluted runoff.

iv. impede or redirect flood flows?

No Impact. Neither alternative would affect flow capacity or create a barrier within an existing drainage feature nor would they substantially alter impervious surface area. As a result, neither would have the potential to increase an upstream water surface level resulting from an obstruction to flow or result in flooding to adjacent areas. With the implementation of design measures such as porous pavement, infiltration trenches, and other permanent treatments BMPs, neither alternative is expected to impede or redirect flood flows.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

No Impact. Neither build alternative is within a 100-year base floodplain, and the project is not located within tsunami or seiche zones; therefore, there is no anticipated risk for release of pollutants due to inundation of the project area.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

No Impact. For both alternatives, the project would comply with the requirements stated in all applicable water quality and groundwater management plans, including the Basin Plan (NCRWQCB 2018) and *Water Quality Control Plan for the Ocean Waters of California* (SWRCB 2019).

4.3.11 Land Use and Planning

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?				✓
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?				✓

CEQA Significance Determinations for Land Use and Planning

This section was prepared using information from the *Community Impact Memo* prepared for the project (Caltrans 2023a). See Section 3.2.1, *Existing and Future Land Use*, and Section 3.2.2, *Consistency with State, Regional, and Local Plans and Programs* for additional information.

Would the project:

a) Physically divide an established community?

No Impact. The project is within state and national parks associated with RNSP. The parks extend both north and south of the project area—the closest communities are Crescent City, approximately 10 miles to the north, and Klamath, approximately 7 miles to the south. As such, there are no communities within the project area and the project would not physically divide an established community. As the purpose of the project is to provide a more reliable connection on U.S. 101 at this location, it would benefit the communities both north and south of the project area.

b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. The project would not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

The project is consistent with state, local, and regional plans, which include the Del Norte County 2020 RTP, Del Norte County General Plan, and the RNSP General Management Plan/General Plan. See Table 3-1 in Section 3.2.2, *Consistency with State, Regional, and Local Plans and Programs*.

4.3.12 Mineral Resources

Would the project:	Significant and Unavoidable 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?				✓

CEQA Significance Determinations for Mineral Resources

This section was prepared using information from the *Geology Summary Memorandum* (Caltrans 2023f) that was prepared for the project.

Would the project:

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?

No Impact. The California Geological Survey did not identify any sites for the extraction of construction minerals, industrial and chemical mineral materials, metallic minerals, rare minerals, and gemstone resources or any oil and gas wells within the project (California Geological Survey 2022a and 2022b).

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?

No Impact. There are no locally-important mineral resource recovery sites identified in any local, specific, or other land use plans.

4.3.13 Noise

Would the project result in:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			✓	
b) Generation of excessive groundborne vibration or groundborne noise levels?			✓	
c) For a project located within the vicinity of a private airstrip or 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?				✓

CEQA Significance Determinations for Noise

The following analysis was prepared using information from the *Noise Study Report* prepared for the project (Caltrans 2023k). See Section 3.3.6, *Noise and Vibration*, for additional information on noise.

Would the project result in:

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less than Significant Impact. Project construction activities would generate noise levels above ambient, including for helicopters used during geotechnical investigations. However, construction work would generally progress in a linear path, and would affect different areas at different times, depending on construction phase, active work locations, and type of work, and helicopter use would be short-term. The greatest sound levels would only be a fraction of construction time, and noise would cease once construction is complete. Though noise from construction would not be substantial, measures to reduce noise for biological resources

would also reduce noise during construction, such as Bio-5, which includes noise control practices. See Section 3.4.4, *Animal Species,* for additional information.

After construction, traffic noise from Alternative X would be similar to existing conditions. In contrast, Alternative F would have lower levels of traffic noise than Alternative X for much of the study area because a portion of the highway would be within a tunnel. Unique to Alternatives F, operation of the OMC could generate noise, such as from use of maintenance vehicles or generators. However, noise would only be noticeable for short periods of time and would not cause substantial disturbance.

Overall, it is anticipated the project would not generate a substantial increase in noise.

b) Generation of excessive groundborne vibration or groundborne noise levels?

Less than Significant Impact. Construction activities may result in groundborne vibration, such as from the use of heavy equipment or from construction of the underground drainage system tunnels (Alternative X) or tunnel (Alternative F). However, any vibration is anticipated to be short-term and intermittent, and would cease once construction is complete. Vibration is not anticipated to affect human receptors, including in outdoor areas such as campgrounds and trails.

c) For a project located within the vicinity of a private airstrip or 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?

No Impact. The closest public airport is the Del Norte County Regional Airport, which is over 10 miles northwest of the project area. There are no private airstrips in the vicinity of the project.

4.3.14 Population and Housing

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				✓
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				✓

CEQA Significance Determinations for Population and Housing

This section was prepared using information from the *Community Impact Memo* prepared for the project (Caltrans 2023a).

Would the project:

a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

No Impact. The purpose of the project is to develop a long-term solution to the problems associated with LCG. The project would maintain a single lane in each direction, and there would be no change in access to the surrounding area, and no increase in capacity or change in travel demands or traffic patterns when compared to existing conditions. Therefore, the project is not anticipated to directly or indirectly induce population growth.

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

No Impact. There are no residences in the project area. No people or houses would be displaced.

4.3.15 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:	Significant and Unavoidable 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?				✓

CEQA Significance Determinations for Public Services

This section was prepared using information from the *Community Impact Memo* prepared for the project (Caltrans 2023a).

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: a) fire protection; b) police protection; c) schools; d) parks; e) other public facilities?

No Impact. Neither build alternative involves construction of, or alteration to, facilities associated with fire protection, police protection, or schools.

Right of way would be required for park land. However, this land is undeveloped, and recreational features in the vicinity, such as the California Coastal Trail, would not be directly impacted. In addition, as the project is not increasing capacity or changing access to

park land, it would not increase use of park facilities. Therefore, the project would not require the construction of new park facilities or the alteration of existing facilities.

Both project build alternatives would require traffic control, which could cause delays to emergency response vehicles, such as fire and police, and to other public service vehicles, like school buses and park personnel. Alternative X would require regular reversing traffic control, and both alternatives would require occasional full-facility closures. However, as described under Standard Measure TT-1, a Transportation Management Plan (TMP) would be implemented to minimize impacts from traffic delays, including consideration of the timing of full-facility closures and, under UE-1, emergency response agencies would be notified of the project schedule, including lane closures. See additional details on emergency response in Section 3.2.7, *Utilities/Emergency Services*. The public would also be notified of closures through various sources, such as Caltrans Quickmap, and press releases.

With the implementation of standard measures, response times for emergency services would only be minimally impacted. There would be no change to service ratios or other performance objectives for public facilities in general and there would be no need for new or physically altered governmental facilities. Therefore, the project would have no impact with respect to public services.

4.3.16 Recreation

	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would 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?				✓
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?				✓

CEQA Significance Determinations for Recreation

This section was prepared using information from the *Community Impact Memo* prepared for the project (Caltrans 2023a), and the Section 4(f) (Appendix B).

Would the project:

a) Would 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?

No Impact. Redwood National and State Parks (RNSP) are primarily accessed from U.S. 101. The project would maintain a single lane in each direction, and there would be no change in access to the surrounding area, with no change to travel demands or traffic patterns. While access for pedestrians and bicyclists on this stretch of U.S. 101 would be improved through increased shoulder widths and a separated path in the tunnel for Alternative F, this is not anticipated to increase the use of the area as this is in a rural area, the areas to the north and south would not be improved, and it does not change access to parks. It is therefore not anticipated that either build alternative would increase the use of RNSP.

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?

No Impact. Neither build alternative would include any new recreational facilities or require construction or expansion of recreational facilities.

4.3.17 Transportation

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?				✓
b) Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?				✓
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				✓
d) Result in inadequate emergency access?			✓	

CEQA Significance Determinations for Transportation

See Section 3.2.7, *Utilities/Emergency Services,* and Section 3.2.8, *Traffic and Transportation/Pedestrian and Bicycle Facilities,* for more information.

Would the project:

a) Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

No Impact. As stated in Section 3.2.2, *Consistency with State, Regional, and Local Plans and Programs*, the project is identified as a regionally significant project in the Del Norte County 2020 RTP, which has a policy to support improvements to U.S. 101 that address stability problems at Last Chance Grade. The Del Norte County General Plan also has several policies related to maintaining and retaining U.S. 101 as it is a primary access route serving the county and its communities. The project would improve the existing highway, and would not conflict with a program, plan, ordinance, or policy related to the circulation system.

b) Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?

No Impact. CEQA Guidelines Section 15064.3(b) relates to analyzing transportation impacts and whether a project impacts vehicle miles traveled (VMT). Both build alternatives would maintain a single lane in either direction. Neither would change access to the surrounding area, or increase roadway capacity, change travel demand, or change traffic patterns and therefore would not result in any increase in VMT. Because there would be no increase in VMT, there would be no impact.

c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

No Impact. Neither build alternative would increase hazards due to design features; both alternatives may decrease potential hazards by increasing shoulder widths, providing opportunities for disabled vehicles to pull off onto a shoulder. Alternative F would also include separated bicyclist and pedestrian paths in the tunnel, reducing potential conflicts between motorized and non-motorized traffic. Neither alternative is introducing incompatible uses into the project area.

d) Result in inadequate emergency access?

Less than Significant Impact. Because it provides the only direct link between Crescent City and points south in California, the LCG portion of U.S. 101 provides a vital connection for emergency services. In the event of a full closure at LCG, the trip between Crescent City and Klamath would require a 449-mile detour, which takes approximately 8 hours.

Due to frequent emergency construction and enhanced maintenance activities needed to keep the highway open, emergency vehicles often experience delays due to the one-way traffic controls at LCG. Once constructed, both build alternatives would substantially improve emergency access through the LCG area by providing a more reliable connection.

During construction, both build alternatives would require traffic control, which could affect emergency response vehicles. As described under Standard Measure TT-1, a TMP would be implemented to minimize impacts from traffic delays, including from full-facility closures. Under UE-1, emergency personnel would be notified of the project schedule, including lane closures. While emergency vehicles would be subject to the same traffic delays as other vehicles during reversing traffic control, it is anticipated that vehicles in construction zones would pull over for emergency vehicles, if feasible, or wait at the green light to let emergency service vehicles pass, reducing delay times.

During full closures, emergency vehicles would be accommodated through the construction area as soon as a path is cleared. See Section 3.2.7, *Utilities/Emergency Services,* for more information.

Though emergency response vehicles would experience temporary delays, U.S. 101 would still be accessible. With the inclusion of the standard measures, it is anticipated the project would have a less than significant impact on emergency access.

4.3.18 Tribal Cultural Resources

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:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or			✓	
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.				✓

CEQA Significance Determinations for Tribal Cultural Resources

See Section 3.2.10, *Cultural Resources,* for additional information on Tribal Cultural Resources.

Extensive consultation with five local tribes suggests the presence of a Traditional Cultural Landscape (TCL) within the project ESL. Ethnographic research and interviews are currently underway with the Resighini Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation, and the Yurok Tribe to determine the boundaries and contributing elements of this landscape. The Elk Valley Rancheria declined to participate in these studies. Currently it is assumed that the landscape encompasses the entire ESL, which would include the entire ADI for both Alternative X and Alternative F. Contributing elements would likely include features both within and outside the ESL. Within the ESL, old-growth redwoods and possibly other species of old-growth trees would be considered contributors to the TCL. It is currently

assumed that this landscape will be eligible to the CRHR under Criteria 1, 2, and 4. Findings will be incorporated into the final environmental document.

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:

a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or

Less than Significant Impact. As noted above, the TCL is considered a tribal cultural resource and is being treated as eligible for the CRHR. Though the project is anticipated to have an adverse effect on this resource under Section 106 of the NRHP, it is not anticipated that impacts would alter the ability for the TCL to continue to convey its historical significance. This is in part due to the size of the landscape itself. Because of this, impacts would be less than significant under CEQA. Standard measures implemented for the project would help minimize project impacts to the contributing elements of the TCL, including measures under BR-4, which requires protection of environmentally sensitive areas, such as redwood forests, and measures to reduce impacts to large trees. In addition, though no mitigation is required under CEQA, Cultural-1 would be implemented, under which a Historic Property Treatment Plan (HPTP) would be prepared to address potential effects to contributing elements of the TCL. Measures would be developed in consultation with appropriate tribes and agencies.

b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

No Impact. The only tribal cultural resource within the ESL is the TCL, which is being treated as eligible for the CRHR, and is discussed under Question a) above.

4.3.19 Utilities and Service Systems

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?				✓
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?				✓
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				✓
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?				✓
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?				✓

CEQA Significance Determinations for Utilities and Service Systems

See Section 3.2.7, *Utilities/Emergency Services*, Section 3.3.1, *Water Quality and Stormwater Runoff*, and Section 3.3.4, *Hazardous Waste/Materials*, for additional information.

Would the project:

a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

No Impact. The proposed project would not result in relocation, reconstruction, or expansion of water, wastewater treatment, natural gas, or telecommunication facilities. None of these facilities are present within the ESL and would not be constructed as part of either build alternative.

Under Alternative F, to provide electricity to the OMC and the tunnel, new electrical lines would be installed to connect to an existing PacificCorp transmission line. Both Alternatives X and F propose the construction of a trenched conduit within the shoulder or pavement of the highway as part of a larger State effort to expand broadband availability, though if cables are in place prior to construction of LCG, they may need to be moved. These activities are not anticipated to cause a significant environmental effect.

Both build alternatives would convey stormwater through existing culverts; some culverts would be lengthened where the roadway would shift from its current location. Temporary water quality impacts associated with stormwater with either build alternative would be addressed with standard measures (see Section 3.3.1).

The OMC would be constructed as part of Alternative F; as this facility would house maintenance staff, it is anticipated to generate a small amount of wastewater. As no wastewater facilities are present in the project vicinity, the OMC would dispose of wastewater either through a septic system or off-hauling. However, this would not require construction or relocation of any wastewater facilities.

b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?

No Impact. Alternative X would not include any facilities that would require an operational water supply, and therefore would have no impact on water supply.

The OMC and tunnel associated with Alternative F would need minimal water supply for operation and maintenance. Storage tanks would serve the water needs, with the tanks being replenished from off-site sources (no onsite well is proposed).

Because of the project's location in RNSP, no other future development is foreseen. It is therefore expected that adequate water supplies would be available during normal, dry, and multiple dry years. Alternative F is anticipated to have no impact on water supply.

c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

No Impact. There is no wastewater treatment provider serving the area and no connection to any wastewater treatment facility is proposed for either build alternative. Alternative X would not generate wastewater, and would therefore have no impact. For Alternative F, the OMC would be minimally staffed and generate wastewater from toilets, showers, and maintenance activities. The OMC may have a septic system for regular wastewater generated on-site. Industrial wastewater associated with maintenance activities would be collected and transported off-site to a licensed facility.

d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

No Impact. Both Alternatives X and F would generate construction waste. Construction waste determined to be hazardous (e.g., thermoplastic road striping or ADL-contaminated soil) would be managed and disposed of in accordance with standard measures (see Section 3.3.4, *Hazardous Waste/Materials*). Alternative X would not generate any solid waste during operations. Operation of the OMC under Alternative F would generate minimal solid waste that would not exceed the capacity of local waste disposal facilities. Regular construction waste and hazardous waste would be disposed of at appropriately licensed facilities with adequate capacity to receive them.

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

No Impact. The project would comply with all federal, state, and local management and reduction statutes and regulations related to solid waste.

4.3.20 Wildfire

If located in or near State Responsibility Areas (SRA) or lands classified as very high fire hazard severity zones, would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?			✓	
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?				✓
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?				✓
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?				✓

CEQA Significance Determinations for Wildfire

The LCG project segment of U.S. 101 (PM 12.7–16.5) is not within or near a very high Fire Hazard Severity Zone (FHSZ). However, it is within State and Federal Responsibility Areas. Within State Responsibility Areas, the project is in the "moderate" FHSZ (California Department of Forestry and Fire Protection 2023). The *Caltrans Climate Change Vulnerability Assessments District 1 Technical Report* (Caltrans 2019f) projects the northern portion of the project limits as roadway at "moderate exposure" to wildfire through 2025 and projects the entire project limits would be at "high and moderate exposure" by 2055 through 2099.

The project is located in a region of temperate rain forests that typically receives 70 inches of rainfall during each winter and fog during the relatively rainless summer months. Fog can contribute over 30% of the total annual water inputs to the redwood forest (Caltrans 2022i;

2023o). Coupled with mild temperatures year-round, these moist conditions reduce wildfire risk. However, mean annual precipitation over the past 21 years has been only about 55% of the long-term average, indicating gradually drying conditions as the climate changes (Caltrans 2023d). Refer to Section 4.5, *Climate Change*, which addresses wildfire and climate change for additional information.

If located in or near State Responsibility Areas (SRA) or lands classified as very high fire hazard severity zones, would the project:

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

Less than Significant Impact. There are no emergency service providers within the ESL; Del Norte County emergency services are based in Crescent City. However, during construction, there would be traffic control; see Section 3.2.7 and Section 3.2.8 for additional information. Traffic control may cause temporary delays to emergency response vehicles, which would be minimized through the implementation of a TMP (Standard Measure TT-1) and through coordination with emergency response agencies (Standard Measure UE-1). After completion, both build alternatives would provide a more reliable connection, and would not impair emergency response or evacuation plans.

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

No Impact. The project limits and immediate surroundings contain no permanent occupants who would be exposed to smoke or pollutants from a wildfire. The project would not directly or indirectly exacerbate wildfire risks and expose people to pollutants or uncontrolled spread of a wildfire. In addition, for construction, the contractor would be required to submit a jobsite Fire Prevention Plan (Standard Measure UE-3).

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

No Impact. Neither build alternative would directly or indirectly exacerbate wildfire risks and would not require the installation or maintenance of infrastructure that may exacerbate wildfire risk.

New infrastructure associated with Alternative F would be constructed with fire-resistant materials, and the tunnel and OMC would include fire suppression systems. Electrical lines

for the tunnel and OMC would be installed in an underground ductbank. Coordination with the power company and compliance with regulations and best practices for electrical work would avoid creating or exacerbating fire risk.

All construction contracts include fire prevention specifications to avoid fire starts during construction.

d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

No Impact. The build alternatives would not expose people or structures to significant risks as a result of runoff, post-fire instability, or drainage changes because there are no permanent occupants or structures within or adjacent to the ESL. Existing drainage patterns would be maintained. The project purpose is to address geologic instability and minimize risk of landslides. Project design for the build alternatives includes slope stabilization and strategic retreat (Alternative X) or realignment into a tunnel below and behind the highest-risk slide area (Alternative F) to better ensure the long-term viability of the transportation facilities and safety of the traveling public.

4.3.21 Mandatory Findings of Significance

	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to substantially 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, substantially 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?			✓	

CEQA Significance Determinations for Mandatory Findings of Significance

Would the project:

a) Does the project have the potential to substantially 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, substantially 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?

Significant and Unavoidable Impact. The project is located within RNSP, a UNESCO World Heritage Site. Both alternatives would result in permanent impacts on sensitive habitat, including removal of late successional forest. The project would also result in potentially significant impacts on marbled murrelet and its designated critical habitat. Caltrans' standard measures and BMPs, described in Chapter 2, as well as the avoidance, minimization, and mitigation measures described in Chapter 3, would lessen impacts on marbled murrelet, sensitive natural communities and late successional forest; however, would not reduce impacts to a less-than-significant level.

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.)

Less than Significant Impact. The LCG project, in conjunction with foreseeable projects, may affect similar resources, including visuals/aesthetics, water quality, cultural resources, SNCs, wetlands and other waters, and special status species. However, it is not anticipated that any of these impacts would be cumulatively considerable. See Section 3.7, *Cumulative Impacts,* for more information.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less than Significant Impact. Because the project is located within RNSP, there are no communities or community facilities within or adjacent to the project. Construction would result in temporary impacts on travelers and park users related to traffic, noise, and visual effects, but these effects would not be substantial.

The project area is within a Traditional Cultural Landscape (TCL) (see Section 3.2.10), and potential contributing elements of the TCL include old-growth redwood trees. With the

removal of these trees, it is anticipated that both alternatives would have an adverse effect on the TCL under Section 106 of the NRHP. Due to the type of resource, changes to the TCL could potentially affect tribal members. However, it is not anticipated that impacts would alter the ability for the TCL to continue to convey its historical significance. Given this, neither alternative would be expected to cause a substantial adverse effect. Coordination with the Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation, the Yurok Tribe, National and State Parks, and the State Historic Preservation Office (SHPO) is ongoing; measures to address potential effects to the TCL would be developed in coordination with these tribes and agencies, and included in a Historic Property Treatment Plan (HPTP), which would be prepared prior to the final environmental document.

4.4 Senate Bill 743 / Induced Demand Analysis

Senate Bill (SB) 743 (2013) required the Governor's Office of Planning and Research (OPR) to identify new metrics for identifying and mitigating transportation impacts under CEQA. Under SB 743, CEQA Guidelines Section 15064.3(b) was revised to identify vehicle miles traveled (VMT) as the most appropriate measure of assessing transportation impacts.

Neither build alternative would result in any long-term increase in VMT. Neither project alternative is considered to be capacity-increasing; the alternatives would not expand or substantially lengthen the roadway, nor would they change travel demands or traffic patterns. Therefore, they would not induce demand and associated increases in VMT.

The No-Build Alternative would likely result in the indefinite continuation of emergency repairs and increased maintenance, similar in scale to ongoing conditions over the past two decades. As the No-Build Alternative would not change existing conditions, it is not anticipated to increase VMT. However, as there would be no long-term solution to the underlying instability of the area, the risk of potential roadway failure would continue. As U.S. 101 is the only viable route between Crescent City and Klamath, and the detour is 449 miles, in the event of a road closure, VMT may increase.

4.5 Climate Change

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the Earth's climate system. The Intergovernmental Panel on Climate Change (IPCC), established by the United Nations and World Meteorological Organization in 1988, is devoted to greenhouse gas (GHG) emissions reduction and climate change research and policy. Climate change in the past has generally occurred gradually over millennia, or more suddenly in response to cataclysmic natural disruptions. The research of the IPCC and other scientists over recent decades, however, has unequivocally attributed an accelerated rate of climatological changes over the past 150 years to GHG emissions generated from the production and use of fossil fuels.

Human activities generate GHGs consisting primarily of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), tetrafluoromethane, hexafluoroethane, sulfur hexafluoride, and various hydrofluorocarbons (HFCs). CO_2 is the most abundant GHG; while it is a naturally occurring and necessary component of Earth's atmosphere, fossil-fuel combustion is the main source of additional, human-generated CO_2 that is the main driver of climate change. In the United States and in California, transportation is the largest source of GHG emissions, mostly CO_2.

