Established in 1938

INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

RTI INFRASTRUCTURE, INC.
EUREKA SUBSEA FIBER OPTIC CABLES PROJECT

February 2021

CEQA Lead Agency:
California State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, California 95825

Applicant:
RTI Infrastructure, Inc.
268 Bush Street, #77
San Francisco, CA 94104

MISSION STATEMENT

The California State Lands Commission provides the people of California with effective stewardship of the lands, waterways, and resources entrusted to its care through preservation, restoration, enhancement, responsible economic development, and the promotion of public access.

CEQA DOCUMENT WEBSITE

www.slc.ca.gov/ceqa/

Geographic Location (Point at Mean High-Tide Line)

Latitude: 40º 48.19’ N
Longitude: 124º 12.05’ W
NAD83 Datum

Cover Photo: Aerial view of the cable landing site

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APPENDICES

In bound copies, appendices are provided on CD.

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LIST OF ABBREVIATIONS AND ACRONYMS

	2017 Scoping Plan	CARB 2017 Climate Change Scoping Plan
	°F	degrees Fahrenheit
A	AB	Assembly Bill
	AMS	Applied Marine Sciences
	APM	Applicant Proposed Measure
	APN	Assessor's Parcel Number
	Applicant	RTI Infrastructure, Inc.
	AWOIS	Automated Wreck and Obstructions Information System
B	BACT	Best Available Control Technology
	BAU	business as usual
	BOEM	Bureau of Ocean Energy Management
	BSA	biological study area
C	CAA	Clean Air Act
	CAAQS	California ambient air quality standards
	cable	fiber optic cable
	Cal OES	California Governor's Office of Emergency Services
	Caltrans	California Department of Transportation
	CARB	California Air Resources Board
	CCA	California Coastal Act
	CCC	California Coastal Commission
	CDFG	California Department of Fish and Game
	CDFW	California Department of Fish and Wildlife
	CEQA	California Environmental Quality Act
	CESA	California Endangered Species Act
	CFR	Code of Federal Regulations
	CGS	California Geological Survey
	CH_4	methane
	CHIRP	compressed high-intensity radiated pulse
	CHRIS	California Historical Resources Information System
	CNDDB	California Natural Diversity Database
	CNPS	California Native Plant Society
	CO	carbon monoxide
	CO_2	carbon dioxide
	CO_2e	CO_2 equivalent
	CRHR	California Register of Historical Resources
	CRPR	California Rare Plant Rank
	CSLC	California State Lands Commission

D	dB	decibel
	DC	direct current
	DEPM	California State Lands Commission's Division of Environmental Planning and Management
	DPM	diesel particulate matter
	DPS	distinct population segment
E	ECOS	Environmental Conservation Online System
	EFH	essential fish habitat
	EIR	Environmental Impact Report
	EPA	U.S. Environmental Protection Agency
	ESHA	environmentally sensitive habitat area
	ESU	evolutionary significant unit
F	FEMA	Federal Emergency Management Agency
	FESA	federal Endangered Species Act
	FHWA	Federal Highway Administration
	FMP	fishery management plan
G	GHG	greenhouse gas
	GPS	global positioning system
	GWP	global warming potential
H	HAPC	habitat area of particular concern
	Harbor District	Humboldt Bay Harbor, Recreation, & Conservation District
	HBAP	Humboldt Bay Area Plan
	HCAOG	Humboldt County Association of Governments
	HDD	horizontal directional drilling
	HLRR	Hammond Lumber Railroad
	HOODS	Humboldt Open Ocean Disposal Site
I	IPaC	Information for Planning and Consultation
	IPCC	Intergovernmental Panel on Climate Change
	IS	Initial Study
	IS/MND	Initial Study/Mitigated Negative Declaration
K	kV	kilovolt
L	LAFCo	Humboldt County Local Agency Formation Commission
	LCP	Local Coastal Program
	LOS	level of service
	LV	landing vault

M	Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
	MMO	mixed metal oxide
	MMP	Mitigation Monitoring Program
	MM	mitigation measure
	MMT	million metric ton(s)
	MND	Mitigated Negative Declaration
	MSA	marine biological study area
	MWMCP	Marine Wildlife Monitoring and Contingency Plan
N	N_2O	nitrous oxide
	NAAQS	national ambient air quality standards
	NAHC	Native American Heritage Commission
	NCAB	North Coast Air Basin
	NCRWQCB	North Coast Regional Water Quality Control Board
	NCUAQMD	North Coast Unified Air Quality Management District
	nm	nautical mile(s)
	NMFS	National Marine Fisheries Service
	NO	nitric oxide
	NO_2	nitrogen dioxide
	NOAA	National Oceanic and Atmospheric Administration
	NO_X	nitrogen oxides
	NPDES	National Pollutant Discharge Elimination System
	NRCS	Natural Resources Conservation Service
	NRHP	National Register of Historic Places
	NSR	New Source Review
	NWIC	Northwest Information Center
O	O_3	ozone
	OCS	Outer Continental Shelf
	OEHHA	California Office of Environmental Health Hazard Assessment
	OGB	ocean ground bed
	OHP	California Office of Historic Preservation
	OHWM	ordinary high-water mark
	OPC	Ocean Protection Council
	OPR	Governor’s Office of Planning and Research
P	PCSD	Peninsula Community Services District
	PG&E	Pacific Gas and Electric Company
	PM_{10} and $PM_{2.5}$	particulate matter with diameters of 10 and 2.5 microns or less
	ppm	parts per million

	PPV	peak particle velocity
	PTS	permanent threshold shifts
R	ROGs	reactive organic gases
	ROV	remotely operated vehicle
	RTI	RTI Infrastructure, Inc.
S	SO_2	sulfur dioxide
	SOx	sulfur oxide
	SP-CA	Singapore to California
	SPL	sound pressure level
	SWPPP	stormwater pollution prevention plan
	SWRCB	State Water Resources Control Board
T	TAC	toxic air contaminant
	THPO	Tribal Historic Preservation Officer
	TTS	temporary threshold shifts
U	USACE	U.S. Army Corps of Engineers
	USCG	U.S. Coast Guard
	USFWS	U.S. Fish and Wildlife Service
	USGS	U.S. Geological Survey
V	VMT	vehicle miles traveled

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The California State Lands Commission (CSLC) is the lead agency under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.) and has prepared this Initial Study (IS)/Mitigated Negative Declaration (MND) that analyzes and discloses the environmental effects associated with the proposed RTI Infrastructure, Inc. Eureka Subsea Fiber Optic Cables Project (Project) in the unincorporated community of Samoa, Humboldt County. The Project would authorize RTI Infrastructure, Inc. (Applicant or RTI) to build telecommunication infrastructure on land (terrestrial) and in ocean (marine) areas within and offshore of Samoa. The infrastructure includes transpacific fiber optic cables (cables) that would carry telecommunication data to connect the United States with Asia (e.g., Singapore, Taiwan, and Japan) and Australia (Figure ES-1).

The CSLC prepared an MND because it determined that, while the IS identifies potentially significant impacts related to the Project, mitigation measures (MMs) incorporated into the Project proposal and agreed to by the Applicant would avoid or mitigate those impacts to a point where no significant impacts would occur.

PROPOSED PROJECT

The Applicant proposes to install and operate four cables (coming from Asia or Australia) and their related structures on land above the ordinary high-water mark (OHWM) (outside of the CSLC's jurisdiction) (Figure ES-2). The terrestrial Project components include the following:

- **Cable Landing Site.** The four cables would land in an unoccupied area of the Humboldt Bay Harbor, Recreation, & Conservation District. An approximately 150-foot by 150-foot area would be used for the following key Project components:
    - Staging Area. The cable landing site would be used to park vehicles and store construction-related equipment for both terrestrial and marine work.
    - Landing Vaults (LVs). Four LVs (approximately 8 feet wide by 12 feet long by 9 feet deep) would be buried with a cast-iron vault cover (36 inches in diameter) at grade level, meaning flush with the ground.
    - Landing Pipes. A separate landing pipe (described below) would be installed from each of the LVs and would exit offshore into the Pacific Ocean. Once the landing pipes are installed, each individual cable (from different Project phases) would be pulled from the Pacific Ocean through its own designated landing pipe into its own designated LV.
    - Ocean Ground Beds (OGB) Onshore. A grounding system known as an OGB would be needed for cathodic protection to control corrosion and to provide a ground for the electricity travelling through the cable to power the marine cable amplifiers. The four OGBs (one for each cable) would be

installed onshore (underground in the cable landing site or offshore (about 50 feet west of where the landing pipes would exit).

The scope of this Project ends at 3 nautical miles (nm) offshore to correspond with the boundaries of CSLC's jurisdiction (after 3 nm, federal waters extend 12 nm from shore and the United States Exclusive Economic Zone extends 200 nm from shore). The following marine Project components would start at the OHWM of the Pacific Ocean and end at 3 nm from the shoreline:

- **Landing Pipes.** As noted above, four landing pipes (approximately 5 to 6 inches in diameter) would be installed. Each landing pipe would be approximately 4,600 feet long, starting from the LV and ending offshore. The landing pipes would be installed at least 35 feet under the cable landing site and beach using the horizontal directional drilling (HDD) construction method; they would exit at about 3,600 feet (0.5 nm or 0.6 mile) offshore at a water depth of approximately 40 feet. This exit point would be just beyond the surf zone where it would be safe for divers to work.
- **Fiber Optic Cables.** The cable lay ship (with the help of a dive support vessel and divers) would bring each cable (in different Project phases) from its international destination to the end of the landing pipe at about 3,600 feet offshore (or 4,600 feet from the LVs) where the ocean water depth is approximately 40 feet. Each cable then would be pulled through its own individual landing pipe (constructed in Phase 1) to its respective LV.

  Before reaching the landing pipe, the cable would be installed as follows:

  - In ocean water 5,904 feet deep or more, the cables would lay directly on the ocean floor at approximately 32 miles offshore from the LVs at the Outer Continental Shelf.
  - In ocean water between 98 and 5,904 feet deep, the cable would be buried under the ocean floor by cable plow, or by diver-assisted or remotely operated vehicle (ROV)- assisted post-lay burial, depending on ocean floor characteristics.
  - In ocean water between 40 and 98 feet deep, the cable would be installed by diver-assisted post-lay burial.
- **Ocean Ground Beds.** An OGB would be installed onshore or offshore (to be determined after the electronic components of the cable system are designed and manufactured) for each cable to ground the cable. An OGB is crucial for cathodic protection to control corrosion and to provide a ground for the electricity that would travel through the cable to power the marine cable amplifiers.

The proposed Project would be completed when the four cables are installed into the landing pipes and are pulled into their respective LVs. The LVs also would provide access to the landing pipes for maintenance activities related to the cables. After completing the

Project, the four cables would connect to a single vault that would be built by a local telecommunications company (Vero Networks)[1] and would be outside of the scope of this Project. The local telecommunications company project is a separate project and has independent utility from the Project analyzed in this MND and requires a separate CEQA analysis. Each cable would be connected to this soon-to-be-built vault that would be located adjacent to the Project vaults. The local telecommunications company would then install conduits west to New Navy Base Road and then northerly along New Navy Base Road to connect with an existing building that will become a new cable landing station (also not part of the Project).

This Project would be built in four phases. Phase 1 (year 2021) would be the initial phase that would build the infrastructure to receive four cables and bring the very first cable from Singapore to California. Phase 2 (year 2022) would connect California to Taiwan. Phase 3 (year 2023) and Phase 4 (year 2024) would connect California to either Japan or Australia; it has not yet been determined which connection would be installed first.

ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION MEASURES

The environmental issues checked below in Table ES-1 have the potential to be affected by this Project; a checked box indicates that at least one impact would be a “potentially significant impact.” The Applicant has agreed to Project revisions, including implementation of mitigation measures (MMs) that would reduce the potential impacts to “less than significant with mitigation,” as detailed in Section 3.0, *Environmental Checklist and Analysis,* of this MND.

The Applicant has identified three Applicant Proposed Measures (APMs) that will be implemented as part of the Project to avoid or minimize impacts on environmental resources and to ensure that certain potential impacts are reduced to or remain at a less than significant level. The following APMs are discussed for the respective resources in Section 3:

- APM-1: Fishing Agreement
- APM-2: Marine Anchor Plan
- APM-3: Cable Burial Surveys

Table ES-2 lists the proposed MMs and APMs designed to reduce or avoid potentially significant impacts. With implementation of the proposed MMs and APMs, all Project-related impacts would be reduced to or remain at less than significant levels.

[1] The local telecommunications company (Vero Networks) would obtain their authorizations from the California Public Utilities Commission. Because they are a Competitive Local Exchange Carrier, they have an existing Certificate of Public Convenience and Necessity from the California Public Utilities Commission. They would obtain their authorization under that permit to connect to the LVs when the proposed Project is completed.

Table ES-1. Environmental Issues and Potentially Significant Impacts

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☒ Biological Resources	☒ Cultural Resources	☒ Cultural Resources – Tribal
☐ Energy	☐ Geology, Soils, and Paleontological Resources	☒ Greenhouse Gas Emissions
☒ Hazards and Hazardous Materials	☒ Hydrology and Water Quality	☐ Land Use and Planning
☐ Mineral Resources	☒ Noise	☐ Population and Housing
☐ Public Services	☒ Recreation	☒ Transportation
☐ Utilities and Service Systems	☐ Wildfire	☒ Mandatory Findings of Significance

Table ES-2. Summary of Mitigation Measures and Applicant Proposed Measures

Biological Resources
MM BIO-1: Provide Environmental Awareness Training
MM BIO-2: Conduct Biological Surveying and Monitoring
MM BIO-3: Delineate Work Limits to Protect Sensitive Biological Resources
MM BIO-4: Install Covers or Some Kind of Escape Ramps in Open Trenches
MM BIO-5: Prepare and Implement an Inadvertent Return Contingency Plan
MM BIO-6: Conduct Pre-Construction Nesting Bird Surveys and Implement Avoidance Measures
MM BIO-7: Implement Best Management Practices for Horizontal Directional Drilling Activities
MM BIO-8: Cable Entanglements and Gear Retrieval
MM BIO-9: Prepare and Implement a Marine Wildlife Monitoring and Contingency Plan
MM BIO-10: Minimize Crossing of Hard Bottom Substrate
MM BIO-11: Contribute Compensation to Hard Substrate Mitigation Fund
MM BIO-12: Control of Marine Invasive Species
MM HAZ-1: Develop and Implement Spill Contingency and Hazardous Materials Management Plans
APM-1: Fishing Agreement
APM-3: Cable Burial Surveys
Cultural Resources
MM CUL-1/TCR-1: Discovery of Previously Unknown Cultural or Tribal Cultural Resources
MM CUL-2/TCR-2: Cultural Resources Contractor Awareness Training
MM CUL-3: Conduct a Pre-Construction Offshore Archaeological Resources Survey
MM CUL-4: Conduct a Pre-Construction Offshore Historic Shipwreck Survey
MM CUL-5: Prepare and Implement an Avoidance Plan for Marine Archaeological Resources
MM CUL-6/TCR-3: Unanticipated Discovery of Human Remains
Cultural Resources – Tribal
MM CUL-1/TCR-1: Discovery of Previously Unknown Cultural or Tribal Cultural Resources
MM CUL-2/TCR-2: Cultural Resources Contractor Awareness Training
MM CUL-6/TCR-3: Unanticipated Discovery of Human Remains
Greenhouse Gas Emissions
MM GHG-1: Purchase GHG Carbon Offsets for Construction Emissions

Table ES-2. Summary of Mitigation Measures and Applicant Proposed Measures

Hazards and Hazardous Materials
MM HAZ-1: Develop and Implement Spill Contingency and Hazardous Materials Management Plans
MM BIO-1: Provide Environmental Awareness Training
MM BIO-3: Delineate Work Limits to Protect Sensitive Biological Resources
MM BIO-5: Prepare and Implement an Inadvertent Return Contingency Plan
MM BIO-7: Implement Best Management Practices for Horizontal Directional Drilling Activities
Hydrology and Water Quality
MM BIO-5: Prepare and Implement an Inadvertent Return Contingency Plan
MM BIO-7: Implement Best Management Practices for Horizontal Directional Drilling Activities
MM HAZ-1: Develop and Implement Spill Contingency and Hazardous Materials Management Plans
Noise
MM NOI-1: Implement Construction Noise Control Measures
MM BIO-9: Prepare and Implement a Marine Wildlife Monitoring and Contingency Plan
Recreation
MM REC-1: Advanced Local Notice to Mariners
Transportation
MM REC-1: Advanced Local Notice to Mariners
APM-2: Marine Anchor Plan
Commercial and Recreational Fishing
MM BIO-10: Minimize Crossing of Hard Bottom Substrate
MM BIO-11: Contribute Compensation to Hard Substrate Mitigation Fund
MM REC-1: Advanced Local Notice to Mariners
APM-1: Fishing Agreement
APM-3: Cable Burial Surveys

Figure ES-1. Proposed Project Phases

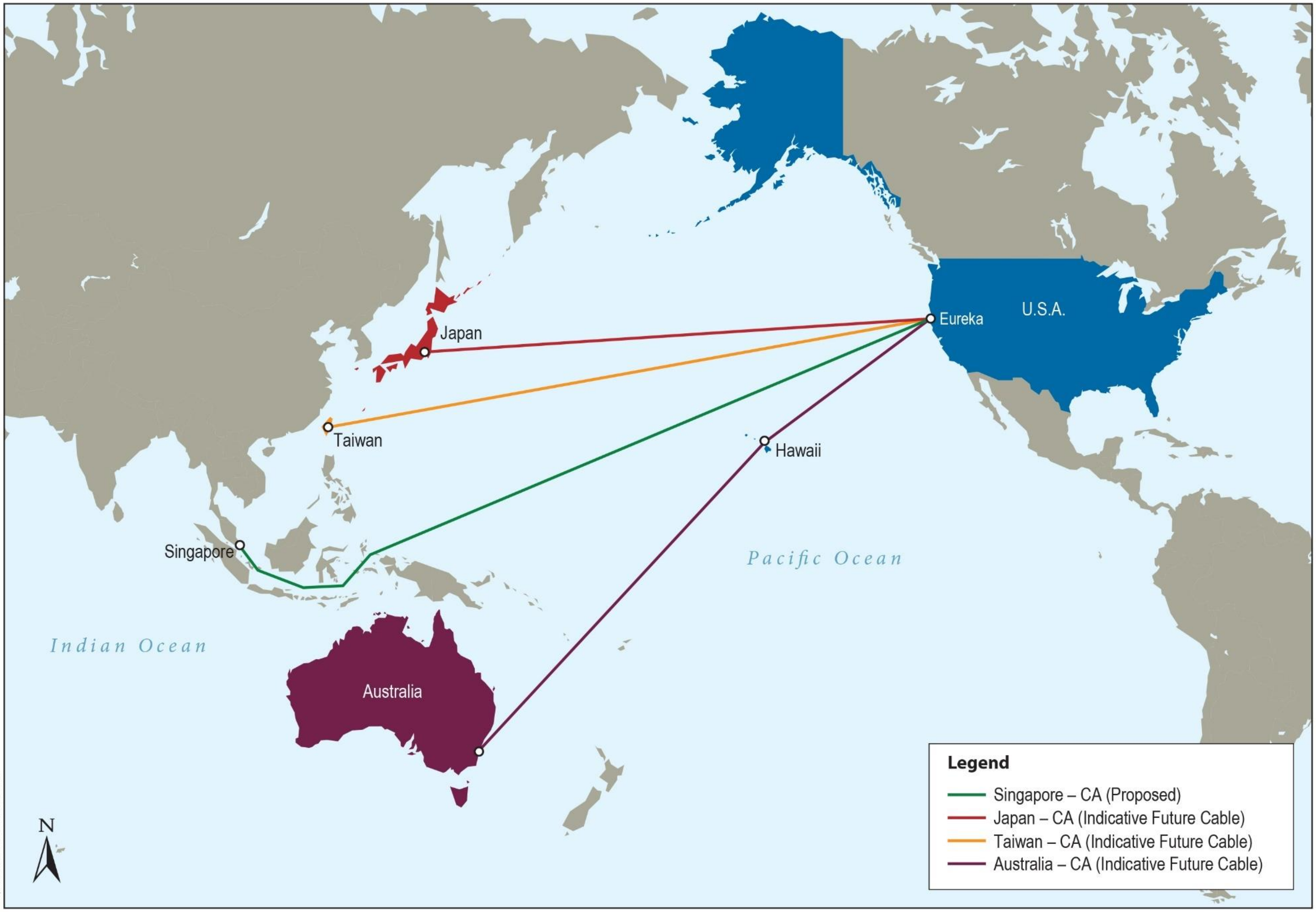
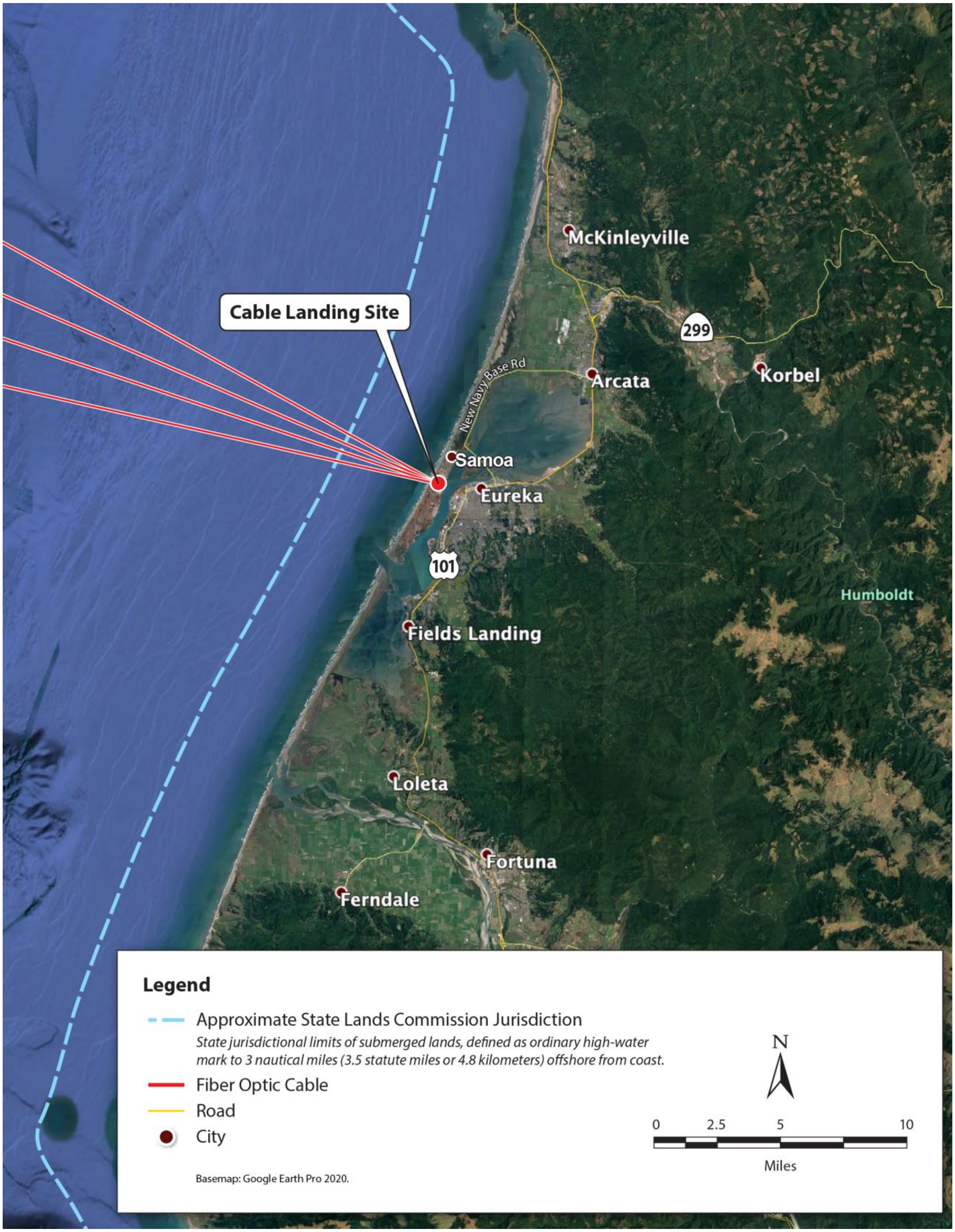


Figure ES-2. Project Location



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1.0 PROJECT AND AGENCY INFORMATION

1.1 PROJECT TITLE

RTI Infrastructure, Inc. Eureka Subsea Fiber Optic Cables Project (Project).

1.2 LEAD AGENCY AND PROJECT SPONSOR

Lead Agency California State Lands Commission 100 Howe Avenue, Suite 100-South Sacramento, CA 95825	Contact Person Afifa Awan, Senior Environmental Scientist Environmental Planning and Management Division Afifa.Awan@slc.ca.gov (916) 574-1891
Applicant RTI Infrastructure, Inc. 268 Bush Street, #77 San Francisco, CA 94104	Contact Person Chris Brungardt, Senior Vice President Chris.Brungardt@rticable.com (916) 949-9141

1.3 PROJECT LOCATION

The Project would be located on the following land (terrestrial) and ocean (marine) areas within and offshore of the incorporated community of Samoa, Humboldt County:

- **Terrestrial Components.** These would include the cable landing site and the landing vaults (LV). The cable landing site would be on the east side of New Navy Base Road and west side of Vance Avenue in an unoccupied area with Assessor's Parcel Number (APN) 401-112-021 (Figure 1-1). The cable landing site would be used as a staging area for terrestrial and marine work. Four LVs would be buried at the cable landing site. A separate landing pipe would be installed from each of the LVs by horizontal directional drilling (HDD) construction methods.
- **Marine Components.** These would include the four landing pipes installed from the cable landing site by HDD construction methods and extend under the adjacent property and CSLC's jurisdiction, exiting the ocean bottom approximately 3,600 feet (0.6 mile or 0.5 nm) offshore in the Pacific Ocean (Figure 1-1). A cable lay ship (with the help of a dive support vessel and divers) would bring each cable (in different Project phases) to the end of the landing pipe at about 3,600 feet offshore (or 4,600 feet from the LVs) where the ocean water depth is approximately 40 feet. Each cable then would be pulled through its own individual landing pipe (constructed in Phase 1) to its respective LV. The cables would be buried in water shallower than 5,904 feet and lay directly on the ocean floor in water deeper than 5,904 feet (approximately 32 miles offshore from the LVs at the Outer Continental Shelf [OCS]).[2]

[2] U.S. federal jurisdiction extends to the edge of the OCS under the Outer Continental Shelf Lands Act.