The impacts of climate change are already being observed in the form of sea level rise (SLR), drought, more intense heat, extended and severe fire seasons, and historic flooding from changing storm patterns. Both mitigation and adaptation strategies are necessary to address these impacts. The most important mitigation strategy is to reduce GHG emissions. In the context of climate change (as distinct from CEQA and NEPA), "mitigation" involves actions to reduce GHG emissions or to enhance the "sinks" that store them (such as forests and soils) to lessen adverse impacts. "Adaptation" is planning for and responding to impacts to reduce vulnerability to harm, such as by adjusting transportation design standards to withstand more intense storms, heat, and higher sea levels. This analysis will include a discussion of both in the context of this transportation project.

4.5.1 Regulatory Setting

This section outlines federal and state efforts to comprehensively reduce GHG emissions from transportation sources.

Federal

To date, no national standards have been established for nationwide mobile-source GHG reduction targets, nor have any regulations or legislation been enacted specifically to address climate change and GHG emissions reduction at the project level.

NEPA (42 USC 4332) requires federal agencies to assess the environmental effects of their proposed actions prior to deciding on the action or project.

The FHWA recognizes the threats that extreme weather, sea level change, and other changes in environmental conditions pose to valuable transportation infrastructure and those who depend on it. FHWA therefore supports a sustainability approach that assesses vulnerability to climate risks and incorporates resilience into planning, asset management, project development and design, and operations and maintenance practices (FHWA 2022). This approach encourages planning for sustainable highways by addressing climate risks while balancing environmental, economic, and social values ("the triple bottom line of sustainability" [FHWA n.d.]). Program and project elements that foster sustainability and resilience also support economic vitality and global efficiency, increase safety and mobility, enhance the environment, promote energy conservation, and improve the quality of life.

The federal government has taken steps to improve fuel economy and energy efficiency to address climate change and its associated effects. The most important of these was the *Energy Policy and Conservation Act of 1975* (42 USC 6201) as amended by the *Energy Independence and Security Act (EISA) of 2007;* and *Corporate Average Fuel Economy (CAFE) Standards.* This act established fuel economy standards for on-road motor vehicles sold in the United States. The U.S. Department of Transportation's (U.S. DOT) National Highway Traffic Safety Administration (NHTSA) sets and enforces the CAFE standards based on each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the United States. The U.S. Environmental Protection Agency (U.S. EPA) calculates average fuel economy levels for manufacturers, and also sets related GHG emissions standards under the Federal Clean Air Act. Raising CAFE standards leads automakers to create a more fuel-efficient fleet, which improves our nation's energy security, saves consumers money at the pump, and reduces GHG emissions (U.S. DOT 2014).

U.S. EPA published a final rulemaking on December 30, 2021, that raised federal GHG emissions standards for passenger cars and light trucks for model years 2023 through 2026,

increasing in stringency each year. The updated GHG emissions standards will avoid more than 3 billion tons of GHG emissions through 2050. In April 2022, NHTSA announced corresponding new fuel economy standards for model years 2024 through 2026, which will reduce fuel use by more than 200 billion gallons through 2050 compared to the old standards and reduce fuel costs for drivers (U.S. EPA 2022b; NHTSA 2022).

State

California has been innovative and proactive in addressing GHG emissions and climate change by passing multiple senate bills (SBs), assembly bills (ABs), and executive orders (EOs) including, but not limited to, the following:

EO S-3-05 (June 1, 2005): The goal of this EO is to reduce California's GHG emissions to: (1) year 2000 levels by 2010, (2) year 1990 levels by 2020, and (3) 80% below year 1990 levels by 2050. This goal was further reinforced with the passage of AB 32 in 2006 and SB 32 in 2016.

AB 32, Chapter 488, 2006, N??ez and Pavley, The Global Warming Solutions Act of 2006: AB 32 codified the 2020 GHG emissions reduction goals outlined in EO S-3-05, while further mandating that the California Air Resources Board (CARB) create a scoping plan and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." The Legislature also intended that the statewide GHG emissions limit continue in existence and be used to maintain and continue reductions in emissions of GHGs beyond 2020 (Health and Safety Code [H&SC] Section 38551(b)). The law requires CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions.

EO S-01-07 (January 18, 2007): This order sets forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10% by year 2020. CARB re-adopted the low carbon fuel standard regulation in September 2015, and the changes went into effect on January 1, 2016. The program establishes a strong framework to promote the low-carbon fuel adoption necessary to achieve the Governor's 2030 and 2050 GHG reduction goals.

SB 375, Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires the CARB set regional emissions reduction targets for passenger vehicles. The Metropolitan Planning Organization (MPO) for each region must then develop a Sustainable Communities Strategy (SCS) that integrates transportation, land-use, and housing policies to plan how it will achieve the emissions target for its region.

SB 391, Chapter 585, 2009, California Transportation Plan: This bill requires the State's long-range transportation plan identify strategies to address California's climate change goals under AB 32.

EO B-16-12 (March 2012): Orders State entities under the direction of the Governor, including CARB, the California Energy Commission, and the Public Utilities Commission, to support the rapid commercialization of zero-emission vehicles. It directs these entities to achieve various benchmarks related to zero-emission vehicles.

EO B-30-15 (April 2015): Establishes an interim statewide GHG emission reduction target of 40% below 1990 levels by 2030 to ensure California meets its target of reducing GHG emissions to 80% below 1990 levels by 2050. It further orders all state agencies with jurisdiction over sources of GHG emissions to implement measures, pursuant to statutory authority, to achieve reductions of GHG emissions to meet the 2030 and 2050 GHG emissions reductions targets. It also directs CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent ($MMTCO_2e$). (GHGs differ in how much heat each traps in the atmosphere, called global warming potential. CO_2 is the most important GHG, so amounts of other gases are expressed relative to CO_2, using a metric called carbon dioxide equivalent [CO_2e]. The global warming potential of CO_2 is assigned a value of 1, and the global warming potential of other gases is assessed as multiples of CO_2.) Finally, it requires the Natural Resources Agency to update the state's climate adaptation strategy, *Safeguarding California*, every 3 years, and to ensure that its provisions are fully implemented.

SB 32, Chapter 249, 2016: Codifies the GHG reduction targets established in EO B-30-15 to achieve a mid-range goal of 40% below 1990 levels by 2030.

SB 1386, Chapter 545, 2016: Declared "it to be the policy of the state that the protection and management of natural and working lands … is an important strategy in meeting the state's greenhouse gas reduction goals, and would require all state agencies, departments, boards, and commissions to consider this policy when revising, adopting, or establishing policies, regulations, expenditures, or grant criteria relating to the protection and management of natural and working lands."

SB 743, Chapter 386 (September 2013): This bill changes the metric of consideration for transportation impacts pursuant to CEQA from a focus on automobile delay to alternative methods focused on vehicle miles traveled (VMT) to promote the state's goals of reducing GHG emissions and traffic-related air pollution and promoting multimodal transportation while balancing the needs of congestion management and safety.

SB 150, Chapter 150, 2017, Regional Transportation Plans: This bill requires CARB to prepare a report that assesses progress made by each MPO in meeting their established regional GHG emission reduction targets.

EO B-55-18 (September 2018): Sets a new statewide goal to achieve and maintain carbon neutrality no later than 2045. This goal is in addition to existing statewide targets of reducing GHG emissions.

AB 1279, Chapter 337, 2022, The California Climate Crisis Act: This bill mandates carbon neutrality by 2045 and establishes an emissions reduction target of 85% below the 1990 level as part of that goal. This bill solidifies a goal included in EO B-55-18. It requires CARB to work with relevant state agencies to ensure updates to the scoping plan identify and recommend measures to achieve these policy goals and to identify and implement a variety of policies and strategies that enable CO_2 removal solutions and carbon capture, utilization, and storage technologies in California, as specified.

4.5.2 Environmental Setting

The proposed project is in a rural area, with a primarily natural-resources-based and tourism economy centered on the RNSP, a UNESCO World Heritage Site. U.S. 101, a designated scenic highway also known as the "Redwood Highway," is the main transportation route to and through the area for both passenger and commercial vehicles. It is also part of the Pacific Coast Bike Route (PCBR). Long-term one-way traffic control needed for ongoing construction and maintenance causes regular traffic delays of 15 to 30 minutes, and more when longer closures are needed for slide repair. Under current conditions, repairs and construction are expected to continue indefinitely.

Other than U.S. 101 and associated features, the project limits are uninhabited and largely undeveloped, with no residences or other facilities present within the project limits. The only alternate route would require a 449-mile, 8-hour detour between Klamath and Crescent City. The Del Norte Local Transportation Commission (DNLTC) guides transportation development in the project region. Neither the Del Norte County General Plan nor the North Coast Unified Air Quality Management District (NCUAQMD) have established thresholds or guidance for transportation GHG emissions (Del Norte County 2003; NCUAQMD 2015).

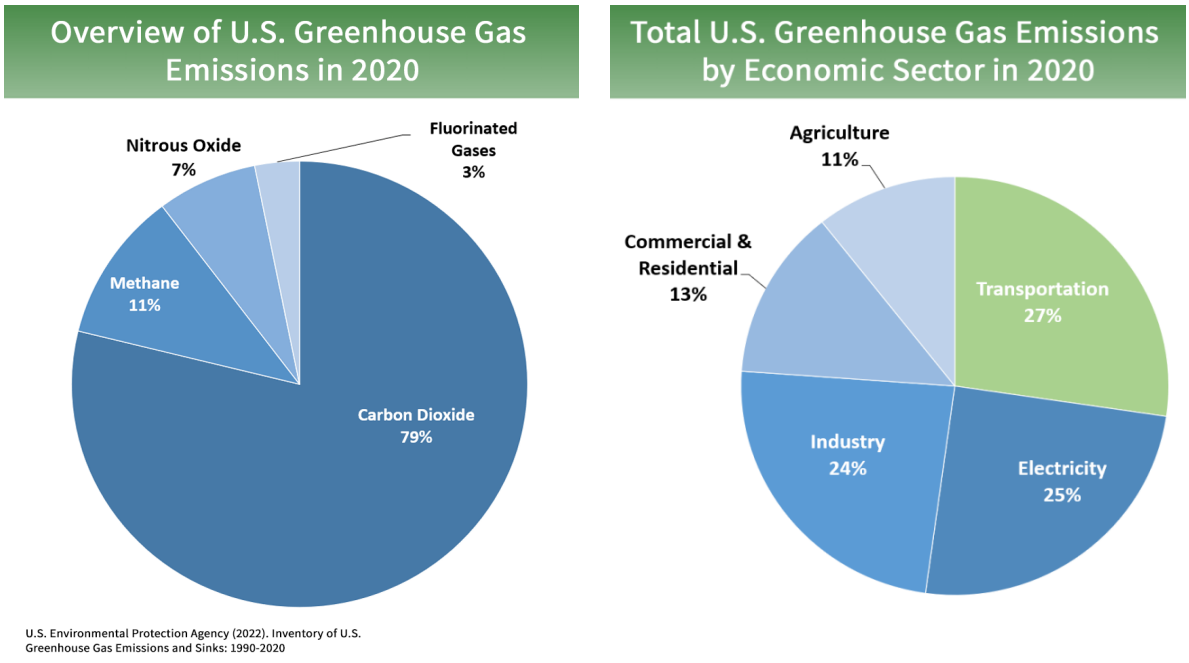
GHG Inventories

A GHG emissions inventory estimates the amount of GHGs discharged into the atmosphere by specific sources over a period of time, such as a calendar year. Tracking annual GHG emissions allows countries, states, and smaller jurisdictions to understand how emissions are

changing and what actions may be needed to attain emission reduction goals. U.S. EPA is responsible for documenting GHG emissions nationwide, and CARB does so for the state, as required by H&SC Section 39607.4. Cities and other local jurisdictions may also conduct local GHG inventories to inform their GHG reduction or climate action plans.

National GHG Inventory

The annual GHG inventory submitted by the U.S. EPA to the United Nations provides a comprehensive accounting of all human-produced sources of GHGs in the United States. Total GHG emissions from all sectors in 2020 were 5,222 million metric tons, factoring in deductions for carbon sequestration in the land sector. Of these, 79% were CO_2, 11% were CH_4, and 7% were N_2O; the balance consisted of fluorinated gases. Total GHGs in 2020 decreased by 21% from 2005 levels and 11% from 2019. The change from 2019 resulted primarily from less demand in the transportation sector during the COVID-19 pandemic. The transportation sector was responsible for 27% of total U.S. GHG emissions in 2020, more than any other sector (Figure 4-1), and 36% of all CO_2 emissions from fossil fuel combustion. Transportation CO_2 emissions for 2020 decreased 13% from 2019 to 2020 but were 7% higher than transportation CO_2 emissions in 1990 (U.S. EPA 2022c).

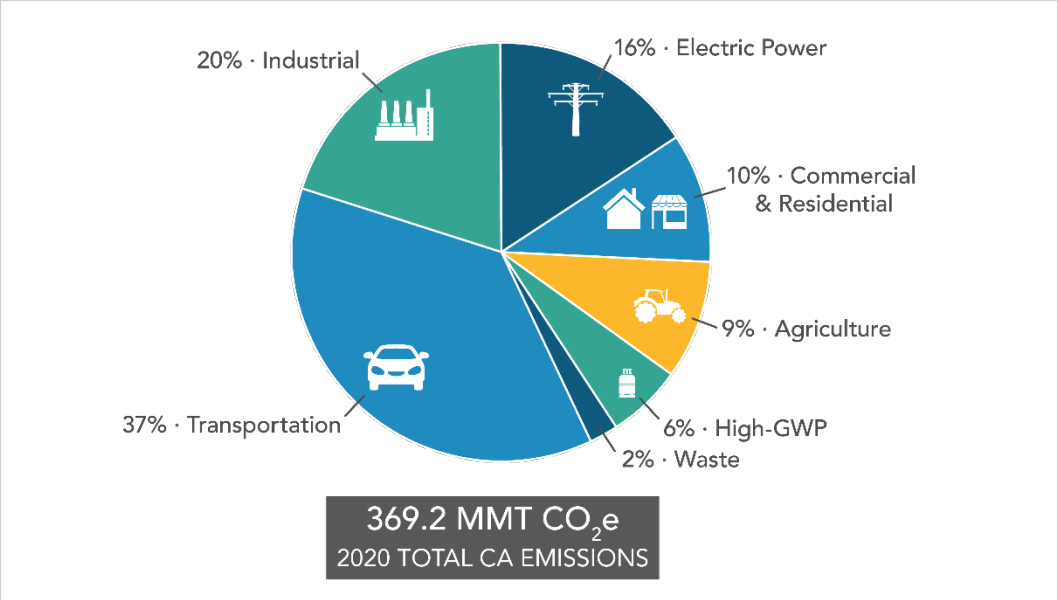


Source: U.S. EPA 2022c

Figure 4-1. U.S. 2020 Greenhouse Gas Emissions

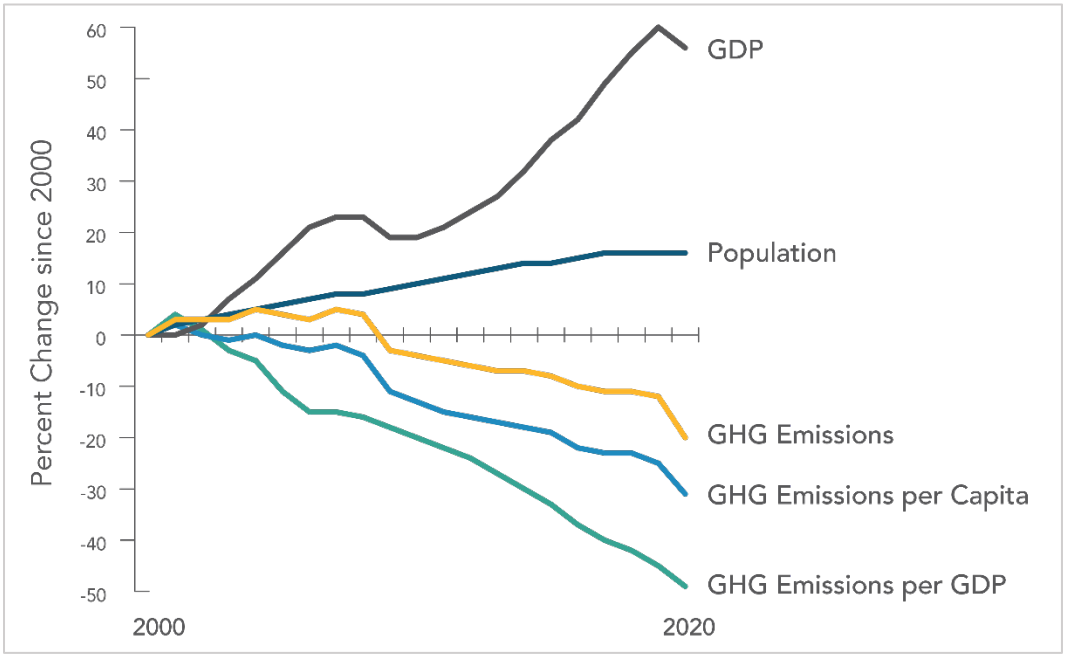
State GHG Inventory

The CARB collects GHG emissions data for transportation, electricity, commercial and residential, industrial, agricultural, and waste management sectors each year. It then summarizes and highlights major annual changes and trends to demonstrate the state's progress in meeting its GHG reduction goals. The 2022 edition of the GHG emissions inventory reported emissions trends from 2000 to 2020. Total California GHG emissions in 2020 were 369.2 $MMTCO_2e$, a reduction of 35.3 $MMTCO_2e$ from 2019 and 61.8 $MMTCO_2e$ below the 2020 statewide limit of 431 $MMTCO_2e$. Much of the decrease from 2019 to 2020, however, is likely due to the effects of the COVID-19 pandemic on the transportation sector, during which VMT declined under stay-at-home orders and reductions in goods movement. Nevertheless, transportation remained the largest source of GHG emissions, accounting for 37% of statewide emissions (Figure 4-2). (Including upstream emissions from oil extraction, petroleum refining, and oil pipelines in California, transportation was responsible for about 47% of statewide emissions in 2020; however, those emissions are accounted for in the industrial sector.) California's gross domestic product (GDP) and GHG intensity (GHG emissions per unit of GDP) both declined from 2019 to 2020 (Figure 4-3). It is expected that total GHG emissions will increase as the economy recovers over the next few years (CARB 2022a).



Source: CARB 2022a

Figure 4-2. California 2020 Greenhouse Gas Emissions by Scoping Plan Category



Source: CARB 2022a

Figure 4-3. Change in California GDP, Population, and GHG Emissions since 2000

AB 32 required CARB to develop a Scoping Plan that describes the approach California will take to achieve the goal of reducing GHG emissions to 1990 levels by 2020, and to update it every 5 years. CARB adopted the first scoping plan in 2008. The second updated plan, *California's 2017 Climate Change Scoping Plan,* adopted on December 14, 2017, reflects the 2030 target established in EO B-30-15 and SB 32. The draft 2022 Scoping Plan Update additionally lays out a path to achieving carbon neutrality by 2045 (CARB 2022b).

Regional Plans

The CARB sets regional GHG reduction targets for California's 18 MPOs by planning future projects that will cumulatively achieve those goals and reporting how they will be met in the RTP/SCS. Targets are set at a percent reduction of passenger vehicle GHG emissions per person from 2005 levels. The project area is not within the jurisdiction of an MPO and therefore not subject to CARB GHG reduction targets. However, the DNLTC is the regional transportation planning agency for the project area. The 2020 Del Norte County RTP commits to County actions that will help Del Norte County proportionally contribute to statewide GHG reduction goals. RTP goals, objectives, and policies aimed at addressing climate change and reducing GHG emissions include an objective to "Reduce or maintain GHG emissions from transportation related sources in the Del Norte region" (DNLTC

2021:48). Neither Del Norte County nor the NCUAQMD currently have climate change or GHG reduction plans.

4.5.3 Project Analysis

GHG emissions from transportation projects can be divided into those produced during operation of the State Highway System (operational emissions) and those produced during construction (construction emissions). The primary GHGs produced by the transportation sector are CO_2, CH_4, N_2O, and HFCs. CO_2 emissions are a product of burning gasoline or diesel fuel in internal combustion engines, along with relatively small amounts of CH_4 and N_2O. A small amount of HFC emissions related to refrigeration are also included in the transportation sector.

The CEQA Guidelines generally address GHG emissions as a cumulative impact due to the global nature of climate change (Public Resources Code [PRC] Section 21083(b)(2)). As the California Supreme Court explained, "because of the global scale of climate change, any one project's contribution is unlikely to be significant by itself." (*Cleveland National Forest Foundation v. San Diego Assn. of Governments* (2017) 3 Cal.5th 497, 512). In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable" (CEQA Guidelines Sections 15064(h)(1) and 15130).

To make this determination, the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. Although climate change is ultimately a cumulative impact, not every individual project that emits greenhouse gases must necessarily be found to contribute to a significant cumulative impact on the environment.

Operational Emissions

The GHG analysis was prepared using information from the *Air Quality, Greenhouse Gas, and Climate Change Technical Memo* (Caltrans 2023j) prepared for the project.

The purpose of the proposed project is to develop a long-term solution to the geologic instability and potential roadway failure at LCG. This type of project generally causes minimal or no increase in operational GHG emissions. Neither Alternative X (roadway realignment) nor Alternative F (a tunnel below the slide area) would increase the vehicle capacity of the roadway. Because the project would not increase the number of travel lanes on U.S. 101, no increase in VMT is anticipated; therefore, there would be no anticipated increase in operational GHG emissions. Project improvements are anticipated to reduce the GHG emissions currently caused by traffic delays for ongoing emergency repairs and

enhanced maintenance and would avoid the emissions related to the lengthy detour that would be required should the roadway entirely fail. Furthermore, mobile source emissions under both build alternatives are expected to decrease compared to existing conditions because of improvements in vehicle efficiency and engine standards, which would occur with or without the project. Accordingly, the build alternatives would not increase, and are likely to decrease long-term on-road GHG emissions on U.S. 101 relative to the No-Build Alternative.

Operation of the OMC proposed for Alternative F would emit 922 metric tons of CO_2e GHGs per year. For conservative estimating purposes, OMC emissions estimates do not take into account any building or vehicle energy-efficiency features or energy-related benefits associated with the green roof of the building or compliance with Caltrans Director's Policy DP-30, Climate Change and Governor's EO B-18-12 that new state buildings be designed as zero net energy after October 23, 2017 (Caltrans 2022j: 71–74). Specific energy-efficiency features to be included in the OMC would be determined at a later design stage. The majority (93%) of estimated OMC-associated GHG emissions would stem from tunnel maintenance equipment (considered "off road") and building energy. These emissions would decline over time due to SB 100, which requires that zero-carbon resources comprise 100% of electric retail sales to end-use customers by 2045. In addition, EO N-79-20 proposes a goal to transition California to 100% zero-emission off-road vehicles (ZEVs) and equipment by 2035. In response to the EO, the Caltrans ZEV Strategy (Caltrans 2023p) commits Caltrans to establish a Green Fleet of ZEVs in accordance with EO N-79-20. Planned actions include purchasing new or replacing certain existing medium- and heavy-duty vehicles used for maintenance as ZEVs in this class become available and as funding and technical considerations permit (Caltrans 2022j).

Furthermore, Caltrans is also required to comply with Department of General Services Management Memo 14-02 on Water Efficiency and Conservation, which requires state agencies to use alternative sources of water at new state buildings whenever cost-effective, and to select landscape plants with reduced water and maintenance needs as suited to local climate and site conditions and (California Department of General Services 2014). Compliance with these and other BMPs would reduce GHG emissions from the OMC, consistent with statewide and Caltrans policies and regulations for the reduction of GHG emissions. As noted above, GHG reductions resulting from the project's operational improvements would help offset the relatively small amount of emissions from the OMC.

Under the No-Build Alternative, no construction would be planned at LCG. However, regular maintenance and operations would continue, with emergency restoration projects conducted as needed to address landslides and roadway failures. Equipment and vehicles

used for regular and emergency maintenance activities under the No-Build Alternative would continue generating or increasing GHG emissions. Potential future highway closures would also likely increase emissions due to vehicle delays and congestion. Without permanent restoration, the potential exists for a large enough landslide movement to cause a major roadway failure, resulting in a long-term highway closure that would require an 8-hour, 449-mile detour and associated increased VMT and GHG emissions (Caltrans 2023j).

Construction Emissions

Construction GHG emissions would result from material processing and transportation, on-site construction equipment, helicopter flights, and traffic delays due to construction. These emissions would be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases.

Use of long-life pavement, improved traffic management plans, and changes in materials can also help offset emissions produced during construction by allowing longer intervals between maintenance and rehabilitation activities.

Construction GHG emissions were calculated using the Sacramento Air Quality Management District's Road Construction Emissions Model (Version 9.0.1) to estimate CO_2, CH_4, and N_2O emissions from off-road equipment and on-road vehicles. Emissions from tunnel locomotives, diesel, and jet fuel (used for helicopters during geotechnical investigations) are included in the total CO_2e emissions shown below in Table 4-1.

Table 4-1. Construction-Period Greenhouse Gas Emissions Estimates for Alternatives X and F

Year	Metric Tons CO_2e [d]	
	Alternative X	Alternative F
2026 [a]	304	76
2031	2,355	5,505
2032	10,621	8,443
2033	4,005	4,019
2034	1,322	1,123
2035	19	1,123
2036	0	563
2037	0	269
Total [b]	**18,626**	**21,121**
Tree removal [c]	14	20
Total with Land Use Change	**18,640**	**21,141**

Source: Caltrans 2023j.

GHG = greenhouse gas; CO_2e = carbon dioxide equivalent.

[a] Geotechnical investigation would occur in advance of construction.

[b] The analysis accounts for all emissions directly and indirectly generated by construction activities for which Caltrans has practical control and program responsibility. Emissions generated upstream (e.g., material manufacturing) and downstream (e.g., recycling) of construction, otherwise known as "lifecycle emissions," are not included in the analysis, consistent with guidance from the California Natural Resources Agency (2018). While the origin of most raw materials is not known, and thus an emissions analysis would be speculative, construction of the shafts and tunnels would require concrete. Lifecycle emissions for cement and aggregate manufacturing, which is upstream of the concrete batching process, have been studied in various literature. Accordingly, for the purposes of disclosure, upstream CO_2 emissions resulting from cement and aggregate manufacturing were quantified using emissions factors from Marceau et al. (2007). The analysis indicates that cement and aggregate manufacturing would generate 8,265 metric tons CO_2e under Alternative X and 52,766 metric tons CO_2e under Alternative F. These emissions would be generated upstream of construction and through activities for which Caltrans has no practical control. Furthermore, CARB directly regulates the industrial emissions associated with cement manufacturing and thus those emissions would be regulated by CARB consistent with the overall meeting of California GHG reduction targets over time. The emissions associated with cement manufacturing are therefore disclosed for informational purposes only.

[c] Lifetime carbon sequestration loss amortized over a 40-year period, per tree growth assumptions from the i-Tree Planting Calculator. Alternatives X and F would remove or severely affect 129 and 144 trees, respectively, with a DBH of 24 inches or greater. Additionally, Alternatives X and F would remove or severely affect 497 and 759 trees, respectively, with a DBH of 6 to 23.9 inches.

[d] Two disposal distance hauling scenarios were calculated (70 miles and 200 miles roundtrip). This table respresents the anticipated worst-case 200 mile round-trip scenario. The actual round-trip hauling distance would likely be somewhere between 70 and 200 miles.

Alternative F would bypass approximately 8,000 linear feet, or about 35 acres, of existing roadway and Caltrans right of way, which would, where feasible, be decommissioned by removing the existing roadway and associated structures, then revegetated with appropriate native species. Smaller portions of roadway would be decommissioned and revegetated under Alternative X. Standard Measure BR-4 would be implemented; this measure requires a revegetation plan, identification, and protection of root zones of large-diameter trees, and root-friendly excavation methods, where feasible. Protecting large trees and replacing removed trees helps preserve the carbon sequestration function of the project area post-construction. In addition, measures to offset impacts on biological resources, such as Bio-1, which includes an option to accelerate the development of forests, would help compensate for construction-related effects of tree removal on carbon sequestration capacity, as young forests grow rapidly and sequester carbon more quickly than older forests, which store more carbon (National Council for Air and Stream Improvement, Inc. 2021).

All construction contracts include Caltrans Standard Specifications related to air quality. Sections 7-1.02A and 7-1.02C, Emissions Reduction, require contractors to comply with all laws applicable to the project and to certify they are aware of and would comply with all CARB emission reduction regulations (Standard Measure GHG-3). Section 14-9.02, Air Pollution Control, requires contractors to comply with all air pollution control rules, regulations, ordinances, and statutes (Standard Measure GHG-1). Certain common regulations (such as equipment idling restrictions) that reduce construction vehicle emissions also help reduce GHG emissions.

CEQA Conclusion

Given there would be no increase in VMT—there would be no increase in capacity or change in travel demands or traffic patterns—it is anticipated that neither alternative would result in an increase in on-road post-construction operational GHG emissions. For Alternative F, the OMC would not contribute to an increase in VMT or mobile source emissions. OMC and tunnel operations would generate a relatively small amount of GHGs associated with electricity use and off-road equipment (for CO_2e, less than 1,000 metric tons per year).

SB 100 requires zero-carbon electricity sales by 2045 and EO N-79-20 proposes to transition the state to 100% ZEVs and equipment by 2035. The OMC is expected to begin operation in 2038, by which time the off-road equipment standards would be in effect. Caltrans plans and policies support the transition to ZEVs in its vehicle fleet and construction of zero net energy new buildings. Design features, construction, and operation would be as energy-efficient as feasible, and equipment would comply with EO N-79-20 by 2038.

Under both build alternatives, revegetation of the existing road surface area that would be removed and of areas temporarily disturbed during construction would contribute to restoring the carbon sequestration capacity of the project area in the long term.

For both alternatives, the need for helicopter-assisted geotechnical investigations in addition to substantial tunneling and off-site disposal of tunnel spoils would likely result in relatively high GHG emissions during construction. While these impacts would be reduced and minimized through standard measures, BMPs, and energy-efficient design features, construction emissions would remain at relatively high levels. As a result, GHG emissions during construction was considered a potentially significant impact under CEQA; however, neither build alternative would conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. The benefits of the project in eliminating the emissions resulting from current frequent emergency repairs and traffic delays, improving road reliability and traveler safety, and avoiding a lengthy detour should the roadway fail due to landslide, are anticipated to offset short-term construction GHG emissions and outweigh the relatively small increase in annual GHG emissions from the OMC. With the included measures and benefits associated with the build alternatives, impacts are anticipated to be less than significant with mitigation.

Caltrans is firmly committed to implementing measures to help reduce GHG emissions. These measures are outlined in the following section.

4.5.4 Greenhouse Gas Reduction Strategies

Statewide Efforts

In response to AB 32, California is implementing measures to achieve emission reductions of GHGs that cause climate change. Climate change programs in California are effectively reducing GHG emissions from all sectors of the economy. These programs include regulations, market programs, and incentives that will transform transportation, industry, fuels, and other sectors, to take California into a sustainable, low-carbon and cleaner future, while maintaining a robust economy (CARB 2022c).

Major sectors of the California economy, including transportation, will need to reduce emissions to meet 2030 and 2050 GHG emissions targets. The Governor's Office of Planning and Research (OPR) identified five sustainability pillars in a 2015 report: (1) increasing the share of renewable energy in the State's energy mix to at least 50% by 2030; (2) reducing petroleum use by up to 50% by 2030; (3) increasing the energy efficiency of existing buildings by 50% by 2030; (4) reducing emissions of short-lived climate pollutants; and (5) stewarding natural resources, including forests, working lands, and wetlands, to

ensure they store carbon, are resilient, and enhance other environmental benefits (California Governor's OPR 2015). OPR later added strategies related to achieving statewide carbon neutrality by 2045 in accordance with EO B-55-18 and AB 1279 (California Governor's OPR 2022).

The transportation sector is integral to the people and economy of California. To achieve GHG emission reduction goals, it is vital that the state build on past successes in reducing criteria and toxic air pollutants from transportation and goods movement. GHG emission reductions will come from cleaner vehicle technologies, lower-carbon fuels, and reduction of VMT. Reducing today's petroleum use in cars and trucks by 50% is a key state goal for reducing GHG emissions by 2030 (California Environmental Protection Agency 2015).

In addition, SB 1386 (Wolk 2016) established as state policy the protection and management of natural and working lands and requires state agencies to consider that policy in their own decision making. Trees and vegetation on forests, rangelands, farms, and wetlands remove CO_2 from the atmosphere through biological processes and sequester the carbon in above- and below-ground matter.

Subsequently, Governor Gavin Newsom issued EO N-82-20 to combat the crises in climate change and biodiversity. It instructs state agencies to use existing authorities and resources to identify and implement near- and long-term actions to accelerate natural removal of carbon and build climate resilience in our forests, wetlands, urban greenspaces, agricultural soils, and land conservation activities in ways that serve all communities and in particular low-income, disadvantaged, and vulnerable communities. To support this order, the California Natural Resources Agency (2022a) released *Natural and Working Lands Climate Smart Strategy*, with a focus on nature-based solutions.

Caltrans Activities

Caltrans continues to be involved on the Governor's Climate Action Team as the CARB works to implement EOs S-3-05 and S-01-07 and help achieve the targets set forth in AB 32. EO B-30-15 (issued in April 2015) and SB 32 (2016) set an interim target to cut GHG emissions to 40% below 1990 levels by 2030. The following major initiatives are underway at Caltrans to help meet these targets.

Climate Action Plan for Transportation Infrastructure

The *Climate Action Plan for Transportation Infrastructure* (CAPTI) builds on EOs signed by Governor Newsom in 2019 and 2020 targeted at reducing GHG emissions in transportation, which account for more than 40% of all polluting emissions, to reach the state's climate goals. Under CAPTI, where feasible and within existing funding program structures, the state will invest discretionary transportation funds in sustainable infrastructure projects that align with its climate, health, and social equity goals (California State Transportation Agency 2021).

California Transportation Plan

The California Transportation Plan is a statewide, long-range transportation plan to meet our future mobility needs and reduce GHG emissions. It serves as an umbrella document for all the other statewide transportation planning documents. The California Transportation Plan 2050 presents a vision of a safe, resilient, and universally accessible transportation system that supports vibrant communities, advances racial and economic justice, and improves public and environmental health. The plan's climate goal is to achieve statewide GHG emissions reduction targets and increase resilience to climate change. It demonstrates how GHG emissions from the transportation sector can be reduced through advancements in clean fuel technologies; continued shifts toward active travel, transit, and shared mobility; more efficient land use and development practices; and continued shifts to telework (Caltrans 2021d).

Caltrans Strategic Plan

The *Caltrans 2020–2024 Strategic Plan* includes goals of stewardship, climate action, and equity. Climate action strategies include developing and implementing a Caltrans Climate Action Plan; a robust program of climate action education, training, and outreach; partnership and collaboration; a VMT monitoring and reduction program; and engaging with the most vulnerable communities in developing and implementing Caltrans' climate action activities (Caltrans 2021c).

Caltrans Policy Directives and Other Initiatives

Caltrans Director's Policy 30 (DP-30) Climate Change (June 22, 2012) established an internal policy to ensure coordinated efforts to incorporate climate change into departmental decisions and activities. *Caltrans Greenhouse Gas Emissions and Mitigation Report* (Caltrans 2020c) provides a comprehensive overview of Caltrans' emissions. The report documents and evaluates current Caltrans procedures and activities that track and reduce

GHG emissions and identifies additional opportunities for further reducing GHG emissions from Caltrans-controlled emission sources, in support of Caltrans and State goals.

Project-Level GHG Reduction Strategies

The measures listed below, as well as standard measures BR-4, TT-1, AR-2, and GHG-1, 2, 3, 4, 5 would also be implemented to reduce GHG emissions and potential climate change impacts from the project (see Section 2.6).

- **Visual-2:** As feasible, construction topsoil would be salvaged and stockpiled for use within planting areas to increase vegetation success. Soil and vegetation sequester carbon.
- **Bio-1:** Caltrans would undertake one or more mitigation projects to compensate for the loss of late successional (mature to old-growth) redwood, Douglas-fir, and Sitka spruce conifer forest and associated large trees. The mitigation project(s) would attempt to offset impacts based on acreage removed and temporal loss of function.

  Typically, mitigation for Caltrans projects is established by applying ratios to compensate for the temporal loss of function of impacted habitat (e.g., 2:1, 3:1, etc.). However, these ratios are for resources where functional equivalency can be achieved within the foreseeable future. Mitigating for late successional forests is more complex, as the unique character and qualities of these forests cannot be replaced in the near-term. These forests, particularly those that support long-lived species such as coast redwood, can take hundreds of years to establish on their own.

  Caltrans anticipates the mitigation strategy for late successional forest communities would include one or both of the following options:

  - **Option One:** Fund forest restoration projects that accelerate the development of late successional characteristics in younger-aged stands.

    Funding thinning projects in dense, early successional stands would accelerate tree growth, increase tree vigor, increase biodiversity for botanical and wildlife species, buffer remaining late successional stands from high intensity stand-damaging fires, and increase carbon sequestration. Current available research supports that thinning young stands could accelerate the formation of late successional characteristics and functions in approximately 100 years for Sitka spruce, 150 years for Douglas-fir, and 200 years for redwood stands, though this is highly variable based on the treated stand's age, location, and position within the landscape.

In addition to funding thinning projects, this mitigation option may include:

- An endowment for the long-term management of treated stands, including additional actions to accelerate the development of late successional characteristics such as additional thinning, crown modification to improve structural complexity, etc.
- A research endowment to fund studies to guide forest management, monitor the efficacy of the thinning treatments, and identify appropriate adaptive management strategies.

Specific objectives related to forest thinning treatments for mitigation include but are not limited to:

- Accelerate the recovery of previously logged young successional conifer stands to mature forest structure and function.
- Create connectivity between the remaining fragments of late successional forest communities.
- Improve stream habitat, reduce erosion, restore hydrology, and enhance landscape resiliency.

Impacts to sensitive natural communities and ESHAs are typically mitigated at a 3:1 ratio; however, given the time it may take for treated stands to reach functional equivalency of the stands impacted by the project, the amount of mitigation required may be based on the length of time it would take to restore functional equivalency of late-successional forest impacted by the proposed project (i.e., the number of years it would take for the treated stands to reach the functional equivalency of the impacted habitat). It is therefore anticipated that in-kind mitigation would be 100:1 for late successional Sitka spruce forest, 150:1 for late successional Douglas-fir forest, and 200:1 for late successional coast redwood forest, though these ratios may increase or decrease depending on various factors, such as quality and age of stands being impacted, or if selected mitigation stands are off-site or out-of-kind. This is a preliminary review and final ratios would be determined through the permitting process and stakeholder coordination.

The amount of mitigation required may be based on the length of time it would take to restore functional equivalency of late-successional forest impacted by the proposed project (i.e., the number of years it would take for the treated stands to reach the functional equivalency of the impacted habitat). Impacts to sensitive natural communities and ESHAs are typically mitigated at 3:1; however, given

that the time it may take for treated stands to reach functional equivalency of the stands impacted by the project, Caltrans proposes to mitigate in-kind at a minimum of 100:1 for late successional Sitka spruce forest, 150:1 for late successional Douglas-fir forest, and 200:1 for late successional coast redwood forest.

These ratios may increase if the selected mitigation stands are off-site or out-of-kind or decrease, depending on the quality of the habitat impacted. This is a preliminary review and final ratios will be determined through the permitting process and stakeholder coordination.

Current opportunities exist to provide funding to one or more organizations, such as Redwoods Rising, that are leading direct efforts to rehabilitate/restore late successional conifer forests using these methods in Del Norte and Humboldt counties.

- **Option Two:** Preservation of existing late successional forest habitat.

  Preservation would be accomplished through the purchase of existing late successional conifer forests in Del Norte or Humboldt counties that are threatened by logging or development, with the intent of conveying such acreage to an agency or organization that would manage it in perpetuity. Preservation ratios are typically greater than restoration ratios and would be coordinated with administering agencies.

  Preservation of existing late successional forest habitat for mitigation may also include:

  - An endowment for the long-term management/maintenance of preserved habitats.
  - A deed restriction or conservation easement that restricts future land use practices that could adversely affect the protected habitat, thereby ensuring protection of the habitat in perpetuity.

The final strategy for mitigating for late successional forest, using one or both of the options above, would be outlined in a Habitat Mitigation and Monitoring Plan. This plan would be established prior to application of project permits and would take into consideration input from project stakeholders and identification of requirements from state/federal regulators.

4.5.5 Adaptation

Reducing GHG emissions is only one part of an approach to addressing climate change. Caltrans must plan for the effects of climate change on the state's transportation infrastructure and strengthen or protect the facilities from damage. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, variability in storm surges and their intensity, and variability in the frequency and intensity of wildfires. Flooding and erosion can damage or wash out roads; longer periods of intense heat can buckle pavement and railroad tracks; storm surges, combined with a rising sea level, can inundate highways. Wildfire can directly burn facilities and indirectly cause damage when rain falls on denuded slopes that landslide after a fire. Effects will vary by location and may, in the most extreme cases, require a facility be relocated or redesigned. Accordingly, Caltrans must consider these types of climate stressors in how highways are planned, designed, built, operated, and maintained.

Federal Efforts

Under NEPA Assignment, Caltrans is obligated to comply with all applicable federal environmental laws and FHWA NEPA regulations, policies, and guidance.

The *Fourth National Climate Assessment*, published in 2018, presents the foundational science and the "human welfare, societal, and environmental elements of climate change and variability for 10 regions and 18 national topics, with particular attention paid to observed and projected risks, impacts, consideration of risk reduction, and implications under different mitigation pathways."

The U.S. DOT Policy Statement on Climate Adaptation in June 2011 committed the federal Department of Transportation to "integrate consideration of climate change impacts and adaptation into the planning, operations, policies, and programs of DOT in order to ensure that taxpayer resources are invested wisely, and that transportation infrastructure, services and operations remain effective in current and future climate conditions" (U.S. DOT 2011). The U.S. DOT Climate Action Plan of August 2021 followed up with a statement of policy to "accelerate reductions in greenhouse gas emissions from the transportation sector and make our transportation infrastructure more climate change resilient now and in the future," following this set of guiding principles (U.S. DOT 2021):

- Use best-available science
- Prioritize the most vulnerable
- Preserve ecosystems

- Build community relationships
- Engage globally

U.S. DOT developed its climate action plan pursuant to the federal EO 14008, *Tackling the Climate Crisis at Home and Abroad* (January 27, 2021). EO 14008 recognized the threats of climate change to national security and ordered federal government agencies to prioritize actions on climate adaptation and resilience in their programs and investments (U.S. White House 2021).

FHWA Order 5520 (*Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events,* December 15, 2014) established FHWA policy to strive to identify the risks of climate change and extreme weather events to current and planned transportation systems. FHWA has developed guidance and tools for transportation planning that foster resilience to climate effects and sustainability at the federal, state, and local levels (FHWA 2022).

State Efforts

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system. A number of state policies and tools have been developed to guide adaptation efforts.

California's Fourth Climate Change Assessment (Fourth Assessment) (2018) is the state's effort to "translate the state of climate science into useful information for action." It provides information that will help decision makers across sectors and at state, regional, and local scales protect and build the resilience of the state's people, infrastructure, natural systems, working lands, and waters. The State's approach recognizes that the consequences of climate change occur at the intersections of people, nature, and infrastructure. The Fourth Assessment reports that if no measures are taken to reduce GHG emissions by 2021 or sooner, the state is projected to experience a 2.7 to 8.8°F increase in average annual maximum daily temperatures, with impacts on agriculture, energy demand, natural systems, and public health; a two-thirds decline in water supply from snowpack and water shortages that will affect agricultural production; a 77% increase in average area burned by wildfire, with consequences for forest health and communities; and large-scale erosion of up to 67% of Southern California beaches and inundation of billions of dollars' worth of residential and commercial buildings due to SLR (State of California 2018).

SLR is a particular concern for transportation infrastructure in the coastal Zone. Major urban airports will be at risk of flooding from SLR combined with storm surge as early as 2040;

San Francisco International Airport is already at risk. Miles of coastal highways vulnerable to flooding in a 100-year storm event will triple to 370 by 2100, and 3,750 miles will be exposed to temporary flooding. The Fourth Assessment's findings highlight the need for proactive action to address these current and future impacts of climate change.

In 2008, then-governor Arnold Schwarzenegger recognized the need when he issued EO S-13-08, focused on SLR. Technical reports on the latest SLR science were first published in 2010 and updated in 2013 and 2017. The 2017 projections of SLR and new understanding of processes and potential impacts in California were incorporated into the *State of California Sea-Level Rise Guidance Update in 2018.* This EO also gave rise to the *California Climate Adaptation Strategy* (2009), updated in 2014 as *Safeguarding California: Reducing Climate Risk* (Safeguarding California Plan), which addressed the full range of climate change impacts and recommended adaptation strategies. The Safeguarding California Plan was updated in 2018 and again in 2021 as the *California Climate Adaptation Strategy*, incorporating key elements of the latest sector-specific plans such as the *Natural and Working Lands Climate Smart Strategy*, *Wildfire and Forest Resilience Action Plan*, *Water Resilience Portfolio,* and the CAPTI (described above). Priorities in the 2021 California Climate Adaptation Strategy include acting in partnership with California Native American Tribes, strengthening protections for climate-vulnerable communities that lack capacity and resources, nature-based climate solutions, use of best available climate science, and partnering and collaboration to best leverage resources (California Natural Resources Agency 2022b).