Figure 1-1. Project Location

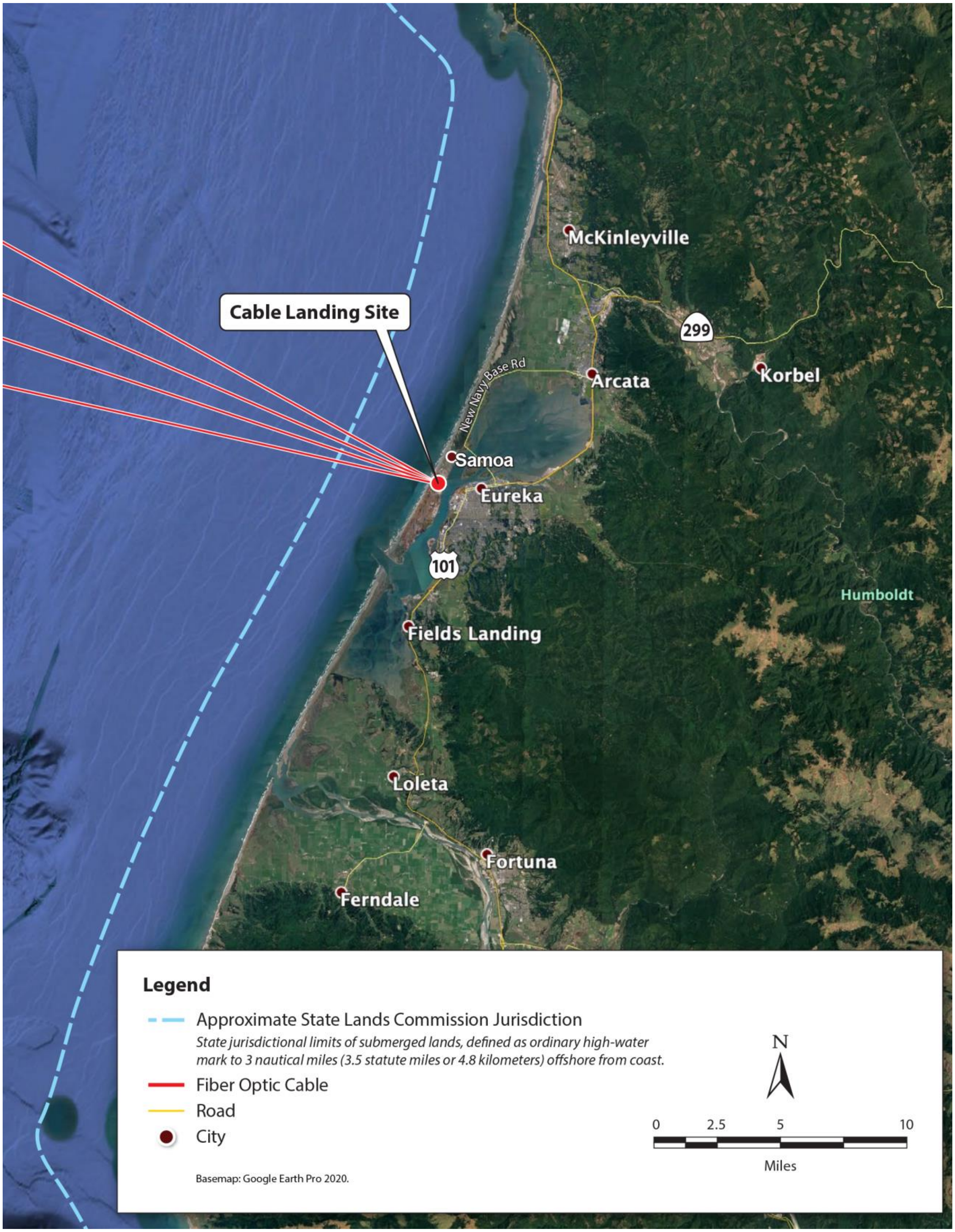
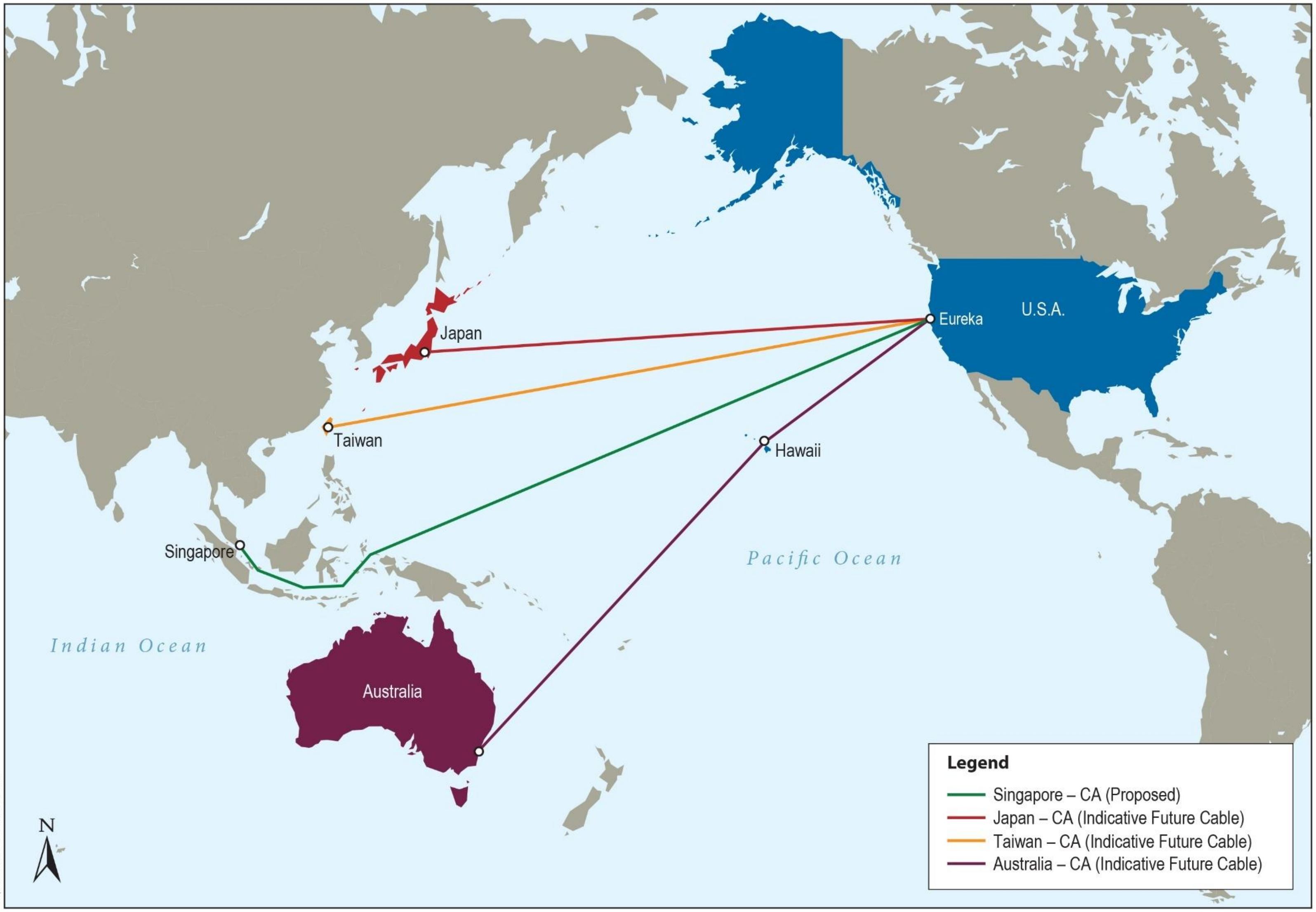


Figure 1-2. Proposed Project Phases



1.4 ORGANIZATION OF THE MITIGATED NEGATIVE DECLARATION

This Initial Study/Mitigated Negative Declaration (IS/MND) is intended to provide the California State Lands Commission (CSLC), as lead agency under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.), and other responsible agencies with the information required to exercise their discretionary responsibilities for the proposed Project. The MND is organized as follows:

- **Section 1** presents the Project location and background, agency and Applicant information, Project objectives, anticipated agency approvals, and a summary of the public review and comment process.
- **Section 2** describes the proposed Project including its layout, equipment, facilities, operations, and schedule.
- **Section 3** presents the IS, including the environmental setting, identification and analysis of potential impacts, and discussion of Project changes and other measures that, if incorporated into the Project, would mitigate or avoid those impacts, such that no significant effect on the environment would occur. The CSLC prepared this IS pursuant to State CEQA Guidelines section 15063.[3]
- **Section 4** presents the Mitigation Monitoring Program.
- **Section 5** discusses other CSLC considerations relevant to the Project, such as climate change, sea-level rise, commercial and recreational fishing, and environmental justice, in addition to the environmental review required pursuant to CEQA.
- **Section 6** presents information on report preparation and references.
- **Appendices** include specifications, technical data, and other information supporting the analysis presented in this MND:
    - Appendix A: Abridged List of Major Federal and State Laws, Regulations, and Policies Potentially Applicable to the Project
    - Appendix B: Air Quality and Greenhouse Gas Analysis Methods and Results
    - Appendix C: Terrestrial and Marine Biological Resource Information
    - Appendix D: Marine Cultural Resources Report

[3] The State CEQA Guidelines are found in California Code of Regulations, title 14, section 15000 et seq.

1.5 PROJECT BACKGROUND AND OBJECTIVES

1.5.1 Project Need

Technology has been connecting the world during the recent COVID-19 pandemic. The world has relied on technology now more than ever before for staying connected with loved ones, for work, for education, and even for telemedicine. As the world relies on faster digital media and telecommunication systems (e.g., cell phones, Internet, voice, social media, streaming videos, telework, online learning, telemedicine, banking transactions, and shopping online), the data transferring systems such as fiber optic cables (cables) also need to be upgraded to keep up with the technical advancements to be able to transmit uninterrupted telecommunication data. Virtually all communications and data transmissions are converted to digital data and transmitted across cables. The proposed Project would transmit telecommunication data at a faster speed to connect the United States with Asia (i.e., Singapore, Taiwan, and Japan) and Australia (Figure 1-2). In addition, this Project location was strategically selected as part of a broader plan to ensure that statewide telecommunications needs are met.

1.5.2 Existing Technology and Infrastructure

Ten operating transpacific cable systems link the Western United States to Asia (Japan, mainland Asia, and southeast Asia) and Australia.[4] The cables connecting the United States to Japan carry 82 percent of existing transpacific telecommunication capacity. The older cable technology limits the amount of telecommunication data that can be transferred between the United States and Asia and Australia. Also, the older cable technology could only transmit signals up to 5,500 miles and requires multiple cables to connect the United States to Asia (e.g., Singapore, Taiwan, and Japan) and Australia.

1.5.3 Proposed Technology and Infrastructure

As the world relies on faster and more bandwidth-intensive data transmission and 4G and 5G[5] networks, the proposed Project is needed to keep up with the technical advancements to transmit uninterrupted data. Even though radio and satellite can transmit data long distances, only subsea cables can supply the volume, speed, reliability, and cost efficiency to meet current and future data demands.

1.5.4 Project Objectives

The proposed Project would help achieve the following objectives:

[4] The 10 cable systems are: Pacific Crossing-1 (PC-1); Tata TGN-Pacific; New Cross Pacific (NCP); FASTER; Japan-U.S.; Unity/EAC-Pacific; Southern Cross Cable Network (SCCN); Huawei; SEA-US; and Asia-America Gateway (AAG).

[5] This refers to the data bandwidth, meaning the amount of data that can be moved (uploaded or downloaded) through a network over a certain time.

- Respond to the increasing need for connecting the United States with Asia (e.g., Singapore, Taiwan, and Japan) and Australia by installing modern cables with higher data transmission capacity and direct connections between termini
- Increase telecommunication data transmission speeds
- Avoid identified seismically unstable zones
- Create diverse telecommunication pathways between the United States and Pacific Rim cities and countries

1.6 PUBLIC REVIEW AND COMMENT

Pursuant to State CEQA Guidelines sections 15072 and 15073, a lead agency must issue a proposed MND for a minimum 30-day public review period. Agencies and the public will have the opportunity to review and comment on the document. Responses to written comments received by CSLC during the 30-day public review period will be incorporated into the MND, if necessary, and provided in CSLC's staff report. In accordance with State CEQA Guidelines section 15074, subdivision (b), the CSLC will review and consider the MND, together with any comments received during the public review process, prior to taking action on the MND and Project at a noticed public meeting.

1.7 APPROVALS AND REGULATORY REQUIREMENTS

1.7.1 California State Lands Commission

All tidelands and submerged lands granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the common law Public Trust Doctrine. The State of California acquired sovereign ownership of all tidelands and submerged lands and beds of navigable lakes and waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all people of the State for statewide Public Trust purposes, which include but are not limited to waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space.

On tidal waterways, the State's sovereign fee ownership extends landward to the ordinary high-water mark (OHWM), which is generally reflected by the mean high-tide line, except for areas of fill or artificial accretion or where the boundary has been fixed by agreement or a court. CSLC's authority is set forth in Division 6 of the Public Resources Code and the agency is regulated by the California Code of Regulations, title 2, sections 1900–3016. CSLC has authority to issue leases or permits for the use of sovereign lands held in the Public Trust, including all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways, and retains certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions (Pub. Resources Code, §§ 6009, subd. (c); 6009.1; 6301; 6306). The CSLC must comply with CEQA when it undertakes an activity defined by CEQA as a "project" that must receive discretionary approval (i.e., the CSLC has the authority to approve or deny the requested lease, permit, or other approval) and that may cause either a direct physical change or a reasonably foreseeable indirect change in the environment. CEQA requires the CSLC to identify the significant environmental impacts of its actions and to avoid or mitigate those impacts, if feasible.

The Applicant applied for a new General Lease – Right-of-Way Use lease to use the area under the CSLC's jurisdiction from the OHWM to 3 nm offshore from the coast (Figure 1-1).

1.7.2 Other Agencies

In addition to CSLC, the Project is subject to the review and approval of other federal, state, and local entities with statutory or regulatory jurisdiction over various aspects of the Project (Table 1-1). The Applicant has started coordination with some of the relevant regulatory permitting agencies (Appendix B). As part of the Project, all permits required for the Project would be obtained before starting construction.

Table 1-1. Anticipated Agencies with Review/Approval over Project Activities

Permitting Agency		Anticipated Approvals/Regulatory Requirements
Federal	U.S. Army Corps of Engineers (USACE)	CWA Section 404 and Section 10 Permit (under Nationwide Permit No. 12)
	U.S. Coast Guard (USCG)	Notice to Mariners
	U.S. Fish and Wildlife Service (USFWS)	Federal Endangered Species Act (FESA) Section 7 consultation (if required)
	National Marine Fisheries Service (NMFS)	FESA Section 7 consultation and consultation on marine mammal/sea turtle protection
State	California Coastal Commission (CCC)	Coastal Zone Management Act Consistency Certification for the U.S. Army Corps of Engineers Section 404 Authorization and Coastal Development Permit
	California State Lands Commission (CSLC)	Submerged Lands Lease and CEQA Lead Agency
	Native American Heritage Commission (NAHC)	Tribal Consultation
	State Historic Preservation Office	National Historic Preservation Act Section 106 Compliance
Regional	Humboldt Bay Harbor, Recreation, & Conservation District	Land Lease
	North Coast Regional Water Quality Control Board (North Coast RWQCB)	Clean Water Act (CWA) Section 401 Water Quality Certification
	North Coast Unified Air Quality Management District	Authority to Construct and Permit to Operate

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2.1 PROJECT WORK AREAS

RTI Infrastructure, Inc. (Applicant) is proposing the RTI Infrastructure, Inc. Eureka Subsea Fiber Optic Cables Project (Project) to install four subsea fiber optic cables (cables) carrying telecommunication data to connect the United States with Asia (e.g., Singapore, Taiwan, and Japan) and Australia. Because the MND analyzes impacts from the Project under California's jurisdiction, the analysis would not change if the cables came from a location other than Singapore, Taiwan, or Japan as long as the cable stayed within the same route analyzed in California's jurisdiction. The Project entails four phases (Section 2.2.1, *Work Phases*) (Figure 1-1). Phase 1 would build all of the infrastructure to receive these four cables and bring the first cable from Singapore to California (SP-CA) in 2021. The subsequent phases would install future cables in the ocean and utilize the infrastructure constructed in Phase 1. The cables would be connected with soon-to-be-built terrestrial cable infrastructure that is not part of the proposed Project.[6] Project-related work would take place in both terrestrial (land) and marine (ocean) areas onshore and offshore of a privately-owned parcel of land in Samoa, a census-designated[7] place in Humboldt County, California. Samoa is 1.5 miles northwest of Eureka, at an elevation of 23 feet in the northern peninsula of Humboldt Bay (Figure 1-2).

2.1.1 Summary of Terrestrial Project Components

The cable landing site is the only terrestrial Project component (further discussed in Section 2.3, *Detailed Terrestrial Project Components*) needed to install four cables (coming from Asia or Australia) and their related structures on land above the ordinary high-water mark (OHWM) (Figure 2-1). The California State Lands Commission's (CSLC) jurisdiction extends from the OHWM to 3 nautical miles[8] (nm) offshore.

The four cables would land in a private and unoccupied area of the Humboldt Bay Harbor, Recreation, & Conservation District (Harbor District). An approximately 1-acre area would be used for the following key Project components in the cable landing site:

- **Staging Area.** The cable landing site would be used to park vehicles and store construction-related equipment for both terrestrial and marine work. An additional already paved staging area would be used in a nearby location, not yet determined.
- **Landing Vaults (LVs).** Four LVs (approximately 8 feet wide by 12 feet long by 9 feet deep) would be buried at the cable landing site. Each LV would have its own

[6] The subsea cables would connect to soon-to-be-built terrestrial cable infrastructure owned by Vero Networks, a local telecommunications company.
[7] A census-designated place is a population that, unlike a city, has not been incorporated.
[8] One nautical mile is equal to 1.1508 statute miles. Nautical miles relate to charting and ocean navigation and are based on degrees of latitude around the equator. Statute or "land" miles is used throughout the rest of the document.

cast-iron vault cover (36 inches in diameter) and would be at grade level (flush with the ground) (Figure 2-1). A separate landing pipe (described below) would be installed from each of the LVs and would exit offshore into the Pacific Ocean. Once the landing pipes are installed, each individual cable (from different Project phases) would be pulled from the Pacific Ocean through its own designated landing pipe into its own designated LV. After completion of the Project, the cables ultimately would connect to onshore cables operated by local telecommunications carriers. The LVs also would provide access to the landing pipes for maintenance activities related to the cables.

- **Landing Pipes.** An independent landing pipe[9] (approximately 5 to 6 inches in diameter) would be installed from each LV for each of the four cables. Each landing pipe would be approximately 4,600 feet long, starting from the LV and ending offshore. The landing pipes would be installed using the horizontal directional drilling (HDD) construction method, starting from the LVs (Figure 2-3). Each landing pipe would continue waterward of the LV at a minimum depth underground of approximately 35 feet, going under the beach and surf zone, and gradually would move upward until it exits the ground offshore at approximately 4,600 feet waterward of the LV and in about 40 feet of water depth.
- **Ocean Ground Beds (OGBs).** A grounding system known as an OGB would be needed for cathodic protection to control corrosion and to provide a ground for the electricity travelling through the cable to power the marine cable amplifiers (Figure 2-2). The four OGBs (one for each cable) would be installed onshore (underground in the cable landing site (Figure 2-1) or offshore (about 50 feet west of where the landing pipes would exit, as seen in Figure 2-3).

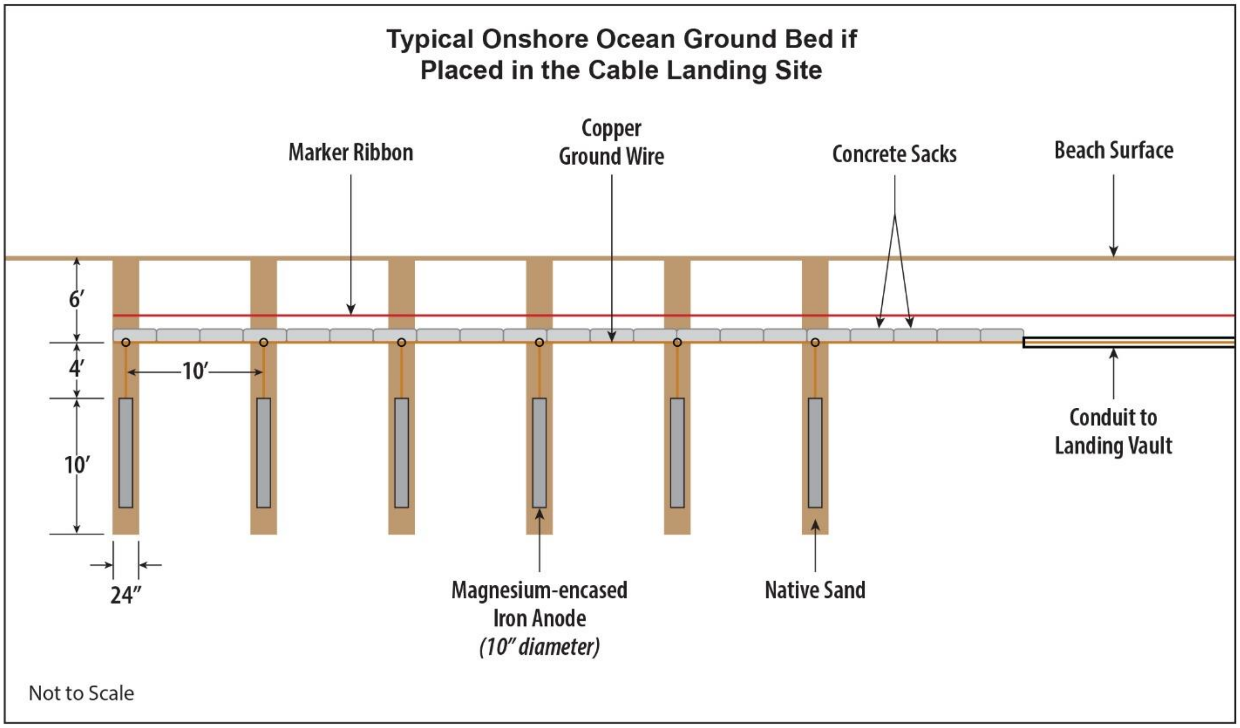
Ultimately, the four cables would connect to a single vault (Figure 2-1) that would be built by a local telecommunications company (Vero Networks)[10] and would be outside of the scope of this Project. The local telecommunications company project is a separate project and has independent utility from the Project analyzed in this MND and requires a separate CEQA analysis. Each cable would be connected to this soon-to-be-built vault that would be located adjacent to the Project vaults. The local telecommunications company would then install conduits west to New Navy Base Road and then northerly along New Navy Base Road to connect with an existing building that will become a new cable landing station (also not part of the Project).

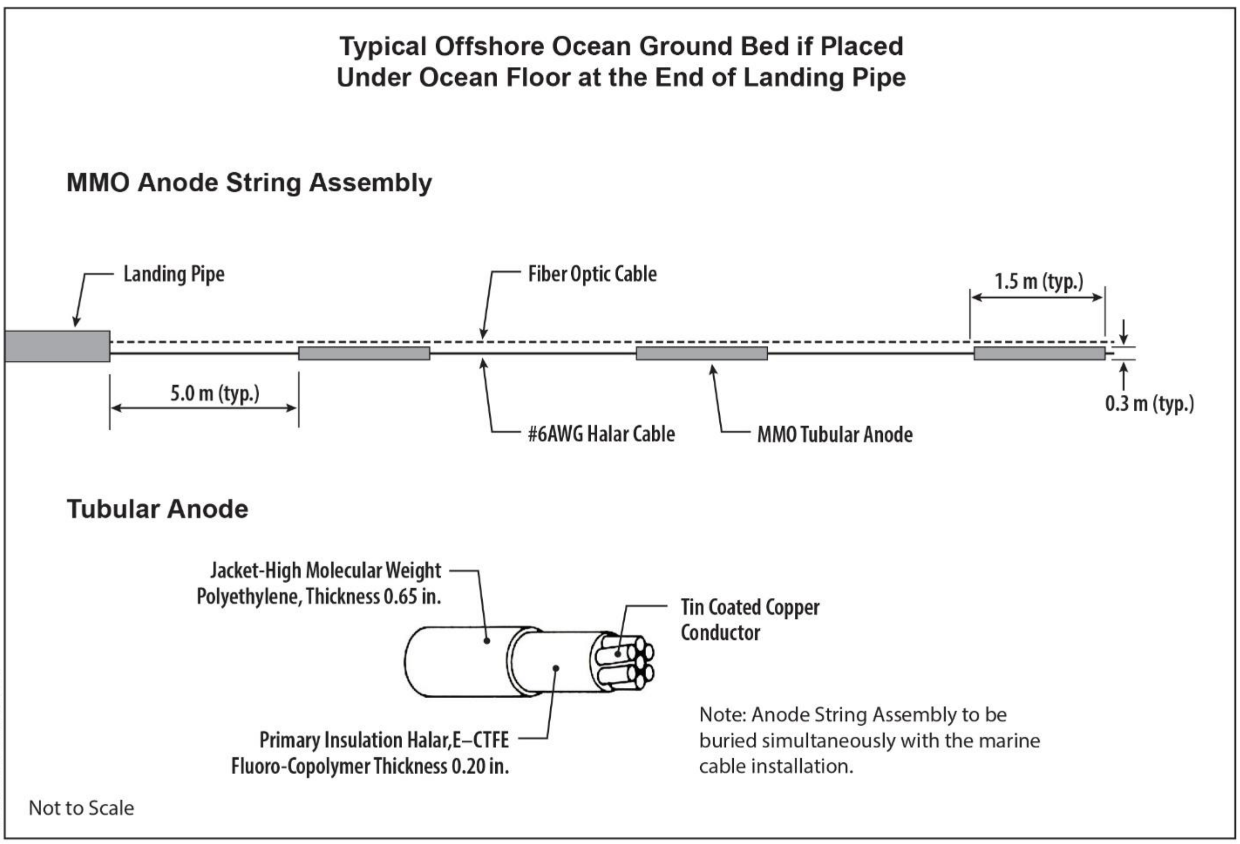
[9] Each landing pipe (about 5 or 6 inches in diameter) would be approximately 4,600 feet long; approximately 3,600 feet of this amount would be offshore. The total length for all four landing pipes would be about 18,400 feet.

[10] The local telecommunications company (Vero Networks) would obtain their authorizations from the California Public Utilities Commission. Because they are a Competitive Local Exchange Carrier, they have an existing Certificate of Public Convenience and Necessity from the California Public Utilities Commission. They would obtain their authorization under that permit to connect to the LVs when the proposed Project is completed.

Figure 2-1. Terrestrial Project Components

Figure 2-2. Cross Section of Ocean Ground Bed (Onshore and Offshore)





2.1.2 Summary of Marine Project Components

The marine Project components (further discussed in Section 2.4, *Detailed Marine Project Components*) would be needed to install four cables (coming from Asia or Australia) and their related structures. Landing pipes would be installed from the cable landing site and would extend offshore about 3,600 feet (0.6 mile or 0.5 nm) beyond the cable landing site to water depth of approximately 40 feet. This exit point would be just beyond the surf zone where it would be safe for divers to work. From the offshore exit point, the cables would be buried under the ocean floor until they reach the Outer Continental Shelf (OCS) at 5,904 feet water depth (deep waters) where the cables would not be buried and would just be dropped on the ocean floor.

The scope of this Project ends at 3 nm[11] offshore to correspond with the boundaries of CSLC's jurisdiction, as seen in Figure 1-1. The following marine Project components (Figure 2-3) would start at the OHWM of the Pacific Ocean and end at 3 nm from the shoreline:

- **Landing Pipes.** As noted above, four landing pipes (approximately 5 to 6 inches in diameter) would be installed. Each landing pipe would be approximately 4,600 feet long, starting from the LV and ending offshore. The landing pipes would be installed at least 35 feet under the cable landing site and beach using the HDD construction method and would exit at about 3,600 feet (0.5 nm or 0.6 mile) offshore at a water depth of approximately 40 feet. Four cables would be pulled through these landing pipes and brought into the LVs.