EO B-30-15, signed in April 2015, requires state agencies to factor climate change into all planning and investment decisions. This EO recognizes that effects of climate change, in addition to SLR, also threaten California's infrastructure. At the direction of EO B-30-15, the OPR published *Planning and Investing for a Resilient California: A Guidebook for State Agencies* in 2017, to encourage a uniform and systematic approach.

AB 2800 (Quirk 2016) created the multidisciplinary Climate-Safe Infrastructure Working Group to help actors throughout the state address the findings of the Fourth Assessment. The working group released its report, *Paying it Forward: The Path Toward Climate-Safe Infrastructure in California*, in 2018. The report provides guidance to agencies on how to address the challenges of assessing risk in the face of inherent uncertainties still posed by the best available science on climate change. It also examines how state agencies can use infrastructure planning, design, and implementation processes to address the observed and anticipated climate change impacts (Climate Change Infrastructure Working Group 2018).

Caltrans Adaptation Efforts

Caltrans Vulnerability Assessments and Adaptation Priority Reports

Caltrans completed climate change vulnerability assessments to identify segments of the State Highway System vulnerable to climate change effects of precipitation, temperature, wildfire, storm surge, and SLR.

The climate change data in the assessments was developed in coordination with climate change scientists and experts at federal, state, and regional organizations at the forefront of climate science. The findings of the vulnerability assessments guide analysis of at-risk assets and development of Adaptation Priority Reports as a method to make capital programming decisions to address identified risks.

Project Adaptation Analysis

This section was prepared using information from the *Location Hydraulic Study/Floodplain Evaluation Report* prepared for the project (Caltrans 2023b), the *Natural Environment Study* (Caltrans 2023d), the *Geology Summary Memorandum* (Caltrans 2023f), and the *Air Quality, Greenhouse Gas, and Climate Change Technical Memo* (Caltrans 2023j).

The *Caltrans Climate Change Vulnerability Assessments District 1 Technical Report* (Caltrans 2019f) identified five key climate-related stressors that may affect transportation infrastructure in the District: temperature, precipitation, wildfire, SLR and storm surge, and cliff retreat. These stressors are discussed below. Because the project location is not subject to cliff retreat, this stressor is not discussed.

Sea Level Rise

Sea level rise (SLR) was evaluated in the *LCG Location Hydraulic Study/Floodplain Evaluation Report* (Caltrans 2023b). Because structures such as bridges, tunnels, and retaining walls each have an expected design life of 75 years, project design life was assumed to be 75 years. Accordingly, SLR projections of the California Ocean Protection Council's 2018 Sea Level Rise Guidance Update[38] were consulted for future years 2110 for Alternative X (open-to-traffic year of 2035 + 75 years) and 2113 for Alternative F (open-to-traffic date

[38] The National Oceanic and Atmospheric Administration published updated SLR projections for the United States in November 2022. The Ocean Protection Council is in the process of revising the state SLR guidance relative to that update. At the time of this analysis, the State of California Sea Level Rise Guidance 2018 Update was still in effect.

of 2038 + 75 years) under a high-emissions scenario (RCP 8.5). The 2018 Ocean Protection Council projections increase in uncertainty beyond year 2100.

The nearest tide gauge is at Crescent City, approximately 10 miles north of the project area. Projections under low risk aversion, medium-high risk aversion, and extreme risk aversion (H++) scenarios are shown in Table 4-2. (The H++ scenario is an extreme SLR scenario that considers the effect of the loss of the West Antarctic ice sheet but is assigned no associated probability of occurring.)

Table 4-2. Sea Level Rise Projections at Crescent City Tide Gauge

Alternative	Low Risk Aversion (feet)	Medium-High Risk Aversion (feet)	Extreme Risk Aversion (H++) (feet)
Alternative X 2110	1.5	6.2	11
Alternative F 2113 [1]	2.6	6.7	12

Source: Caltrans 2023b; California Natural Resources Agency and California Ocean Protection Council 2018.

[1] Projections for 2113 were interpolated from values for 2110 and 2120 and are approximate within a fraction of a foot.

SLR in 2110/2113 would affect the floodplain of Wilson Creek, which the roadway crosses on the Louis P. DeMartin Senior Memorial Bridge at PM 12.67 (Figure 4-4). The elevation of Wilson Creek is about 10 feet (US), as mapped by the Caltrans Environmental GIS Library. The bottom of the bridge soffit is approximately 40 feet above sea level. The lowest point of the project area is at PM 12.7, the southern "begin construction" location, at an elevation of 80 feet (NAVD 88) and about 71 feet above the elevation of Wilson Creek. This area would be utilized only for construction staging and would not contain any project structures or permanent improvements.

Based on SLR projections under the medium-high risk aversion scenario, the Location Hydraulic Study/Floodplain Evaluation Report presented projected sea level elevation within the project ESL, shown below in Table 4-3.

Table 4-3. Projected Sea Level Elevation within Project Environmental Study Limits

Location	Year	Zone VE[1] Elevations (feet NAVD 88) Medium-High Risk Aversion Scenario[2]
Existing Base Flood Elevation	2017	19.0
Alternative X	2110 (2035 plus 75 years)	25.2
Alternative F	2113 (2038 plus 75 years)	25.7

Source: Caltrans 2023b

[1] Zone VE comprises coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. The base flood elevation of the Zone VE floodplain adjacent to the project site is 19 feet NAVD 88.

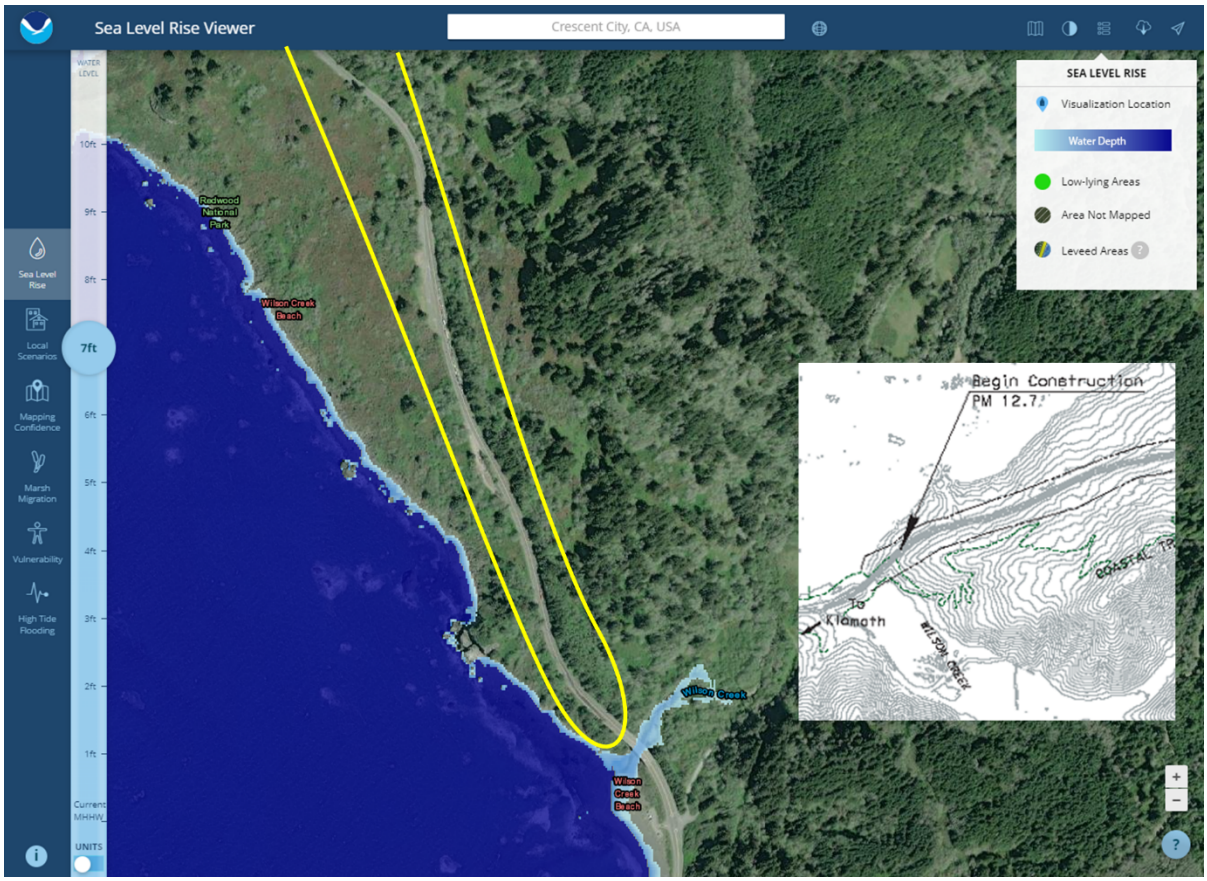
[2] Under the less-likely H++ scenario, these levels of inundation could occur as early as 2080.

During the project's expected service life of 75 years, the inundation zone with SLR was estimated to be below the elevations of U.S. 101 in the project ESL, shown in Table 4-4.

Table 4-4. Project Elevations

Alternative	Post Miles (begin/end)	Alignment Elevation Range (feet at begin/end PMs)
Alternative X	14.3 / 15.9	537 / 852
Alternative F	14.1 / 15.7	460 / 896
Alternative F Tunnel alignment	–	700 / 1,080

Both Alternative X and Alternative F would be higher than the projected SLR elevations. It is therefore not expected that SLR or storm surge would affect the highway or the project alternatives.



Source: NOAA Sea Level Rise Viewer

Figure 4-4. Visualization of Sea Level Rise at Project Design Year 2110/2113.

(High emissions, Medium-High Risk Aversion Scenario of 7 feet of sea level rise (or 5.9 feet in 2080 under the H++ scenario)

The project is in the Coastal Zone. Consistency with Coastal Zone policies of the California Coastal Commission and the Del Norte County LCP are evaluated in Section 3.2.3, *Coastal Zone*. The proposed project would not affect beach areas, beach nourishment, or sand supply. The project ESL is not within flood hazard, tsunami, or seiche zones and would not exacerbate or be affected by these hazards (Caltrans 2023b).

Precipitation and Flooding

Historically, the project region has received on average more than 70 inches of rainfall per year; however, mean annual precipitation over the past 21 years has been observed to be only about 55% of the long-term average, indicating gradually drying conditions as the climate changes (Caltrans 2023d).

In general, climate change in this region is expected to result in less total precipitation, but the precipitation would come in heavier individual events. The 100-year storm rainfall event in the project region is expected to increase by 5 to 9% through 2085, according to mapping in the *Caltrans Climate Change Vulnerability Assessments District 1 Technical Report* (Caltrans 2019f). The anticipated increase in extreme precipitation events potentially heightens risk to slope stability driven by the interaction of severe weather events (Caltrans 2023j).

Flooding and extreme weather events may disrupt construction activities and damage equipment and facilities used during the construction period. Changes in the frequency or intensity of these events are uncertain during the construction period. However, these events are typical for the region and are expected to be managed through existing construction management procedures, including appropriate construction scheduling, contingency budgeting, and emergency management protocols.

Project limits are outside the 100-year floodplain and above risk of SLR and storm surge (see *Sea Level Rise*, above) (Caltrans 2023b). Increased flooding and extreme weather events due to climate change, however, can be expected to place increasing stress on the proposed infrastructure under either build alternative. Both alternatives incorporate design features to minimize risk to the project from earth movement that might result from intense rainfall that could result from climate change. Alternative X would re-engineer the alignment to include an underground drainage system, a series of retaining walls, and strategic eastward retreats to minimize landslide risk. Alternative F's tunnel would realign the route inland to behind the landslide; at 200 feet underground, it would be protected from landslides and rockfall. The south portal of the tunnel, which is in an active earthflow portion of the slide complex, would be protected with an EDAS designed to absorb earthflow movement (Caltrans 2023f).

Wildfire

The project limits are within State and Federal Responsibility Areas and within and adjacent to *moderate* and *high* Fire Hazard Severity Zones (Figure 4-5) (California Department of Forestry and Fire Protection 2023). The *Caltrans Climate Change Vulnerability Assessments District 1 Technical Report* (Caltrans 2019f) climate change mapping tool indicates portions of U.S. 101 in the northern part of the project limits will remain at moderate exposure for wildfire through 2025, and the entire project limits would be at high or moderate exposure by 2055 through the end of the century.

Wildfire risk is driven in part by moisture and temperature. High annual precipitation and regular fog keep the region moist, although average annual rainfall has declined in recent decades, as noted in *Precipitation and Flooding* above. Average maximum temperature is projected to rise up to 10°F through 2100. However, given that current temperatures along the coast range from 41°F to 63°F throughout the year (Caltrans 2023j), it would not meaningfully increase fire risk. Alternative X would be more vulnerable to wildfire than Alternative F as the road would be above ground. However, it would not be more vulnerable than it is under existing conditions.

Under Alternative F, new electrical lines would be installed in a ductbank to connect to the existing PacificCorp transmission line, and a new transformer installed to provide electricity to the OMC and the tunnel. The OMC would be minimally staffed, minimizing the risk of accidental fire starts by human activities. The tunnel would include a fire suppression system and the exposed south and north tunnel portals and the bridge at the north portal would be constructed with concrete and other fire-resistant materials. Coordination with the power company and compliance with regulations and best practices for electrical work would avoid creating or exacerbating fire risk. All Caltrans construction contracts include fire prevention specifications to avoid fire starts during construction. The design and features of Alternative F would protect the project from wildfire effects.

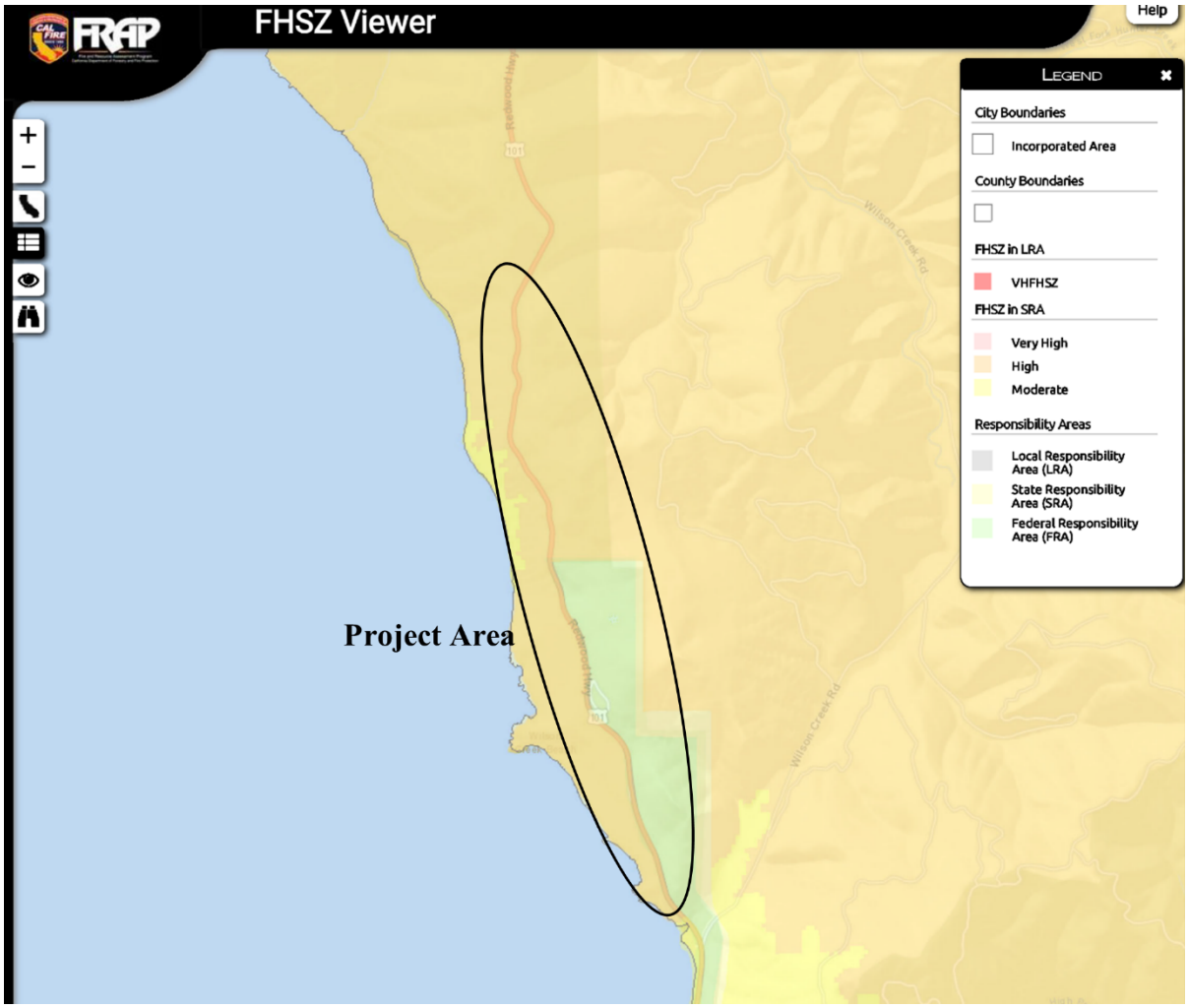


Figure 4-5. Fire Hazard Severity Zones in the Project Limits

Temperature

Average annual temperatures in the region that includes Del Norte County are anticipated to rise by 5 to 9°F through the end of the 21st century, with interior regions experiencing the greatest warming (Calrans 2023a). The District Climate Change Vulnerability Assessment mapping of change in average absolute maximum temperatures over 7 days in the project area shows a potential increase of 2 to 3.9°F by 2025 (the midpoint of the 30-year period from 2010 to 2039); 4.0 to 5.9°F by 2055 (midpoint of years 2040 to 2069) and 8 to 9.9°F by 2085 (midpoint of years 2070 to 2099) (Caltrans 2019f). No projections beyond 2099 are provided.

Alternative X would be more likely to experience effects of temperature increase because it would remain a surface route, but given the relatively low baseline temperatures in the region (41 to 63°F), this range of temperature changes during the project's lifetime would not likely require adaptive changes in pavement design or maintenance practices. The tunnel proposed with Alternative F would be 200 feet below ground and its pavement and concrete walls are unlikely to be affected by temperature changes at the surface.



CHAPTER 5. Comments and Coordination

Early and continuing coordination with the general public and public agencies is an essential part of the environmental process. It helps planners determine the necessary scope of environmental documentation and the level of analysis required, and to identify potential impacts and avoidance, minimization, and/or mitigation measures and related environmental requirements. Agency and tribal consultation and public participation for this project have been accomplished through a variety of formal and informal methods, including interagency coordination meetings, public meetings, public notices, and stakeholder meetings. This chapter summarizes the results of Caltrans' efforts to fully identify, address, and resolve project-related issues through early and continuing coordination.

Caltrans has regularly engaged stakeholders, including the public, since 2014. These efforts included conducting community meetings and establishing and holding meetings with stakeholder working groups, as well as maintaining a website to provide information about the project and project updates.

5.1 Notice of Preparation, Notice of Intent, and Public Scoping Meeting

A Notice of Preparation (NOP) serves as notice to agencies, organizations, and individuals that an EIR will be prepared under CEQA, while a Notice of Intent (NOI) serves as notice that an EIS will be prepared under NEPA.

A NOP for the project was filed with the State Clearinghouse on November 4, 2021, while a NOI to prepare an EIS was published in the Federal Register on November 4, 2021. These documents circulated for public comment for a period of 30 days, beginning November 5, 2021, and ending December 6, 2021. The NOI and NOP are included in Appendix E.

The NOP and NOI also provided a notice of a virtual scoping meeting planned for November 18, 2021. The meeting was also announced through email and written communication to agencies and stakeholders, print and newspaper advertisements, Caltrans social media, and the project's website. The scoping meeting included a presentation of the scoping process, the project's purpose and need, and the proposed alternatives for the evaluation in the environmental document, the environmental review process, and included a question-and-answer session. Comments received during the scoping period, and responses to comments, are included in Section 5.4.

5.2 23 USC 139: Coordination Plan

Following the 23 USC 139 environmental review process, which is required for an EIS, a coordination plan[39] was prepared to identify lead, participating, and cooperating agencies; identify coordination points and responsibilities; and establish timing and format for public and agency participation.

Under NEPA Assignment, Caltrans is the lead agency. Participating and cooperating agencies are defined as follows:

- ***Participating Agency:*** Any federal, state, tribal, local, or regional government agencies that may have an interest in the project.
- ***Cooperating Agency:*** Any federal agency, other than the lead agency, which has jurisdiction by law or special expertise with respect to any environmental impact in a proposed project. State, tribal, or local agencies may become cooperating agencies by agreement with the lead agency.

Agency participation and cooperation invitation letters were sent on November 10, 2021. Of the nineteen agencies invited to be participating and/or cooperating agencies, nine are considered participating and/or cooperating agencies (Table 5-1)[40]. A meeting to discuss the coordination plan with participating and cooperating agencies was held on February 2, 2022.

Key coordination points in the environmental review process with opportunities for input and involvement prior to the draft environmental document included the project's purpose and need, range of alternatives, methodology on range of alternatives, and collaboration on mitigation.

Discussion on the purpose and need and alternatives began soon after project initiation, and included input from the public, agencies, and other stakeholders. These included community workshops and meetings with working groups, as documented in Section 5.3, *Coordination,* in addition to the scoping meeting held after publication of the NOP and NOI.

[39] The coordination plan is available in the document library on the project's website: www.lastchancegrade.com

[40] To become a participating agency, state, tribal, local, or regional government agencies must respond in writing. Federal agencies are participating agencies unless they decline in writing and are cooperating agencies upon request. Of the agencies invited, ten state, tribal, and local agencies did not respond to the request, and are therefore not considered participating agencies. These include the California Coastal Commission, California Department of Fish and Wildlife, City of Crescent City, Del Norte County Board of Supervisors, Humboldt County Board of Supervisors, Humboldt County Association of Governments, Yurok Tribe, Resighini Rancheria, Tolowa Dee-ni' Nation, and Tolowa Nation.

Between December 2020 and April 2021, alternatives analysis meetings were held with stakeholder working group members, which included participating and cooperating agencies. These meetings included discussion on the range of alternatives, evaluation of alternatives, screening methodologies, and resulted in the identification of alternatives for further study in the EIR/EIS (Alternatives X, F, and No-Build).

Between November 2021 and May 2023, four workshops were held with stakeholder working group members to provide project updates and collaborate on mitigation opportunities.

After the draft environmental document is circulated, coordination points include identification of the preferred alternative, and acquisition of permits and other approvals. The preferred alternative will be identified in the final environmental document. The status of permits and other approvals are included in Section 2.7, *Permits and Approvals Needed*.

Table 5-1. Lead, Cooperating, and Participating Agencies

Agency	Role
Caltrans	Lead
NPS—Redwood National Park	Participating/Cooperating Agency
USACE	Participating/Cooperating Agency
U.S. EPA	Participating/Cooperating Agency
USFWS	Participating/Cooperating Agency
NMFS	Participating/Cooperating Agency
California Department of Parks and Recreation—Del Norte Coast Redwoods State Park	Participating Agency
State Water Resources Control Board—NCRWQCB	Participating Agency
DNLTC	Participating Agency
Elk Valley Rancheria	Participating Agency

5.3 Coordination

The following sections document coordination efforts with project stakeholders (Section 5.3.1) and the general public (Section 5.3.2).

5.3.1 Project Stakeholders

Caltrans has regularly engaged stakeholders since 2014. This has included the formation of working groups centered around important topics and coordination with agencies, tribes, and other involved parties, as documented in Table 5-2.

The working groups, which include federal, state, and local governments, local tribes, private sector industry groups, non-governmental organizations, and other concerned citizen groups, were established to foster collaboration and active participation from a variety of perspectives on the LCG project. There are a total of four working groups:

- ***Congressman Huffman's Stakeholder Working Group:*** Representatives from local governments, tribal groups, businesses, agencies, and environmental groups.
- ***LCG Partners Working Group:*** Stakeholders with land ownership and land management responsibilities.
- ***Cultural Resources Working Group (CRWG):*** Stakeholders with responsibility for and expertise in cultural resource management and preservation.
- ***Biological Resources Working Group (BRWG):*** Stakeholders with responsibilities for and expertise in natural resource management and permitting.

Working group meetings and other engagement with stakeholders, including public agencies and tribal governments, are documented in Table 5-2.

In addition to the coordination points in the table, Caltrans has worked with landowners in the area—NPS, CDPR, and GDRC—to conduct studies within Redwood National Park, Del Norte Coast Redwoods State Park, and on GDRC timberland, and for enhanced coordination for geotechnical activities, such as those associated with the LCG Phase 2B Geotechnical Investigation.

Pursuant to Section 106 of the National Historic Preservation Act (NHPA), Caltrans initiated consultation with the State Historic Preservation Officer (SHPO) in October 2019. Letters of consultation with SHPO can be found in Appendix F.

In addition, to help keep stakeholders up-to-date, quarterly updates have been sent to stakeholders and posted on the LCG website since April 2022, and annual progress updates

have been sent to county residents and stakeholders and posted on the LCG website since 2020.

Table 5-2. Summary of Coordination with Project Stakeholders

Date	Parties Involved	Summary
2/4/2014	DNLTC	Letter from DNLTC with 16 attached letters of concern about LCG from various agencies, businesses, institutions, and residents.
3/19/2014	CDPR, NPS, Yurok Tribe	LCG Partners Working Group. Kick-off meeting to discuss development of Partnering Charter and Communication Plan.
4/16/2014	Elk Valley Rancheria, CDPR, NPS, Yurok Tribe	LCG Partners Working Group. Meeting to discuss and agree to combine information from Partnering Charter and Communication Plan into a Memorandum of Understanding (MOU).
5/29/2014	Elk Valley Rancheria, CDPR, NPS, Tolowa Dee-ni' Nation, Yurok Tribe	LCG Partners Working Group. Meeting to discuss updates, existing conditions at LCG, discussion of previously studied alternatives, and updates on MOU.
6/19/2014	Elk Valley Rancheria, CDPR, NPS, Tolowa Dee-ni' Nation, Yurok Tribe	LCG Partners Working Group. Meeting to discuss MOU.
6/26/2014-7/15/2015	CA State Senator Jim Nielsen, Elk Valley Rancheria, Phoebe Lenhart, County of Mendocino BOS, Redwood Region Audubon Society, EPIC, Sonoma County Transportation Authority and Regional Climate Protection Authority	Letters received from sources listed regarding concerns about U.S. 101 at LCG and/or project alternatives.
7/2/2014	Yurok Tribe	Email correspondence on LCG alternatives.
8/7/2014	Elk Valley Rancheria	Meeting to discuss project.
8/18/2014	Yurok Tribe	Meeting to discuss project.
8/28/2014	Elk Valley Rancheria	Meeting with the cultural committee, in which information was requested on impacts on redwoods.
9/4/2014	Tolowa Dee-ni' Nation	Meeting to discuss project.
9/15/2014	CDPR	Email correspondence with cultural staff on LCG alternatives and cultural resources in the area.
9/25/2014	NPS	Email correspondence with cultural staff on LCG alternatives and known and potential resources in the area.
11/6/2014	Elk Valley Rancheria	Meeting to discuss Programmatic Agreement (PA).

Date	Parties Involved	Summary
11/6/2014	Elk Valley Rancheria, CDPR, NPS, Yurok Tribe	LCG Partners Working Group. Meeting to discuss updates and project development process.
11/9/2014	Yurok Tribe	Meeting to discuss PA.
11/17/2014	Tolowa Dee-ni' Nation	Meeting to discuss PA.
1/16/2015	Elk Valley Rancheria, CDPR, NPS, Yurok Tribe	LCG Partners Working Group. Meeting to discuss project updates, including MOU, Economic Impact Study, and emergency access, and overview of public workshop materials.
1/21/2015	Trinidad Rancheria	Phone call to inform tribe of upcoming public meetings.
1/27/2015	Big Lagoon	Phone message regarding the LCG project.
2/11/2015	Resighini Rancheria	Meeting to discuss project alternatives.
3/4/2015	Elk Valley Rancheria, CDPR, NPS, Tolowa Dee-ni' Nation, Yurok Tribe	LCG Partners Working Group. Meeting to discuss MOU, slide updates, Engineered Feasibility Study, and public workshops.
4/13/2015	Elk Valley Rancheria, CDPR, NPS, Yurok Tribe	LCG Partners Working Group. Meeting to discuss MOU, slide updates, Engineered Feasibility Study, and alternatives.
5/6/2015	Congressman Huffman's Office and 19 stakeholder representatives	Huffman's Stakeholder Working Group. Meeting to facilitate discussions and provide an overview of the stakeholder group process.
6/3/2015	Congressman Huffman's Office and 18 stakeholder representatives	Huffman's Stakeholder Working Group. Meeting to discuss stakeholder group progress and project and alternative route information.
6/9/2015	Elk Valley Rancheria, CDPR, NPS, Tolowa Dee-ni' Nation, Yurok Tribe	LCG Partners Working Group. Meeting to discuss MOU, slide movement, Engineered Feasibility Study, and other updates.
7/1/2015	Congressman Huffman's Office and 15 stakeholder representatives	Huffman's Stakeholder Working Group. Meeting to discuss stakeholder group progress, preliminary alternate routes for LCG, etc.
8/5/2015	Congressman Huffman's Office and 18 stakeholder representatives	Huffman's Stakeholder Working Group. Meeting to discuss project updates, prioritization of alternatives, etc.
8/12/2015	Elk Valley Rancheria, CDPR, NPS, Yurok Tribe	LCG Partners Working Group. Meeting to discuss MOU, slide movement, Engineered Feasibility Study, and other updates.
9/2/2015	Congressman Huffman's Office, GDRC, Save the Redwoods League, CDPR, Yurok Tribe, additional stakeholder groups not listed in summary	Huffman's Stakeholder Working Group. Meeting to discuss project updates, stakeholder perspectives, group progress, draft stakeholder consensus outcomes, etc.

Date	Parties Involved	Summary
10/21/2015	Elk Valley Rancheria, CDPR, NPS	LCG Partners Working Group. Meeting to discuss MOU, slide movement, Project Study Report, and other updates.
11/4/2015	Congressman Huffman's Office, CHP, CDPR, Kurt Stremberg, City of Crescent City, Crescent City-DN Chamber of Commerce, DN County BOS, DNLTC, Elk Valley Rancheria, EPIC, Friends of Del Norte, GDRC, HUM County BOS, HCAOG, NPS, C. Renner Petroleum, Rumiano Cheese, Save the Redwoods League, Tolowa Dee-ni' Nation, Yurok Tribe	Huffman's Stakeholder Working Group. Meeting to discuss project updates, group progress, draft stakeholder consensus white paper, etc.
12/8/2015	CHP, CDPR, Kurt Stremberg, City of Crescent City, Crescent City-DN Chamber of Commerce, DN County BOS, DNLTC, Elk Valley Rancheria, EPIC, Friends of Del Norte, GDRC, HUM County, HCAOG, NPS, Renner Petroleum, Rumiano Cheese, Save the Redwoods League, Tolowa Dee-ni' Nation, Yurok Tribe	Huffman's Stakeholder Working Group. Consensus White Paper signed, with consensus that the No-Build was not an option, and an alternative route must be selected.
12/17/2015	Tolowa Dee-ni' Nation, CDFW, CDPR, NPS, Yurok Tribe, NMFS, USFWS, CCC	BRWG. Meeting to provide project overview, including discussion of alternatives and environmental impacts
1/25/2016	NMFS, CCC, USFWS, Elk Valley Rancheria, Yurok Tribe, CDPR, NPS	BRWG. Meeting to discuss project updates and environmental resources.
1/27/2016	Elk Valley Rancheria, CDPR, NPS	LCG Partners Working Group. Meeting to discuss slide movement and other updates and discussion of public involvement strategy; MOU was completed.
3/2/2016	Elk Valley Rancheria, CDPR, NPS	LCG Partners Working Group. Meeting to discuss updates and public engagement.
3/18/2016	NMFS, CDFW, CDPR, CCC, NPS, NCRWQCB, USACE	BRWG. Meeting to discuss project updates, environmental surveys, mitigation, and environmental resources.
5/18/2016	NMFS, CCC, USFWS, CDPR, CDFW, NPS, Yurok Tribe	BRWG. Meeting to discuss project updates and environmental resources.
6/1/2016	Elk Valley Rancheria, CDPR, NPS	LCG Partner Working Group. Meeting to discuss project updates and public involvement strategies.
8/16/2016	NCRWQCB, NMFS, NPS, USFWS, CDPR, CDFW	BRWG. Meeting to discuss project updates and environmental resources.
9/14/2016–9/16/2016	CDFW	Meeting to discuss coho salmon in Mill Creek and Smith River.
10/24/2016	NCRWQCB, NPS, CDFW, CDPR, USACE, U.S. EPA, Elk Valley Rancheria	BRWG. Meeting to discuss project updates, environmental surveys, and environmental resources.

Date	Parties Involved	Summary
1/27/2017	NPS, CDFW, NMFS, CDPR, CCC, NCRWQCB, Elk Valley Rancheria, Yurok Tribe, USFWS	BRWG. Meeting to discuss project updates, environmental surveys, and environmental resources.
5/18/2017	CDFW, NMFS, CDPR, CCC, USFWS, Yurok Tribe, CCC, USACE	BRWG. Meeting to discuss project updates, environmental surveys, and environmental resources.
5/31/2017	Yurok Tribe, Elk Valley Rancheria, CDPR, NPS, GDRC	LCG Partners Working Group. Discussed MOU and other project updates.
7/26/2017	Elk Valley Rancheria, CDPR, NPS, Resighini Rancheria	LCG Partners Working Group. Discussed Partnering MOU and other project updates.
8/7/2017	NPS, CDPR, Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation, Yurok Tribe	Letters sent to invite agencies and tribes to participate in the development of a project-specific PA.
9/20/2017	Yurok Tribe, Elk Valley Rancheria, CDPR, NPS	Meeting to discuss MOU, project updates, and the upcoming public meeting.
11/2/2017	Elk Valley Rancheria, Tolowa Dee-ni' Nation, NPS, CDPR	CRWG. Discussed project-specific PA, project updates, and cultural resource studies
11/13/2017	NPS, CDFW, NMFS, CDPR, USFWS, Yurok Tribe, USACE, NCRWQCB	BRWG. Meeting to discuss project updates, environmental surveys, and environmental resources.
12/6/2017	CDPR, NPS, Tolowa Dee-ni' Nation, GDRC	Partner Working Group. Discussed project updates, and geotechnical, environmental, and cultural resource studies.
2/13/2018	NPS, CDPR, Yurok Tribe, Elk Valley Rancheria, Tolowa Dee-ni' Nation	CRWG. Discussed PA, project updates, and various other cultural resource topics (Elk Valley Rancheria)
3/5/2018	Native American Heritage Commission	Response letter received from the Native American Heritage Commission regarding cultural sites in the project area and list of potential tribes with knowledge of the area.
3/8/2018	Yurok Tribe, Elk Valley Rancheria, CDPR, NPS, GDRC	LCG Partners Working Group. Meeting to discuss project updates, partner updates, upcoming community outreach, and geotechnical, environmental, and Expert-Based Risk Assessment studies.
4/9/2018	CHP, CDPR, Kurt Stremberg, City of Crescent City, Crescent City-DN Chamber of Commerce, DN County BOS, DNLTC, Elk Valley Rancheria, EPIC, Friends of Del Norte, GDRC, HCAOG, NPS, Renner Petroleum, Save the Redwoods League, Tolowa Dee-ni' Nation, Yurok Tribe, Congressman Huffman's Office	Huffman's Stakeholder Working Group. Meeting to discuss the project.
5/22/2018	NPS, CDPR, Yurok Tribe, Elk Valley Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation	CRWG. Meeting to discuss PA.

Date	Parties Involved	Summary
8/24/2018	NMFS, CCC, USFWS, CDFW, CDPR, NPS, Yurok Tribe	BRWG. Meeting to discuss project updates, including new alternatives and preliminary geotechnical investigations, and environmental surveys.
8/27/2018, 8/31/2018	CDPR, Kurt Stremberg, City of Crescent City, Crescent City-DN Chamber of Commerce, DNLTC, DN County BOS, Elk Valley Rancheria, EPIC, Friends of Del Norte, GDRC, HUM County BOS, NPS, Renner Petroleum, Save the Redwoods League, Congressman Huffman's Office	Huffman's Stakeholder Working Group. Meeting to discuss project updates, including purpose and need and project alternatives.
9/5/2018	Elk Valley Rancheria	Presentation on project and current alternatives.
9/26/2018	Yurok Tribe	Presentation on project and current alternatives.
11/14/2018	Kurt Stremberg, City of Crescent City, Crescent City-Del Norte Chamber of Commerce, DNLTC, DN County BOS, Friends of Del Norte, NPS, Save the Redwoods League, Tolowa Dee-ni' Nation, Congressman Huffman's Office	Huffman's Stakeholder Working Group. Meeting to discuss project updates.
11/16/2018	NMFS, CCC, USFWS, CDFW, CDPR, NPS	BRWG. Meeting to discuss project updates, including preliminary geotechnical investigations, environmental studies, and mitigation.
11/29/2018	Tolowa Dee-ni' Nation	Presentation on project and current alternatives.
1/24/2019–4/9/2019 (various dates)	CDPR	Email correspondence regarding surveys on CDPR properties, survey data for Pacific (Humboldt) marten, fisher, and northern spotted owl.
2/5/2019	NMFS, USFWS, CDFW, CDPR, NPS	BRWG. Meeting to discuss project updates, dropping Alternative C, environmental resources and surveys, and preliminary geotechnical investigations.
2/8/2019	NPS, CDPR, Yurok, Elk Valley, Tolowa Dee-ni' Nation, Tolowa Nation	CRWG. Meeting to discuss project updates and comments on PA.
3/15/2019–11/19/2019 (various dates)	Yurok Tribe, Elk Valley Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation, Resighini Rancheria, NPS, CDPR	Email correspondence on Phase 2A and/or Phase 2B geotechnical investigations. Discussions included permits for cultural resource studies and cultural resource studies.
3/18/2019	Resighini Rancheria	Presentation on project and current alternatives.

Date	Parties Involved	Summary
3/19/2019	NPS, CDPR, Elk Valley Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation	CRWG. Meeting to discuss comments on PA.
4/10/2019	CDPR, Kurt Stremberg, City of Crescent City, DNLTC, DN County BOS, EPIC, Friends of Del Norte, GDRC, HUM County BOS, HCAOG, NPS, Save the Redwoods League, Congressman Huffman's Office	Huffman's Stakeholder Working Group. Meeting to discuss project overview and updates, including alternatives and mitigation.
4/17/2019	Yurok Tribe, Elk Valley Rancheria, CDPR, NPS, Tolowa Dee-ni' Nation, GDRC	LCG Partners Working Group. Meeting to discuss project updates, public and stakeholder engagement, environmental study process, and other updates.
6/4/2019	NPS, CDPR, Yurok Tribe, Elk Valley Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation, Resighini Rancheria	CRWG. Meeting for consensus on PA and updates on 2A Geotechnical Investigations, cultural resource studies, and associated reports and reviews.
8/8/2019	CDPR, NPS, Yurok Tribe, Congressman Huffman's Office, Tolowa Nation, GDRC, Friends of Del Norte, HCAOG, Kurt Stremberg, Save the Redwoods League, DN County BOS, Renner Petroleum, NCRWQCB, EPIC	Stakeholder working group field visit to GDRC land.
8/20/2019–8/22/2019	USFWS	Email correspondence regarding northern spotted owl and marbled murrelet helicopter impacts.
8/27/2019	NMFS, USFWS, CDFW, CDPR, NPS, CCC, U.S. EPA	BRWG. Meeting to discuss project updates, preliminary geotechnical investigations, environmental resources, and mitigation.
9/3/2019	NMFS	Email correspondence regarding federally listed fish species and a general project discussion.
9/11/2019	Crescent City-DN Chamber of Commerce, HCAOG, DNLTC, DN County Board of Supervisors, GDRC, City of Crescent City, CDPR, NPS, EPIC, HUM County BOS, Save the Redwoods League	Huffman's Stakeholder Working Group. Meeting to discuss project updates, alternatives, and mitigation.
9/30/2019	USFWS	Email correspondence regarding fisher listing status.
10/14/2019	SHPO	Letter for initiation of consultation sent to SHPO for Phase 2B geotechnical investigations, requesting concurrence on eligibility of the Crescent City to Trinidad Wagon Road and one other resource.
10/17/2019	USFWS	Email correspondence regarding marbled murrelet and northern spotted owl measures.

Date	Parties Involved	Summary
10/24/2019	CDPR, NPS, Tolowa Dee-ni' Nation	LCG Partners Working Group. Meeting to discuss updates and upcoming CTC town hall.
10/31/2019	USFWS	Email correspondence regarding marbled murrelet CH spatial data.
11/5/2019	SHPO	Letter from SHPO recommending assumption of eligibility for the wagon road, and concurrence on ineligibility of the one other resource.
12/4/2019	USFWS	Email correspondence regarding fisher and marten survey methodology.
1/6/2020	NMFS, USFWS, CDFW, CDPR, CCC	BRWG. Meeting to discuss project updates, mitigation, preliminary geotechnical investigations, and environmental resources.
2/5/2020	CDPR, Kurt Stremberg, City of Crescent City, Crescent City-DN Chamber of Commerce, DNLTC, DN County BOS, Friends of Del Norte, GDRC, HUM County BOS, NPS, Resighini Rancheria, Save the Redwoods League, Congressman Huffman's Office	Huffman's Stakeholder Working Group. Meeting to discuss project updates, alternatives analysis, challenges/opportunities, and stakeholder engagement.
2/6/2020	NPS	Email correspondence regarding northern spotted owl surveys.
2/6/2020	USFWS	Email correspondence regarding fisher and marten measures.
2/11/2020	CDFW	Email correspondence regarding northern red-legged frog.
2/11/2020	NPS, CDPR, Tolowa Nation, Tolowa Dee-ni' Nation, Yurok Tribe, Resighini Rancheria, Elk Valley Rancheria	CRWG. Meeting to discuss PA, project updates, and cultural resource studies.
2/12/2020	USFWS	Email correspondence regarding special status insect surveys.
3/5/2020–4/8/2020 (various dates)	CDFW	Email correspondence regarding northern spotted owl survey locations.
3/24/2020–6/23/2020 (various dates)	GDRC	Email correspondence regarding special data request, results of northern spotted owl surveys on GDRC properties, tree data on GDRC properties, and survey coordination.
4/8/2020	CDFW	Email correspondence regarding northern spotted owl surveys.
5/11/2020	Yurok Tribe	Meeting to provide the tribal council updates on all Caltrans District 1 projects in Yurok tribal or ancestral territory.

Date	Parties Involved	Summary
5/20/2020	CDFW	Email correspondence regarding fisher–West Coast distinct population segment status.
6/4/2020–6/6/2020	CDFW	Email correspondence regarding Humboldt (Pacific) marten surveys and protocols.
6/4/2020	CDFW	Meeting to discuss project updates, survey status, and survey protocols.
6/4/2020	USFWS	Phone correspondence regarding marten and fisher surveys.
6/15/2020	USFWS	Email correspondence regarding drone surveys.
6/24/2020,	Wild Heritage	Meeting on UNESCO World Heritage Sites.
7/13/2020, 8/6/2020	Wild Heritage, IUCN	Follow-up email correspondence on UNESCO World Heritage Sites regarding participation in stakeholder working groups.
9/16/2020	CDPR, Kurt Stremberg, Crescent City-DN Chamber of Commerce, DNLTC, DN County BOS, EPIC, GDRC, HUM County BOS, HCAOG, Renner Petroleum, Resighini Rancheria, Save the Redwoods League, Congressman Huffman's Office	Huffman's Stakeholder Working Group. Meeting to discuss the working group's mission and roles/responsibilities, project timeline, understanding the process of reviewing alternative analysis elements.
9/23/2020	Elk Valley Rancheria	Meeting to provide annual project updates to the tribal council.
9/24/2020	Tolowa Dee-ni' Nation	Meeting to provide annual project updates to the tribal council.
11/24/2020	USFWS	Email correspondence regarding yellow-billed cuckoo and bald eagle.
12/1/2020	NPS, State Parks, CDPR, Tolowa Nation, Tolowa Dee-ni' Nation, Yurok Tribe, Resighini Rancheria, Elk Valley Rancheria	CRWG. Meeting to discuss edits on PA prior to sending document to SHPO.
12/7/2020–12/9/2020	CDPR	Email correspondence regarding vegetation mapping protocols on CDPR properties.
12/11/2020	CCC	Email correspondence regarding buffers for ESHA.
12/14/2020-12/17/2020	CCC, CDFW, CDPR, Crescent City-DN Chamber of Commerce, DN BOS, DNLTC, Elk Valley Rancheria, EPIC, Friends of Del Norte, GDRC, HCAOG, HUM County BOS, NMFS, NPS, Congressman Huffman's Office, Resighini Rancheria, NCRWQCB, Save the Redwoods League, Tolowa Dee-ni' Nation, USACE, U.S. EPA, USFWS, Yurok Tribe	Alternatives Analysis Workshop #1. One meeting held for each stakeholder working group to solicit and refine stakeholder input on the methodology and criteria for selection of alternatives for further study.