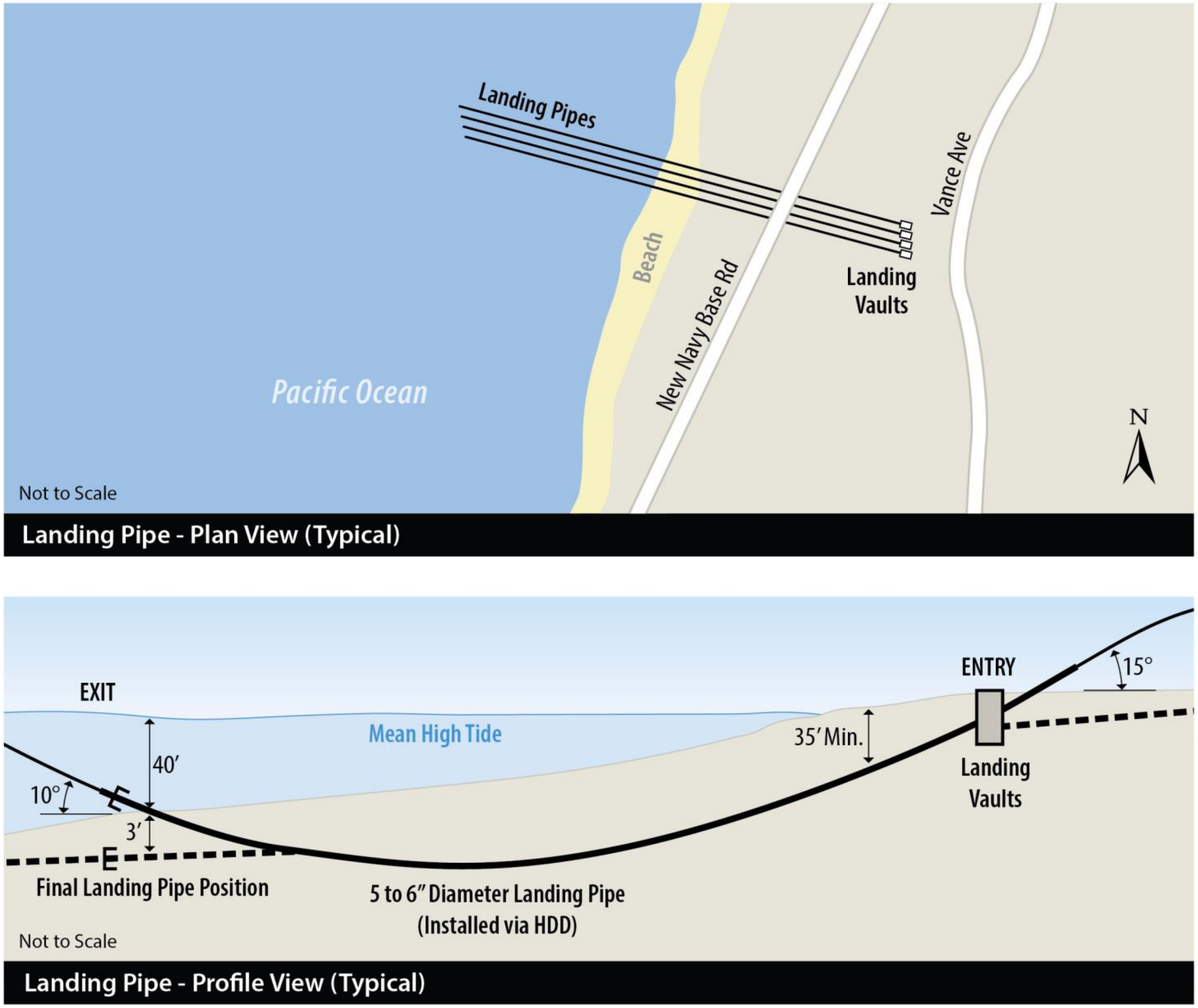
- **Fiber Optic Cables.** The cable lay ship (with the help of a dive support vessel and divers) (Figure 2-5 below) would bring each cable (in different Project phases) to the end of the landing pipe at about 3,600 feet offshore (or 4,600 feet from the LVs) where the ocean water depth is approximately 40 feet. Each cable then would be pulled through its own individual landing pipe (constructed in Phase 1) to its respective LV.

  Before reaching the landing pipe, the cable would be installed as follows:

  - In ocean water 5,904 feet deep or more, the cables would lay directly on the ocean floor at approximately 32 miles offshore from the LVs at the OCS.
  - In ocean water between 98 and 5,904 feet deep, the cable would be buried under the ocean floor by cable plow, or by diver-assisted or remotely operated vehicle- (ROV) assisted post-lay burial, depending on ocean floor characteristics.
  - In ocean water between 40 and 98 feet deep, the cable would be installed by diver-assisted post-lay burial.

[11] After 3 nm, federal waters extend 12 nm from shore and the United States Exclusive Economic Zone extends 200 nm from shore.

Figure 2-3. Marine Project Components



- **Ocean Ground Bed (OGB) Offshore.** An OGB would be installed onshore or offshore (to be determined after the electronic components of the cable system are designed and manufactured) for each cable to ground the cable. An OGB is crucial for cathodic protection to control corrosion and to provide a ground for the electricity that would travel through the cable to power the marine cable amplifiers. This MND will analyze both onshore (Figure 2-1) and offshore (Figure 2-3) OGB installation options.

2.2 PROJECT WORK PHASES AND WORK SCHEDULE

2.2.1 Work Phases

Four cables would be installed to connect the United States to Asia and Australia (Figure 1-1). Regardless of where these cables originate, construction activities associated with their installation in California would be similar, as summarized below.

- **Phase 1: Singapore to California (SP-CA) Expected in 2021.** This initial phase would build the infrastructure to receive four cables and bring the very first cable from Singapore to California through the following key Project components:
  - Set up the cable landing site (including the staging area and LVs)
  - Install four landing pipes (for four cables)
  - Install cable starting from offshore by laying it on the ocean floor up until 5,904 feet depth, and then burying it from here until 40 feet depth until it reaches the landing pipe
  - Pull the marine cable through its own dedicated landing pipe to end in its own designated LV
  - Install one OGB (onshore or offshore) for this cable
- **Phase 2: Taiwan to California Expected in 2022.** This phase would connect California to Taiwan through the following key Project components:
  - Install cable starting from offshore by laying it on the ocean floor up until 5,904 feet depth, and then burying it from here until 40 feet depth until it reaches the landing pipe
  - Pull the marine cable through its own dedicated landing pipe to end in its own designated LV
  - Install one OGB (onshore or offshore) for this cable
- **Phase 3: Japan or Australia to California Expected in 2023.** This phase would connect California to Japan or Australia (not yet determined which would be installed first) through the following key Project components:

  - Install cable starting from offshore by laying it on the ocean floor up until 5,904 feet depth, and then burying it from here until 40 feet depth until it reaches the landing pipe
  - Pull the marine cable through its own dedicated landing pipe to end in its own designated LV
  - Install one OGB (onshore or offshore) for this cable
- **Phase 4: Japan or Australia to California Expected in 2024.** This phase would connect California to Japan or Australia (not yet determined which would be installed first) through the following key Project components:
  - Install cable by laying it on or burying it under the ocean floor until it reaches the landing pipe
  - Pull the marine cable through its own dedicated landing pipe to end in its own LV
  - Install one OGB (onshore or offshore) for this cable

2.2.2 Work Schedule

Table 2-1 provides the anticipated work schedule for the Project's four phases. The terrestrial and nearshore activities would take place during daylight hours, 7 days a week, to comply with Humboldt County noise standards.

- **Terrestrial Work.** Terrestrial work would take place only during daylight hours and would require the following lengths of time (Table 2-1):
  - Phase 1. Approximately 5 months[12]
  - Phases 2, 3, and 4. Approximately 3.5 months for each phase
- **Marine Work.** Offshore marine-related work would continue for 24 hours a day for 7 days a week, or for 12 hours a day for 6 days a week (Table 2-1). The duration of marine work would depend on the permit requirements from the California Coastal Commission (CCC). Once the cable ship arrives offshore near the seaward end of the landing pipe and work starts, it would take up to 48 hours to pull the cable from offshore through the landing pipe that would bring the cable into the LV (referred to as "Marine cable pulling from offshore to onshore" in Table 2-1).

[12] Installation of the landing pipes could require from 3 to 4 weeks or from 5 to 7 weeks, depending on the construction schedule (see Table 2-1).

Table 2-1. Proposed Construction Schedule for Project Phases 1–4

Component	Proposed Start Date	Proposed Hours	Duration
Phase 1			
Install landing pipes using marine HDD machines	Summer 2021	24 hours/day for 7 days/ week or 12 hours/day for 6 days/ week	3 to 4 weeks or 5 to 7 weeks
Install OGB onshore or offshore and landing vaults	Summer 2021	Daylight, 7 days/week	2 weeks
Pre-lay grapnel run	Summer 2021	24 hours/day, 7 days/week	1 week
Marine cable pulling from offshore to onshore	Fall 2021	24 hours/day, 7 days/week	2 days
Marine cable lay on the ocean floor	Fall 2021	24 hours/day, 7 days/week	4 weeks
Marine cable burial (diver-assisted)	Fall 2021	Daylight, 7 days/week	1 week
Marine cable burial (ROV-assisted)	Fall 2021	24 hours/day, 7 days/week	2 weeks
Phase 2			
Install OGB onshore or offshore	Fall 2022	Daylight, 7 days/week	2 weeks
Pre-lay grapnel run	Fall 2022	24 hours/day, 7 days/week	1 week
Marine cable pulling from offshore to onshore	Fall 2022	24 hours/day, 7 days/week	2 days
Marine cable lay on the ocean floor	Fall 2022	24 hours/day, 7 days/week	4 weeks
Marine cable burial (diver-assisted)	Fall 2022	Daylight, 7 days/week	1 week
Marine cable burial (ROV-assisted)	Fall 2022	24 hours/day, 7 days/week	2 weeks
Phase 3			
Install OGB onshore or offshore	Fall 2023	Daylight, 7 days/week	2 weeks
Pre-lay grapnel run	Fall 2023	24 hours/day, 7 days/week	1 week
Marine cable pulling from offshore to onshore	Fall 2023	24 hours/day, 7 days/week	2 days
Marine cable lay on the ocean floor	Fall 2023	24 hours/day, 7 days/week	4 weeks
Marine cable burial (diver-assisted)	Fall 2023	Daylight, 7 days/week	1 week
Marine cable burial (ROV-assisted)	Fall 2023	24 hours/day, 7 days/week	2 weeks
Phase 4			
Install OGB onshore or offshore	Fall 2024	Daylight, 7 days/week	2 weeks
Pre-lay grapnel run	Fall 2024	24 hours/day, 7 days/week	1 week
Marine cable pulling from offshore to onshore	Fall 2024	24 hours/day, 7 days/week	2 days
Marine cable lay on the ocean floor	Fall 2024	24 hours/day, 7 days/week	4 weeks
Marine cable burial (diver-assisted)	Fall 2024	Daylight, 7 days/week	1 week
Marine cable burial (ROV-assisted)	Fall 2024	24 hours/day, 7 days/week	2 weeks

Terms:
HDD = horizontal directional drilling
OGB = ocean ground bed
ROV = remotely operated vehicle

Note: For each phase, the staging area at the cable landing site would be occupied from approximately 2 weeks before starting construction until approximately 2 weeks after construction ends.

2.3 DETAILED TERRESTRIAL PROJECT COMPONENTS

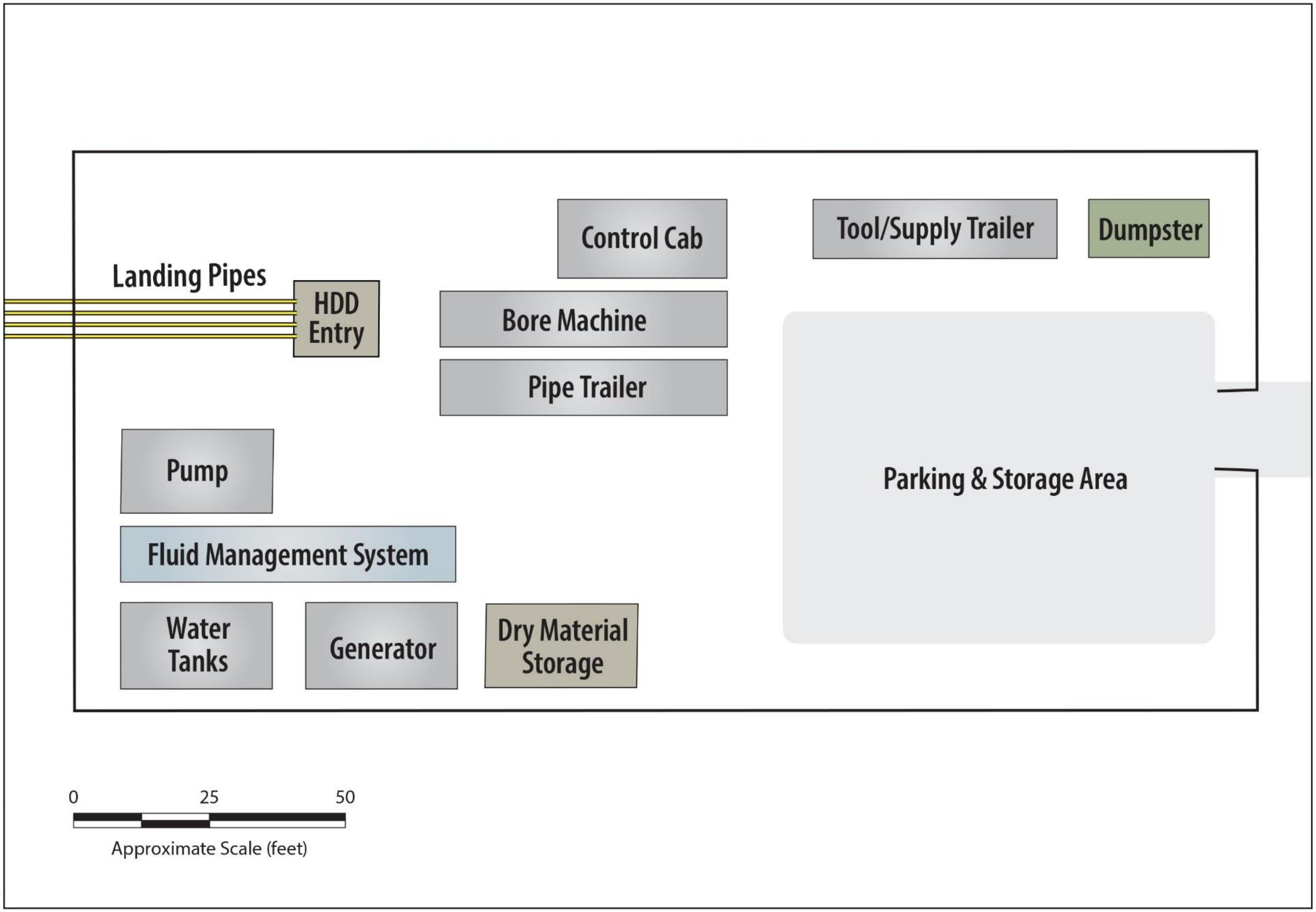
Terrestrial Project activities are those landward of the OHWM and would include the key Project components described below.

2.3.1 Cable Landing Site

The cables would be pulled into the LV on the cable landing site from offshore landing pipes (Figure 2-4). Some of the key Project components in the cable landing site are listed below:

- **Staging Area.** For each phase, the staging area at the cable landing site would be occupied from approximately 2 weeks before starting construction or installation work until approximately 2 weeks after construction or installation work ends. Equipment and material such as backhoes, landing pipe, and drilling equipment needed to install the terrestrial components of the Project would be brought to the staging area and stored there (Figure 2-4). As noted above, four landing pipes would be installed in Phase 1. For Phases 2 through 4, the cable landing site would be used to install the OGBs and to pull the cables into their designated landing pipes to their respective LVs.
- **Landing Pipes.** In Phase 1, the HDD construction equipment would be operated in the cable landing site to install all four landing pipes (5 to 6 inches diameter each and approximately 4,600 feet long). As part of Phase 1, the first cable would be brought to Samoa. As part of Phases 2, 3, and 4, each of the remaining three cables (Figure 1-1) would be pulled through its designated landing pipe offshore (installed as part of Phase 1) (one per pipe) and be brought onshore into its designated LV (see Section 2.4.4 for additional detail).
- **Landing Vaults (LVs).** For each landing pipe, a separate LV (approximately 8 feet wide by 12 feet long by 9 feet deep) would be buried at grade level with a cast-iron vault cover (36 inches in diameter). The vault covers would be marked with appropriate identification and would be secured (i.e., locked and bolted). The LVs would be installed in 2 days by excavating with a rubber-tired backhoe or excavator, placing the vault in the excavation, and then backfilling around the vault. Operators then would compact the material using a hand-operated vibratory compactor. Although excess material is not expected, any material that is not replaced on site would be hauled to a local landfill site.

Figure 2-4. Cable Landing Site



Splicing of the marine cable to the soon-to-be-built terrestrial cables would occur at a later date by the local cable provider and is not part of the proposed Project. This future work would happen completely within the LVs. The cables would be pulled into the LV and spliced onto the terrestrial cable. After the fiber optic cables are fused together, they would be encased in a splice case and secured to the wall of their respective LV.

The proposed Project would be completed when the four cables are installed into the landing pipes and terminated in their respective LVs.

- **Ocean Ground Beds (OGBs).** An OGB would be installed onshore or offshore for each cable for cathodic protection to control erosion and to ground electrical signals traveling through the cable to power the marine cable amplifiers. The final location of the OGBs would be determined after the electronic components of the cable system are designed and manufactured. At that time, the system engineers would be able to select the grounding location that would offer the best performance characteristics.

  Figure 2-2 above illustrates a cross section of the onshore and offshore OGB options, with the following differences:

  - Onshore near the location of the LV. If installed on land, the OGB would be within approximately 100 feet of the LV. Each OGB would consist of up to six anodes constructed of cast iron and encased in a magnesium canister 10 inches in diameter and up to 84 inches in length. The anodes would be placed in a line and spaced at 10-foot intervals. The tops of the anodes would be approximately 10 feet below grade. Ground cable would be buried approximately 6 feet below grade and lead from each OGB to the LV. The OGBs would be located approximately 250 feet landward of the mean high-water line.

  - Offshore under the ocean floor. If the offshore anode (i.e., American wire gauge mixed metal oxide [MMO]) array is used, the OGB would be installed in the ocean about 50 feet offshore from where the landing pipes would exit. The tubular anodes would be MMO rods approximately 11.8 inches in diameter and approximately 4.9 feet in length. Three to five anodes would be connected in a linear or string fashion to create an MMO anode string assembly. Each anode on the array would be approximately 9.8 feet apart and connected by an insulated copper conductor. The MMO anode string assembly would be installed by diver jet burial in the same operation as the marine cable burial. The cable and the ocean anode string assembly would be tied together and buried as part of the same burial operation.

2.3.2 Terrestrial Fiber Optic Cable

The terrestrial cable would be encased in a landing pipe installed 35 feet below the cable landing site. This would protect the cable from future geologic and sedimentary conditions.

2.3.2.1 Install Landing Pipes Using Marine HDD Machines

Using the HDD construction method, four landing pipes (5 to 6 inches in diameter and 4,600 feet long) would be installed from the cable landing site and would achieve a minimum depth of 35 feet as they pass under the beach. The landing pipes would maintain a minimum depth of 35 feet under the ocean floor until the point where they would be directed upward to the exit location offshore. Use of HDD would avoid impacts on the surface area of the shore, surf zone, and ocean floor. At least 60 days before HDD operations, the engineers would provide the CSLC detailed engineering drawings with a supporting site-specific geotechnical report (with surveys completed by an entity with an offshore geophysical survey permit) and calculations. These drawings would depict the horizontal and vertical alignment best fitting the site conditions based on the site-specific geotechnical report.

The cable landing site is approximately 1 acre that includes access roads and equipment and material storage areas. The bore entry pit (shown in the cable landing site in Figure 2-4) for the landing pipes would measure approximately 10 feet wide by 12 feet long by 4 feet deep. A containment pit would be used to capture the material that would be removed from the hole being drilled. This containment pit (not in the water table) would be about 4 feet deep and would contain only inert materials. As the pit would fill with material, the material would be loaded into a dump truck, removed from the site, and disposed of offsite per industry standards. The bore entry pit also would serve as the HDD fluid return pit to collect the HDD fluid that would return to the bore entry site.

Once the landing pipes are completed, the LVs would be installed at the end of their respective landing pipe. Topsoil from the expanded bore pit would be stockpiled during LV installation and used to restore the cable landing site.

2.3.2.2 HDD Machine Drill Heads

The HDD would be guided by a drill head fitted with a steering tool, using magnetometers and inertial devices to track the direction of advance (horizontally and vertically) and the absolute location. Two types of drill heads could be used, depending on geologic conditions:

- **Spud Jet.** Spud jets force the drilling fluid through the jet bit to erode the earth material and create the bore hole into which the conduit is inserted. This type of drill head is used in soft soils such as sands, silts, and clays—the expected composition of material to be encountered during landing pipe installation.

- **In-Hole Mud Motor.** An in-hole mud motor would use drilling fluids to rotate a drill head though hard rock such as limestone, sandstone, and granite; this type of head would be used if such conditions were encountered.

The landing pipe would be advanced in 30-foot sections through the bore hole as it is created. Surveys would be conducted in 15-foot and 30-foot increments (using 30-foot joint sections) to verify the drill position and path. The HDD machine would occupy the bore entry site, drilling steel casing into the ground at an angle (Figure 2-3). Once the landing pipe reaches the desired depth, the direction would level out as the drilling continues to push the landing pipe horizontally through the ground. Once the landing pipe reaches the appropriate distance offshore, the drill head would be guided to the ocean bottom at approximately 40 feet of water depth. This operation would happen four times to install four independent landing pipes for the four cables.

The marine HDD would be guided by a drill head fitted with a wireline steering tool in conjunction with an energized wire tracking loop to track the direction of advance (horizontally and vertically) and to determine the exact location of the drill head. The tracking system would be implemented continuously to verify the drill position and path. The wire loop would be placed on the ground in the cable landing site and would be energized for a fraction of a second after each 30-foot joint of pipe is installed. The loop allows the drill operator to triangulate the exact location of the drill head. T-posts would be used to secure the wire and show its location. The cable landing site is private property, without public access. However, there is public access to the beach between the landing vaults and offshore where the landing pipes exit. The crew would instruct anyone in the area to avoid the tracking wire.

The drill head would remain at the landing pipe's exit point offshore (at approximately 40 feet of water depth) until divers would take it off and install a flapper valve. The flapper valve would prevent ocean water from entering the offshore landing pipe. Once a cable comes from Asia or Australia to the landing pipe exit point offshore, the flapper valve would be taken off, and a hydraulic winch in the LV would use a wire rope installed in the landing pipe to pull the cable through the landing pipe and bring it onshore into the LV. This operation would happen four times for the four cables (during each Project phase).

2.4 DETAILED MARINE PROJECT COMPONENTS

The marine Project components are segments between the OHWM and the outer limit of the OCS, at approximately 5,904 feet of seawater depth. The CSLC has jurisdiction from the OHWM to 3 nm offshore (Figure 1-2); the federal jurisdiction is past 3 nm to the OCS. In the CSLC's jurisdiction, the cable would be installed in both soft and hard bottom substrates. The soft bottom substrate predominates, consisting of sand, silt, and clay—

with silt and clay components increasing with greater water depth. Some low- to high-relief hard substrates could be present, but they would be avoided, where feasible, using data from the ocean bottom surveys being conducted by the Applicant prior to construction.

Prior to the installation of each cable, a marine geophysical survey will be conducted. The survey will use hull-mounted sonar to collect bathymetry (ocean floor topography). The survey will also utilize a towed side scan sonar and a subbottom profiler. These tools will allow the determination of the ocean floor makeup, for example sand, soft bottom, rock, etc. This information would be used to determine the final cable alignment of each of the cables proposed to make sure that it would offer the best burial success.

2.4.1 Marine Protected Areas

The Samoa State Marine Conservation Area is located a few miles north of the cable landing site (Figure 3.4-3). This area is located within the larger State Marine Recreation Management Area that extends several miles into the Pacific Ocean. This marine protected area conserves and restores ocean biodiversity and protects cultural marine resources for recreational and commercial purposes, while allowing certain activities such as marine recreation, research, allowing specific recreational and commercial take of salmon, and exempting the Wiyot Tribe from take regulations (CDFW 2020b).

2.4.2 Humboldt Open Ocean Disposal Site

Offshore several kilometers into the Pacific Ocean is the Humboldt Open Ocean Disposal Site (HOODS) (Figure 3.4-3). Periodic dredging is necessary for maintaining safe navigation in the Humboldt Bay area, and an environmentally appropriate disposal site for the dredged sediment is crucial to the area’s maritime economy. HOODS was designated by the U.S. Environmental Protection Agency (EPA) in 1995 for this purpose. EPA Region 9 periodically monitors HOODS to ensure that unexpected or significant negative effects are not occurring from past or continued use of the disposal site and to verify regulatory and permit compliance. EPA recently proposed expanding HOODS and depending on the final boundary selection, the southernmost Project cable could potentially be buried under the northernmost boundary of HOODS.

2.4.3 Offshore Wind Farms

In January 2016, the Bureau of Ocean Energy Management (BOEM) received an unsolicited request for a commercial lease from Trident Winds, LLC. The BOEM reviewed the lease application and determined in March 2016 that Trident Winds was legally, technically, and financially qualified to hold a commercial lease on the OCS. The location of the proposed wind farm is approximately 40 kilometers offshore in the Pacific Ocean (Figure 3.4-3). Any future proposed wind farm projects would consider the location of cables during environmental review.

2.4.4 Horizontal Directional Drilling Fluid

HDD drilling fluid (a non-toxic, inert material, typically a solution of bentonite clay and water) would be circulated into the bore hole to prevent it from caving in; the fluid would coat the wall of the bore hole to minimize fluid losses to permeable rock and soil types. Drilling fluid also serves as a lubricant for the drill head and carries the cuttings (pieces of drilled rock) back to the entry pit, where the cuttings (rock, sand, and other materials) are removed so the drilling fluid can be recirculated into the bore hole. Drilling fluid would be used for drilling all conduit except for the final approximately 30 feet of the bore hole offshore. The drilling fluid would be changed to water (instead of the drilling fluid) at the end of the bore hole installing the landing pipes; this would minimize the release of drilling fluid into the ocean floor when the drill bit exits offshore. Spent drilling fluid (except for that lost to the surrounding subsurface material) and cuttings would be temporarily collected in the cable landing site and disposed of at a permitted landfill.

Given the variety of geologic conditions that may be encountered, it is possible that some of the drilling fluid would be absorbed into fractures in the surrounding subsurface material. In cases where the fracture is lateral and subterranean, lost fluid would not rise to the surface. In other cases, drilling fluid may reach the surface (e.g., if the fracture comes close enough to the surface that the pressure causes release of drilling fluid above the ocean bottom).

The potential for substantial releases of drilling fluid into the environment would be minimized through several measures. Prior to drilling, the geologic characteristics of the substrate would be evaluated to determine the most appropriate route for the landing pipe installation. During drilling, the potential for losing drilling fluid to the substrate would be assessed by monitoring the volume of the drilling fluid that is returning to the bore entry point and monitoring for changes in the drilling fluid’s pressure.

2.4.5 Inadvertent Releases of Horizontal Directional Drilling Fluid

If a loss of fluid volume or pressure is detected, drilling may be stopped or slowed to allow close observation for a surface release in the ocean. If a release is discovered, the marine monitor would work with the driller to take feasible measures to reduce the quantity of fluid released by lowering drilling fluid pressures, thickening the drilling fluid—or both, depending on geologic conditions.

Any surface releases above the OHWM would be contained with sandbags and collected for reuse or disposal as required in an Inadvertent Return Contingency Plan (**MM BIO-5**). For inadvertent releases below the OHWM, it may be impractical to contain and collect releases because of ambient wind and wave energy in nearshore ocean environment. The wind, wave, and subsurface current energy in the nearshore waters of the Project site can be expected to quickly dissipate any inadvertently released drilling fluid.

However, the landing pipe operation would be closely monitored, as directed in the Inadvertent Return Contingency Plan to be developed.