Date	Parties Involved	Summary
12/15/2020	SHPO	Draft PA sent to SHPO for first review.
12/16/2020	NPS	Meeting to discuss wetland delineations; NPS requested archaeological monitors.
1/4/2021, 1/11/2021	CDFW	Email correspondence regarding Lake and Streambed Alteration Agreement (1602).
1/11/2021	CDFW	Email correspondence regarding riparian tree mapping.
1/21/2021	CDFW	Email and phone correspondence regarding voles.
1/21/2021	CDPR	Phone correspondence regarding voles.
1/26/2021	NPS, CDPR, Tolowa Nation, Tolowa Dee-ni' Nation, Yurok Tribe, Resighini Rancheria, Elk Valley Rancheria	CRWG. Meeting to discuss project updates and cultural resource studies (Virtual).
2/17/2021	CCC	Meeting to discuss ESHA buffers and visual resources.
2/18/2021	Tolowa Dee-ni' Nation	Meeting to discuss various District 1 projects, including LCG updates, such as the alternatives analysis.
3/1/2021-3/4/2021	CCC, CDPR, Crescent City-DN Chamber of Commerce, DN County BOS, DNLTC, Elk Valley Rancheria, EPIC, Friends of Del Norte, GDRC, HUM County BOS, Resighini Rancheria, NCRWQCB, NPS, Congressman Huffman's Office, Resighini Rancheria, Tolowa Dee-ni' Nation, Tolowa Nation, USACE, U.S. EPA, USFWS	Alternatives Analysis Workshop #2. One meeting held for each stakeholder working group to solicit and refine stakeholder input on the methodology and criteria for selection of alternatives for further study.
3/1/2021	SHPO	Letter received from SHPO regarding the draft PA.
3/10/2021–3/24/2021	U.S. EPA	Email correspondence regarding climate change.
3/10/2021	USFWS	Meeting to discuss northern spotted owl and marten.
3/29/2021	Yurok Tribe	Meeting to discuss various District 1 projects, including LCG updates, such as the alternatives analysis.
4/2/2021	GDRC	Email correspondence regarding northern spotted owl surveys on GDRC properties.
4/7/2021	Elk Valley Rancheria	Meeting to present alternative analysis results.
4/8/2021	Tolowa Dee-ni' Nation	Meeting to present alternative analysis results.
4/13/2021	NPS, CDPR, Yurok, Tolowa Nation, Tolowa Dee-ni' Nation, Resighini Rancheria, Elk Valley	CRWG. Meeting to discuss project updates and cultural resource studies.

Date	Parties Involved	Summary
4/20/2021	Tolowa Nation	Meeting to discuss LCG updates.
4/22/2021	CCC, CDFW, CDPR, Kurt Stremberg, Crescent City-DN Chamber of Commerce, DN County BOS, DNLTC, Elk Valley Rancheria, EPIC, Friends of DN, GDRC, HCAOG, HUM County BOS, NCRWQCB, NMFS, NPS, Congressman Huffman's Office, Office of Senator Mike McGuire, Save the Redwoods League, Tolowa Nation, USACE, U.S. EPA, USFWS, Yurok Tribe	Alternatives Analysis Workshop #3. Combined meeting with all stakeholder working groups to solicit and refine stakeholder input on the methodology and criteria for selection of alternatives for further study.
5/12/2021	CCC	Email correspondence regarding wetland delineation documentation requirements as they pertain to the Coastal Development Permit.
5/19/2021	Elk Valley Rancheria	Meeting with the cultural committee to see if the tribe wanted to participate in ethnographic interviews for the project.
5/20/2021	Tolowa Dee-ni' Nation	Meeting with the tribal council to see if the tribe wanted to participate in ethnographic interviews for the project.
5/26/2021	Resighini Rancheria	Meeting with the tribal council to see if the tribe wanted to participate in ethnographic interviews for the project.
6/9/2021	Yurok Tribe	Meeting with the tribal council on ethnographic interviews. The tribe expressed that they would like a separate contract to conduct their own studies, as they are best qualified to tell their own history.
6/16/2021, 8/10/2021	CDPR	Email correspondence regarding drone usage on CDPR property.
8/27/2021, 9/3/2021	CDFW	Email correspondence regarding SNC mapping.
8/31/2021	Yurok Tribe	Meeting with Tribal Historic Preservation Officer (THPO) to discuss a potential contract with the tribe to do studies for various projects, including ethnographic studies for LCG.
9/7/2021	NPS, CDPR, Yurok, Tolowa Dee-ni' Nation, Tolowa Nation, Resighini Rancheria	CRWG. Discussed project updates, ASR comments, ethnographic studies.
11/5/2021	Elk Valley Rancheria	Meeting to provide project updates, and discuss the importance of ethnographic studies, and a MOU for the studies.
11/8/2021	Yurok Tribe, Tolowa Dee-ni' Nation, Resighini Rancheria, Elk Valley Rancheria, and Tolowa Nation	AB 52/106 consultation letter mailed to tribal chair and digital copy emailed to THPO of each tribe.

Date	Parties Involved	Summary
11/10/2021	CCC, CDFW, CDPR, Crescent City-DN Chamber of Commerce, DNLTC, Elk Valley Rancheria, EPIC, Friends of Del Norte, GDRC, HCAOG, HUM County BOS, NMFS, NPS, Save the Redwoods League, NCRWQCB, Tolowa Dee-ni' Nation, USACE, U.S. EPA, USFWS, Congressman Huffman's Office	Mitigation Workshop #1. Meeting with stakeholder working groups representatives to provide project updates, timelines, summary of alternatives analysis, and outline discussion topics around mitigation and the engagement process, and discussion on mitigation.
1/24/2022	NPS, CDPR, Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation	CRWG. Discussed project updates and ethnographic studies and interviews (Virtual)
2/2/2022	CDPR, DNLTC, NCRWQCB, NMFS, USFWS, U.S. EPA	Participating/Cooperating Agencies. Meeting to discuss Agency Coordination Plan.
2/15/2022	NCRWQCB, SWRCB	Meeting to discuss the Area of Special Biological Significance (ASBS).
2/16/2022	NPS	Meeting to discuss project updates relating to RNP.
3/2/2022	CCC, CDFW, CDPR, Crescent City-DN Chamber of Commerce, DNLTC, Elk Valley Rancheria, EPIC, Friends of Del Norte, GDRC, HCAOG, HUM County BOS, NMFS, NPS, Resighini Rancheria, Save the Redwoods League, Tolowa Dee-ni' Nation, Tolowa Nation, U.S. EPA, USFWS	Mitigation Workshop #2. Meeting with stakeholder working group members to provide project updates, and discussion on the project and engagement process.
3/15/2022	Adventure Cycling, and local cyclist	Meeting to discuss concerns for bicyclists.
4/25/2022	Yurok Tribe, CDPR, NPS, Tolowa Dee-ni' Nation, Resighini Rancheria, GDRC	Partner Working Group. Meeting to discuss project updates, environmental process, partner group process.
4/27/2022	NCRWQCB, SWRCB	Meeting to discuss the ASBS.
4/27/2022	NPS, CDPR, Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation	CRWG. Meeting to discuss project updates, ethnographic studies, and TCLs.
6/22/2022	Yurok Tribe, Tolowa Dee-ni' Nation, Resighini Rancheria, Elk Valley Rancheria, and Tolowa Nation	Email for review of the draft Ethnographic Report: Background Research and Historic Resources Evaluation Report (HRER).
7/5/2022	CCC	Email correspondence regarding the Coastal Development Permit and ESHA analysis for the project.
7/19/2022	CDPR, NPS	Meeting to discuss project updates and draft plans.
7/28/2022	NPS, CDPR, Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation	CRWG. Meeting to discuss project updates, ethnographic studies, and report comments.
8/25/2022	NPS, CDPR	Meeting to discuss trees and mitigation.

Date	Parties Involved	Summary
8/29/2022	USACE	Phone discussion of USACE wetland delineation methods.
9/29/2022	USACE	Phone correspondence regarding wetlands and waters.
10/12/2022	CCC, CDPR, Crescent City-DN Chamber of Commerce, DN County BOS, Friends of Del Norte, GDRC, HCAOG, HUM County BOS, NPS, NCRWQCB, Save the Redwoods League, Tolowa Nation, U.S. EPA, Yurok Tribe	Mitigation Workshop #3. Meeting with stakeholder working group members to discuss project updates and discuss mitigation, focusing on trees. Included field trip meeting to project site.
11/14/2022	CDPR, NPS	Email discussion on Section 6(f) and DNCRSP and RNP.
11/17/2022	NPS, CDPR, Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation	CRWG. Meeting to discuss project updates and development of APE. Based on input, moving forward with a preliminary ADI for purposes of the environmental document.
11/23/2022	SHPO	Letter sent to SHPO regarding the eligibility of six cultural resources for the NRHP.
1/5/2023	SHPO	SHPO provided concurrence that five of the six cultural resources were ineligible for the NRHP and recommended one (the Crescent City to Trinidad Wagon Road) be assumed eligible for the purposes of the project.
1/6/2023	CDPR	Non-project-specific field meeting to discuss Redwoods Rising and potential future mitigation opportunities.
2/9/2023	CDPR, NPS, Congressman Huffman's Office	Discussion of tree data from mitigation workshop and coastal access.
2/27/2023	NPS, CDPR, Elk Valley Rancheria, Resighini Rancheria, Tolowa Dee-ni' Nation	CRWG. Meeting to discuss project updates, status of ethnographic interviews, PA, and DED.
3/1/2023	Yurok Tribe, Tolowa Dee-ni' Nation, Resighini Rancheria, Elk Valley Rancheria, and Tolowa Nation	Letters sent to each tribe's THPO or cultural resource representatives via email for 106/AB 52 consultation on Phase 6 Geotechnical Investigations.
3/14/2023	CDPR, DN County, DN County BOS, EPIC, Friends of DN, GDRC, NPS, Save the Redwoods League, Congressman Huffman's Office	Huffman's Stakeholder Working Group. Meeting to discuss preliminary impact data and selection of a Preliminary Preferred Alternative
3/22/2023	CDPR, NPS	Meeting to discuss trails in RNSP.
3/27/2023	Yurok Tribe, Tolowa Dee-ni' Nation, Resighini Rancheria, Elk Valley Rancheria, and Tolowa Nation	Email to tribes to inform them of upcoming isotope studies, which would identify water sources of plants in areas that may be subject to groundwater alterations. The studies would require soil samples. Study locations are outside of archaeological sites.

Date	Parties Involved	Summary
4/5/2023	USFWS	Meeting to discuss project updates and impacts in relation to marbled murrelet, northern spotted owl, and marten.
4/11/2023	CDPR, GDRC, Elk Valley Rancheria, NPS, Yurok Tribe	LCG Partners Working Group. Meeting to discuss project updates.
4/25/2023	CDFW	Meeting to provide project overview, discuss species, and answer questions.
5/2023	Elk Valley Rancheria, Resighini Rancheria, Yurok Tribe, CDPR, NPS	Meeting to discuss project updates, status of ethnographic interviews, PA, and DED.
5/2/2023	CCC, CDFW, CDPR, Crescent City-Del Norte Chamber of Commerce, DN County BOS, Elk Valley Rancheria, EPIC, Friends of Del Norte, GDRC, HUM County BOS, NPS, NCRWQCB, Congressman Huffman's Office, Resighini Rancheria, Save the Redwoods League, USACE, USFWS, U.S. EPA, Yurok Tribe	Mitigation Workshop #4. Meeting with stakeholder working group members to provide project updates, and discuss mitigation. Included presentation on Redwoods Rising by CDPR, a potential mitigation opportunity.
5/2/2023	CDPR, NPS	Field meeting to review trails in the project area.
5/11/2023	NMFS	Meeting to provide overview of project and project impacts. Discussion of coho critical habitat.
5/17/2023	CCC	Meeting to discuss federal consistency determinations.
5/23/2023, 6/2/2023, 6/8/2023	NPS	Email and phone correspondence on Section 6(f) within RNP.
6/7/2023	CDPR, NPS	Email for coordination on Section 4(f).
6/22/2023	Elk Valley Rancheria, Resighini Rancheria, Yurok Tribe, CDPR, NPS	CRWG. Discussed project updates, status of ethnographic interviews, PA, and DED.
6/28/2023	NCRWQCB	Meeting to discuss project impacts as it relates to wetlands and other waters, and mitigation.
7/7/2023	NPS	Meeting to discuss Section 4(f).
7/17/2023	CDPR	Email for coordination on Section 4(f).
7/31/2023	FHWA	Phone and email discussion on coastal consistency determinations and timelines.
8/16/2023	CCC, CDPR, NPS	Meeting to discuss the California Coastal Trail and redwoods and potential mitigation.
8/17/2023	USFWS	Meeting to discuss federally listed species, with a focus on marbled murrelet.
8/30/2023	CDFW	Meeting to discuss project, including species impacts and mitigation.

Date	Parties Involved	Summary
9/6/23	CCC	Presentation of project updates to the CCC at the CCC's monthly hearing.
10/2/2023	CDFW, CDPR	Meeting to discuss feasibility of Redwoods Rising based on existing permit restrictions.

BOS = Board of Supervisors

CCC = California Coastal Commission

CDPR = California Department of Parks and Recreation

CHP = California Highway Patrol

DN = Del Norte

DNLTC = Del Norte Local Transportation Commission

EPIC = Environmental Protection Information Center

FHWA = Federal Highway Administration

GDRC = Green Diamond Resource Company

HCAOG = Humboldt County Association of Governments

HUM = Humboldt

IUCN = International Union for Conservation of Nature

NCRWQCB = North Coast Regional Water Quality Control Board

NMFS = National Marine Fisheries Service

NPS = National Park Service

SHPO = State Historic Preservation Officer

SWRCB = State Water Resources Control Board

U.S. EPA = U.S. Environmental Protection Agency

USACE = U.S. Army Corps of Engineers

USFWS = U.S. Fish and Wildlife Service

5.3.2 General Public

As mentioned previously, Caltrans has been engaging with the public about LCG throughout the life of the project. This has taken place through community meetings, as well as a regularly updated project website where interested parties can sign up to receive notifications when there are new events or if updates have been posted on the website. In addition, annual progress updates have been sent to county residents and other stakeholders since 2020; these updates are also posted on the project website. Quarterly updates for stakeholders, beginning April 2022, are also available online. Public outreach meetings and opportunities for involvement are summarized in Table 5-3.

Table 5-3. Public Outreach Opportunity Summary

Date	Outreach Type	Summary
1/26/2015-1/28/2015	Community Workshops	The LCG Partners Working Group hosted a series of community workshops to get public input and ideas on a range of possible alternatives for LCG.
3/22/2016-3/24/2023	Community Town Hall	The LCG Partners Working Group hosted a series of community town hall meetings to discuss the status of the project and what is currently being done to keep travelers safe as they travel on LCG.
10/18/2017	Open House	Caltrans and its partner agencies hosted an open house to update the community and answer questions on what is currently being done to keep travelers safe on LCG.
7/19/2018	Open House	Caltrans and its partner agencies hosted an open house to update the community on progress made and answer questions on what is currently being done to keep travelers safe on LCG.
11/19/ 2020	Town Hall	Caltrans participated in a virtual town hall hosted by Senator Mike McGuire, Assemblymember Jim Wood, and Congressman Jared Huffman to update the community and answer questions on what is currently being done to keep travelers safe on LCG.
7/7/2021	Town Hall	Caltrans hosted a virtual town hall to update the community and answer questions regarding construction schedules necessitating multi-hour road closures.
11/5/ 2021	NOI/NOP	Caltrans released the NOP and NOI for the preparation of an EIR/EIS for the project, with a 30-day public comment period.
11/18/2021	Scoping Meeting	Caltrans conducted a virtual public scoping meeting to update the community and answer questions regarding the NOP and NOI for the preparation of an EIR/EIS for the project.

Date	Outreach Type	Summary
7/12/2022	Town Hall	Caltrans participated in a virtual town hall hosted by Senator Mike McGuire, Assemblymember Jim Wood, and Congressman Jared Huffman to update the community and answer questions on what is currently being done to keep travelers safe on LCG.

5.4 Comments and Response to Comments

Comments were submitted by the public and other stakeholders during the NOI/NOP circulation period. These comments, and responses to comments, are summarized in Table 5-4.

Table 5-4. Comments and Responses Recorded During the NOI/NOP Circulation Period

Commenter, Date Rec'd, Format	Comment	Response
Lori Gastineau, 11/8/2021, Email	Questions related to Alternative F: 1. If alternative F, the twin-bore tunnel, is chosen will a geological study report be included that addresses the possible destabilization of the cliff last chance grade sits on at present and the mountain above it due to vibrations from tunnel boring machines? 2. Will the present road and cliff that last chance grade sits on be able to withstand the effects of the tunnel boring machines vibrations and remain open during tunnel completion? 3. How will the inevitable water drainage problem be dealt with if the tunnel dips deep underground? Comment: As I recall there was an issue with water drainage in the tunnels in San Mateo County, CA at Devil's Slide on Highway 1 when I drove through them.	Thank you for your email, Ms. Gastineau. Geological studies have been and will continue to be conducted. Potential vibration associated with bore machines would be negligible and not anticipated to have any potential effect on slide stability. The highway would be open during construction. The tunnel would mostly be constructed below the slide plane and would not require groundwater drainage. As a result, there are no anticipated drainage concerns. Please refer to Section 2.2.1, *Project Alternatives*.
Chairman Dale A. Miller, Elk Valley Rancheria, 11/10/2021, Letter	The Elk Valley Rancheria, California, a federally recognized Indian tribe (the "Tribe"), hereby submits its comments regarding the California Department of Transportation's (Caltrans) Notice of Preparation (NOP) and Notice of intent (NOI) for the preparation of a draft Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the Last Chance Grade Permanent Restoration Project. Last Chance Grade is the 3.5-mile-long section of US 101 in Del Norte County (post mile [PM] 12.0 to 15.5) that runs between Wilson Creek to about nine (9) miles south of Crescent City. The Project would realign the highway in response to landslide and roadway failures which have caused damage for decades. The Tribe understands that the proposed actions are Alternative X and Alternative F. Alternative X would involve reengineering the existing roadway. Within a portion of Alternative X, the roadway would retreat inland (to the east) by approximately 130 feet	Thank you for your letter, Chairman Miller. Regarding your comments related to including a discussion in the EIR/EIS related to project alternatives, including why other alternatives were not selected and the regional socio-economic impacts associated with the alternatives, please see Section 2.5, *Alternatives Considered but Eliminated from Further Discussion;*

Commenter, Date Rec'd, Format	Comment	Response
	to improve geotechnical stability and longevity. Alternative X would involve constructing a series of retaining walls (single and terraced) to minimize the potential for landslides on the roadway. Depending on feasibility, drainage improvements might also be included for this alternative. Alternative F would construct a 10,000-foot-long tunnel that would diverge from the existing roadway near PM 14.06 and reconnect to US 101 near PM 15.5, thereby avoiding the portion of existing roadway most prone to landslides and geologic instability. The EIR/EIS will also study a No Project Alternative, which would result in no new long term feasible and sustainable solution for Last Chance Grade but would instead be a continuation of ongoing maintenance and repair activities needed to enable ongoing roadway operations. The Tribe recommends that in addition to the areas identified in the NOI/NOP, the following issues be analyzed in the EIS/EIR: Project alternatives, including why other alternatives were not selected; Regional socio-economic impacts associated with the proposed alternatives - especially the no action alternative. Please note that the reference to a study of cultural resources and Tribal Cultural Resources should include appropriate consultation with the Tribe and concurrence from the Tribe's Tribal Historic Preservation Officer. Thank you for your consideration of these issues in the EIS/EIR. We look forward to reviewing the Draft EIS/EIR when it is available.	Section 3.2.5, *Environmental Justice;* and Section 3.2.6, *Equity*. Regarding Tribal Cultural Resources consultation with the Tribe, please see Section 5.3, *Coordination;* Sections 3.2.10 and 4.3.5, *Cultural Resources;* Section 4.3.18, Tribal Cultural Resources; and Appendix B, *Section 4(f)*.
Victoria "Tory" Callahan, Bureau of Land Management, 11/26/2021, Email	This project will not affect any BLM AFO lands. We have no comment at this time.	Thank you for your email, Ms. Callahan.

Commenter, Date Rec'd, Format	Comment	Response
Ernie DeGraff, 11/28/2021, Email	This project needs to get underway ASAP. I've looked at all the alternatives and because of the dire consequences of LOSING the entire roadway during a "Pineapple Express" rainfall or a large earthquake, I think you should develop reasonable alternatives that can be completed in the shortest time. Keep the number of alternatives to the minimum to speed up the completion of the EA/EIR process. Following are my comments: No action: Required and here is where you list the consequences of doing nothing, and is really not addressing the problem. Tunnel Bypass: Most expensive and time consuming. Time is of the essence. Requires BIG equipment not readily available here. Shortest route Inland: This would be the least expensive, completed in the shortest amount of time, and provide a scenic portion of the highway through the redwoods. Would require removing some "old growth redwoods", but don't let that stop you from developing this alternative. It isn't like these are the "last redwoods in the world". Sacrificing a few of these trees for the greater good is realistic. All equipment and manpower for this alternative is available locally, and the project could be started right away and be finished in the shortest time. (my preferred alternative). Longer route inland: Could be the one that avoids the "tree huggers/sitters" that are sure to surface during construction and could cause you to have to delay approval because of all the lawsuits that could result. That's not to say you wouldn't have the same thing with other alternatives, especially with the "shortest route" alternative. But don't be afraid to do battle with the "save the earthers". The fewer alternatives you develop will speed up the environmental process and cut down on expenses. Four alternatives would meet NEPA process. You'd have two inland, one tunnel, and one No Action. Whatever you do, do it quickly. Use more than one company to help with the preparation of the document. SPEED is on the essence here. Good luck and the sooner you start this process the better.	Thank you for your email, Mr. DeGraff. A lot of time and effort has been dedicated to identifying reasonable and feasible alternatives. Please see Chapter 2 for a detailed description of the build alternatives and alternatives considered but eliminated from further discussion. Caltrans understands the need for immediate action and every effort is being made to deliver this project as quickly as possible.