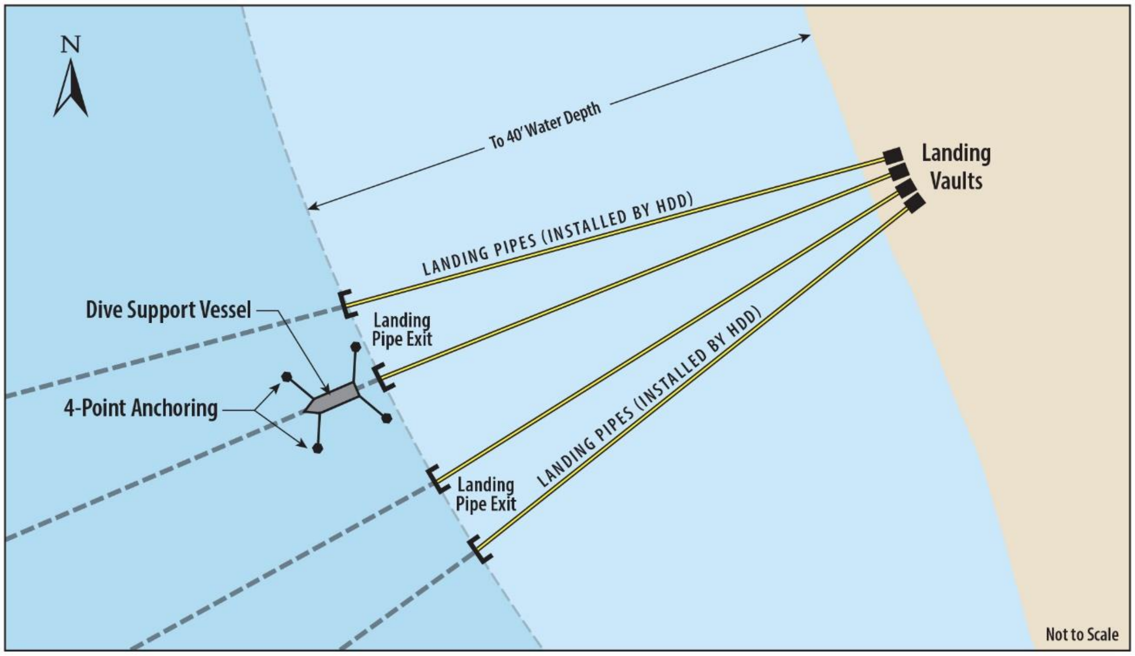
If inadvertent drilling fluid releases are detected in the water column, additional operational measures would be implemented to stop, minimize and control the inadvertent release, as determined feasible by the onsite marine biological monitors, in consultation with the drilling crew and key State agency personnel. Exactly what altered operational measures might be implemented are highly incident specific. Typical measures would include adding lost control materials (e.g., saw dust, binding polymers, and ground nut shells) to the drilling mud to attempt to plug the pathway by which drilling fluid is flowing to the ocean floor, reducing downhole mud pressure to slow the movement of drilling fluid to the ocean, and limiting the flow of drilling fluid into the ocean so that natural oceanographic conditions (wind, wave and current action) can dissipate the released drilling fluid.

Depending on the volume of released material, ocean floor habitats at the point of discharge, and existing oceanographic conditions, if sufficiently large volumes of drilling fluid are deposited onto the ocean floor and pose a significant threat to marine taxa, additional clean-up and removal actions can be implemented including using commercial divers to contain the release with hand-placed barriers (e.g., Brady barrels, or sandbags, silt fences, or silt curtains) and collect released material using vacuum pumps, as practical.

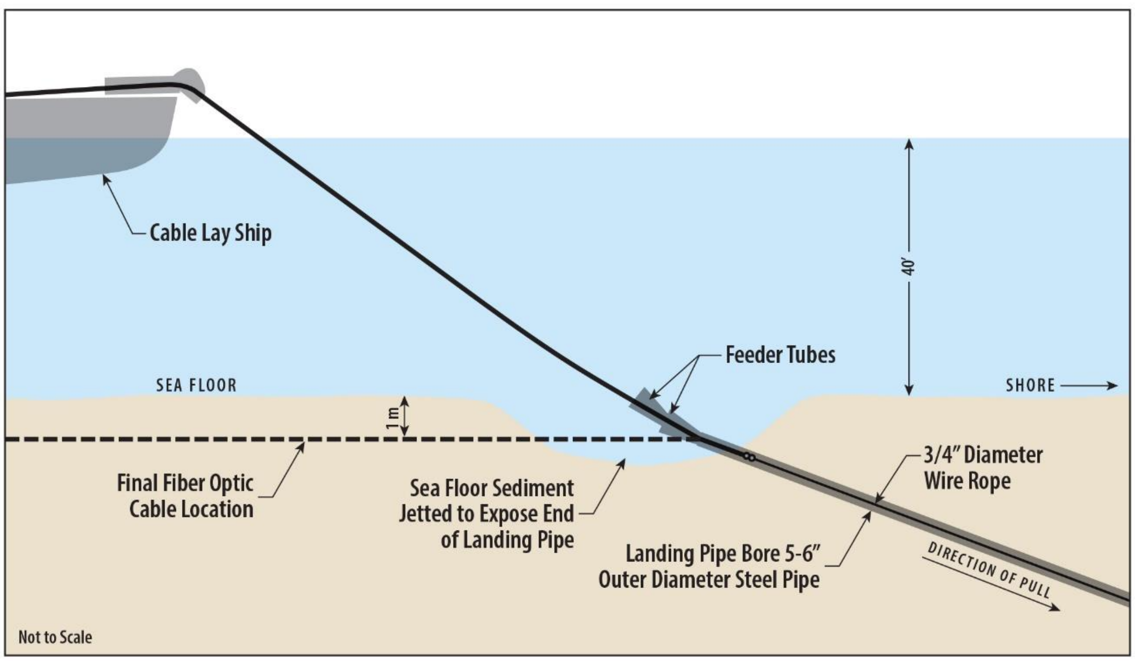
2.4.6 Landing Pipes

Four new landing pipes (5 to 6 inches in diameter) would extend west from the four LVs into the ocean (Figure 2-3), as explained in Section 2.3. These landing pipes would be installed using the HDD construction method. Once a marine cable arrives offshore from Asia or Australia, it would be pulled through a landing pipe and brought onshore into its designated LV (Figure 2-5).

Figure 2-5. Marine Cable Pulling from Offshore to Onshore



Vessel Anchor Plan



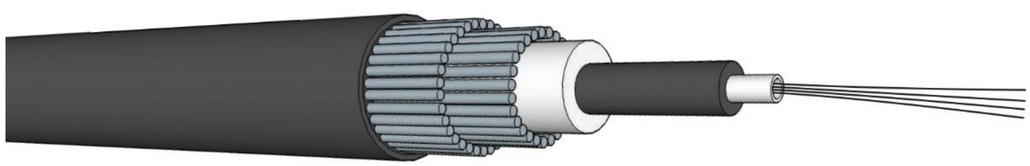
Marine Cable Pulling

2.4.7 Marine Fiber Optic Cable Design

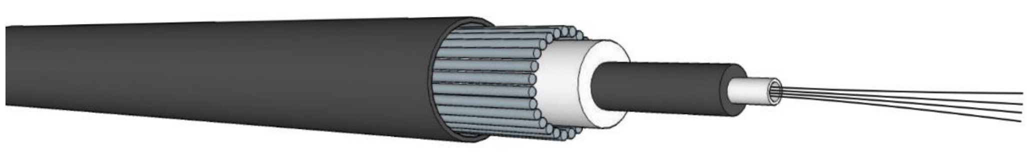
The following two marine cable armoring designs (double armor and single armor) would be used to provide an appropriate degree of protection from geologic and sedimentary conditions encountered during installation and from potential interactions with fishing gear (Figure 2-6):

- **Double-Armored Cable.** This design (less than 2 inches in diameter) offers the greatest degree of protection and is recommended for use in rocky or coarse substrate areas where protection from fishing gear may be warranted. There are two surrounding layers of galvanized wires that are coated with tar to reduce corrosion, two layers of polypropylene sheathing, and an outer layer of tar-soaked nylon yarn.
- **Single-Armored Cable.** This design (less than 2 inches in diameter) is like double-armored cable but with only a single layer of polypropylene sheathing and a single ring of galvanized wires. This cable would be used where there is reduced risk of damage caused by substrate conditions or fishing by burying the cables in soft bottom sediments using a sea plow or ROV.

Figure 2-6. Marine Fiber Optic Cable Designs



Double Armor Marine Fiber Optic Cable



Single Armor Marine Fiber Optic Cable

2.4.8 Signal Regenerators in the Marine Fiber Optic Cables

The marine cable would contain a copper conductor to transmit telecommunication data signals (light pulses). The maximum distance a signal can travel without a regenerator is approximately 35 miles. Therefore, signal regenerators would be required at appropriate intervals in the cables to help transmit the signals from the United States to Asia or Australia.

The regenerator equipment[13] would operate from 48 volts of direct current (DC) electricity using DC power feed equipment housed at the existing cable landing station. The marine cable would transmit this signal (DC electrical power) to the regenerators. The DC power equipment system is not part of the proposed Project because the closest one to California would be more than 3 nm offshore. The completed system would include protective equipment to detect a sharp decrease or sharp increase in electrical current flow in the cables. If an abnormal current flow is detected in the cable, the DC power system would shut down. The DC power would generate a magnetic field on the order of 5 milligauss at 3.28 feet from the cable. The magnetic field would diminish with distance from the cable (such that, at 33 feet, it would be approximately 0.5 milligauss).[14]

2.4.9 Marine Project Construction Methods

Marine Project construction would happen during all Project phases (Table 2-1). The first marine Project component would be to install four landing pipes from the LVs to exit offshore, using the HDD method.

Appendix B discusses the types and number of equipment, and an estimated number of personnel required for Project-related marine construction activities. Overall, marine construction would involve a dive support vessel (primary work vessel), a smaller secondary work vessel, and a cable lay ship (Figure 2-5). Table 2-2 and the text following explains the different marine construction methods that typically would be used at different water depths.

[13] The equipment would be in an existing building not part of this MND.

[14] This magnetic field strength would not adversely affect marine life. The field strength level at 3.3 feet (5 milligauss) is far below the most protective field strength for human health (833 milligauss from the International Commission on Non-Ionizing Radiation Protection [ICNIRP]) and is the equivalent to the field strength from a personal computer at 3.3 feet.

Table 2-2. Summary of Proposed Marine Construction Methods

Approximate Water Depth Range	Approximate Distance Offshore	Likely Installation Method
Landing vault to 40 feet deep	Up to 0.66 mile	Horizontal directional drilling
Between 40 and 98 feet deep	From 0.66 to 1.3 miles	Diver-assisted post-lay burial
Between 98 and 5,904 feet deep	From 1.3 to 32 miles	Cable plow, or diver- or ROV-assisted post-lay burial
Greater than 5,904 feet deep	Beyond 32 miles	Direct-surface lay

Term:
ROV = remotely operated vehicle
Note: All buried and unburied sections would be detailed in a burial report, prepared after each Project phase.

2.4.9.1 Onshore Landing Vault to 40 Feet Water Depth (0.66 mile offshore)

Once all four landing pipes are installed, the cable lay ship would arrive offshore at about 40 feet water depth (about 3,600 feet or 0.66 mile) as it keeps dropping the cable on the ocean floor coming from Asia or Australia.

Exposing Landing Pipe Exit

At approximately 3,600 feet offshore (where the landing pipes exit) (Figure 2-5), divers would jet approximately 10 to 15 cubic yards of ocean floor sediment to expose the end of the landing pipe. The divers would remove the drill head from the landing pipe and install a flapper valve on the end of the landing pipe to keep seawater from entering until the cable is installed into the landing pipe.

Dive Support Vessel (Primary Work Vessel)

A 100- to 200-foot-long dive support vessel (Figure 2-5) would arrive and set up on station within about 50 feet of the landing pipe exit point (about 3,600 feet offshore), using a four-point mooring with an anchor spread of 328 feet. A smaller secondary work vessel would be used with the dive support vessel to set and retrieve anchors, and to shuttle crew between the diver support vessel and the shore. Both of these vessels would be hired locally in California or Oregon. All anchors would be set and retrieved vertically to avoid dragging them across the ocean floor. All anchoring would be conducted as described in a Marine Anchor Plan (**APM-2**), and the anchor drop zones would avoid hard bottom and existing utilities. Refer to Appendix B, Table B-6 (Marine Vessel Inventory) for a list of vessels by phase and the hours per day that each vessel would be in use. Up to 10 employees per day during construction were assumed for purposes of modeling air quality emissions.

Cable Lay Ship

The cable lay ship is a large vessel typically measuring approximately 300 feet to 400 feet and would originate outside of the U.S. The cable lay ship would be laying cable as it arrives in the California coastal waters. Once the cable lay ship arrives offshore, it would position itself several hundred feet oceanward of the end of the landing pipe (3,600 feet offshore) at about 40-foot depth. The divers would connect the end of the incoming cable to an existing wire rope in the landing pipe,[15] install cable chutes (also known as *feeder tubes* as seen in Figure 2-5) into the end of the landing pipe, and attach floats to the cable so it can be pulled through the landing pipe and brought onshore in the LV. The cable would be pulled onshore into the LV by a hydraulic winch and anchored behind the LV. Once the cable is secured in the LV, the cable lay ship would move away from that location. Divers would manage and monitor the pulling process from the dive support vessel.

2.4.9.2 40 to 5,904 Feet Water Depth (0.66 to 32 miles offshore)

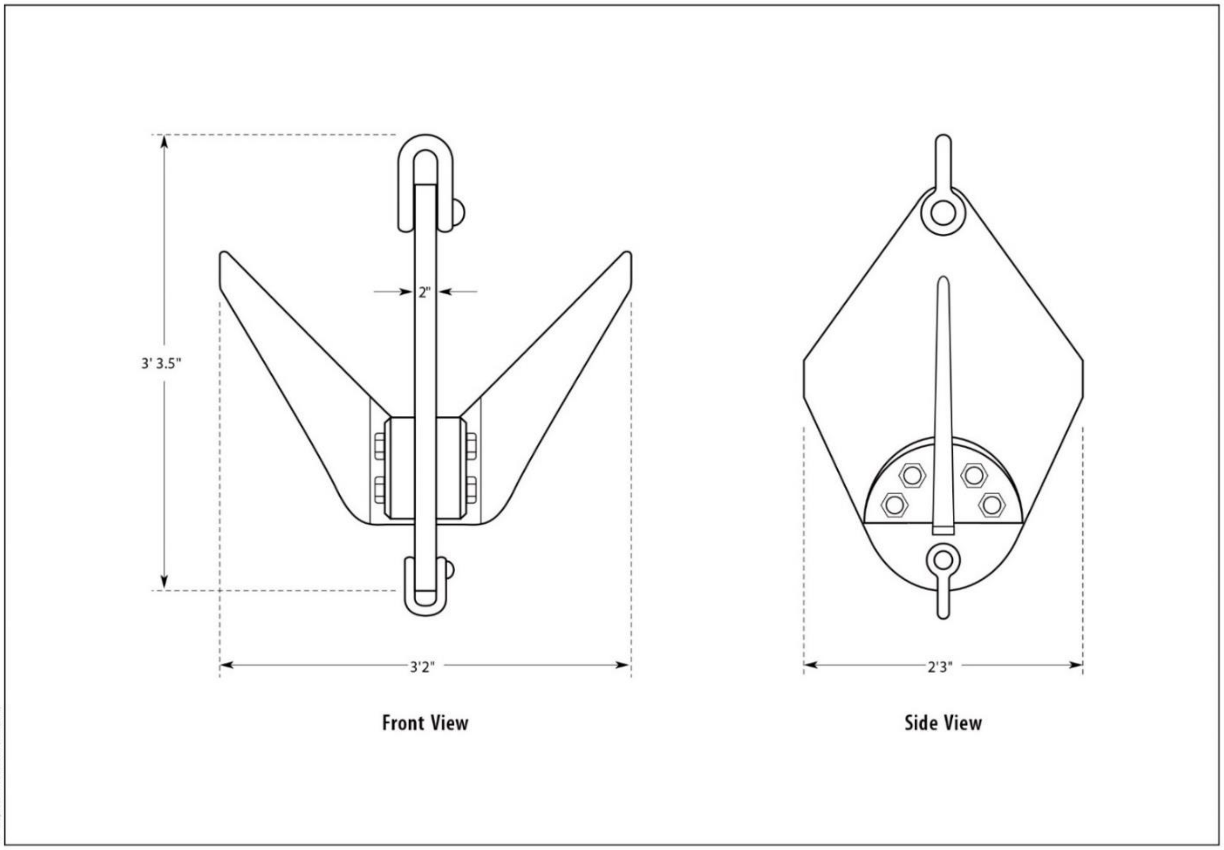
Information from the ocean-bottom surveys[16] would be used to assist in this "run." The purpose of an engineered pre-lay grapnel run is to clear debris on the bottom of the ocean floor (e.g., discarded fishing gear) along the routes where the cables would be buried. A grapnel, typically of the *flat fish* type, would be dragged along the cable route before cable installation to clear out the path for burying cables (Figure 2-7).

The grapnel would be attached to a length of chain to ensure that it touches the bottom of the ocean floor. The cable lay ship or a dive support vessel would tow the grapnel at approximately 1.2 miles per hour (approximately 1 knot per hour). The arms of the grapnel are designed to hook debris lying on the ocean floor or shallowly buried to approximately 1.3 feet. If debris is hooked and towing tension increases, towing would stop, and the grapnel would be retrieved by winch. Any debris recovered during the operation would be stowed on the vessel for subsequent disposal in port.

[15] A 0.75-inch wire rope or *pull cable* in the landing pipe would be attached to a hydraulic winch in the LV when the landing pipe is installed.

[16] There is no permit process for surveys outside state waters. Inside state waters, the Low Energy Geophysical Survey Permit would be obtained from CSLC.

Figure 2-7. Flat Fish Grapnel to Clear Ocean Bottom Debris



2.4.9.3 40 to 98 Feet Water Depth (0.66 to 1.3 miles offshore)

Once the cable has been connected to the LV, the cable lay ship would begin to move west (farther offshore) along the predetermined course, rolling out (paying out) the cable as it goes traveling at approximately 2.3 miles per hour (2 knots per hour). The cable would be temporarily laid directly on the ocean floor and later the divers would bury it, starting from the landing pipes exit point at about 0.66 mile (40 feet water depth) to 1.3 miles (98 feet water depth) offshore. Post-lay burial of the cable by ROV would take place between 1 day and 3 weeks after the cable is first laid on the ocean floor.

Divers would use hand jets to open a narrow furrow beneath the cable, allowing the heavy cable to drop into the furrow. The disturbed sediments then would settle back over the cable, filling the furrow and restoring the surface to original grade. Depending on bottom conditions, the cable would be buried to a depth of approximately 3.3 feet.

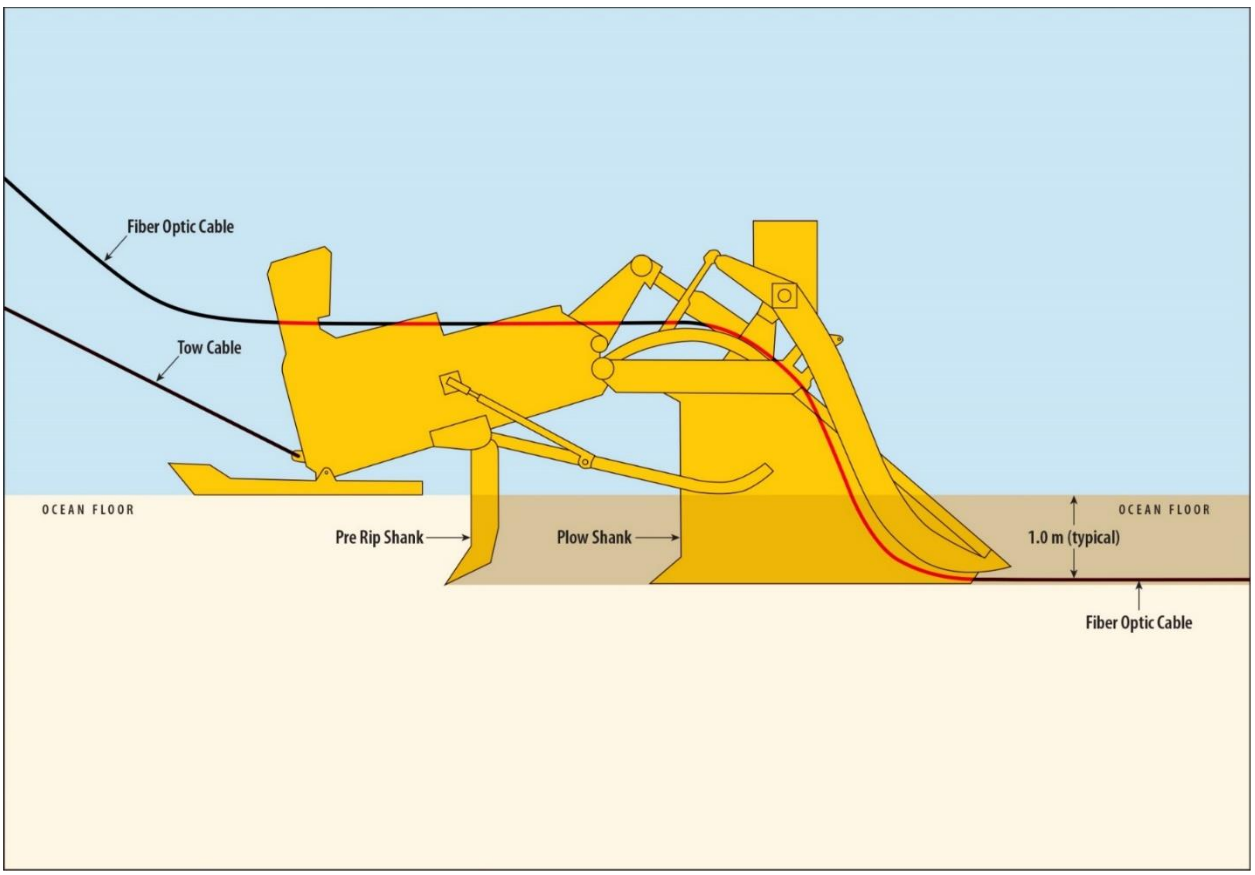
2.4.9.4 98 to 5,904 Feet Water Depth (1.3 to 32 miles offshore)

Sea plow burial would be used beyond water depths of 98 feet to a depth of 5,904 feet. In some locations where plow burial is not possible, the cable would be buried using post-lay burial methods (ROV-assisted post-lay burial) as explained below.

Cable Plow Post-Lay Burial

The cables can be plow buried at water depths of approximately 98 to 5,904 feet, from approximately 1.3 to 32 miles offshore. A sea plow is a sled-like burial tool that would be deployed by the cable lay ship after the shore-end landing operations are complete (Figure 2-8). Once the sea plow, supported by two sled outriggers to a total width of approximately 20 feet, is deployed to the bottom, divers would assist with loading the cable into the sea plow's burial shank. The mechanical movements would be controlled by an operator watching the divers through a video camera mounted on the plow. The cable would be buried at the same time as it would continue to feed through the sea plow shank and into the bottom of the furrow, all in a single operation. The 3.3-foot-wide sea plow furrow would naturally close under the weight of the sediments and the plow sled outriggers. The plow would be expected to operate at the rate of approximately 0.6 mile per hour (approximately 0.5 knot per hour).

Figure 2-8. Sea Plow for Burying Marine Fiber Optic Cables on Ocean Floor



Remotely Operated Vehicle Cable Post-Lay Burial

At water depths of approximately 98[17] to 328 feet, from 1.3 to 8 miles offshore, or where the sea plow cannot be deployed because of bottom conditions, an ROV (a robotic device operated from the cable lay ship) or a similar vessel would be used to bury the cable (Figure 2-5). The ROV would move under its own power and would be tethered to and guided from the cable lay ship. ROV jets would loosen the ocean floor sediments beneath the cable, allowing it to settle to the desired depth of 3 to 4 feet. The disturbed sediments would settle back over the area to their original grade, leaving the cable buried. The ROV would operate at a nominal speed of 0.35 mile per hour (0.3 knot per hour) when jetting. However, the overall rate of forward progress would depend on the number of passes needed to attain target burial depths, a variable that is in turn a function of sediment stiffness. The post-lay burial of cable by ROV would disturb about 15 feet of the ocean floor (not the water column).

2.4.9.5 Greater Than 5,904 Feet Water Depth (32 miles and beyond offshore)

At this depth, the cable lay ship would lay the cable directly on the ocean floor without burial, while maintaining slack control to ensure a straight lay of the cable and ensuring contact with the ocean floor to avoid suspensions.

2.5 CABLE OPERATIONS, MAINTENANCE, AND REPAIR

A differential global positioning system (GPS) would be used when the cable systems are installed. Extensive records would be maintained to track the exact locations of the cable lay ship, sea plows, and ROVs during the installation process. After installation, the data would be compiled into a standard-format cable record and distributed to all cable maintenance zone ships, government charting agencies, CSLC, and other data users. These records can be used in the future to locate these cables on the ocean floor when a cable repair is needed. These records would be maintained throughout the system's life and after the system is retired. The cable owner is responsible for repair and maintenance of the cable.

2.5.1 Cable Operations and Maintenance

No routine maintenance is planned for the submerged cable network. These cables in the ocean typically operate for at least 25 years. Because of the stability of the ocean bottom environment, regular maintenance is unnecessary.

[17] There is overlap between the ROV and the plow post-lay burial methods (both start at 98 feet). This is because some plows and vessels can deploy at water depths of 98 feet, while others need more depth.

2.5.2 Emergency Cable Repair (Marine)

Even though the cable would be buried at least 3.3 feet deep below the ocean floor, it can still be damaged by saltwater entering into the landing pipe, or by anchors or fishing gear snagging the cable and causing a *fault* (the point at which transmission is interrupted). There is no specific source with the information of how often faults have happened within the State waters. The Applicant and ICF are not aware of any such faults in California.

These are the two types of emergency repairs that would happen:

- **Buried Repair.** A buried fault would be repaired one of these ways:
  - Shallow-burial repair. The fault usually can be pinpointed by using low-frequency electroding. This type of repair would require adding little if any extra cable (to replace the bad cable) during the repair because of the shallow depth.
  - Up to 20 inches depth repair. A grapnel would be rigged to this location to penetrate and recover the cable buried up to 20 inches.
  - Deeper than 20 inches depth repair. A grapnel, divers, or an ROV would remove the cable from the burial trench and bring it to the surface. The cable then would be repaired and reburied in its original position to the extent practicable.
- **Unburied Repair.** It may be possible to engage the cable and bring it to the surface without cutting. If not, then a cutting blade would be fitted to a grapnel to cut the cable close to the fault location before recovery. A grapnel then would be used to recover each cut end, which would be sealed and temporarily buoyed off for easy recovery later. The other end would be recovered and tested to locate the fault more precisely. The repair vessel would recover the cable until the cable's fault site is on the ship. After the fault site is removed from the system, the repaired cable would be joined to the fault-free cable end, and then the cable would be rolled out (paid out) as the vessel returns to the buoyed end. When the buoy is recovered, the two cable ends would be joined, and the repaired cable would be put back into the ocean.

2.6 RETIREMENT, ABANDONMENT, OR REMOVAL OF THE CABLE SYSTEM

The Applicant has requested a 25-year lease from the CSLC for the Project components under the CSLC's jurisdiction. The Applicant proposes that all terrestrial and marine Project components be left in place and available for future cable systems. Even though the Applicant proposes to keep the structures in place, CSLC authorization would be required for continued occupation beyond the cable's life or once the cable is taken out of service. CSLC's preference is to remove all structures under the CSLC's jurisdiction to ensure that these structures do not become a future public hazard.

At least 2 years before the lease expires, the cable owner(s) would submit a CSLC lease application to remove all Project components (within the CSLC's leasing jurisdiction) or to request continued use and maintenance of these components. At least 90 days before taking the cables out of service, the cable owner(s) would notify Humboldt County and the CCC of their decision and how they plan to dispose of the inactive cables.

If the Project components are removed, the potential impacts would be similar to those associated with installing the Project. The significance of impacts related to removal would depend on the existing setting and significance criteria at the time of removal. At the end of the cable's life, subsequent environmental documentation likely would be required to analyze environmental impacts at that time with those existing environmental conditions.

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3.0 ENVIRONMENTAL CHECKLIST AND ANALYSIS

This section presents the Initial Study (IS) for the proposed RTI Infrastructure Inc. Eureka Subsea Fiber Optic Cables Project (Project) in accordance with the requirements of the California Environmental Quality Act (CEQA). The IS identifies site-specific conditions and impacts, evaluates their potential significance, and discusses ways to avoid or lessen impacts that are potentially significant. The information, analysis, and conclusions included in the IS provide the basis for determining the appropriate document needed to comply with CEQA. Based on the analysis and information contained herein, California State Lands Commission (CSLC) staff has found evidence that the Project may have a significant effect on the environment but that revisions to the Project would avoid the effects or mitigate them to a point where clearly no significant effect on the environment would occur. As a result, the CSLC has concluded that a Mitigated Negative Declaration (MND) is the appropriate CEQA document for the Project.