Commenter, Date Rec'd, Format	Comment	Response
Katie Harris, Director of Advocacy, Adventure Cycling Association, 12/5/2021 Letter	Adventure Cycling Association is writing in regard to Last Chance Grade Project. Adventure Cycling Association inspires, empowers, and connects people to travel by bicycle. Our advocacy work focuses on four key aspects of bicycle travel: more miles of connected routes, bike-accessible transportation, safer conditions, and bike-friendly services. With the power of the community behind us, we work to align the people, places, and infrastructure needed for meaningful bicycle travel. The Last Chance Grade Project will have an impact on one of Adventure Cycling Routes, the Pacific Coast Route. This route is part of a nation-wide network of more than 50,000 miles of mapped routes connecting the United States. Thousands of people ride the Pacific Coast Route every year. Their safety is our #1 priority. These bike travelers bring millions of dollars to the CA tourism economy and are valid road users and valued members of our community. The design of Last Chance Grade Project needs to prioritize the safety of bicyclists. A separated, protected design, like a protected bike lane within the design of Alternative F, would be appropriate. A design that dictates that bicyclists ride on a narrow shoulder within the tunnel would be unacceptable. The design should ensure the safety of all road users, including bicyclists. We are more than happy to serve as advisors on what design would accommodate, support and keep bicyclists safe. There are many options for keeping bicyclists safe, and we can provide firsthand and community experience. We would like to be considered as stakeholders in the project, representing people traveling by bike, and in partnership with local and regional bike advocates.	Thank you for your letter, Ms. Harris. As currently proposed, Alternative X would provide eight-to-ten-foot shoulders (current shoulder width is zero to four) and Alternative F would have eight-to-ten-foot shoulders and would also include a separated six-foot-wide bike/pedestrian lane. Please see Chapter 2, *Project Alternatives*, for specific project alternatives details.
Michelle Bush Alves, 11/30/2021, Email	Greetings! Thank you for taking public comments about the proposed Last chance grade tunnel. I believe the concept is a great idea. However please include a safety lane for bicyclists. The area is well traveled by bicyclists who bring in millions upon millions of tourist dollars to our state. With the pending transformation of Cal State Humboldt into the only Poly Tech University in Northern California, additional national focus will be on our area. We do not want the Tunnel to be known for multiple accidents and fatalities of bicyclists because of the lack of a dedicated safety bicyclist lane. 'Blood Alley' is not good for our state, our residents, and our visitors. With the goal to reduce and eliminate our dependence on fossil fuels - we should be protecting our bicyclists and encouraging	Thank you for your email, Ms. Alves. As currently proposed, Alternative X would provide eight-to-ten-foot shoulders (current shoulder width is zero to four) and Alternative F would have eight-to-ten-foot

Commenter, Date Rec'd, Format	Comment	Response
	the use of alternate transportation modes. Thank you for your time and consideration in this matter. Respectfully, Michelle Bush Alves	shoulders and would also include a separated six-foot-wide bike/pedestrian lane. Please see Chapter 2, Project Alternatives, for specific project alternatives details.
T.J. Jennings, 11/30/2021, Email	I am not a geologist/hydrologist/engineer but I have lived/driven on the Humboldt Coast for 50 years and I can tell you moving the road bed 130 feet inland isn't a long term solution. Build the tunnel or move the roadbed a lot further inland!	Thank you for your email, T.J. Jennings. Alternative X would be an end-to-end reengineered solution that includes an underground drainage system. Current engineering studies indicated this alternative to be a potential feasible long-term solution. Please refer to Chapter 2, *Project Alternatives*, for details related to Alternative X.
Kathryn Vadas, 11/30/2021, Email	Hello, thank you for reading my email. In regard to the Last Chance Grade Project, the tunnel would be a higher quality option. I would be appalled if this project went through because it is the best option, and seldom do I see Humboldt choosing the best option over "what's cheap and fast". Fortunately, the tunnel has been declared the cheapest option, this has instilled hope that the project will go through. This tunnel will be a home run, as it will also cut off time for people traveling through that area. It was also increase safety for all parties driving through, because there will not be a dangerous edge to drive off of, and the road will be straight instead of having dangerous curves. If this project doesn't go through, I'll be convinced it's just the locals needing to fight back against "something". This project is perfect at every end.	Thank you for your email, Ms. Vadas.

Commenter, Date Rec'd, Format	Comment	Response
R. Coke, 12/3/2021, Email	Why not build a bridge approximately 3 miles long. Bypassing the problem area and creating a tourist attraction.	Thank you for your email, R. Coke. Variations of a long bridge over the landslide area of LCG were discussed but determined infeasible, including a bridge with deep foundations that would need to extend to a depth below the landslide plane and withstand the force of the landslide and a suspended bridge with foundations anchored upslope of the existing roadway suspending the roadway deck over the slide. Constructing a 3-mile bridge would not meet the purpose and need of the project or reduce environmental impacts, and would have additional geotechnical, cost, and visual/recreational impacts.
Willie Gilbert, 12/4/2021, Email	An inland tunnel that takes US 101 east of Last Chance Grade is the only viable long-term solution. Yes, the cost is steep but it will prove to be the least costly over time when you consider what all the closures and constant repairs have already cost in losses and problems for everyone in the county. All repairs to Last Chance Grade are just band-aids with the entire mountain above and below the road continuing to slide into the Pacific. And the movement is accelerating overtime, despite the tons of concrete, re-bar, anchors, netting and thousands of hours of labor and equipment invested in this project.	Thank you for your email, Mr. Gilbert.

Commenter, Date Rec'd, Format	Comment	Response
	Work on the tunnel should have begun a decade ago.	
Tom Stewart, 12/5/2021, Email	Upon arrival of our local newspaper the Triplicate, Friday, December 3, 2021, I was amazed at the front-page headline, "Tunnel could be used to fix Last Chance Grade." Reading of the article was disheartening to say the least. To find out at the end of the article, that the public had till Dec. 6, 5 p.m. to comment on this issue / subject, was maddening. Maybe I am living in such a rural area, that I was not informed of the ongoing comment timeframe, coming from a supposedly zoom meeting back in early Nov. I hope this comment will be accepted by the Dec. 6 cutoff and SHUT UP time frame. Regarding the proposals of Alternative X and Alternative F, the following comment is submitted: Alternative X, while the entire engineering process is not explained, let me provide my insight of opinion and likely fact. Proposing to reengineer the existing roadway, by retreating inland 130 feet to engineer a new roadway is beyond human comprehension. The slope gradient and sub soil content, from the existing area's to the confluence of the ocean below, is and will remain a reason for future failure of such a proposal. I believe these circumstances are already understood by CalTrans and the "Stakeholders," which constitutes the Alternative F proposal. Some of the same issues of Alternative X is parallel to Alternative F. However, with F, to imagine a 10,000 foot tunnel bypassing the unstable portion of Last Chance is similar to sending a mission to Mars by the year 2038. Please bare with me here. In trying to understand the entry point of the tunnel at milepost 14.06 and a reconnecting point at MP 15.5, this is actually difficult to humanly understand. You, which would constitute CalTrans and "Stakeholders" are trying to tell the public, that there have been Sonar, Geological, Stability, Molecular Composition, Drainage, Bore Samples, etc studies completed in this proposed area? Again, not being an engineer, just high on the list of common sense. I believe, that somewhere in the process of the attempt of boring 10,000 feet of this tunnel, there WILL be a complete failure to the process with lose of life, equipment and the entire geological area of the proposed tunnel. Being entitled to this comment, I wish to include the following: It is said there is another proposal to be studied. Please explain what studied would entail. The proposal of "No	Thank you for your email, Mr. Stewart. A lot of time and effort has been dedicated to identifying reasonable and feasible alternatives. These alternatives were coordinated and developed with the input of numerous State, Federal, Tribal, and local stakeholders. Please see Chapter 2 for a detailed description of the build alternatives and alternatives considered but eliminated from further discussion. Also, please see Chapter 5, *Comments and Coordination*, for a complete list of coordination and consultation completed for the development of the project, as well as the identification of project stakeholders.

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	Project Alternative," to be studied. What needs to be studied? You, as explained before, know exactly what that proposal would entail, that alternative has been studied for over 30 years. If this is needed to be explained further, read on. IF, X and F were to be equally entertained as options, what is the process to complete these proposals while keeping the route open for travel? I can only predict and presume that with proposal F, it would be necessary to continue maintenance on the now existing roadway. Would this also show a cost variant to be included with the $1.3 Billion proposed tunnel cost? Is the engineering staff / contractors / "Stakeholders," prepared for any failure to the existing roadway, while engineering Alternative X or F? Please enlighten us, the public and the uneducated of this great Northwest of California. I respect the effort of all involved over the years, however, what is so very apparent to most onlookers, the "Stakeholders," are the leading factor to the decision making process of this unbelievable project. The stakeholders who are left out of this equation is simply, US. The public, the people dependent on the existence of HWY 101 to and from this part of NORTHERN California. Stakeholders, is it possible for YOU to provide a listing as to WHO the stakeholders are, having interest / investment in managing these alternatives? Please do not offend me or others here, it is not very hard to consider the top 5 so called stakeholders. May I mention some in grouping, Environmental groups / activists, Distribution Unions, CalTrans, TRIBAL influencers, State Parks, Federal assistance entities, the Great State of California Government in entirety. Did I hit on just a few? If a person such as myself could gaze into a Crystal Ball, what may be seen is, this process of comment is a curtain such as compared to the story of the Wizard of Oz. The process of continuing with the proposed alternatives is on its way, already laying on someone's desks, awaiting the boxes to be checked and the signatures to proceed. I have but maybe one more question. Way back when, prior to the Covid thing, there was spoken of $50 million dollars already set aside for the beginning faze of an alternative. Some time later, it is spoken of that $50 million dollars was used for studies completed for the alternatives. Can you explain just how $50 million dollars was spent and exhausted on all studies associated with this project? In summary, is it possible for you to provide a complete video of a fly by / fly over, of the existing area's of Last Chance Grade, to include the entire area from Wilson Creek to Crescent City? Ensure the video depicts the slope gradients and failure to the geologic make up of the bluffs, ALL THE WAY TO THE OCEAN. Should this video ever be made	

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	available to the public, it would show many of the answers to my questions or any other. It would also alter the comments from the public on the propose alternatives. Thank you for the opportunity to comment. I have worked for the State of California, and with that said, it is highly unlikely this comment will even be read or documented. If you could appease me, find some way to confirm reading and receiving this comment. Please, not with a canned response.	
Glenn Felix, 12/6/2021, Email	I think a serious look should be made at a bridge in the ocean between south beach and just before Trees of Mystery. Such bridges connect the Florida keys and have withstood hurricanes for many years. Not having to climb hills as the present road does, will save gas and wear and tear on vehicles.	Thank you for your email, Mr. Felix. A lot of time and effort has been dedicated to identifying viable, reasonable, feasible, and safe alternatives. A bridge of this type would likely need to be over ten miles long and constructed in deep ocean water. Further, the ocean in this area routinely experiences waves of more than 20-25 feet. The cost associated with constructing a bridge of this length, as well as the potential lack of safety and wear and tear associated with this type of structure, would likely make this an unviable alternative.
Kurt Stremberg, 12/5/2021 Email	Myself and former county supervisors Chuck Blackburn and Roger Gitlin started our community movement to get a bypass done around Last Chance Grade at the time that Caltrans was completing retaining walls and more road work to the tune of twelve million dollars only to have that work a year later starting to fall apart. With our ability to get Congressman Huffman involved with setting up the stakeholders group to get serious movement from Caltrans we as the county of Del Norte were all in support of a bypass only. That is still the goal, not to have repairs done to the current highway location or to just leave it As Is. We have a great need for a new bypass to give us a reliable highway to service us from a very large economic standpoint let alone health	Thank you for your email, Mr. Stremberg.

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	and safety issues. My son is the school principal at the Klamath grade school and drives the highway down from Crescent City each day of the school year which I'm not happy with considering the current highway condition. In my conversations with everyone I have no one that wants to see the highway remain in the current location. I don't believe there is a long-term solution by moving the road bed farther into the unstable hillside or leaving it As Is. One of our stakeholder parties who was an engineer out of Humboldt county said that he felt a tunnel was the best solution considering the cut and fills that a long bypass would encounter plus the left over soil that would have to be transported out of the area. A tunnel seems to be the best solution with the least amount of impact to the Redwood National Park. Thanks, Kurt Stremberg	
Carolyn Mulvihill, Environmental Review Branch, U.S. EPA, 12/6/2021, Letter	The U.S. Environmental Protection Agency (U.S. EPA) has reviewed the October 28, 2021 notice requesting comments on the California Department of Transportation decision to prepare an Environmental Impact Statement for the Last Chance Grade Permanent Restoration Project, and the November 10, 2021 request from Caltrans for the EPA to be a Participating Agency and a Cooperating Agency on the project. Our comments are provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) and Section 309 of the Clean Air Act. The EPA accepts Caltrans' invitation to become a "Cooperating Agency" (as defined in 40 CFR 1508.1). As stated in your request, we agree that EPA's role in this project would include: 1. Provide meaningful and early input on defining the purpose and need, range of alternatives to be considered, and methodologies and level of detail required in the alternatives analysis. 2. Participate in coordination meetings and joint field reviews as appropriate. 3. Provide timely review of early project information, and prepared environmental analyses, to reflect the views and concerns of the EPA on the adequacy of documents, alternatives considered, and the anticipated impacts and mitigation. The EPA's participation as a cooperating agency does not constitute formal or informal approval of any part of this project under any statute administered by the EPA, nor does it limit in any way the EPA's independent review of the draft and final EISs pursuant to Section 309 of the Clean Air Act. The EPA has participated in the extensive early coordination that Caltrans has undertaken with resource agencies and other stakeholders for the project prior to this phase of environmental analysis. We have appreciated the opportunity to provide input	Thank you for your letter, Ms. Mulvihill. Caltrans appreciates your recommendations related to the several topics and resources, including, but not limited to, alternatives analysis, water quality, air resources, Tribal resources, avoidance and minimization measures, Environmental Justice and Climate Change, and cumulative resources. Please see Chapter 2 and Sections 3.2.5, 3.2.6, 3.2.10, 3.3.1, 3.3.5, 3.7, 4.3.5, 4.3.10, 4.3.18, 4.5 for a discussion of these resources.

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	to the analysis of early alternatives and other aspects of project planning. We commend Caltrans on seeking participation and input from a wide representation of regulatory agencies and stakeholders. The EPA appreciates the opportunity to provide the attached scoping comments for Caltrans to consider as the EIS is being prepared. Once the EIS is released for public review, please provide EPA with an electronic copy, or information about where the document is available online. Alternatives Analysis: The EPA recommends that Caltrans explore and objectively evaluate a range of reasonable alternatives and identify opportunities to avoid or minimize adverse environmental impacts, particularly to waters of the United States, while fulfilling the project purpose. The EPA has participated in the extensive early coordination that has taken place with resource agencies and other stakeholders for this project and we are aware of the extensive analyses of preliminary project alternatives that have been performed as a part of this process. EPA recommends including in the Draft EIS a summary of the preliminary alternatives that were eliminated as a part of this process, and briefly discussing the reasons for eliminating these alternatives from further evaluation. Water Resources: Given the proximity of the project to aquatic resources, this project will likely involve the discharge of dredged or fill material into jurisdictional wetlands and waterways. Discharges of dredged or fill material into waters of the United States require authorization by the U.S. Army Corps of Engineers under Clean Water Act Section 404. The Federal Guidelines at 40 CFR Part 230 promulgated under CWA Section 404 (b)(1) provide substantive environmental criteria that must be met to permit such discharges into waters of the United States. The purpose of the Guidelines is to restore and maintain the chemical, physical, and biological integrity of waters of the United States. These goals are achieved, in part, by controlling discharges of dredged or fill material (40 CFR 230.1(a)). Fundamental to the Guidelines is the principle that dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that there is no less environmentally damaging practicable alternative that achieves an applicant's project purpose. In addition, no discharge can be permitted if it will cause or contribute to significant degradation of the waters of the United States, cause or contribute to a violation of a State water quality standard or jeopardize a federally listed species. Water Resources, cont'd: Given the potential impacts associated with the proposed project, Caltrans must clearly demonstrate that the preferred alternative is the least	

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	environmentally damaging practicable alternative (LEDPA) that achieves the overall project purpose while not causing or contributing to significant degradation of the aquatic ecosystem. Identification of the LEDPA is achieved by performing an alternatives analysis that estimates the impacts to jurisdictional waters resulting from each alternative considered. There are three main categories of impact that must be considered during the Section 404(b)(1) Guidelines review process: One, Direct impacts - arise from the actual placement or "footprint" of dredged or fill material into waters of the U.S. Direct impacts are typically measured in area (e.g., acres) or linear (e.g., linear feet) terms. Two, Secondary effects - effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. Common examples of secondary effects include: 1) changes in flow regime or water quality upstream or downstream; 2) increased flooding or dewatering; 3) fragmentation of aquatic habitats; 4) blockage/interruption of wildlife travel corridors; 5) polluted runoff; and 6) thermal impacts to the aquatic environment. Three, Cumulative effects - the changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual discharges of dredged or fill material [40 CFR 230.11(g)]. A watershed in which 25% of the original wetland acreage has been lost due to fill associated with development would be an example of a documented cumulative effect. Cumulative effects may also include "reasonably foreseeable" future activities that would impact the aquatic ecosystem. For example, the potential for future roadway or other development should be considered in the context of cumulative impacts. Water Resources, cont'd: The analysis of secondary and cumulative effects helps inform the determination of whether a proposed discharge would cause or contribute to significant degradation of waters of the U.S. [40 CFR 230.10(c)]. We note that in some cases, an alternative with higher direct impacts but fewer secondary and/or cumulative effects may be viewed as less damaging than one that may involve less direct impact but more substantial secondary or cumulative effects. The EPA is available for pre-application consultation, which provides an opportunity for the applicant to obtain guidance about the nature and extent of the secondary and cumulative impact evaluation that will be needed to support the permit application. Waters Assessment: The waters assessment for each alternative should be of an appropriate scope and detail to identify sensitive areas or aquatic systems with functions highly susceptible to change. We recommend that Caltrans present enough information in the Draft EIS in order to provide decision-makers with adequate detail to	

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	compare impacts to aquatic resources and make a determination as to which alternative will have fewest impacts to aquatic resources. Recommendations: (1) Describe the nature and geographic extent of impacts to the aquatic environment for each alternative that may be practicable. (2) Identify what methodology was employed to assess impacts. (3) Provide a discussion of the functions performed by identified aquatic resources and how they compare to similar ("reference") habitats, and/or how the landscape setting affects the functions and values of identified resources. (4) If available, provide monitoring information from other similar types of projects that may be useful to further understand project impacts. (5) Describe any uncertainties that exist regarding predicted impacts. (6) Provide information on any State or Federally listed threatened or endangered species at the project site, including information on any life cycle or habitat requirements that should be considered. Identify whether impacts can be avoided or minimized based on timing or design considerations. (7) Describe any adverse effects to the aquatic environment that extend beyond the footprint of the fill (secondary effects), and what methodologies were used to evaluate potential secondary effects. (8) Describe how cumulative effects have been assessed and conclusions reached, including constraints (e.g., geographic scope, time periods) and other assumptions that were used in the analysis. (9) Identify whether any waters of the U.S. in the project vicinity are impaired (Clean Water Act Section 303(d) list) and what effect, if any, the proposed discharge may have on the impaired water(s). On-site Avoidance and Minimization Strategies: Identify in the Draft EIS on-site alternatives and design considerations to avoid or minimize impacts to waters. Typically, transportation projects can accomplish this by: (1) using spanned crossings, arch crossings, or oversized buried box culverts over drainages to encourage continuity of sediment transport and hydrological processes, and wildlife passage; (2) moving alignments to avoid impacts to wetlands and waterways; and (3) establishing and maintaining adequate buffers away from aquatic resources. The EPA recommends that the Draft EIS identify on-site measures and modifications for all alternatives to further reduce impacts to waters and wetland resources. Air Quality: The project area is currently in attainment for all criteria pollutants. Identify in the Draft EIS potential air quality impacts from this project, including a projection of the air emissions expected from construction and operation of the project, and demonstrate that those emissions would not exceed the National Ambient Air Quality Standards for criteria pollutants.	

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	Air Quality, cont'd: While the area is in attainment, fugitive dust is still a pollutant of concern that would be generated during construction, and therefore, dust control Best Management Practices should be utilized. The EPA recommends that the Draft EIS include a Construction Emissions Mitigation Plan for fugitive dust and other pollutants. We recommend that the best available control measures for all pollutants be implemented, including those listed below. Air Quality, cont'd: Fugitive Dust Source Controls: (1) Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions. (2) Install wind fencing and phase grading operations where appropriate. Operate water trucks or consider other options for stabilization of soil and disturbed surfaces under windy conditions. (3) When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph. Air Quality, cont'd: Mobile and Stationary Source Controls: (1) Reduce use, trips, and unnecessary idling from heavy equipment. (2) Maintain and tune engines per manufacturer's specifications to perform at EPA certification, where applicable, levels and to perform at verified standards applicable to retrofit technologies. Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications. (3) Prohibit any tampering with engines and require continuing adherence to manufacturer's recommendations. (4) If practicable, lease new equipment meeting the most stringent of applicable federal standards, commit to using the best available emissions control technologies on all equipment, and where appropriate use alternative fuels such as natural gas and electric. (5) Utilize EPA-registered particulate traps and other appropriate controls where suitable to reduce emissions. Consultation with Tribal Governments: EO 13175, Consultation and Coordination with Indian Tribal Governments (November 6, 2000) was issued to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, and to strengthen the United States government-to-government relationships with Indian Tribes. In 2009, the Presidential Memorandum on Tribal Consultation was issued, and required each agency to prepare and periodically update a detailed plan of action to implement the directive of EO 13175. In January 2021, the Administration committed to strengthening the relationship	

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	between the Federal Government and Tribal Nations and to advancing equity for Native Americans. A Presidential Memorandum on Tribal consultation directed federal agencies to develop robust plans for ensuring meaningful Tribal consultation on agency work that may affect Tribal Nations and the people they represent. The EPA commends Caltrans on engaging with Tribal partners through the early coordination process and recommends that Caltrans continue to consult with Tribes in analyzing potential project impacts and determining potential mitigation options. Consultation with Tribal Governments, cont'd: Recommendations: (1) In the EIS, describe the process and outcome of government-to-government consultation between Caltrans and the tribal governments that have tribal resources within the project area, identify issues or concerns that were raised (if any), how those issues were addressed, and what additional or continuing consultations may be warranted. (2) To the extent appropriate, solicit and elevate Indigenous Traditional Ecological Knowledge (ITEK) into the Tribal consultation process to better inform decision-making. (See the November 14, 2021 joint White House/Council on Environmental Quality Memorandum, https://www.whitehouse.gov/wp-content/uploads/2021/11/111521-OSTP-CEQ-ITEK-Memo.pdf). Environmental Justice and Climate Change: Executive Order 12898 was issued in 1994 to focus federal attention on the environmental and human health effects of federal actions on minority and low-income populations, with the goal of achieving environmental protection for all communities. In 2021, Executive Order 13985, Advancing Racial Equity and Support of Underserved Communities through the Federal Government, reiterated these goals in stating that each agency must assess whether, and to what extent, its programs and policies perpetuate systemic barriers to opportunities and benefits for people of color and other underserved groups. EO 13985 further stated that agencies shall consult with members of communities that have been historically underrepresented in the Federal Government and underserved by, or subject to discrimination in, Federal policies and programs. Environmental Justice and Climate Change, cont'd: Executive Order 14008 on Tackling the Climate Crisis at Home and Abroad (January 27, 2021) recognizes that the climate crisis is profound and directs the federal government to drive assessment, disclosure, and mitigation of climate pollution and climate-related risks. The EO also directs federal agencies to achieve environmental justice as a part of their missions by developing programs, policies, and activities to address the disproportionately high and adverse	

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	impacts on human health, environmental, climate-related and other cumulative impacts on these communities, as well as the accompanying economic challenges of such impacts. Environmental Justice and Climate Change, cont'd: Promising Practices for Environmental Justice Methodologies in NEPA Reviews (2016) is a compilation of methodologies from current agency practices identified by the NEPA Committee of the Federal Interagency Working Group on Environmental Justice. The document focuses on the interface of environmental justice considerations through NEPA processes and provides recommendations on applying EJ methodologies that have been established in federal NEPA practice. Environmental Justice and Climate Change, cont'd: Recommendations: (1) Consider Promising Practices for EJ Methodologies in NEPA Reviews when developing the environmental justice analysis. (2) Include a description of the area of potential impact used for the environmental justice impact analysis and provide the source of demographic information. (3) Define potential environmental justice concerns, including any environmental justice issues raised during scoping meetings and other early coordination. Discuss the key issues where environmental justice is potentially a concern, such as relocation, air quality, noise, vibration, access to property, pedestrian safety, etc. (4) Define the reference community and the affected community. The definitions are used to analyze whether there are disproportionately high and adverse human health or environmental impacts by comparing the impacts to the affected community with the impacts to the reference community. (5) Disclose whether the project will result in a disproportionate and adverse impact on minority or low-income populations. Ensure this conclusion is reported consistently throughout the EIS. This statement should be supported by sufficient information for the public to understand the rationale for the conclusion. (6) Propose appropriate mitigation if disproportionately high and adverse impacts on minority or low-income populations are likely to result from the proposed action and any alternatives. (7) Include in the environmental justice analysis a summary of past impacts to minority or low-income communities from the existing transportation facility and if and how the proposed project may mitigate past impacts. (8) Identify any potential climate change-related impacts to communities with environmental justice concerns along with climate-specific mitigation measures to reduce impacts. Environmental Justice and Climate Change, cont'd: Executive Order 13990 on Protecting Public Health and the Environment and Restoring Science to Tackle the	

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	Climate Crises (January 20, 2021) declares that it is essential that agencies capture the full costs of greenhouse gas emissions as accurately as possible, including taking global damage into account. Given the geography of the project area and the existing impacts of extreme weather events on the area, the Draft EIS should discuss how the effects of climate change could exacerbate these events and how the project will be designed to address potential climate change-related impacts. Recommendations: (1) The EPA recommends that Caltrans review and incorporate the findings and forecasts from the most recent National Climate Assessment and other available information resources as part of a climate analysis for the proposed project. (2) The climate analysis should consider how climate change could affect the project area, specifically within sensitive areas, and assess how the potential impacts of the project could be exacerbated by climate change, in particular with regard to extreme weather events, and how the project will be designed to address these issues. (3) The analysis should also consider the potential effects of the proposed project on climate change, as indicated by its estimated GHG emissions. Cumulative Impact Analysis: Effects from the proposed project may have an impact on the environment that results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions. Impact-causing actions include both transportation and non-transportation activities. Include in the Draft EIS an analysis of these cumulative impacts, with consideration of non-transportation projects such as large-scale developments and approved urban planning projects that are reasonably foreseeable and are identified within city and county planning documents. It is beneficial to the public and decisionmakers to understand the cumulative impact that this project may have on resources when also considering other ongoing projects in the area. The cumulative impact analysis for the project provides an opportunity to identify potential large, landscape-level regional impacts, as well as potential large-scale mitigation measures and an opportunity to examine landscape-level impacts to all sensitive resources on a regional scale. The Draft EIS can guide potential avoidance and minimization measures, while focusing design and mitigation efforts. Cumulative Impact Analysis, cont'd: Recommendations: (1) Conduct a thorough cumulative impact assessment, including a complete list of reasonably foreseeable actions, including non-transportation projects. EPA recommends use of Caltrans' cumulative impacts guidance at http://www.dot.ca.gov/ser/cumulative_guidance/purpose.htm. (2) For each resource	

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	analyzed: A. Identify the current condition of the resource as a measure of past impacts. For example, the percentage of wetlands lost to date. B. Identify the trend in the condition of the resource as a measure of present impacts. For example, the health of the resource is improving, declining, or stasis. C. Identify the future condition of the resource based on an analysis of the cumulative impacts of reasonably foreseeable projects or actions added to existing conditions and current trends. D. Assess with specific measures, the contribution of the impact from each alternative to the long term health of the resource. E. Disclose the parties that would be responsible for avoiding, minimizing, and mitigating those adverse impacts. F. Identify landscape-level opportunities to avoid and minimize impacts, including working with other entities.	
Bruce Campbell, 12/6/2021, Email	These are my scoping comments regarding the Last Chance Grade project. Whichever alternative is chosen, including the No Action Alternative, the Last Chance Grade highway project must: 1. minimize the removal of trees – particularly minimizing the removal of large conifer trees; and 2. minimize the size of equipment storage and work areas to prevent trampling of meadow-type areas which reduces rodent population which is dined upon by the Northern Spotted Owl and other large birds. Do you think that the alternative (Alt. F) involving a 10,000-foot tunnel is the alternative which, over time, will result in the loss of the least number of sizable conifer trees? If this is the case, and the project can be accomplished with little likelihood that such a tunnel project might lead toward a major debris flow, then this alternative is likely best. I surmise the most trees would be cut in the next couple decades if Alternative X was chosen and Hwy. 101 moved 130 feet inland. Over, say, a fifty year period, the road may slip enough times that "fixes" on such may eventually lead toward more conifers being logged relating to the No Project Alternative than the relocate the highway 130 miles inland alternative (Alt. X). Please consider the life cycle of the marbled murrelet when considering times of day and times of year that the Last Chance Grade project will be carried out – no matter which alternative is chosen. Be sure to minimize food scrap litter associated with all alternatives to minimize attracting corvids which are not good for marbled murrelet habitat areas.	Thank you for your letter, Mr. Campbell. In reference to your comments, please see Chapter 2, *Project Alternatives*, and Section 3.4, *Biological Environment*.

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	Future environmental impact documentation for Alternative F should examine possible locations where the blasted material would be hauled – and what would be done with it. Best wishes for a project positive for wildlife.	
Victor Bjelajac, Superintendent, North Coast Redwoods District, California Department of Parks and Recreation, 12/6/2021, Email	The California Department of Parks and Recreation (CDPR) has received the Notice of Preparation and Notice of Intent for the Last Chance Grade Permanent Restoration Project. The California Department of Transportation (Caltrans) is the lead agency for both the California Environmental Quality Act and National Environmental Policy Act. The public comment period ends December 6, 2021 at 5pm. Redwood and National State Parks is a World Heritage Site coordinated in part by the United Nations Educational, Scientific and Cultural Organization (UNESCO). CDPR has been notified that the UNESCO has requested the environmental and social impacts of each alternative is analyzed with respect to potential impacts upon the site's Outstanding Universal Value (OUV) in a format that is compatible with the International Union for Conservation of Nature (IUCN) World Heritage Advice Note on Environmental Assessment. We look forward to working with Caltrans on this important regional project as the analysis develops.	Thank you for your letter, Mr. Bjelajac. Caltrans acknowledges the project has the potential to impact a UNESCO site, and a thorough analysis of potential impacts on sensitive resources is included throughout the DED.
Tina Bartlett, Regional Manager, Department of Fish and Wildlife, Northern Region, CA Dept. of Fish and Wildlife, 12/7/2021, Email	On November 4, 2021, the California Department of Fish and Wildlife (CDFW) received a Notice of Preparation and Notice of Intent (NOP/NOI) for the preparation of a Draft Environmental Impact Report/Environmental Impact Statement (DEIR/EIS) from the California Department of Transportation (Lead Agency) for the Last Chance Grade Permanent Restoration Project (Project), Del Norte County, California. CDFW understands that the Lead Agency will accept comments on the Project through December 6, 2021. As a Trustee Agency for the State's fish and wildlife resources, CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants and the habitat necessary to sustain their populations. As a Responsible Agency, CDFW administers the California Endangered Species Act (CESA) and other provisions of the Fish and Game Code (FGC) that conserve the State's fish and wildlife public trust resources. CDFW offers the following comments and recommendations in our role as Trustee and Responsible Agency pursuant to the California Environmental Quality Act	Thank you for your letter, Ms. Bartlett. Caltrans appreciates your comments related to biological resources, mitigation, and CEQA requirements. Please see Chapter 2 and Sections 3.3.1, 3.4, 3.7, 4.3.4, and Chapter 5 for a discussion of these topics.

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	(CEQA; California Public Resource Code §21000 et seq.). CDFW participates in the regulatory process in its roles as Trustee and Responsible Agency to minimize Project impacts and avoid potential significant environmental impacts by recommending avoidance and minimization measures. These comments are intended to reduce the Project's impacts on public trust resources. Project Description: The Lead Agency proposes to realign the 3.5-mile-long section of U.S. Highway 101 (US 101) in Del Norte County from post mile (PM) 12.0 to 15.5 from Wilson Creek to approximately nine miles south of Crescent City. The Project area is almost entirely within portions of Redwood National and State Parks. According to the NOP/NOI, the EIR/EIS will consider two alternatives: Alternative X would involve relocation and reengineering of the existing roadway by approximately 130 feet inland (east) to improve geotechnical stability and longevity. Alternative X would involve constructing a series of retaining walls (single and terraced) to minimize the potential for landslides on the roadway. Drainage improvements may also be included in this alternative. Alternative F would construct a 10,000-foot-long tunnel that would diverge from the existing roadway near PM 14.06 and reconnect to US 101 near PM 15.5, thereby avoiding the portion of existing roadway most prone to landslides and geologic instability. The DEIR/EIS will also evaluate a No Project Alternative that would entail no new long-term feasible and sustainable solution for Last Chance Grade but would instead be a continuation of ongoing maintenance and repair activities needed to enable ongoing roadway operations. CDFW Consultation History: CDFW consultation for this Project began in 2015, with several CDFW staff participating in a variety of working groups and related meetings. CDFW appreciates the level of communication and coordination by the Lead Agency. While many Project alternatives, potential Project impacts, and potential mitigation for those impacts have been discussed since 2015, the NOP/NOI does not contain information about potential Project impacts or mitigation. CDFW looks forward to reviewing the DEIR/EIS and providing comments on specific Project components, impacts, and proposed mitigation strategies. CDFW Permitting: The proposed Project will require a Lake or Streambed Alteration Agreement pursuant to FGC 1602 if it will result in substantial impacts to the bed, bank, or channel of streams. If the Project will result in take (defined by FGC Section 86 as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill") of any species listed as Threatened, Endangered, or as a Candidate for listing pursuant	

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	to the California Endangered Species Act (CESA), the Project will require an appropriate take authorization pursuant to CESA. CDFW looks forward to continued coordination with the Lead Agency regarding state permitting requirements and mitigation approaches. Environmental Setting and Special Status Species: Special Status Species: The Project area provides habitat for and could result in impacts to a variety of sensitive and special status aquatic and terrestrial fish, wildlife, and plant species, including but not limited to: State and Federally Threatened Southern Oregon Northern California coho salmon (Oncorhynchus kisutch) and northern spotted owl (*Strix occidentalis caurina*); State Endangered and Federally Threatened marbled murrelet (*Brachyramphus marmoratus*) and Humboldt marten (*Martes caurina humboldtensis*); State Endangered willow flycatcher (*Empidonax traillii*); State Species of Special Concern northern red-legged frog (*Rana aurora*), Pacific tailed frog (*Ascaphus truei*), southern torrent salamander (*Rhyacotriton variegatus*), foothill yellow-legged frog (*R. boylii*), Sonoma tree vole (*Arborimus pomo*), white-footed vole (*A. albipes*), Fisher – west coast DPS (Pekania pennanti), yellow warbler (Setophaga petechia), olive-sided flycatcher (*Contopus cooperi*), Purple Martin (*Progne subis*), Vaux's swift (*Chaetura vauxi*); State Fully Protected species such as American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), and ring-tailed cat (*Bassariscus astutus*); and rare plants such as California Rare Plant Rank (CRPR) 2B.2 ghost-pipe (M*onotropa uniflora*), Oregon coast paintbrush (*Castilleja litoralis*), and CRPR 1B.1 Wolf's evening-primrose (*Oenothera wolfii*). Sensitive Natural Communities: Impacts to a number of Sensitive Natural Communities are likely as a result of a variety of Project activities. Surveys that will be used to inform the DEIR/EIS should follow CDFW's 2018 Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. CDFW recommends that, in addition to a protocol level floristic survey for rare plants, surveys identify any natural communities with a rank of S1-S3. Natural communities with ranks of S1-S3 are considered Sensitive Natural Communities that should be addressed in the DEIR/EIS. Please see https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities for more information. Old Growth Redwood Forest Habitats: While information has not been provided on the extent of potential impacts to this habitat type, it appears that the Project may result in potentially significant impacts to old-growth forest habitat. Impacts of losing old-growth	

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	forests and large old trees from the landscape are long-term and far reaching and limit available habitat for old-growth dependent species for decades or centuries. Impacts include both the immediate and cumulative sustained loss of old-growth wildlife habitats, and the associated ecosystem inputs that drive and sustain these old-growth forests. CDFW recommends the DEIR/EIS propose appropriate mitigation for any potentially significant impacts to old-growth forest habitat, including a timeline for mitigation activities that provides for implementation concurrently with or in advance of the Project. Mitigation measures must be fully enforceable through permit conditions, agreements, or other legally binding instruments. Old Growth Redwood Forest Habitats, cont'd: Mitigation for the loss of old-growth forest should focus on avoidance, retention, and recruitment of late-seral forest elements on-site and in-kind. If this is not possible, off-site and/or out-of-kind mitigation will likely be required for Project impacts. CDFW is available to discuss mitigation ideas and approaches. Impacts to Wetlands: It is State and Federal policy to ensure that proposed projects result in no net loss of wetland or riparian habitat values or acreage. The DEIR/EIS should include a detailed analysis of potential impacts to wetland and riparian habitats including direct, indirect, and cumulative impacts to these resources. If the Project will result in the loss of wetland or riparian habitat, the DEIR/EIS should identify mitigation for their loss. A common mitigation ratio for the loss of wetland and riparian habitat is at least 3:1, but Project-specific ratios must be developed based on the impacts identified in the DEIR/EIS. Wildlife Connectivity: The two Project Alternatives are likely to differ greatly in terms of the degree to which they could interfere with the movement of native resident or migratory wildlife within a wildlife corridor. The Project area is within a habitat connectivity linkage identified in the joint Caltrans - CDFW California Essential Habitat Connectivity Project (Spencer et al. 2010). The Project area is part of an important wildlife corridor for large ungulates such as Roosevelt elk (*Cervus canadensis roosevelti*) and mule deer (*Odocoileus hemionus*) as well as mesocarnivores such as Humboldt marten, Fisher (*Pekania pennanti*), and ring-tailed cat. Additionally, the Project area supports a diversity of amphibian species such as northern red-legged frog, foothill yellow-legged frog, and Del Norte salamander (*Plethodon elongatus*), and small mammals such as Sonoma tree vole and white-footed vole.	

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	Wildlife Connectivity, cont'd: CDFW is particularly concerned about potential impacts to northern red-legged frog as a result of the Project. CDFW is aware of a substantial northern red-legged frog breeding population in the DeMartin Pond, approximately 0.25 miles from the southern end of the Project area, and the DEIR/EIS must consider the annual movement of adult frogs to this pond as well as dispersal of post-metamorphic juveniles from the pond to adjacent uplands. In a 2021 study funded by Caltrans, this segment of US 101 was identified as a "Highway Segment of Concern" for northern red-legged frog (Brehme and Fisher 2021). The northern red-legged frog is a State Species of Special Concern (SSC), a designation indicating that the species is in decline, and intended to encourage conservation efforts before these species become rare enough to warrant listing pursuant to State or Federal Endangered Species Acts (Thomson et al. 2016). SSCs are also considered "Species of Greatest Conservation Need" in California's State Wildlife Action Plan (CDFW 2015). Wildlife Connectivity, cont'd: Because of these wildlife passage concerns, the DEIR/EIS should include mitigation measures, based on best available science, to maintain or improve passage for terrestrial wildlife of all sizes through this known wildlife corridor. CDFW notes that tunnels (i.e., Alternative F) typically serve as wildlife overpasses, and that this alternative would retain full permeability for wildlife over the 10,000-foot length of the tunnel. However, if Alternative X is chosen, permeability will continue to be impacted by the roadway. Therefore, if Alternative X is chosen, the Lead Agency should improve connectivity and permeability for wildlife to the greatest extent feasible, by considering features to help terrestrial wildlife of all sizes safely pass between habitats on either side of US 101. This could be achieved by construction of wildlife overpasses, by oversized culverts beneath the roadway, and by installation of safe amphibian passageways at a variety of locations along the roadway. CDFW recommends resources such as the recent guidance prepared for Caltrans by the Western Transportation Institute in collaboration with the United States Geological Service (Langton and Clevenger 2021). Wildlife Connectivity, cont'd: Because the NOP/NOI does not describe Project activities in detail, this is not an exhaustive list of species or habitats that may be impacted by the Project. Conversely, some of the species or habitats listed here may not be impacted by Project activities, depending on specific details of Project components and actions. CDFW looks forward to reviewing the DEIR/EIS in order to be able to provide more focused comments on Project impacts to fish, wildlife, and plant resources and habitats.	

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	Potentially Significant Impacts: CDFW has identified a number of impacts that could, depending on forthcoming specific details of Project components and actions, be determined to be potentially significant impacts. The Lead Agency should evaluate these impacts in the DEIR/EIS to determine whether they are potentially significant and whether mitigation is necessary to reduce project impacts to less than significant. These impacts may include, but are not limited to: (1) Take (defined by FGC Section 86 as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill") of special status species (State-and federally-listed species and/or State Species of Special Concern); (2) Impacts to rare plants from Project construction; (3) Impacts to Sensitive Natural Communities from Project construction Permanent impacts to old-growth forest habitats; (4) Removal, degradation, and/or fragmentation of habitat for special status species; (5) Impacts to wildlife corridors and connectivity; (6) Disturbance to wildlife via light, noise, vibration, and other impacts from Project construction. Potentially Significant Impacts, cont'd: The Lead Agency must include feasible mitigation measures for impacts determined to be potentially significant in order to reduce these impacts a to less than significant level, pursuant to CEQA section 21002. Mitigation measures must contain sufficient details and performance standards to avoid improperly deferring mitigation until some future time, pursuant to CEQA Guidelines section 15126.4 (a)(1)(B). The mitigation measures should, at minimum, commit to performance standards such as mitigation ratios and success criteria, and should provide location(s) of on or off-site mitigation areas, including information regarding land ownership and future proposed management plans. These details should be incorporated into a draft Mitigation Monitoring and Reporting Program (MMRP), which should be circulated with the DEIR/EIS for public review and comment. CDFW looks forward to continuing to coordinate with the Lead Agency in developing appropriate mitigation that will reduce Project impacts to less than significant and fulfill State permitting requirements. Environmental Data: CEQA requires that information developed in EIRs and negative declarations be incorporated into a database that may be used to make subsequent or supplemental environmental determinations (Pub. Resources Code Section 21003, subd. (e).). Accordingly, any special status species and/or sensitive natural communities detected during Project surveys must be reported to the California Natural Diversity Database (CNDDB). The online submission and CNDDB field survey forms, as well as information on which species are tracked by the CNDDB, can be found under their	

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	corresponding tabs at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Submitting-Data. Summary of Comments and Recommendations: 1. Rare plant and Sensitive Natural Community Surveys that will be used to inform the DEIR/EIS should follow CDFW's 2018 Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. The DEIR/EIS should evaluate impacts to Sensitive Natural Communities for potential significance and propose adequate mitigation as necessary. The DEIR/EIS should propose appropriate mitigation for any potentially significant impacts to old-growth forest habitat, including a timeline for mitigation activities that provides for implementation concurrently with or in advance of the Project. Mitigation measures must be fully enforceable through permit conditions, agreements, or other legally binding instruments. The DEIR/EIS should include a detailed analysis of potential impacts to wetland and riparian habitats including direct, indirect, and cumulative impacts to these resources. If the Project will result in the loss of wetland or riparian habitat, the DEIR/EIS should identify appropriate mitigation for their loss. The DEIR/EIS should include mitigation measures to maintain wildlife movement through the wildlife corridor within the Project site. If Alternative X is chosen, the Lead Agency should improve connectivity and permeability for wildlife, to the greatest extent feasible, by incorporating infrastructure, based on best available science, to help terrestrial wildlife of all sizes safely pass between habitats on either side of US 101. This could be achieved by construction of wildlife overpasses, by oversized culverts beneath the roadway, and by installation of safe amphibian passageways at a variety of locations along the roadway. The DEIR/EIS must include feasible mitigation measures for impacts determined to be potentially significant. The mitigation measures should, at minimum, commit to performance standards such as mitigation ratios and success criteria, and should provide location(s) of on or off-site mitigation areas, including information regarding land ownership and future proposed management plans. These details should be	

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	incorporated into a draft MMRP, which should be circulated with the DEIR/EIS for public review and comment. Data collected for the purposes of the Project must be reported to CNDDB and/or submitted to the appropriate database pursuant to CEQA Section 21003(e). Thank you for the opportunity to comment on this Project. CDFW staff are available to meet with you to consult with or address the contents of this letter in greater depth.	

CHAPTER 6. List of Preparers

The following Caltrans staff and consultants contributed to the preparation of this EIR/EIS.

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CHAPTER 7. Distribution List

The Draft EIR/EIS has been distributed to the following entities:

7.1 Federal Agencies

Federal Agency	Address
Federal Highway Administration	Shawn Oliver, Planning and Environmental Unit Federal Highway Administration 650 Capitol Mall Suite 4-100 Sacramento, CA 95814
National Marine Fisheries Service	Jeff Jahn, Branch Chief National Marine Fisheries Service 1655 Heindon Road Arcata, CA 95518
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7.2 State Agencies

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7.3 Regional/County/Local Agencies

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7.4 Tribal Governments

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Yurok Tribe	Honorable Joseph James Yurok Tribe 190 Klamath Boulevard Klamath, CA 95548

7.5 Utilities

Name of Utility Company	Address
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7.6 Interested Groups, Organizations, and Individuals

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Environmental Protection Information Center	Tom Wheeler, Executive Director Environmental Protection Information Center 145 G Street, Suite A Arcata, CA 95521
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7.8 Elected Officials

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7.9 Emergency Responders

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CHAPTER 8. References

8.1 Printed References

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8.2 Personal Communications

Holroyd, Patricia. Senior Museum Scientist. Museum of Paleontology, University of California, Berkeley, CA. August 12, 2022—email about search of paleontological records for the Last Chance Grade Project to Kim Scott, Principal Investigator for Paleontology, Cogstone, Orange, CA.