The evaluation of environmental impacts provided in this document is based in part on the impact questions contained in Appendix G of the State CEQA Guidelines. These questions, which are included in an impact assessment matrix for each environmental category (e.g., Aesthetics, Air Quality, and Biological Resources), are "intended to encourage thoughtful assessment of impacts." Each question is followed by a check-marked box with column headings that are defined below:

- **Potentially Significant Impact.** This column is checked if there is substantial evidence that a Project-related environmental effect may be significant. If there are one or more "Potentially Significant Impacts," a Project Environmental Impact Report (EIR) would be prepared.
- **Less than Significant with Mitigation.** This column is checked when the Project may result in a significant environmental impact, but the incorporation of identified Project revisions or mitigation measures would reduce the identified effect(s) to a less than significant level.
- **Less than Significant Impact.** This column is checked when the Project would not result in any significant effects. The Project's impact is less than significant for the category without the incorporation of Project-specific mitigation measures.
- **No Impact.** This column is checked when the Project would not result in any impact in the category or the category does not apply.

The environmental factors checked below (Table 3-1) would be potentially affected by this Project; a checked box indicates that at least one impact would be a "Potentially Significant Impact" except that the Applicant has agreed to Project revisions, including implementation of mitigation measures, that would reduce the impact to "Less than Significant with Mitigation."

Table 3-1. Environmental Issues and Potentially Significant Impacts

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☒ Biological Resources	☒ Cultural Resources	☒ Cultural Resources – Tribal
☐ Energy	☐ Geology, Soils, and Paleontological Resources	☒ Greenhouse Gas Emissions
☒ Hazards and Hazardous Materials	☒ Hydrology and Water Quality	☐ Land Use and Planning
☐ Mineral Resources	☒ Noise	☐ Population and Housing
☐ Public Services	☒ Recreation	☒ Transportation
☐ Utilities and Service Systems	☐ Wildfire	☒ Mandatory Findings of Significance

Detailed descriptions and analyses of impacts from Project activities and the basis for their significance determinations are provided for each environmental factor on the following pages, beginning with Section 3.1, *Aesthetics*. Relevant laws, regulations, and policies potentially applicable to the Project are listed in the Regulatory Setting for each environmental factor analyzed in this IS as well as within Appendix A – Abridged List of Major Federal and State Laws, Regulations, and Policies Potentially Applicable to the Project.

AGENCY DETERMINATION

Based on the environmental impact analysis provided by this Initial Study:

☐ I find that the proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

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

☐ I find that the proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Afifa Awan ______________________ 12/11/2020

Signature — Date

Afifa Awan, Senior Environmental Scientist
Division of Environmental Planning and Management
California State Lands Commission

3.1 AESTHETICS

AESTHETICS - Except as provided in Public Resources Code Section 21099, would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**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 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?	☐	☐	☒	☐

3.1.1 Environmental Setting

The Project consists of temporary work on land (terrestrial) and in the ocean (marine).

3.1.1.1 Terrestrial Components

Cable Landing Site

The Pacific Ocean and Samoa Beach are not visible from the cable landing site due to intervening dune vegetation and topography. Project-related equipment and work in the cable landing site would be visible to individuals traveling along Vance Avenue. An additional already paved staging area would be used in a nearby location, not yet determined.

The Redwood Marine Terminal II (pulp mill), adjacent and to the east, is no longer in operation. The closest residences to the cable landing site are along Bay Street approximately 0.5 mile southeast (Fay Street and Bay Street) and these residents do not have views of the cable landing site. Reference Figure 3.1-1 for sensitive receptors in the Project area and reference the photographs in Figures 3.1-2a through 3.1-2d for views of the Project site from different vantage points.

Figure 3.1-1. Sensitive Receptors

Figure 3.1-2a. Photographs of Project Site Views

Looking east across the cable landing site with the former pulp mill in the background

Figure 3.1-2b. Photographs of Project Site Views

Looking northwest across the cable landing site with the water tower in the background

Figure 3.1-2c. Photographs of Project Site Views

Looking south across the middle of the cable landing site with an old pulp mound in the background

Figure 3.1-2d. Photographs of Project Site Views

Looking southeast across the cable landing site

Samoa Dunes Recreation Area

The Samoa Dunes Recreation Area is located along the beach to the west and south of the cable landing site but is not visible from the cable landing site. The primary access route to the Samoa Dunes Recreation Area is more than 2 miles south of the cable landing site off New Navy Base Road. The Samoa Dunes Recreation Area is a multi-recreational park that attracts off-highway vehicle enthusiasts, hikers, surfers, beachcombers, and fishing enthusiasts from throughout the region.

Highway 101 (Eligible State Scenic Highway)

Highway 101, an eligible State Scenic Highway, is not visible from the cable landing site and is approximately 1.3 miles east of the cable landing site (Caltrans 2018).

3.1.1.2 Marine Components

The temporary marine work would happen about 40 feet below the ocean surface where the approximately 4,600-foot landing pipes would exit offshore. In this offshore area, fishing vessels or freighters pass by periodically. The equipment used offshore would be lit at night in accordance with applicable U.S. Coast Guard (USCG) safety regulations for marine vessels.

3.1.2 Regulatory Setting

Appendix A contains the federal and state laws and regulations pertaining to aesthetics relevant to the Project. Local policies from Humboldt County's Local Coastal Program (LCP) are listed below:

- **Electrical Transmission Lines. Policy 6.a.** Transmission line rights-of-way shall be routed to minimize impacts on the viewshed in the coastal zone, especially in highly scenic areas, and to avoid locations which are on or near habitat, recreational, or archaeological resources, whenever feasible. Scarring, grading, or other vegetative removal shall be minimized and revegetated with plants similar to those in the area.
- **Visual Resource Protection. Policy 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.

The proposed Project-related activities would be consistent with the above policies and would not result in a potentially significant environmental impact.

3.1.3 Impact Analysis

The terrestrial and marine Project-related work would be temporary. Once the work is completed, there would be no new permanently visible structures. The closest residence to the cable landing site is approximately 0.5 mile southeast on Fay Street and Bay Street, with no view of the Project (Figure 3.1-1). People recreating on Samoa Beach, approximately 0.2 mile west of the cable landing site would not be able to see the site because of intervening topography and vegetation.

a) Have a substantial adverse effect on a scenic vista?

Less than Significant Impact.

Terrestrial Components

The Project site is not within a scenic vista according to the Humboldt County LCP (Humboldt County 2014). The aesthetic impacts would be temporary for locals, tourists, and recreationalists from the following locations since they would not have Project views:

- **Cable Landing Site.** There would be no new above ground structures at the cable landing site.
- **Samoa Dunes Recreation Area and Samoa Beach.** These areas are not visible from the cable landing site.
- **Residents.** The closest residence to the cable landing site is approximately 0.5 mile southeast on Fay Street and Bay Street. There would be temporary visual impacts (i.e., the presence of construction equipment and trucks) during construction for travelers along Vance Avenue and at the second staging area. Based on the short construction window and compliance with local regulations, and the absence of sensitive receptors (e.g., residences, hospitals, schools, and parks) in the Project vicinity with views of the Project, these temporary visual impacts would be less than significant.

Marine Components

The temporary marine work (about 3,600 feet offshore) and vessels would be visible offshore by boats and onshore from Samoa Beach. This work would last about 7 weeks (or 51 days) during each phase (Table 2-1). Based on the temporary nature of the offshore marine work, visual impacts would be less than significant.

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 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?

(b and c) No Impact.

<u>All Project Components</u>

There are no scenic resources within the Project area. Vance Avenue or New Navy Base Road are not designated as local scenic routes. The Project site is well out of view from highway travelers. Highway 101, approximately 1.3 miles east of the cable landing site, is well out of view of the travelers. Even though Highway 101 is an eligible State Scenic Highway, it has not yet been designated as such (Caltrans 2018). Therefore, there is no impact on scenic resources.

The Project would not conflict with applicable zoning and other regulations because it would be temporary construction. No natural landforms would be changed, and no permanent structures would be built, thereby maintaining the existing visual character of the site.

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

Less than Significant Impact.

<u>All Project Components</u>

There would be no impact from terrestrial areas because this work would occur during daytime hours without introducing any new light or glare to the area. Even though offshore work would be continuous for 24 hours, it would comply with USCG regulations. The night-time lighting would meet all applicable USCG navigational standards. The dive support vessel and secondary work vessel would remain offshore at night, with some limited lighting on the vessels and anchor crown buoys to avoid a navigational hazard to existing marine traffic. This impact would be less than significant.

3.1.4 Mitigation Summary

The Project would not result in significant impacts related to aesthetics; therefore, no mitigation is required.

3.2 AGRICULTURE AND FORESTRY RESOURCES

AGRICULTURE AND FORESTRY RESOURCES[18] - Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**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 Natural 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 Pub. Resources Code, § 12220, subd. (g)), timberland (as defined by Pub. Resources Code, § 4526), or timberland zoned Timberland Production (as defined by Gov. Code, § 51104, subd. (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?	☐	☐	☐	☒

3.2.1 Environmental Setting

Because Humboldt County has not yet been included in the California Natural Resources Agency's Farmland Mapping and Monitoring Program, no lands are designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. There are no forest lands or agricultural lands in the Project area. The Project site is not under Williamson Act contract. The closest Williamson Act-contracted lands are over 5 miles northeast (Humboldt County 2020a). The cable landing site and the existing cable landing station are located on Assessor's parcel number (APN) 401-112-021, and are zoned MC/MG (Industrial, Coastal Dependent Heavy/Industrial General). The adjacent parcels to the north, south, and east also are zoned for industrial uses; and the land west of New Navy

[18] 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 (2019) 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 the California Air Resources Board.

Base Road is zoned Natural Resources with a Combining Zone overlay of Coastal Wetlands and Beach and Dune Areas.

3.2.2 Regulatory Setting

Appendix A contains the federal and state laws and regulations pertaining to agriculture and forestry resources relevant to the Project. At the local level, no goals, policies, or regulations are applicable to the Project.

3.2.3 Impact Analysis

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 Natural 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 Pub. Resources Code, § 12220, subd. (g)), timberland (as defined by Pub. Resources Code, § 4526), or timberland zoned Timberland Production (as defined by Gov. Code, § 51104, subd. (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?

(a to e) No Impact.

<u>All Project Components</u>

The Project would not result in impacts on agriculture or forestry resources and would not conflict with a Williamson Act contract because no farmland or forest land is within the Project area.

3.2.4 Mitigation Summary

The Project would not affect agriculture or forestry resources; therefore, no mitigation is required.

3.3 AIR QUALITY

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:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**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?	☐	☐	☒	☐

3.3.1 Environmental Setting

3.3.1.1 Local Climate and Meteorology

The Project is in the North Coast Air Basin (NCAB), which includes Mendocino, Del Norte, Humboldt, Trinity, and northern Sonoma Counties. The climate generally is characterized by cool (dry) summers and mild (relatively damp) winters. Along the coast (terrestrial Project components), temperatures are relatively constant throughout the year (41 to 63 degrees Fahrenheit [°F]). Annual average rainfall (as reported by the Eureka climate monitoring station) is about 40 inches (Western Regional Climate Center 2020). Dominant winds along the coast exhibit a seasonal pattern. In summer months, strong north to northwesterly winds are common; during winter, storms from the south Pacific increase the percentage of days when winds are from the south.

Inversion conditions are common in the NCAB because of the region’s topography and coastal air movements. Inversions are created when warm air traps cool air near the ground surface and prevents vertical dispersion of air. During summer, inversions are less prominent, and vertical dispersion of the air is good. However, during cooler months between late fall and early spring, inversions last longer and are more geographically extensive; vertical dispersion is poor, and pollution may be trapped near the ground for several concurrent days.

3.3.1.2 Pollutants of Concern

Criteria pollutants are those contaminants for which ambient air quality standards have been established for the protection of public health and welfare. Criteria pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead, and particulate matter with diameters of 10 (PM_{10}) and 2.5 ($PM_{2.5}$) microns or less. These pollutants commonly are used as indicators of ambient air quality conditions.

Criteria pollutants are regulated under the national ambient air quality standards (NAAQS) by the U.S. Environmental Protection Agency (EPA) and under the California ambient air quality standards (CAAQS) by the California Air Resources Board (CARB). All criteria pollutants can cause human health and environmental effects at certain concentrations. The NAAQS and CAAQS limit criteria pollutant concentrations to protect human health and prevent environmental and property damage. Epidemiological, controlled human exposure, and toxicology studies evaluate potential health and environmental effects of criteria pollutants; these studies form the scientific basis for new and revised ambient air quality standards.

The primary criteria pollutants of concern generated by the Project are CO, PM, and SO_2.[19, 20] Other pollutants of concern are nitrogen oxides (NO_X) and reactive organic gases (ROGs), which are precursors to O_3; and the toxic air contaminant (TAC) diesel particulate matter (DPM).[21] Principal characteristics and possible health and environmental effects from exposure to the primary pollutants generated by the Project are discussed below.

- **Ozone (O_3) and Ozone Precursors.** O_3 is considered a regional pollutant because its precursors combine to affect air quality on a regional scale. Pollutants such as CO, NO_2, SO_2, and lead are considered local pollutants that tend to accumulate in the air locally. PM is both a local and a regional pollutant. O_3 or smog, is a photochemical oxidant that is formed when ROGs and NO_X (both by-products of the internal combustion engine) react with sunlight. ROGs are compounds primarily made up of hydrogen and carbon atoms. Internal combustion associated with motor vehicle usage is the major source of hydrocarbons. Other sources of ROGs are emissions associated with the use of paints and solvents; the application of asphalt paving; and the use of household consumer products such as aerosols. The two major forms of NO_X are nitric oxide (NO) and NO_2. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature or high pressure. NO_2 is a reddish-brown irritating gas formed by the combination of NO and oxygen. In addition to

[19] There are also ambient air quality standards for lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility particulates. However, these pollutants typically are associated with industrial sources, which are not included as part of the proposed Project. Accordingly, they are not evaluated further.

[20] Most emissions of NOx are in the form of nitric oxide (Reşitoğlu 2018). Conversion to NO_2 occurs in the atmosphere as pollutants disperse downwind. Accordingly, NO_2 is not considered a local pollutant of concern for the proposed Project and is not evaluated further.

[21] Naturally occurring asbestos (NOA) is found in Humboldt County, but the Project is not within an area of mapped ultramafic rock, and there are no mapped ultramafic rock unit areas in the Project vicinity (California Department of Conservation 2000). Accordingly, NOA is not considered a TAC of concern for the proposed Project and is not evaluated further.

serving as an integral participant in ozone formation, NO_X directly acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens due to impairments to the immune system.

O_3 poses a higher risk to those who already suffer from respiratory diseases (e.g., asthma), children, older adults, and people who are active outdoors. Exposure to O_3 at certain concentrations can make breathing more difficult, cause shortness of breath and coughing, inflame and damage the airways, aggregate lung diseases, increase the frequency of asthma attacks, and cause chronic obstructive pulmonary disease. Studies show associations between short-term O_3 exposure and nonaccidental mortality, including deaths from respiratory issues. Studies also suggest that long-term exposure to O_3 may increase the risk of respiratory-related deaths (EPA 2019a). The concentration of O_3 at which health effects are observed depends on an individual's sensitivity, level of exertion (i.e., breathing rate), and duration of exposure. Studies show large individual differences in the intensity of symptomatic responses, with one study finding no symptoms to the least responsive individual after a 2-hour exposure to 400 parts per billion of O_3 and a 50-percent decrement in forced airway volume in the most responsive individual. Although the results vary, evidence suggests that sensitive populations (e.g., asthmatics) may be affected on days when the 8-hour maximum ozone concentration reaches 80 parts per billion (EPA 2016a).

In addition to human health effects, O_3 has been tied to crop damage, typically in the form of stunted growth; leaf discoloration; cell damage; and premature death. Ozone also can act as a corrosive and oxidant, resulting in property damage such as degradation of rubber products and other materials.

- **Carbon Monoxide (CO).** CO primarily is formed through incomplete combustion of organic fuels. Higher CO values generally are measured during winter, when dispersion is limited by morning surface inversions. Seasonal and diurnal variations in meteorological conditions lead to lower values in summer and in the afternoon. CO is an odorless, colorless gas that affects red blood cells in the body by binding to hemoglobin and reducing the amount of oxygen that can be carried to the body's organs and tissues. Exposure to CO at high concentrations also can cause fatigue, headaches, confusion, dizziness, and chest pain. There are no ecological or environmental effects of CO at levels at or near ambient (CARB 2020a).
- **Particulate Matter.** Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulates now generally are divided into the two categories of respirable particles:
    - PM10. These particles have an aerodynamic diameter of 10 microns or less and are about 1/7th the thickness of a human hair. Major sources of PM10

include motor vehicles; wood burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions.

- PM 2.5. These fine particles have an aerodynamic diameter of 2.5 microns or less and are roughly about 1/28th the diameter of a human hair. Major sources of PM2.5 include fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves.

Particulate matter also forms when gases emitted from industries and motor vehicles, such as SO_2, NO_X, and ROG, undergo chemical reactions in the atmosphere.

Particulate pollution can be transported over long distances and may adversely affect the human respiratory system, especially for people who are naturally sensitive or susceptible to breathing problems. Numerous studies have linked PM exposure to premature death in people with preexisting heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms. Depending on its composition, both PM10 and PM2.5 also can affect water quality and acidity, deplete soil nutrients, damage sensitive forests and crops, affect ecosystem diversity, and contribute to acid rain (EPA 2020a).

- **Sulfur Dioxide (SO_2).** Sulfur dioxide is generated by burning fossil fuels; industrial processes; and natural sources, such as volcanoes. In recent years, emissions of SO_2 have been reduced significantly by increasingly stringent controls placed on the sulfur content of fuels used in stationary sources and mobile sources. SO_2 is a precursor to fine PM formation in the form of sulfates, such as ammonium sulfate. Short-term exposure to SO_2 can aggravate the respiratory system, making breathing difficult. Controlled laboratory studies indicate that brief exposure (5 to 10 minutes) of exercising asthmatics to an average SO_2 level of 0.4 parts per million (ppm) can result in increases in air resistance. Healthy adults do not show any symptoms to SO_2 at levels as high as 1 part per million, even after up to 3 hours of exposure. Sulfur dioxide also can affect the environment by damaging foliage and decreasing plant growth (EPA 2019b).

- **Diesel Particulate Matter.** Although NAAQS and CAAQS have been established for criteria pollutants, no ambient standards exist for TACs. A *TAC* is defined by California law as an air pollutant that “may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health.” Diesel particulate matter is emitted by diesel-powered engines. The CARB estimates that DPM emissions are responsible for about 70 percent of the total ambient air toxics risk in California (CARB 2020b). Short-term exposure to DPM can cause acute irritation (e.g., eye, throat, and bronchial), neurophysiological symptoms (e.g., lightheadedness and nausea), and respiratory symptoms (e.g., cough and phlegm).

3.3.1.3 Ambient Criteria Pollutant Concentration Stations

Several monitoring stations measure criteria pollutant concentrations in Humboldt County and the NCAB. The nearest station to the Project is the Eureka-Jacobs station, which is approximately 2 miles southeast of the proposed cable landing site. Pollutant concentrations monitored at this station are considered representative of ambient air quality in the Project area. Table 3.3-1 shows the available monitoring data collected at the station from 2017 to 2019.

Table 3.3-1. Available Ambient Criteria Air Pollutant Monitoring Data from the Eureka-Jacobs Station (2017–2019)

Pollutant and Standards	2017	2018	2019
Ozone			
Maximum 1-hour concentration (ppm)	0.063	0.045	0.051
Maximum 8-hour concentration (ppm)	0.059	0.041	0.049
Number of days standard exceeded[a]			
CAAQS 1-hour (>0.09 ppm)	0	0	0
NAAQS 8-hour (>0.070 ppm)	0	0	0
CAAQS 8-hour (>0.070 ppm)	0	0	0
Nitrogen Dioxide (NO_2)			
National maximum 1-hour concentration (ppm)	22.4	58.1	27.9
State maximum 1-hour concentration (ppm)	22	58	27
State annual average concentration (ppm)	2	2	2
Number of days standard exceeded[a]			
NAAQS 1-hour (98th Percentile>0.100 ppm)	0	0	0
CAAQS 1-hour (0.18 ppm)	0	0	0
Annual standard exceeded?			
NAAQS annual (>0.053 ppm)	No	No	No
CAAQS annual (>0.030 ppm)	No	No	No
Particulate Matter (PM_{10})[b]			
National[c] maximum 24-hour concentration (mg/m^3)	114.1	71.0	49.3
National[c] second-highest 24-hour concentration mg/m^3)	72.5	55.4	44.4
State[d] maximum 24-hour concentration (mg/m^3)	N/A	N/A	N/A
State[d] second-highest 24-hour concentration (mg/m^3)	N/A	N/A	N/A
National annual average concentration (mg/m^3)	17.4	18.6	15.1
State annual average concentration (mg/m^3)[e]	N/A	N/A	N/A
Number of days standard exceeded[a]			
NAAQS 24-hour (>150 mg/m^3)[f]	0	0	0
CAAQS 24-hour (>50 mg/m^3)[f]	N/A	N/A	N/A
Annual standard exceeded?			
CAAQS annual (>20 mg/m^3)	N/A	N/A	N/A

Table 3.3-1. Available Ambient Criteria Air Pollutant Monitoring Data from the Eureka-Jacobs Station (2017–2019)

Pollutant and Standards	2017	2018	2019
Particulate Matter ($PM_{2.5}$)			
National[c] maximum 24-hour concentration (mg/m^3)	49.0	39.6	18.7
National[c] second-highest 24-hour concentration (mg/m^3)	30.5	39.5	18.5
State[d] maximum 24-hour concentration (mg/m^3)	49.0	39.6	18.7
State[d] second-highest 24-hour concentration (mg/m^3)	30.5	39.5	18.5
National annual average concentration (mg/m^3)	8.3	7.7	6.7
State annual average concentration (mg/m^3)[e]	N/A	7.7	N/A
Number of days standard exceeded[a]			
NAAQS 24-hour (>35 mg/m^3)[f]	3	6	0
Annual standard exceeded?			
NAAQS annual (>12.0 mg/m^3)	No	No	No
CAAQS annual (>12 mg/m^3)	No	No	No
Carbon Monoxide (CO)			
No data available			
Sulfur Dioxide (SO_2)			
No data available			

Source: CARB 2020c

Terms:

> = greater than

CAAQS = California ambient air quality standards

CO = carbon monoxide

mg/m^3 = milligrams per cubic meter

N/A = not applicable or insufficient, or no data were available to determine the value

NAAQS = national ambient air quality standards

O_3 = ozone

PM_{10} = particulate matter 10 microns or less in diameter

$PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

ppm = parts per million

SO_2 = sulfur dioxide

Notes:

[a] An exceedance of a standard is not necessarily a violation because of the regulatory definition of a violation.

[b] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.

[c] State statistics are based on local conditions data.

[d] Measurements usually are collected every 6 days.

[e] State criteria for sufficiently complete data for calculating valid annual averages are more stringent than the national criteria.

[f] Mathematical estimates of how many days' concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been rounded.

As shown in Table 3.3-1, the Eureka-Jacobs station has not experienced any violations of the O_3, PM10, or NO_2 ambient air quality standards for which data are available but recorded three violations of the PM2.5 24-hour NAAQS in 2017 and six violations of the same standard in 2018 (CARB 2020c). As discussed above, the CAAQS and NAAQS are concentration limits of criteria air pollutants needed to adequately protect human health and the environment. Existing violations of the 24-hour PM2.5 NAAQS indicate that certain individuals exposed to this pollutant may experience increased acute cardiovascular and respiratory ailments.

3.3.1.4 Sensitive Receptors

Sensitive land uses are locations where human populations, especially children, seniors, and sick persons, are found and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (i.e., 24-hour, 8-hour). Typical *sensitive receptors* are residences, hospitals, schools, and parks. Based on the Project footprint and National Agriculture Imagery Program imagery from the U.S. Department of Agriculture (2018), there are no sensitive receptors within a 1,000-foot buffer of the Project footprint (Figure 3.1-1). The closest residential receptor to the cable landing site is approximately 0.5 mile (2,500 feet) to the southeast, off Fay Street and Bay Street.

3.3.2 Regulatory Setting

Appendix A contains the federal and state laws and regulations pertaining to air quality laws and regulations relevant to the Project. The federal Clean Air Act (CAA) of 1969 and its subsequent amendments form the basis for the nation’s air pollution control effort. The EPA is responsible for implementing most aspects of the CAA. A key element of the CAA is the NAAQS for criteria pollutants. The CAA delegates enforcement of the NAAQS to the states. In California, the CARB is responsible for enforcing air pollution regulations and implementing the California Clean Air Act, which requires attainment of the CAAQS by the earliest practical date.

The EPA and CARB use ambient air quality monitoring data to determine whether geographic areas achieve the following NAAQS and CAAQS:

- **Attainment Areas.** Areas with pollutant concentrations that are below or within the ambient air quality standards for the respective air district.
- **Nonattainment or Maintenance Areas.** Areas that do not meet the ambient air quality standards for the respective air district.

For regions that do not attain the NAAQS, the CAA requires preparing a State Implementation Plan. The Project area within Humboldt County is designated as an attainment area (pollutant concentrations are below the ambient air quality standards) for all criteria pollutants under the NAAQS (EPA 2020b). Humboldt County is designated as a nonattainment area (pollutant concentrations are above the ambient air quality standards) for the state 24-hour PM10 standard (CARB 2020d). The County attains all other CAAQS.

The CARB delegates to local air agencies the responsibility of overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality-related sections of environmental documents required by CEQA.

The North Coast Unified Air Quality Management District (NCUAQMD) has air quality jurisdiction within Del Norte, Humboldt, and Trinity Counties. The NCUAQMD published a study titled *1995 PM10 Attainment Plan*, which presents available information about the nature and causes of exceedances of the PM10 CAAQS standards and identifies cost-effective control measures that can be implemented to reduce ambient PM10 levels (NCUAQMD 2020). The air district also has established local air quality rules and regulations that address the requirements of federal and state air quality laws to ensure that the NAAQS and CAAQS are met. The Project would be subject to NCUAQMD rules and regulations. Construction activities would require an Authority to Construct pursuant to Rule 102 prior to groundbreaking (or any disturbances to the vegetation).

NCUAQMD has not established CEQA significance criteria to determine the significance of impacts that would result from projects. However, NCUAQMD Rule 110 (New Source Review [NSR]) identifies thresholds for new or modified stationary sources, which represent levels above which emissions from these sources could conflict with regional attainment efforts. By permitting large stationary sources, the NSR program ensures that new emissions will not slow regional progress toward attaining the NAAQS. While NCUAQMD's NSR thresholds are related to stationary source emissions, they represent emissions levels required to attain the NAAQS and CAAQS based on the regional attainment status of Humboldt County. The NAAQS and CAAQS are informed by a wide range of scientific evidence demonstrating that there are known safe concentrations of criteria pollutants. While recognizing that air quality is cumulative problem, the NCUAQMD considers projects that generate criteria pollutant and ozone precursor emissions below these thresholds to be minor and to not adversely affect air quality such that the NAAQS or CAAQS would be exceeded. The NCUAQMD's significance thresholds from Rule 110 are presented in Table 3.3-2.

Table 3.3-2. North Coast Unified Air Quality Management District Thresholds of Significance

Pollutant	Significance Thresholds[a]	
	Daily (pounds per day)	Annual (tons per year)
Reactive organic gases	50	40
Carbon monoxide	500	100
Particulate matter with a diameter of 10 microns or less	80	15
Particulate matter with a diameter of 2.5 microns or less	50	10
Sulfur oxide	80	40
Nitrogen oxides	50	40

Source: NCUAQMD 2015

Note:

[a] The North Coast Unified Air Quality Management District has developed a threshold for lead. However, lead emissions are not associated with the Project; therefore, the threshold is not shown in this table.

Construction of the proposed Project would require both terrestrial (e.g., underground landing pipe installation) and marine (e.g., installing landing pipes and laying and burying marine fiber optic cable [cable] on the ocean floor) activities. The CSLC has exclusive jurisdiction over California's sovereign tide and submerged lands. The offshore boundary of the State's sovereign lands was established in the case of *United States of America, Plaintiff v. State of California*, 135 S. Ct. 563; 190 L. Ed. 2d 514; 2014 U.S. LEXIS 8436 (2014). The U.S. Supreme Court decision permanently fixes the offshore boundary between the United States and California at 3 nautical miles (nm) off the coast of California ("State waters").

This analysis evaluates construction emissions within State waters (i.e., up to 3 nm from shore) consistent with the regulatory authority of the CSLC as a state agency under CEQA. Appendix B presents the methodology used for the air quality evaluation and its results.

Appendix B also presents criteria pollutant emissions within 24 nm to support the greenhouse gas (GHG) emissions analysis (Section 3.9) to be consistent with the State's GHG emissions inventory and reduction planning goals.

The cable owner is responsible for repair and maintenance of the cable. No routine maintenance is planned for the submerged cable network. Because of the stability of the ocean bottom environment, regular maintenance is unnecessary. Monthly inspection trips and routine testing of emergency generators for the terrestrial cable network would be conducted by the local cable provider. These activities are not part of the proposed Project and are part of a separate CEQA analysis. Accordingly, Project operations are not discussed further.

3.3.3 Impact Analysis

a) Conflict with or obstruct implementation of the applicable air quality plan?

Less than Significant Impact.

<u>All Project Components</u>

The proposed Project would not conflict with or obstruct implementing the applicable air quality plan. The Project would generate criteria pollutants primarily from marine vessels, off-road equipment (e.g., backhoes), and on-road vehicles used for employee commuting and hauling. Since Humboldt County is in attainment (pollutant concentrations are below the ambient air quality standards) for all NAAQS, there is no applicable State Implementation Plan. The NCUAQMD has adopted the *1995 PM10 Attainment Plan* that outlines recommended control measures to reduce emissions and attain the state PM10 standard (NCUAQMD 2020).

A project may be inconsistent with air quality plans if it would result in population or employment growth that exceeds estimates used to develop the emissions inventories for the plans. As discussed in Section 3.12, *Land Use and Planning* and in Section 3.15, *Population and Housing*, the proposed Project would not change current land use or zoning designations and would not induce growth or significantly increase employment in the area. Therefore, the Project would be consistent with regional growth and labor projections. While construction activities would generate criteria pollutants (discussed below), those emissions would not exceed the analysis thresholds. The Project would require contractors to comply with NCUAQMD Rule 104, which establishes general limitations related to public nuisances, particulate matter and fugitive dust emissions, and SOx emissions. Therefore, the proposed Project would not conflict with, or obstruct implementation of, the current NCUAQMD air quality plan. This impact would be less than significant.

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?

Less than Significant Impact.

<u>All Project Components</u>

Terrestrial construction would generate criteria pollutant emissions from off-road equipment (e.g., backhoes), vehicles used for employee commuting and hauling, earthmoving activities, and marine vessels operating within 3 nm offshore. These criteria pollutant emissions were estimated for each of the four construction phases (Figure 1-2 and Table 2-1). Tables 3.3-3 and 3.3-4 (below) summarize the results of the analysis and compare the estimated daily and annual emissions to the NCUAQMD's recommended analysis thresholds. Phase 1 would result in the highest emissions of all four phases because that is when the terrestrial infrastructure for all four cables would be built (Section 2.2.1, *Work Phases*). Appendix B includes details about the modeling methods, schedule, and equipment inventories assumed in the modeling.

Table 3.3-3. Estimated Daily Construction Criteria Pollutant Emissions

Phase	ROG	NOx	CO	PM10	PM2.5	SOx
Phase 1	5	27	11	1	1	1
Phase 2	1	15	2	<1	<1	1
Phase 3	1	15	2	<1	<1	1
Phase 4	1	15	2	<1	<1	1
Threshold	*50*	*50*	*500*	*80*	*50*	*80*
Exceed threshold?	*No*	*No*	*No*	*No*	*No*	*No*

Terms:
CO = carbon monoxide
NO_X = nitrogen oxides
PM10 = particulate matter with a diameter of 10 microns or less
PM2.5 = particulate matter with a diameter of 2.5 microns or less
ROG = reactive organic gases
SOx = sulfur oxide

Table 3.3-4. Estimated Annual Construction Criteria Pollutant Emissions

Phase	ROG	NOx	CO	PM10	PM2.5	SOx
Phase 1	<1	5	2	<1	<1	<1
Phase 2	<1	3	<1	<1	<1	<1
Phase 3	<1	3	<1	<1	<1	<1
Phase 4	<1	3	<1	<1	<1	<1
Threshold	*40*	*40*	*100*	*15*	*10*	*40*
Exceed threshold?	*No*	*No*	*No*	*No*	*No*	*No*

Terms:
CO = carbon monoxide
NO_X = nitrogen oxides
PM10 = particulate matter with a diameter of 10 microns or less
PM2.5 = particulate matter with a diameter of 2.5 microns or less
ROG = reactive organic gases
SOx = sulfur oxide

As provided in Tables 3.3-3 and 3.3-4, construction-generated emissions would not exceed NCUAQMD's recommended analysis thresholds. Accordingly, these emissions would not be expected to contribute a significant level of air pollution such that regional air quality within the NCAB would be degraded. Therefore, this impact would be less than significant.

c) Expose sensitive receptors to substantial pollutant concentrations?

Less than Significant Impact.

Criteria Pollutants

All Project Components

All criteria pollutants can cause human health and environmental effects at certain concentrations. Negative health effects associated with criteria pollutant emissions are highly dependent on a multitude of interconnected variables (e.g., cumulative concentrations, local meteorology and atmospheric conditions, and the number and character of exposed individuals [e.g., age, preexisting health conditions]). Ozone and secondary PM can be formed through complex chemical reactions over long distances. In addition, directly emitted PM does not always equate to a specific localized impact because emissions can be transported and dispersed. Given the factors that influence the formation and transportation of pollution, the model designed to evaluate future criteria pollutant concentrations and resulting health effects was not conducted because it would not yield reliable or accurate results.

As discussed above, the ambient air quality standards for criteria pollutants are set to protect public health and the environment within an adequate margin of safety (42 U.S. Code § 7409 [b] [1]). NCUAQMD's recommended NSR thresholds are used to determine whether increased emissions from a new source could cause or contribute to a violation of the NAAQS or CAAQS, requiring further analysis. The thresholds for criteria pollutants are provided in Table 3.3-2. Projects with emissions below the thresholds are not anticipated to contribute to violations of the NAAQS or CAAQS and thus meet the EPA and CARB health-protective standards.

As provided in Tables 3.3-3 and 3.3-4, construction of the Project would not exceed the NCUAQMD criteria pollutant thresholds for violations of the health-protective CAAQS and NAAQS, and potential impacts would be less than significant.

Diesel Particulate Matter

Terrestrial Components

Terrestrial construction would generate short-term diesel exhaust emissions from the use of heavy-duty equipment and vehicles. However, no residential or non-residential receptors are within 1,000 feet of the Project footprint. The closest residence to the Project is approximately 2,500 feet from the cable landing site. The concentration of DPM decreases dramatically as a function of distance from the source. For example, studies show that DPM concentrations at 1,000 feet from the source can be reduced by more than 65 percent, compared to concentrations directly at the source (CARB 2005). Consequently, DPM concentrations, and thus health risks, would be reduced substantially at the nearest receptor location. Moreover, health risks related to DPM generally are associated with chronic exposure and are assessed over a 30- or 70-year exposure period. Emissions generated during terrestrial construction would be temporary.

Consequently, individual receptors would not be exposed to elevated levels of DPM for an extended period. Therefore, the DPM emissions from terrestrial construction would have a limited potential to affect sensitive receptors, and impacts would be less than significant.

Marine Components

Marine vessels would generate DPM even though they would occur exclusively offshore. Support vessels would operate no closer than 2,000 feet from the shore, and ocean-going vessels approximately 3,600 feet from shore (Brungardt pers. comm.). The nearest sensitive receptor from the shore (a residence) is approximately 3,000 feet. Accordingly, the distance between the marine emissions source and the closest receptor is approximately 5,600 feet. DPM concentrations, and thus health risks, would be substantially reduced at the nearest receptor location. Moreover, marine vessels would have a limited potential to affect sensitive receptors since they would operate only during marine cable-laying operations, with marine vessel activity occurring for fewer than 10 days per year during this phase. Therefore, this impact would be less than significant.

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Less than Significant Impact.

All Project Components

Project construction would not create objectionable odors affecting a substantial number of people. Diesel-powered equipment used during construction would generate temporary odors in the immediate surrounding area. Like DPM, odor emissions decrease as a function of distance, and therefore would be far less perceptible at the nearest receptor, which is about 2,500 feet from the cable landing site. Accordingly, this impact would be less than significant.

3.3.4 Mitigation Summary

The Project would not have significant impacts on air quality; therefore, no mitigation is required.

3.4 BIOLOGICAL RESOURCES

BIOLOGICAL RESOURCES - Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**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 or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife and 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?	☐	☐	☐	☒

3.4.1 Environmental Setting

3.4.1.1 Terrestrial Biological Resources

The terrestrial biological study area (BSA) evaluated for this MND extends roughly from Old Navy Base Road east to Vance Avenue near the town of Samoa (Figure 3.4-1). The BSA is within the North Coast Geographic Subdivision of the California Floristic Province (Baldwin et al. 2012). The BSA includes a 100-foot buffer around the Project site to account for environmentally sensitive habitat areas (ESHAs) defined in the California Coastal Act (CCA) and regulated by the California Coastal Commission (CCC).

Figure 3.4-1. Terrestrial Biological Study Area

The climate is characterized by cool, wet winters and dry (foggy) summers. Annual average temperatures within the terrestrial BSA range from 47 to 59°F, with the coolest temperatures occurring in December and January, and the warmest in August and September (Western Regional Climate Center 2020). Average annual rainfall in the Project vicinity is 38 inches, most of which falls between December and March.

Land Cover Types

The 5.071-acre BSA (Table 3.4-1) occurs within an industrial area and is heavily disturbed because of historical and current industrial land uses.

Table 3.4-1. Vegetation and Land Cover Types in the BSA

Vegetation and Land Cover Type	State Rarity Ranking	Acres	CDFW Sensitive Natural Community?[a]	California Coastal Commission Wetland?[b]
Coyote brush scrub (*Baccharis pilularis* shrubland alliance)	S5	0.144	No	No
Degraded dune mat (*Abronia latifolia – Ambrosia chamissonis* herbaceous alliance)	S3	0.680	**Yes**	No
Coastal dune willow thicket (*Salix hookeriana*)	S3	0.176	**Yes**	**Yes**[c]
Non-native European beach grass swards (*Ammophila arenaria* herbaceous semi-natural alliance)	Not ranked	1.509	No	No
Non-native Monterey pine, and Monterey cypress stands (*Pinus radiata – Hesperocyparis macrocarpa* landscaped forest alliance)	Not ranked	0.044	Not ranked	No
Non-native pampas grass (*Cortaderia jubata* herbaceous semi-natural alliance)	Not ranked	0.020	Not ranked	No
Non-native sweet vernal grass and ripgut brome grassland (*Anthoxanthum odoratum* and *Bromus diandrus* herbaceous alliance)	Not ranked	1.765	Not ranked	No
Ruderal/paved and developed	Not ranked	0.733	Not ranked	No
Total in BSA	**–**	**5.071**	**Two**	**Two**

Terms:
BSA = terrestrial biological study area
CDFW = California Department of Fish and Wildlife
Notes:
[a] CDFW 2020a. S1–S3 ranks are considered sensitive natural communities.
[b] Not formally delineated with soil excavations. These vegetation types were within localized depressions, and the plant wetland indicator status of the dominant species suggested that sufficient water was near the surface during the growing season to support hydrophytic plant communities in these isolated depressional aquatic features.
[c] Two patches of coastal dune willow occur in the BSA.

The land cover types in the BSA consist mostly of invasive grasses (66%), open sand and degraded dune mat habitat (14%), and ruderal/developed (13%). The degraded dune mat consists of scattered patches of some native dune plant species among non-native invasive grasses, all of which appear to have recently colonized bare sand disturbed habitat. The remaining land cover in the BSA consists of coastal dune willow thickets (4%), coyote brush scrub (3%), and non-native Monterey pine and cypress stands. Acreages of land cover types mapped in the BSA are described below and listed in Table 3.4-1 above.

Coyote Brush Scrub

Coyote brush scrub (*Baccharis pilularis* shrubland alliance) grows along the edge of the coastal dune willow thicket. Coyote brush contain non-native grasses and scattered individuals of coastal bush lupine (*Lupinus arboreus*).

Degraded Dune Mat

In the BSA, degraded dune mat (*Abronia latifolia – Ambrosia chamissonis* herbaceous alliance) was mapped where native dune indicator plants species achieved 25% or greater relative cover in the mapping unit and where the ground layer comprised mostly open sand. The use of a 25% relative cover convention follows the methods used in this area on a previously approved project (GHD 2012a; CCC 2013). Mapping alliances based on just 10% native plant cover is recommended by vegetation scientists at NatureServe, the California Native Plant Society, and the California Department of Fish and Wildlife (CDFW) for seasonal grasslands; no such recommendations are provided for other vegetation types (CDFW 2020a). The native dune mat indicator species used included yellow sand verbena (*Abronia latifolia*), silver beachweed (*Ambrosia chamissonis*), coastal sagewort (*Artemisia pycnocephala*), beach morning glory (*Calystegia soldanella*), sand mat (*Cardionema ramosissima*), and coast buckwheat (*Eriogonum latifolium*).

The degraded dune mat areas in the BSA are heavily disturbed and considered relatively low quality compared to those dune mat areas along Old Navy Base Road with greater proportions and distribution of native species and habitat that also support populations of special-status plant species. The degraded dune area on the Project site has been subjected to regular staging, dewatering of materials, or other construction activities associated with the pulp-mill industry of the area; and much of the dune mat habitat consists of bare sand and invasive grasses. Specifically, the degraded dune mat areas are threatened by invading non-native European beachgrass from the north, east, and south (Figure 3.4-2) and by recent invasions of non-native pampas grass (*Cortaderia jubata*).

Coastal Dune Willow Thicket

Coastal dune willow thickets (*Salix hookeriana* shrubland alliance) occur in two depressional areas in the BSA. The location southeast of the BSA, opposite the eastern access road from Vance Avenue, is smaller in stature (i.e., less than 10 feet tall) and consists exclusively of coastal dune willow. The location southwest of the BSA is larger in size and contains greater than 50% coastal dune willow growing along with arroyo willow (*Salix lasiolepis*), wax myrtle (*Morella californica*), and California blackberry (*Rubus ursinus*). Coastal dune willow thickets are considered a sensitive natural community (CDFW 2020a). Although neither thicket is associated with a watercourse, they were mapped as CCC wetlands because they are dominated by willows, which are facultative wetland species, and because they are within depressions in the landscape where rainy season high water tables are likely.

Non-Native European Beach Grass Swards

European beach grass swards (*Ammophila arenaria* herbaceous semi-natural alliance) are dominated by non-native and invasive grasses that are considered a regional threat to coastal habitats.

Non-Native Monterey Pine and Monterey Cypress Stands

Two areas within the northwest BSA contain Monterey pine and Monterey cypress stands (*Pinus radiata – Hesperocyparis macrocarpa*).

Non-Native Grassland

In the BSA, non-native invasive grassland is the dominant landcover and is dominated by Pampas grass (*Cortaderia jubata*) or a combination of sweet vernal grass (*Anthoxanthum odoratum*) and ripgut brome (*Bromus diandrus*). Pampas grass has a California Invasive Plant Council rating score of “High” overall impact. Both sweet vernal grasses, an escaped cultivar, and ripgut brome have a rating score of “Moderate” overall impact. Other grasses present in the vegetation type include foxtail barley (*Hordeum murinum* subsp. *leporinum*), wild oat (*Avena fatua*), rattlesnake grass (*Briza maxima*), and soft chess (*Bromus hordeaceus*).

Ruderal/Paved and Developed

Ruderal/paved and developed areas include roads, a few small built structures associated with municipal water lines, a storage tank to the west, and areas that are unvegetated or primarily support sparse or ruderal or managed vegetation around structures, roads, and a wood chip pile north of the BSA.

Special-Status Species

For the purpose of this MND, *special-status species* are plants and animals that are legally protected under the federal Endangered Species Act (FESA), California Endangered Species Act (CESA), or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such listing. Special-status species are defined as follows:

- Species that are listed or proposed for listing as threatened or endangered under FESA (50 Code of Federal Regulations [CFR] 17.11 [listed animals], 50 CFR 17.12 [listed plants], and various notices in the Federal Register).
- Species that are candidates for possible future listing as threatened or endangered under FESA (81 Federal Register 87246 87272, December 2, 2016).
- Species that are listed or proposed for listing by the State of California as threatened or endangered under CESA (14 California Code of Regulations 670.5).
- Animals listed as California species of special concern on CDFW's Special Animals List (CDFW 2020c).
- Animals listed as California fully protected species as described by Fish and Game Code sections 3511 (birds), 4700 (mammals), and 5050 (reptiles and amphibians).
- Plants listed as rare under the California Native Plant Protection Act (Fish and Game Code 1900 et seq.).
- Plants with a California Rare Plant Rank (CRPR) of 1A, 1B, 2A, and 2B on CDFW's Special Vascular Plants, Bryophytes, and Lichens List (CDFW 2020e), and considered threatened or endangered in California by the scientific community.
- Plants designated as CRPR 3 and 4 that may warrant legal consideration if the population is locally significant and meets the criteria under State CEQA Guidelines section 15380(d).

ICF's terrestrial biological team reviewed the following existing natural resource information to identify special-status species and other sensitive biological resources that could occur in the BSA:

- California Natural Diversity Database (CNDDB) records search of the 7.5-minute U.S. Geological Survey (USGS) quadrangle containing the BSA (Eureka) and the six neighboring quadrangles (Tyee City, Arcata North, Arcata South, McWhinney, Fields Landing, and Cannibal Island) (CDFW 2020e).
- The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) species report for the BSA (USFWS 2020a).
- Final designated critical habitat as mapped by the USFWS Environmental Conservation Online System (ECOS).

- Recovery Plan for the Pacific Coast Population of the Western Snowy Plover (USFWS 2007).
- A Petition to the State of California Fish and Game Commission to List the Crotch bumble bee (*Bombus crotchii*), Franklin's bumble bee (*Bombus franklini*), Suckley cuckoo bumble bee (*Bombus suckleyi*), and western bumble bee (*Bombus occidentalis occidentalis*) as endangered under CESA (Xerces Society et al. 2018).

The ICF terrestrial biological team also coordinated with relevant resource agencies to discuss sensitive biological resources expected within the BSA. A summary of agency communications is provided in Appendix C.

<u>Special-Status Wildlife Species</u>

There were 24 special-status wildlife species identified with the potential to occur in or near the BSA (Table C-1 in Appendix C). At least 3 (Northern harrier, White-tailed kite, and Western bumble bee) out of 24 species have moderate to low potential to occur in the BSA or to be affected by Project activities.

ICF conducted two different field surveys. On July 10, 2020, ICF's wildlife biologist Steve Yonge conducted a field survey by walking the BSA and evaluated existing conditions, including vegetation composition, aquatic resources, and land use to determine the potential for special-status wildlife species (see Table C-1 in Appendix C) to occur on the Project site.

On August 12 and 19, 2020, ICF biologist Jordan Mayor conducted follow-up surveys to assess the potential habitat for western bumble bee. An initial habitat assessment was conducted to determine whether the Project supported hive or nesting habitat and pollen or nectar sources. Both surveys also included the survey of two plots to determine use by special-status bumble bee species. Suitable nectar sources and multiple species of insect pollinators were observed.

ICF consulted with CDFW (Mr. Greg O'Connell, Environmental Scientist) to discuss species that could occur near the BSA (see a summary of this coordination effort under *Resource Agency Coordination* in Appendix C). The species discussed were native bumble bees, specifically the western bumble bee, a CDFW candidate for listing. The western bumble bee has been documented within 5 miles of the BSA (CDFW 2020e) and could use the BSA to forage. Based on the sandy soil conditions and lack of hive or nest substrates, there is no potential for the western bumble bee to nest in the BSA. The BSA contains suitable nectar sources, and multiple species of insect pollinators as observed on August 12 and 19, 2020, bumble bee habitat assessment surveys.

Based on a review of existing information, existing habitat conditions documented during the field survey, the anticipated level of disturbance, and coordination with resource agencies (Appendix C), 24 special-status wildlife species were identified with the potential to occur in or near the BSA (Table C-1 in Appendix C). Out of these 24, at least the following three have moderate to low potential to occur in the BSA or to be affected by Project activities:

- Northern harrier (*Circus cvaneus*) – State Species of Special Concern – moderate potential to occur in the BSA
- White-tailed kite (*Elanus leucurus*) – State Fully Protected Species – moderate potential to occur in the BSA
- Western bumble bee (*Bombus occidentalis occidentalis*) – State Candidate for Listing as Endangered – low potential to occur in the BSA

Northern Harrier

The northern harrier is a State Species of Special Concern that is known to occur in the vicinity of the BSA (CDFW 2020e; ebird 2020). The vegetated dune and scrub habitat within and adjacent to the BSA provides suitable foraging and nesting habitat. Because the Project site is sparsely vegetated, it provides only foraging habitat for the northern harrier and no suitable nesting habitat.

White-Tailed Kite

The white-tailed kite is a State Fully Protected Species that is known to occur in the vicinity of the BSA (CDFW 2020e; ebird 2020). The vegetated dune and scrub habitat within and adjacent to the BSA provides suitable foraging habitat. Mature coastal willow thicket and the non-native Monterey pine and Monterey cypress stands in the BSA provide suitable nesting habitat. Because the Project site is sparsely vegetated and lacks trees, there is no suitable nesting habitat present, and the area only provides foraging habitat for the white-tailed kite.

Western Bumble Bee

The western bumble bee is a state candidate for listing as endangered. The western bumble bee has been documented in the vicinity of the BSA (CDFW 2020e) and is known to occur in coastal habitat types (Xerces et al. 2018). Their hives or nests typically are found in abandoned small mammal burrows, but they may nest in inactive bird nests (Osbourn et al. 2008 *in* Xerces et al. 2018). They also may use aboveground substrates such as rock or brush piles or downed woody debris to nest or overwinter. Soils within and adjacent to the BSA are sandy, lack small mammal burrows, and have limited woody debris or other substrates required for ground nests or hive construction. However, flowering plant species are present in the BSA that could provide a nectar and pollen source for the bee.

To determine the potential for the western bumble bee to occur in the BSA, two surveys were conducted on the afternoons of August 12 and 19, 2020. Surveys were targeted to occur between the hours of 12 and 4 p.m., when temperatures were greater than 60°F, wind speeds were below 8 miles per hour, and the conditions were sunny to partly cloudy – an approach modified from Ward et al. (2014) to accommodate the local northern coastal climate conditions. Ward et al. (2014), recommend that surveys in California be conducted during the growing season (May-July). However, given the California north coast climate is dramatically different from most of the state, (cooler and moister), nectar and pollen sources were prevalent and because our surveys were performed during the recommended weather conditions, our August surveys were conducted during appropriate conditions to detect western bumble bee.

During the August 12, 2020 survey, a series of meandering transects were walked through the BSA to assess small mammal burrow density, nest or hive habitat, and pollen and nectar resources. Two of the highest density of floral resources within or near the access roads in the BSA were selected for 30-minute observations of pollinator activity. Streamlined protocols based on 3 years of surveys in California, Michigan, and New Jersey found that simply observing and recording the abundance of native bees on flowers during two site visits of 15 minutes each provide good estimates of both abundance and diversity of bees visiting the sites (Ward et al. 2014). ICF consulted with CDFW staff about their survey approach and met with them on site to review the terrestrial portion of the project.

No mammal burrows were observed in the BSA. The only sources of woody nesting material were those derived from bush lupine coyote brush, wax myrtle, or arroyo willow located around the margins of the BSA. These shrub species were absent within the BSA. The sandy soils and lack of other suitable substrates for hive construction in the Project site would prevent construction of ground hives by the western bumble bee.

Even though extensive floral resources were present, the only *Bombus* spp. observed were the relatively common yellow-faced bumblebee (*B. vosnesenskii*). A few other individuals that were observed may had been *B. mixtus*, *B. caliginosus* or *B. vandykei.* The western bumble bee was not observed during the August 12 or 19, 2020 survey. The surveys were appropriately timed because nectar and pollen sources were prevalent and were performed during the recommended weather conditions (warm sunny and calm; Ward et al. 2014).

Special-Status Plant Species

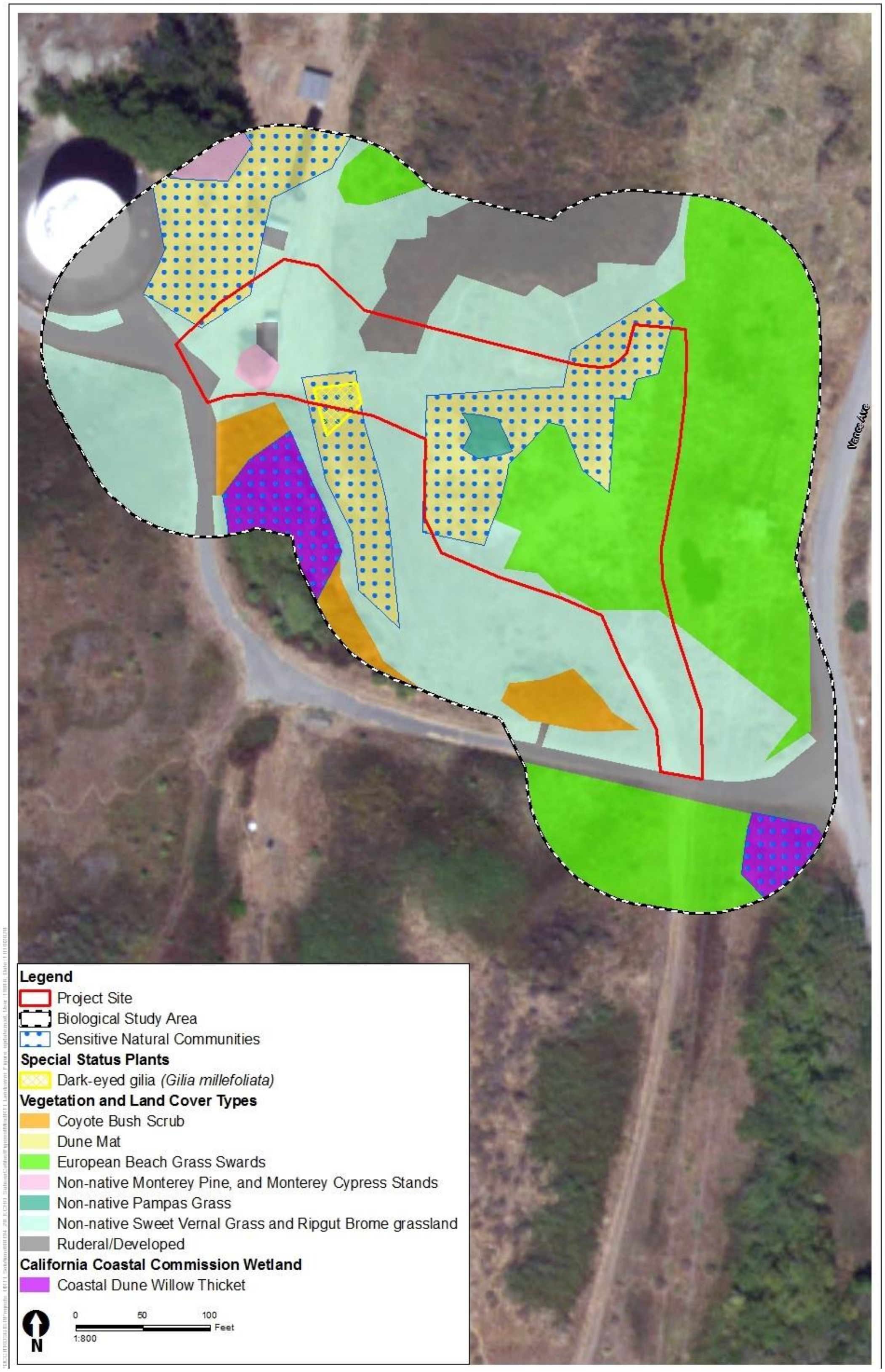
ICF conducted floristic surveys on April 14, May 7, and July 13, 2020. Surveys were timed to coincide with the flowering and identification periods of the potentially occurring special-status plant species. Prior to conducting the botanical surveys, ICF conducted a search of the California Natural Diversity Database [CNDDB] (CDFW 2020e) and the California Native Plant Society's online Inventory of Rare and Endangered Plants (CNPS 2020a). The CNDDB only documents occurrences of species from previous surveys reported to the CDFW and does not predict occurrences. ICF reviewed this existing information and identified 10 special-status plant species (Table C-2 in Appendix C) with the potential to occur in the Project region based on the species range, habitat characteristics present in the BSA (Figure 3.4-2), and nearby documented occurrences.

The field surveys followed current CDFW protocols (CDFW 2018). The botanist traversed the BSA on foot, using meandering parallel transects spaced at a distance that enabled visibility of all plant species present. Hand-held GPS units were ready to be used to record the locations of special-status plant species and habitat types observed. A list of plant species observed during the floristic surveys is provided in Table C-3 in Appendix C.

One special-status plant (dark-eyed gilia [*Gilia millefoliata*, California Rare Plant Rank [CRPR] 1B.2]) was documented in the BSA. Dark-eyed gilia occurs in open stabilized sandy foredune habitats along the coastal strand of California, from Del Norte to Santa Barbara Counties. Dark-eyed gilia is known in the CNDDB from several populations along Old Navy Base Road, including one population within the northern portion of the BSA that was observed in 1963 and one population 400 feet south of the BSA that was observed in 2003.

Disturbance of non-native grasses, through removing competition and opening bare sand habitats, allows these annual plants to persist in and around the BSA. Approximately 50 individual dark-eyed gilia plants were found in the BSA on the edge of the disturbed dune habitat.

Figure 3.4-2. Aquatic Resources, Sensitive Natural Communities, and Special-Status Plants in the BSA



Sensitive Natural Communities

Field surveys to map sensitive natural communities were conducted concurrently with the floristic surveys. Rarity of each vegetation type was determined from CDFW's current California Natural Community List (CDFW 2020a), the current list of vegetation alliances, associations, and special stands, which notes which natural communities are considered sensitive. Natural communities with ranks of 1-3 are considered sensitive. Semi-natural stands are not ranked because they are dominated by non-native species.

CDFW regulates sensitive natural communities (CDFW 2020a), and they generally are considered ESHAs under the CCA.

Based on a query of the CNDDB, several natural communities in the Project region are afforded protection by a state or local authority and may support special-status plants and wildlife. For this analysis, sensitive communities are communities that meet the following criteria:

- Sensitive natural communities defined by CESA and protected by CDFW or local agencies.
- Sensitive habitats protected by the County of Humboldt and the CCC.
- Rare habitats protected by local professional organizations or the scientific community.

Sensitive natural communities are habitats that have been assessed for their range, distribution, trends, and threats. Vegetation communities observed in the BSA were identified using the *Manual of California Vegetation*, Online Edition (CNPS 2020b), and their sensitive status was informed by review of CDFW's (2019) California Natural Community List descriptions. In the BSA, the land cover types that meet the criteria for sensitive natural communities include coastal dune willow thickets and degraded dune mat (Table 3.4-1; Figure 3.4-2).

Wetlands and Non-Wetland Waters

Potential wetlands and non-wetland waters were identified and mapped concurrently with the floristic surveys. During the field surveys, ICF walked the BSA and identified potential wetlands and non-wetland areas based on observable characteristics (e.g., a prevalence of hydrophytic vegetation, surface hydrologic indicators, and topography).

ICF looked for areas that potentially could be regulated as waters of the United States by USACE, waters of the State regulated by the North Coast Regional Water Quality Control Board and CDFW, and coastal zone wetlands regulated by the CCC. USACE defines jurisdictional wetlands under the Clean Water Act Section 404 as areas that exhibit positive field indicators for all three wetland parameters: hydrophytic vegetation, hydric soils, and wetland vegetation. The CCC regulates features that display one or more of the wetland parameters provided above as defined in the *Definition and Delineation of Wetlands in the Coastal Zone* (CCC 2011). The CCA section 30121 defines wetlands as "lands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens."

Coastal dune willow thicket was the only potential wetland identified in the BSA (Figure 3.4-2). This wetland type was in landscape depressions dominated by coastal dune willow and with minor components of arroyo willow, both of which are facultative wetland species (Lichvar et al. 2016). Coastal dune willow thicket occupied 0.176 acres in the BSA. No non-wetland waters (e.g., stream or ditch) were observed in the BSA during the field surveys.

Environmentally Sensitive Habitat Areas (ESHAs)

Areas that qualify as ESHA in the BSA include the coastal dune willow thicket, degraded dune mat habitat, and occurrences of dark-eyed gilia (*Gilia millefolia*; Figure 3.4-2). ESHA for terrestrial wildlife species include coastal dune willow thicket and non-native Monterey pine and Monterey cypress stands that provide nesting habitat for the white-tailed kite; and degraded dune mat, non-native grasslands, and non-native European beach grass swards that provide nesting habitat for the northern harrier and foraging habitat for the western bumble bee. These areas qualify as potential ESHAs based on the CCA definition of an environmentally sensitive area. An ESHA is defined 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" (section 30107.5).

There are three important elements to the definition of an ESHA. First, a geographic area can be designated as an ESHA because of the presence of individual species of plants or animals or because of the presence of a particular habitat. Second, in order for an area to be designated as an ESHA, the species or habitat must be rare or especially valuable. Finally, the area must be easily disturbed or degraded by human activities. (CCC 2003).

The CCC and the Humboldt County Planning Department, through their LCP, regulate coastal wetlands and ESHA in the coastal zone at the Project site; specific protection measures for wetland ESHAs are included in the Humboldt Bay Area Local Coastal Program (2014). For instance, section 30240 states:

> (a) 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.

(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 such areas and shall be compatible with the continuance of such habitat areas.

Protection measures that will be implemented to the Project and minimize impacts to ESHA include regular biological monitoring of work activities and delineating the work area and installing fencing or flagging to ensure ESHA is avoided and impacts minimized.

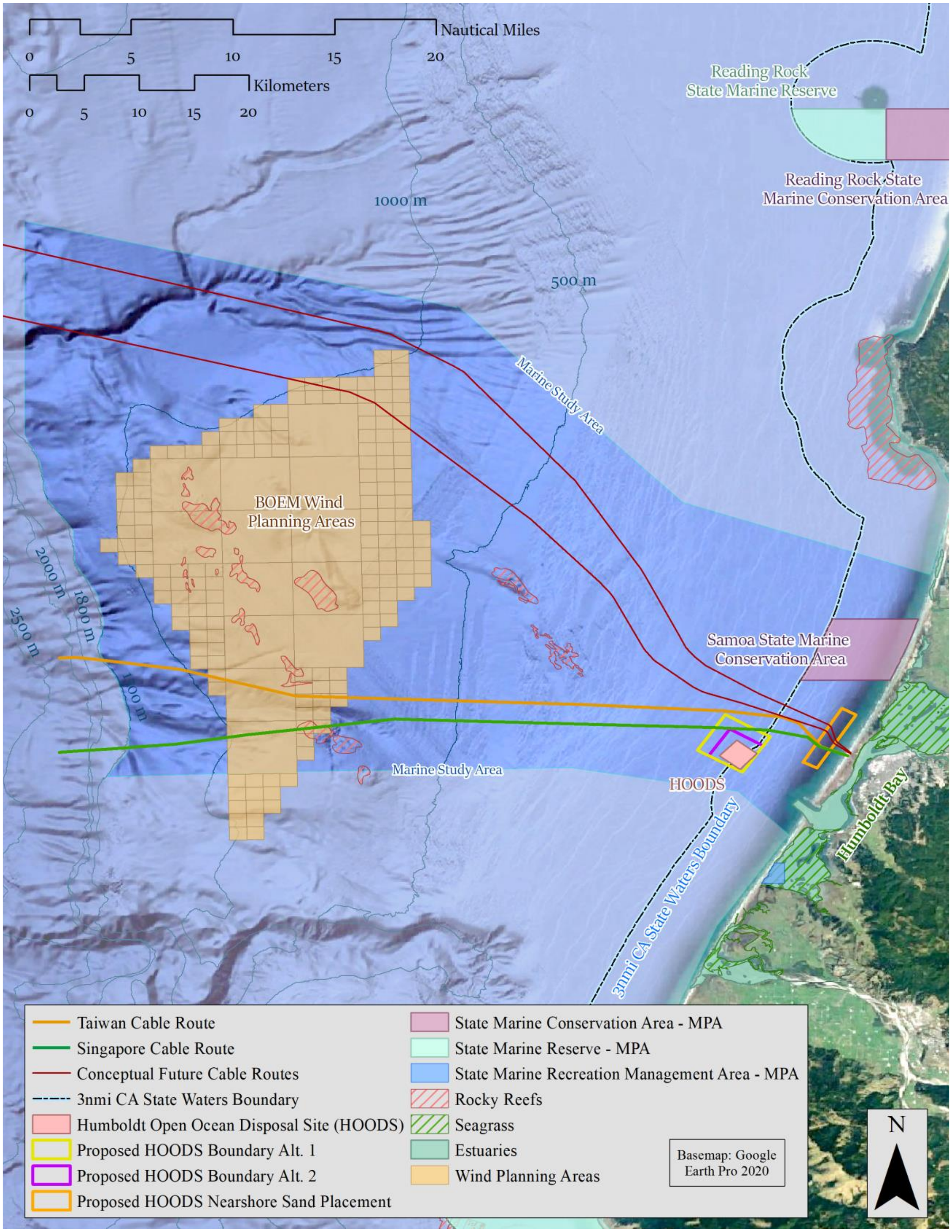
3.4.1.2 Marine Biological Resources

The marine biological study area (MSA) extends west into the Pacific Ocean and is south of Samoa State Marine Conservation Area (Figure 3.4-3). It extends to the 5,940-foot depth contour from the mean high-tide line and comprises coastal water and intertidal and subtidal habitats occurring offshore of the cable landing site. It also extends approximately 1,650 feet (about 0.5 mile) up-coast and down-coast of the proposed cable routes. Because there would be four fiber optic cables for this Project, the 1,650-foot buffer in the MSA would be beneficial to plan cable routes.

Please note the following for Figure 3.4-3:

- This map is only meant to broadly show the different components of the surrounding area and does not depict precise locations of the features
- The EFH (essential fish habitat) is the entire region, as discussed in detail in Section 3.4.1.2, *Marine Biological Resources* and Section 5.2, *Commercial and Recreational Fishing*.
- The ocean floor habitats are predominantly soft bottom except for rocks that are indicated by the National Oceanic and Atmospheric Association (NOAA) as possible habitat areas of particular concern (HAPCs) (e.g., rocky reefs, seagrass) as pointed out in the figure.
- The rocky reefs identified in the figure were based on NOAA-identified potential HAPCs. Although the Singapore cable (solid green line) shows crossing rocky reefs south of the Bureau of Energy Management (BOEM) Wind Planning Area, it does not mean that rocky reefs are actually present at that location because of the scale of NOAA data maps. Detailed high-resolution surveys would be completed for each cable route to ensure that all rocky reefs are avoided when laying the cable. All known rocky reefs would be avoided.
- There are virtually no established fishing locations even though there are some restrictions on where commercial trawling can happen. The commercial and recreational fishers are quite secretive about where they set traps and trawl.
- The southernmost cable could be buried under the northern Humboldt Open Ocean Disposal Site (HOODs) boundary (Section 2.4.2, *Humboldt Open Ocean Disposal Site)*.

Figure 3.4-3. Marine Biological Study Area



Marine Biota

The marine biota in the MSA (Figure 3.4-3) include invertebrate infauna,[22] mobile epifauna,[23] sessile[24] encrusting invertebrates, marine vegetation attached to either natural or artificial hard substrate, planktonic organisms, fish, marine mammals, and marine birds that inhabit or use the open waters. These habitats and their associated biological communities are briefly discussed below and are described in more detail in Appendix C.

Marine Habitat

The marine habitat consists of intertidal and nearshore habitat zone and pelagic open water habitat zone as further discussed below.

Intertidal and Nearshore Habitat

The intertidal and nearshore zones include sandy beach and subtidal habitats that support benthic species and demersal fishes, as described below.

Sandy Beach

The beach habitat primarily is unvegetated, consisting of sand and drift debris. Wildlife species commonly using this habitat include shorebirds, gulls, terns, pelagic birds, raptors, fishes, marine mammals, crustaceans and other invertebrates. Sandy beaches are among the most intensely used coastal ecosystems for human recreation and are important to coastal economies, as well as to foraging shorebirds and surf zone fishes. Western snowy plovers and California least terns are known to nest on some sandy beaches and coastal dunes. Pinnipeds haul out on isolated beaches and sand spits, including gravel and fine- to medium-grained beaches (Horizon Water and Environment 2012).

Generally, beaches are highly dynamic environments subject to intense wave-related energy, exposure to air and sun during low tides, constant reworking, and large-scale seasonal substrate variations (Thompson et al. 1993). In addition, the distribution of organisms within the sand is subject to daily fluctuations in the temperature, salinity, and moisture content of the sand (Dugan et al. 2015). Many individual animals that live in the sand are mobile and frequently shift position in response to environmental fluctuations. California beaches support a variety of invertebrate species that live in the sand or in wracks of decaying seaweed and other detritus on the beach surface. Kelp wrack and

[22] Organisms living in the sediments of the beach or ocean floor.
[23] Organisms living on the surface of the ocean floor or attached to submerged objects.
[24] Organisms that are permanently attached or established on hard substrate habitat and typically are not free to move about.

other washed-up organic debris are the predominant energy and food source for beach ecosystems (Nielsen et al. 2017).

Subtidal Habitats

Ocean floor sediment composition is dependent on physical factors such as wave energy, water depth, and currents. Subtidal habitats generally are broken into two broad categories:

- Soft Substrate – typically ranges from coarse sands to finer silts and clays.
- Hard Substrate – can be composed of naturally occurring features (e.g., rocky outcrops) or artificial structures (e.g., concrete, pilings, and debris).

Soft substrate is the predominant habitat on the Outer Continental Shelf (OCS[25]) (Horizon Water and Environment 2012). The elevation (relief) of hard substrates above the ocean floor commonly is quantified as low, moderate, high, and mixed because species abundance and diversity tend to increase with an increase in elevation above the ocean floor (AMS 2020)[26]; the increased species diversity and abundance generally are attributed to decreasing turbidity, sand scouring, periodic burial and exposure cycles, and increased water flow.

Benthic Species

Benthic (bottom-dwelling) biological communities change with both the type of substrate and water depth. Mobile scavengers, predators, and burrowing organisms are common on soft substrates;[27] while hard substrates typically support abundant sessile organisms that anchor to sturdy surfaces or species preferring physical features that provide hiding spaces. Many subtidal benthic species are not restricted by substrate type, as many (e.g., crabs, sea stars, brittle stars, and fishes) can inhabit both soft and hard substrate habitats. Depth also influences benthic community composition because sediments change with depth due to the decreasing influence of wave energy.

As ocean depth increases and wave energy decreases, the substrate composition shifts from coarse sand with low organic content nearshore to fine muds with higher organic content farther offshore (AMS 2020). Apart from rock jetties flanking the entrance to Humboldt Bay, there are no known occurrences of hard substrate habitats occurring offshore Eureka shallower than 656 feet water depth (RCEA 2018). However, there may be sporadic pieces of discarded debris that could provide artificial hard substrate in

[25] The cables would lay directly on the ocean floor in water deeper than 5,904 feet (approximately 32 miles offshore from the LV)

[26] “AMS 2020” is used when showing the source for a specific fact or measurement from Appendix C. “Appendix C” is used when referring to the report or a table within the report.

[27] Soft substrate can range from coarse sands to fine muds, while hard substrate can be divided into natural (rocky outcrop) or artificial substrate and further characterized by elevation or rise above the ocean floor.

shallower water depths (AMS 2020). Hard substrate occurring in the MSA between 656 and 1,640 feet water depth (Figure 3.4.3) is identified as habitat areas of particular concern (HAPCs) under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Specific invertebrate organisms found at various depths and substrate types within the MSA are discussed in detail in Appendix C.

Demersal Fishes

Demersal fishes are species that live and feed on or near the ocean floor. They are found in coastal waters and over the OCS but are not common in the abyssal plain (the deepest part of the ocean). Seamounts and islands also provide suitable habitats for demersal fishes. Examples of demersal fishes that inhabit soft substrate ocean floor include flounders (*Pleuronectoidei*), soles (*Soleidae*), sanddabs (*Citharichthys* spp.), eelpouts (*Zoarcidae*), hagfish (*Myxinae*), combfishes (*Zaniolepsis* spp.), and skates and rays (*Rajidae*). Fishes that typically associate with hard substrate habitats include the rockfishes (*Sebastes* spp.), lingcod (*Ophiodon elongatus*), staghorn sculpin (*Leptocottus armatus*), and wolf eels (*Anarrhichthys ocellatus*).

Details about specific fish species found at various depths and ocean floor substrate types in the MSA are provided in Section 4 of the Marine Biological Technical Report (Appendix C).

<u>Pelagic Open Water Habitats</u>

The pelagic zone supports planktonic organisms (phytoplankton, zooplankton, and ichthyoplankton) that have restricted swimming abilities and float with the currents, as well as nektonic organisms such as fishes, sharks, and marine mammals that move freely against local and oceanic currents.

Phytoplankton

Phytoplankton, the primary producers at the base of the pelagic food web, are consumed by many species of zooplankton. In turn, zooplankton support a variety of species, including small schooling fishes (e.g., sardines, herring) and baleen whales (*Mysticeti*). In the marine environment, phytoplankton typically occur at higher densities near coastlines where nutrient inputs from terrestrial point and nonpoint sources help promote their growth (Fischer et al. 2014). The abundance and composition of phytoplankton along the California coast are heavily influenced by upwelling and often are dominated by diatoms year-round (Du et al. 2015). Winds blowing from the north create a southward current along the shore that causes upwelling and mixing of plankton over large spatial scales. Relaxation of upwelling and stratification of the water column promote the growth of phytoplankton, such as dinoflagellates and various *Pseudonitzschia* species that can be harmful to marine organisms (Du et al. 2016).

Organisms that complete their entire lifecycle as planktonic forms are called holoplankton; these include phytoplankton such as diatoms and zooplankton such as *Acartia tonsa*. Plankton that spend only part of their life cycle in the plankton form (as eggs or larvae) are called meroplankton. Holoplankton have short generation times (hours to weeks), can reproduce continually (i.e., are not dependent on a certain season), and are not restricted to specific geographic zones. In contrast, meroplankton, which only spend a portion of their life cycle as plankton, make up a small fraction of the total number of planktonic organisms in the ocean. Additionally, they have shorter spawning seasons and are restricted to a narrow region of the coast. Important meroplankton include fish larvae and fish eggs (ichthyoplankton) as well as larvae of invertebrates such as lobsters, crabs, octopus, mollusks, and squid.

Fish

Pelagic fish communities tend to be similar throughout the coastal waters of Northern California. They are characterized by small schooling species such as Pacific sardine (*Sardinops sagax*) and northern anchovy (*Engraulis mordax*); schooling predators such as bluefin tuna (*Thunnus thynnus*), thresher shark (*Alopias vulpinus*), and swordfish (*Xiphias gladius*); and large, solitary predators such as Mako (*Isurus oxyrinchu*) and leopard (*Triakis semifasciata*) sharks (CDFW 2020f). Other common fish species that inhabit the open water environment include Chinook salmon (*Oncorhynchus tshawytscha),* market squid (*Doryteuthis opalescens*), smelt (*Spirinchus stark*), jack and Pacific mackerel (*Trachurus symmetricus* and *T. symmetricus*), opah (*Lampris* spp*.),* and assorted perches *(Embiotocidae)*. More information on fish species inhabiting the open waters in the Project vicinity is provided in Section 6 of the Marine Biological Technical Report (Appendix C).

Marine Mammals and Sea Turtles

Marine mammals and sea turtles in open ocean habitat along the California coast are identified as special-status species.

Special-Status Marine Species

The Northern California coast supports numerous special-status marine mammals, birds, turtles, and fishes. Special-status species include those species that are state- or federally listed as endangered or threatened, species proposed for such listing, and candidate species—as well as state or local species of concern. For the purposes of this analysis, special-status marine species are those species that meet any of the following criteria:

- Listed or proposed, or are candidate species for listing as threatened or endangered by USFWS <u>and NOAA</u> pursuant to FESA.
- Listed as rare, threatened, or endangered by CDFW pursuant to CESA.

- Managed and regulated under the Magnuson-Stevens Act.
- Protected under the Marine Mammal Protection Act.
- Managed and regulated by CDFW under the Nearshore Fisheries Management Plan and the Market Squid Fisheries Management Plan.
- Designated by CDFW as a California species of concern.
- Designated by the National Oceanic and Atmospheric Administration (NOAA) as a species of concern.
- Not currently protected by statute or regulation but considered rare, threatened, or endangered under CEQA (State CEQA Guidelines section 15380).

Special-status species considered for evaluation and their likelihood to occur in the MSA are discussed in detail in the Marine Biology Technical Report (Appendix C). Table 7.1 in Appendix C lists special-status marine species and their potential to occur in the MSA.

<u>Marine Mammals</u>

Of the approximately 40 marine mammals known to occur along the California coast, a few have been observed in the MSA near Eureka (Table 7.1 in Appendix C).

Those species with a moderate or high probability to occur in the MSA (and thus potentially subject to Project effects) are California sea lion (*Zalophus californianus*), harbor seal (*Phoca vitulina*), humpback whale (*Megaptera novaeangeliae*), blue whale (*Balaenoptera musculus*), common dolphin (*Delphinus delphis*), fin whale (*Balaenoptera physalus*), gray whale (*Eschrichtus robustus*), harbor porpoise (*Phocoena phocoena*), northern elephant seal (*Mirounga angustirostris*), and Steller sea lion (*Eumetopias jubatus*). These species can be expected to be present in the MSA seasonally when migrating along the coast or opportunistically when foraging in the area. There are no established haul-out, pupping, or birthing sites in the MSA.

<u>Sea Turtles</u>

Five species of sea turtles are known to inhabit coastal waters of California: the green sea turtle *(Chelonia mydas*), loggerhead sea turtle (C*aretta caretta*), leatherback sea turtle (*Dermochelys coriacea*), Pacific hawksbill sea turtle (*Eretmochelys imbricata*), and olive ridley sea turtle (*Leipidochelys olivacea*). Of these five species, only the olive ridley sea turtle has been recorded in the nearshore waters of Northern California; however, no olive ridley sea turtles are expected to occur in the MSA because they are primarily a pelagic species and rare observations have coincided with warmer El Niño years (Table 7.1 in Appendix C). The other four turtle species are not expected to occur within the MSA.

Fishes

Of the 20 shark and bony fish species listed in Table 7.1 (Appendix C), the following species have a moderate to high potential to occur within the MSA: bluefin tuna (*Thunnus thynnus*), Chinook salmon (*Oncorhynchus tshawytscha*, California Coastal Evolutionary Significant Unit [ESU] and Klamath-Trinity Rivers spring run), cowcod (*Sebastes levis*), coho salmon (*Oncorhynchus kisutch*, Southern Oregon/Northern California ESU), longfin smelt (*Spirinchus thaleichthys*), steelhead trout (*Oncorhynchus mykiss irideus*, Northern California distinct population segment [DPS]) and Klamath Mountains Province), and white shark (*Carcharodon carcharias*) (Table 7.1 in Appendix C).

Invertebrates

The range of the four special-status gastropods discussed in Table 7.1 (Appendix C) does not extend north into the MSA; therefore, these species are not expected to be present within the MSA.

Significant Ecological Areas

The proposed marine cable route does not transit any areas of special biological importance (e.g., Areas of Special Biological Significance, Marine Protected Areas, State Marine Reserves, State Marine Parks, State Marine Conservation Areas, or ESHAs). The cable route does pass through portions of the MSA marked as rocky reef and identified as critical habitat and EFH.

Critical Habitat

Although many state- and federally listed species may occur in the coastal and offshore waters of the MSA (Table 7.1 in Appendix C), the MSA includes designated critical habitat only for North American green sturgeon, northern DPS.

Essential Fish Habitat

The MSA offshore Eureka is located in an area designated as EFH under four fishery management plans (FMPs): the Coastal Pelagic Species FMP (PFMC 2016), Pacific Coast Groundfish FMP (PFMC 2019b), Pacific Coast Salmon FMP (PFMC 2016), and Highly Migratory Species FMP (PFMC 2017). An EFH assessment is being prepared and will be submitted to the National Marine Fisheries Service (NMFS) with a biological assessment for the Project.

Non-Native and Invasive Species

Project-specific marine surveys were not conducted. Data on marine habitats and species were obtained from previous studies. Non-native and invasive species are spread through human activities such as work marine vessels like the cable lay ship, international shipping, recreational boating, aquaculture, and aquarium trade. Biofouling is identified as the leading cause of the introduction of marine non-native species to California, followed by ship ballast water discharge (CDFG 2008). Most species that are introduced to California are from the Northwest Atlantic, Northwest Pacific, and Northeast Atlantic (CDFG 2008). The most commonly introduced taxa are snails, shrimp, plankton, crabs, and algae.

All shipping operations that involve major marine vessels (i.e., vessel 300 gross registered tons or greater that are capable of carrying ballast water) are subject to the Marine Invasive Species Act of 2003 (Pub. Resources Code §§ 71200–71271), which revised and expanded the California Ballast Water Management for Control of Nonindigenous Species Act of 1999 (Assembly Bill [AB] 703). The CSLC administers the Marine Invasive Species Program, which regulates biofouling and ballast water discharge from marine vessels arriving in California ports to prevent or minimize the introduction of invasive species from other regions.

3.4.2 Regulatory Setting

Appendix A contains the relevant federal and state laws and regulations pertaining to biological resources. At the local level, the following policies and programs in the Humboldt County General Plan, Volume II, Humboldt Bay Area Plan of the Humboldt County Local Coastal Program (2014) are immediately applicable.

3.4.2.1 Humboldt County Local Coastal Program (2014)

Policy 3.13 – Section 3.13 (Coastal-Dependent Development)

> **30255.** Coastal-dependent developments shall have priority over other developments on or near the shoreline. Except as provided elsewhere in this division, coastal-dependent developments shall not be sited in a wetland.

The following text quotes the Development Policies included in Section B:

1. Industrial:
    a. within areas designated Coastal Dependent Industrial (MC), the principal uses shall be any coastal-dependent industrial use that requires access to a maintained navigable channel in order to function, including, but not limited to: …, outfall or discharge pipelines serving offshore facilities, ….

4. Where coastal-dependent uses conflict among themselves, priority shall be given to industrial over recreational or commercial uses, and to recreational over commercial uses; except that industrial, recreational, and visitor serving

use of private lands shall not displace existing agricultural use where the Area Plan or zoning protect the use.

Policy 3.30 – Section 3.30 (Natural Resources Protection Policies and Standards)

30240. (a) 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.

(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 such areas, and shall be compatible with the continuance of such habitat areas.

The following text quotes the Planned Uses included in Section A:

The dune area west of New Navy Base Road and south of the intersection that includes the Samoa Bridge is a greatly disturbed dune habitat. This area has both natural resource values and utility to the adjacent coastal dependent industrial area on the east side of New Navy Base Road. In order to accommodate these seemingly opposite values, as well as preserve the recreational and visual resources of this area, a natural resources designation has been proposed with the following industrial-related uses permitted. The applicant shall demonstrate that there is no less environmentally damaging alternative in the immediate area:

1. transmission and water line construction
2. dredge spoils disposal
3. pipeline construction for surf zone disposal of dredge spoils
4. parking lot construction for coastal-dependent industrial facilities located directly adjacent to the proposed parking area on the east side of New Navy Base Road; parking shall be made available for public access to the ocean on the subject parcel
5. ocean outfall, intakes and pipelines
6. underground utilities

The following text quotes the Development Policies included in Section B: 6. Wetland Buffer

a. No land use or development shall be permitted in areas adjacent to coastal wetlands, called Wetland Buffer Areas, which degrade the wetland or detract from the natural resource value. Wetland Buffer Areas shall be defined as:

(1) The area between a wetland and the nearest paved road, or the 40 foot contour line (as determined from the 7.5' USGS contour maps), whichever is the shortest distance, or,

(2) 250 feet from the wetland, where the nearest paved road or 40 foot contour exceed this distance, or

(3) Transitional Agricultural lands designated Agriculture Exclusive shall be excluded from the wetland buffer.

b. New development; except for:

(1) development permitted in 3.30B2,3, and 4

(2) wells in rural areas; and

(3) new fencing, so long as it would not impede the natural drainage shall be sited to retain a setback from the boundary of the wetland sufficient to prevent adverse effects to the wetland's habitat values.

f. All new development within the wetland buffer shall include the following mitigation measures:

(1) Not more than 25% of the lot surface shall be effectively impervious.

(2) The release rate of storm runoff to adjacent wetlands shall not exceed the natural rate of storm runoff for a 50 year storm of 10 minute duration.

3.4.3 Impact Analysis

The impact analysis below is based on the State CEQA Guidelines, Appendix G, for biological resources.

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 or U.S. Fish and Wildlife Service?

Less than Significant with Mitigation.

Terrestrial Components

The following three special-status wildlife species (of the 24 species discussed in Table C-1 in Appendix C) have moderate to low levels of potential for occurring in the BSA:

- Northern harrier – moderate potential to occur in the BSA
- White-tailed kite – moderate potential to occur in the BSA
- Western bumble bee – low potential to occur in the BSA

Dark-eyed gilia was the only special-status plant documented within the BSA (of the 32 species discussed in Table C-2 in Appendix C). The following sections describe potential impacts associated with each of the special-status species listed above.

Northern Harrier/White-Tailed Kite and Other Non-Special-Status Migratory Birds

Northern harrier and white-tailed kite have a moderate potential to occur in the BSA. These special-status bird species and other non-special-status migratory birds protected under the federal Migratory Bird Treaty Act and Fish and Game Code have the potential to nest in or adjacent to the BSA suitable nesting habitat for migratory birds is present in coastal dune willow thicket, non-native Monterey pine and Monterey cypress stands, and dune habitats in the BSA (Figure 3.4-2). No suitable nesting habitat is present on the Project site based on site surveys and because adjacent nesting habitat would be avoided by the HDD west toward the Pacific Ocean, direct impacts on nesting habitat would be minimized. Nevertheless, noise associated with the HDD could directly affect nesting behavior and cause nest abandonment or premature fledging of young.

Project activities could result in a significant impact on these species. Project construction activities during the migratory bird breeding season (typically from February 1 to September 1) could disturb occupied nests of migratory birds. Increased levels of noise and human activity in the vicinity of an active nest could result in nest abandonment or forced fledging and subsequent loss of fertile eggs, nestlings, or juveniles. Implementing **MM BIO-1** through **MM BIO-6** would reduce these potential impacts to a less than significant level.

MM BIO-1: Provide Worker Environmental Awareness Training. The Applicant shall provide environmental awareness training before starting construction activities for all construction personnel (including new personnel as they are added to the Project) working on the terrestrial and marine Project components. This training would be given by biological monitors (approved by CSLC staff) to help the trainees understand the following:

- Surrounding common and special-status species and their habitats
- Sensitive natural communities and ESHAs
- Applicable regulatory requirements
- MMs designed to avoid or minimize impacts on sensitive resource areas

The training materials shall be developed and approved by CSLC staff at least 30 days before starting Project activities in the terrestrial and marine work areas. The biological monitors shall maintain a list of all contractors who have been trained and shall submit this list and the final training material to CSLC staff within 30 days after construction starts and shall provide an updated final list after construction is completed.

The lead environmental monitor shall be the main contact for reporting any special-status species observed in or near the Project area by any employee or contractor. The Applicant shall provide the contact information for the lead environmental monitor and the biological monitors to onsite construction workers, USFWS, CDFW, and CSLC staff before construction starts.

MM BIO-2: Conduct Biological Surveying and Monitoring. A biological monitor (typically with a college degree in a field of biology or environmental science, knowledge of species surveying for, and experience with pre-construction and construction monitoring), approved by CSLC staff, shall be present onsite to survey the work area for special-status species and nesting birds (as applicable) prior to starting work in the terrestrial work area to minimize potential impacts on any special-status species or other wildlife that may be present during Project construction.

The biological monitor shall be onsite full-time during the initial equipment mobilization and site preparation (including fence installation) and during the final demobilization phase of construction at the cable landing site. In addition, the monitor shall make weekly site visits during Project construction for all work on the cable landing site. While onsite, if the biological monitor observes special-status species on the Project site, the biological monitor shall have the authority to stop all work, and the Applicant shall contact the appropriate agency, (i.e., CDFW or USFWS and CSLC staff) to discuss ways to protect the special-status species. If a biological monitor was not monitoring the Project site during construction when a special-status species was observed on the site, the lead environmental monitor for the Project would be contacted immediately to determine the appropriate course of action.

Construction monitoring reports for marine work under CSLC's jurisdiction shall be submitted daily, and for terrestrial work outside of the CSLC's jurisdiction shall be submitted weekly.

MM BIO-3: Delineate Work Limits to Protect Sensitive Biological Resources. Natural areas outside the construction work area shall not be disturbed. Before starting Project construction, sensitive biological resource areas within and adjacent to the cable landing station work area shall be staked and flagged by the biological monitor (**MM BIO-2**). The special-status plant (dark-eyed gilia) located along the southern edge of the cable landing site work area will be protected with orange construction barrier fencings. The location of the staking and flagging and barrier fencing will be documented in the daily monitoring log and provided to CSLC prior to the start of construction. These demarcated areas shall be inspected daily throughout construction to ensure that they are visible for construction personnel.

MM BIO-4: Install Covers or Some Kind of Escape Ramps in Open Trenches. To prevent accidental entrapment of wildlife species during construction, all excavated holes that will be left open overnight shall have a cover or some kind of soil ramp installed, allowing wildlife an opportunity to exit. If escape ramps are installed, a biological monitor or the construction inspector shall inspect excavations before starting construction each day to confirm that no wildlife species are entrapped or to remove wildlife species that are unable to escape on their own. Any wildlife handling will be conducted under the biological monitor's applicable collection permit or as authorized by the appropriate wildlife agency. If a biological monitor is not onsite, a local biologist (with appropriate permits) would be called out to remove any species.

MM BIO-5: Prepare and Implement an Inadvertent Return Contingency Plan. A Final Inadvertent Return Contingency Plan (either one report that describes a plan for both terrestrial and marine areas or separate reports for each area) shall be submitted to CSLC staff for review and approval at least 30 days before starting construction terrestrial and marine areas. The plan shall include the following:

- Measures to stop work, maintain appropriate control materials onsite, contain and remove drilling mud before demobilization, prevent further migration of drilling mud into the stream or waterbody, and notify all applicable authorities.
- Control measures of constructing a dugout/ settling basin at the bore exit site to contain drilling mud to prevent sediment and other deleterious substances from entering waterbodies.
- Onshore and offshore biological monitors shall monitor the onshore and offshore to identify signs of an inadvertent release of drilling fluids.
- Any abandonment contingency plans in case the HDD operations are forced to be suspended and a partially completed bore hole abandoned.
- Complete list of the agencies (with telephone number) to be notified, including but not limited to the CSLC's 24-hour emergency notification number (562) 590-5201, and the California Governor's Office of Emergency Services (Cal OES) contact number (800) 852-7550.

MM BIO-6: Conduct Pre-Construction Nesting Bird Surveys and Implement Avoidance Measures. If construction occurs during the nesting season (typically from February 1 to September 1), the following conditions (designed to protect both special-status and non–special-status birds) shall be implemented:

- Areas within the BSA: No more than 1 week before starting Project-related construction, a biological monitor, approved by CSLC staff, shall survey the non-developed natural areas within the BSA to look for nesting activity.

- If no active nests are detected during these surveys, no additional measures are required.
- If an active nest is found, an appropriate avoidance buffer (based on the species as explained below) shall be established around the nest site to avoid disturbance or destruction of the nest until the end of the breeding season (generally August 31) or until after the biological monitor determines that the young have fledged and moved out of the area (this date varies by species). Suitable buffer distances may vary between species. The extent of these buffers shall be determined by the biological monitor in coordination with the applicable wildlife agency (i.e., CDFW and/or USFWS) and will depend on the bird species, level of construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. No disturbances shall occur within the protective buffer(s) until all young birds have fledged, as confirmed by the biological monitor.
- A biological monitor shall be retained by the Applicant (MM BIO-2) and shall be onsite every day if construction activities happen during bird nesting season and a nest is identified within the buffer area.

Western Bumble Bee

Based on existing habitat conditions and results of the August 2020 field surveys, it was determined that the western bumble bee has a low potential to occur on the Project site. As described previously, the potential for this species to occur within and adjacent to the Project was identified during the pre-survey efforts. However, the western bumble bee was not observed during the field surveys, and no suitable hive or nesting habitat was found in the BSA. Project activities may affect foraging resources, but these impacts would be less than significant because of the availability of pollen and nectar sources adjacent to the Project site. Therefore, the Project would have a less than significant impact on western bumble bee.

Special-Status Plant Species

One population of dark-eyed gilia (CRPR 1B.2) was documented in the Project work area along the southern edge of a proposed access road (Figure 3.4-2). This population consists of approximately 50 plants on a patch of degraded dune habitat.

Project activities associated with using the proposed access road to the cable landing site work area could result in the loss of dark-eyed gilia. To avoid direct impacts the dark-eyed gilia, the dune habitat along the access road will be fenced and avoided (MM BIO-3). In addition to potential direct effects, ground disturbance could further degrade the habitat occupied by a special-status plant species and render it vulnerable to colonization by invasive species. Establishment of invasive species in disturbed areas would decrease the potential for recruitment of special-status plant species. These impacts would be considered significant. Implementing **MM BIO-1** through **MM BIO-3** would reduce potential impacts to a less than significant level.

Marine Components

Special-status marine taxa with the potential to occur in the MSA (Figure 3.4-3) include marine mammals, sea turtles, marine birds, fishes, and invertebrates. Installation, operation, and repair of the marine components of the Project have the potential to affect marine species or groups of species, either directly or indirectly, through habitat modification and interactions with individuals. The Project design, construction methods, duration, and extent of construction activities would reduce possible impacts to less than significant with implementation of mitigation measures **MM BIO-1, MM BIO-5,** and **MM BIO-7**. As discussed in greater detail below, the potential effects on marine habitats in the MSA (Figure 3.4-3) would be temporary, affecting a small area of habitat. Disturbed habitat is expected to recover rapidly to pre-disturbance conditions. Consequently, none of the potential Project-related effects on marine ecosystems are expected to eliminate a marine plant or wildlife community or cause a fish or marine wildlife population to decline below self-sustaining levels.

Contaminant Release

Accidental release of fuel, oil, hydraulic fluids, or drilling mud could affect special-status marine species. These impacts are addressed in detail in Section 3.10, *Hazards and Hazardous Materials* and Section 3.11, *Hydrology and Water Quality*. Implementing **MM HAZ-1, MM BIO-5,** and **MM BIO-7** would reduce this impact to a less than significant level.

Horizontal directional drilling of the landing pipes poses a small risk of an accidental release of drilling fluid to the marine environment. Drilling fluid is composed of water and bentonite, which is a natural marine clay. The drilling fluid is used to lubricate the bore head cutting tool and transport borehole cuttings[28] back to shore. During the HDD process, it is possible that some bentonite drilling fluid could be released to the ocean floor and thus into the water column. An accidental release of drilling fluid to the ocean floor could result in a temporary negative impact on the marine environment and associated marine biota. The bentonite contained in the drilling fluid could result in short-term burial and smothering of benthic epifauna and infauna, clog fish gills (Robertson-Bryan 2006), and cause increased turbidity around the area of release. Since 2000, bentonite fluid has been detected in only 4 of 29 HDD bored coastal landings for which records are available (AMS 2020); in each of these discharges, the borehole locations were suspected to be naturally fractured due to the proximity of known geologic fault lines.

[28] Bits of rock and sand resulting from the bored HDD hole.

In some cases, an accidental release of drilling fluid occurred just prior to the drillhead exiting the ocean floor; the drilling fluid immediately was substituted for water, which curtailed any further loss of drilling fluid. Rhodamine dye, an environmentally safe fluorescent dye, is added to the drilling fluid to enable earlier detection of any discharge of bentonite to the marine environment by an onshore or offshore marine biological monitor. **MM BIO-5** details procedures for preventing the accidental release of drilling fluid during HDD work, monitoring for a release using Rhodamine dye, and responding to a release. These measures would prevent an inadvertent discharge of large volumes of bentonite drilling fluid to the marine environment or minimize its impact. Implementing **MM BIO-5** and **MM BIO-7** would reduce this potential impact to a less than significant level by implementing an Inadvertent Return Contingency Plan and best management practices for HDD activities.

MM BIO-7: Implement Best Management Practices for Horizontal Directional Drilling Activities. When using the large HDD equipment to install landing pipes, the following shall be submitted to CSLC staff for review at least 60 days prior to construction of Phase 1 as defined in the MND:

- Engineering design drawings for construction certified by a California-registered Civil/Structural Engineer.
- A site-specific geotechnical report certified (stamped, signed, and dated) by a California-registered Geotechnical Engineer, including boring logs and any geotechnical recommendations (including, but not limited to, identification of reasonably foreseeable risks during HDD installation and proposed risk mitigations) for safe HDD installation.
- If HDD is under CSLC jurisdiction, a minimum depth of 35 feet is required unless a shallower depth is recommended by a California-registered Geotechnical Engineer.
- The Applicant shall incorporate any BMPs identified in the reports or reviews into the HDD plans in order to minimize potential impacts on marine wildlife and water quality.

Cable Entanglement

There could be a potential for cable exposures or suspensions to entangle marine species. Whale entanglements described in a 1957 paper raised concerns about hazards posed to marine species. The paper documented and investigated 14 instances of sperm whale entanglements with submarine cables at depths to 3,720 feet (Heezen 1957). Replacement of historical telegraphic cables with modern fiber optic cable systems and installation techniques has improved torsional and flexion characteristics in subsea cables (Wood and Carter 2009), virtually eliminating the potential for exposed cable to entangle marine species. In addition, burying the cable to a maximum depth of 1 meter (3.3 feet) out to a water depth of 5,904 feet would further reduce or eliminate the potential for entanglement. No mammal or wildlife entanglements have been reported in fiber optic cable systems installed in California waters since 2000 (AMS 2020). Additionally, implementing **APM-3** would ensure that Project cables would remain buried throughout their operating life and further prevent any potential for entanglement of any kind with the installed cable.

APM-3: Cable Burial Surveys. The Applicant will conduct an initial and periodic post-lay surveys of all installed cables between the mean high tide line to where project operations extend into federal waters and out to the 1,800-meter depth contour to verify that the cable was and remains buried as initially planned or to the maximum extent feasible as determined by the initial post-lay assessment. These surveys will assess and report to the CSLC and CCC the following:

- The depth of burial achieved along the cable route.
- Any areas of cable suspension greater than 3.3 feet from the ocean floor and an explanation of why the cable could not be re-routed to avoid suspension.
- The consistency of cable installation with the project description.

These post-lay surveys and assessments will be conducted as follows:

- Within 60 days of cable installation.
- Every 5 years after cable installation or until such time as the Applicant can demonstrate following one or more post-lay burial survey that the cable remains buried.
- After any incident or activity, including but not limited to potential commercial fishing gear snags, severe earthquake in the vicinity of the cable, or extreme storm event that could result in excessive ocean floor scouring, that could result in cable exposure to the ocean floor surface.

Should the cable be observed to have become unburied in any location where it should have been buried or had been buried, the Applicant shall ensure that the cable is reburied to the initial cable burial depth at that location. A survey/burial report will be prepared and distributed to responsible State agencies following each survey.

Fishing Gear Entanglement

Cables could be a source of fishing gear entanglement and continued entrapment of marine species if fishing gear were to get snagged and abandoned on exposed cable segments. Most abandoned fishing gear is the result of snagging on marine debris (Laist and Liffmann 1997; Watters et al. 2010) rather than on active and maintained cables.

Nevertheless, snagged nets or fishing gear may incidentally entangle marine wildlife until the gear is removed or recovered.

The potential for exposed cables to snag or become entangled with commercial fishing gear would be reduced by routing and installing cable with state-of-the-art cable route planning and installation techniques designed to increase burial success. These routes are developed by desktop and ocean floor surveys that map substrate types along the proposed cable path. The cables would be buried in soft sediments to a depth of 3.3 feet where feasible in water depths less than 5,904 feet. In areas of hard bottom, the cable would be surface laid with only enough slack to allow the cable to conform to the ocean floor. Post-lay burial and inspection would be conducted by a remotely operated vehicle (ROV) in accordance with the installation procedures outlined in Section 2.0, *Project Description*.

If areas of exposed cable are identified during the post-lay inspection survey, the segments would be reburied to a depth of 3.3 feet, or to the deepest depth feasible for the substrate. As discussed in Section 5.2, *Commercial and Recreational Fishing*, the likelihood of Project cables becoming entangled with commercial fishing gear is extremely unlikely. Since 2000, one commercial fisher's longline fishing gear might have become entangled with a cable and was requested to abandon his gear. His lost gear was replaced by the local commercial fisher's liaison committee and the cable operator. Despite the unlikely potential of commercial fishing gear becoming entangled with a buried cable, implementing **MM BIO-8** would ensure that any potential for cable entanglement with fishing gear and subsequent effects of abandoned gear to entrap marine wildlife would remain at a less than significant level.

MM BIO-8: Cable Entanglements and Gear Retrieval. If fishers snag a cable and lose or cut gear, or if the Applicant snags fishing gear, the Applicant shall use all feasible measures to retrieve the fishing gear or inanimate object. Retrieval shall occur no later than 42 days after discovering or receiving notice of the incident. If full removal of gear is not feasible, the Applicant shall remove as much gear as practicable to minimize harm to wildlife (e.g., fishes, birds, and marine mammals). Within 14 days of completing the recovery operation, the Applicant shall submit to CSLC staff a report describing the following:

- Nature and location of the entanglement (with a map).
- Method used for removing the entangled gear or object, or the method used for minimizing harm to wildlife if gear retrieval proves infeasible.

In addition, the Applicant has implemented **APM-1** by enacting a Fishing Agreement that establishes methods of gear replacement and costs claims in the unlikely event that fishing gear is entangled near a cable owned by the Applicant.

APM-1: Fishing Agreement. The Applicant is actively involved in a Fishing Agreement with the regional commercial fishing cable liaison committee. This agreement, in part, establishes the following:

- A cable/fishing liaison committee that manages the interactions between the fishers and the cable companies.
- Policies for how the fishermen will work around the cables and what to do if they think their fishing gear is caught on a cable or similar issue.
- Methods of gear replacement and costs claims in the unlikely event that fishing gear is entangled in cable owned by the Applicant.
- Design and installation procedures to minimize impacts on fishing activities, such as:
  - Burying cable where possible, and
  - Allowing fishing representatives to review marine survey data and participate in cable alignment selection.
- Communication and notification procedures.
- Contributions to fishing improvement funds

Increased Turbidity

During plow and trenching activities, temporary spikes in turbidity near the ocean floor may occur. Increased turbidity typically is restricted to the region of the water column immediately above and adjacent to the ocean floor where the plowing or trenching is occurring. Depending on water depth and natural wave or current energy generated through the water column, any generated turbidity plumes can be expected to dissipate quickly, and any resuspended sediments will settle to the ocean floor. During ROV surveys of proposed cable routes, ocean floor sediments frequently are disturbed by the ROV thrusters and generate similar turbidity plumes (AMS 2008, 2016). These turbidity plumes dissipate quickly, and the resuspended sediments settle within minutes of the disturbance. Similarly, rapid settlement of sediments can be expected following cable trenching and plowing activities.

Like local increases in turbidity from cable trenching and plowing activities, installing landing pipes could result in an accidental release of bentonite drilling fluid to nearshore subtidal habitats, resulting in temporarily altered sediment composition and increased turbidity. During installation of the landing pipes, **MM BIO-5** will be implemented to reduce the potential for an accidental release of bentonite drilling fluid to the marine environment. The HDD construction method typically terminates the landing pipe at water depths between 40 and 55 feet. In general, the offshore termination point along the cable route is selected over a soft bottom habitat. Throughout most of California, the ocean floor sediments occurring at these water depths largely are composed of sand with some silt and clay components. Coastal ocean floor sediments at these shallow depths are regularly exposed to extreme wind and wave energy, producing an environment with naturally elevated turbidity. The accidental release of small volumes of bentonite drilling fluid into this environment is not expected to result in any detectable effects on marine biota that may be present around the release or to result in any permanent changes to soft bottom habitat.

Underwater Noise

The Project-related activities associated with the offshore installation of landing pipes (Figure 2-5) and burial of the cable would generate temporary (Table 2-1) and isolated non-impulsive underwater noise. The HDD construction method and vessel support for the landing (Appendix B) would generate non-impulsive, continuous noise as explained in Section 2.4.4, *Marine Project Construction Methods*. The HDD-related activities would occur primarily during daylight hours, although 24-hour operations could occur (Table 2-1) (Section 2.3.8.1, *Install Landing Pipes Using Marine HDD Machines for Landing Pipes)*. Installation and burial of the cable to a depth of 3.3 feet offshore to a water depth of 5,904 feet would occur 24 hours a day for about 3 weeks (Table 2-1). Peak nearshore background underwater noise levels have been reported averaging between 128 and 138 decibels (dB) (re 1 μPa at 3.3 feet) for nearshore coastal waters in Central California (Fabre and Wilson 1997). Higher background noise levels can be expected offshore Eureka because of increased wave and surf heights. Project-related marine activities can be expected to generate the following ranges of underwater noise.

- Cable Trenching. Studies in the North Sea assessing cable trenching and plowing projects for offshore wind farms reported peak underwater noise sound levels (sound pressure levels [SPLs]) of 178 dB (re 1 μPa at 3.3 feet) (Nedwell et al. 2003).
- Cable Installation and Lay Vessel. Peak underwater noise levels for cable-laying ships have been reported to range between 170 and 180 dB (re 1 μPa at 3.3 feet) (Hale 2018), and between 160 and 180 dB (re 1 μPa at 3.3 feet) for small work vessels (Caltrans 2015), depending on the vessel size and design.

The following are detailed discussions of fishes, marine mammals, and sea turtles expected within the MSA (Figure 3.4-3) (Section 3.4.1.2, *Marine Biological Resources* and Table 7.1 in Appendix C).

FISHES

Of the 18 special-status marine fish species expected in these waters, only bluefin tuna, Chinook salmon (California Coastal ESU, Upper Klamath-Trinity Rivers), cowcod, coho salmon (Southern Oregon/Northern California Coast ESU), longfin smelt, steelhead trout

(Northern California DPS, Klamath Mountains Province), and white shark (*Carcharodon carcharias*) are regarded as having at least a moderate potential to occur in the MSA (Figure 3.4-3) (Section 3.4.1.2, *Marine Biological Resources* and Table 7.1 in Appendix C). In the absence of formal non-impulsive, continuous noise thresholds for fishes, the established impulsive noise thresholds of 183 dB and 187 dB for fishes less than and greater than 2 grams in mass, respectively can be used. As detailed above, Project-related non-impulsive underwater noise levels from cable installation and cable lay vessel operations are below these established sound criteria for acute impacts on fish. Using the 150-dB noise level established for non-lethal behavioral responses in fish, it is estimated that generated underwater noise will drop to this level in less than 210 feet from the noise source. Furthermore, potential ambient noise levels are anticipated to be attained within 420–840 feet from the source (AMS 2020). Consequently, the non-impulsive underwater sound generated by the Project is not expected to cause any substantive impact on fish.

Marine Mammals and Sea Turtles

Of the 40 marine mammal species found along the coast of California, only 10 have a moderate to high potential to occur within the MSA (Figure 3.4-3) (Section 3.4.1.2, *Marine Biological Resources* and Table C-4 in Appendix C). The California sea lion, harbor seal, humpback whale, blue whale, common dolphin, fin whale, gray whale, harbor porpoise, northern elephant seal, and Steller sea lion could be affected by Project-related generated noise as explained above. No sea turtle species are expected within the MSA as their ranges occur further south.

As discussed above, Project-related work vessel activities can be expected to generate peak underwater noise levels ranging between 170 and 180 dB, based on anticipated vessel sizes. In 2018, NOAA established updated thresholds for the onset of permanent threshold shifts (PTS) and temporary threshold shifts (TTS) for impulsive and non-impulsive noise sources based on marine species hearing groups. These thresholds identify the levels at which a marine mammal is predicted to experience changes in hearing sensitivity, whether temporary or permanent, from acute exposure to loud underwater anthropogenic sound sources. The updated impulsive noise thresholds are dual metric, meaning whichever results in the largest isopleth for calculating PTS or TTS onset should be used. NOAA recommends that the peak SPL threshold for impulsive noise be used if a non-impulsive sound has the potential to exceed the peak SPL noise threshold associated with impulsive sounds. Therefore, the following PTS and TTS values shown in Table 3.4-2 were used for the Project’s underwater noise analysis because the Project-related activities would create non-impulsive underwater noise that are not expected to exceed the peak SPL thresholds for impulsive sound (NOAA 2018).

With the exception of the sound exposure levels established for porpoises, all NOAA-established underwater thresholds for non-impulsive sound levels (PTS and TTS) are greater than or at the upper limit of the underwater noise generated by cable installation equipment and vessels. For any porpoises to be affected by Project-generated underwater noise, they would need to be positioned at the noise source, which is unlikely to occur. As discussed above for underwater noise effects on fishes, assuming a 5- to 6-dB decrease in noise level for every doubling of the distance from the noise source, cable installation underwater noise can be expected to decrease to levels <153 dB approximately 26 feet from the sound source.

Table 3.4-2. Cumulative Sound Exposure Levels for Marine Mammals

Marine Mammal Group	Onset of Permanent Threshold Shifts (Cumulative SEL)	Onset of Temporary Threshold Shifts (Cumulative SEL)
Baleen Whales	199 dB	179 dB
Dolphin and Toothed Whales	198 dB	178 dB
Porpoises	173 dB	153 dB
True Seals	201 dB	181 dB
Sea lions and fur seals	219 dB	199 dB

Source: NOAA 2018
Term:
SEL = sound exposure level

Dall's porpoise and harbor porpoise (Table C-4 in Appendix C) are the only porpoise species with "low to moderate" and "moderate" potential to occur in the coastal waters offshore of Eureka. It is expected that marine wildlife would avoid the immediate area where underwater noise would be generated during cable-laying activities. Sound levels generated by the Project would fall below ambient underwater noise levels beyond 105 feet from the cable lay ship or diver support vessel (Figure 2-5). Additionally, a marine mammal observer would be present onboard the cable lay vessel per **MM BIO-9**.

MM BIO-9: Prepare and Implement a Marine Wildlife Monitoring and Contingency Plan. The Applicant shall prepare and implement a Marine Wildlife Monitoring and Contingency Plan (MWMCP) for installing or repairing cables with the following elements, procedures, and response actions:

- Awareness training for Project vessel crew that includes identification of common marine wildlife and avoidance procedures included in the MWMCP for Project activities.
- Have two qualified shipboard marine mammal observers onboard all cable installation vessels during cable installation activities. The MWMCP shall establish the qualifications of and required equipment for the observers.
- In consultation with NMFS, establish a safety work zone around all Project work vessels that defines the distance from each work vessel that marine mammals

and sea turtles may approach before all operations must stop until the marine mammal or sea turtle has moved beyond.

- Project-specific control measures for Project vessels (including support vessels) and actions to be undertaken when marine wildlife is present, such as reduced vessel speeds or suspended operations.
- Reporting requirements and procedures for wildlife sightings and contact made to be required in the post-installation reports. The MWMCP shall identify the resource agencies to be contacted in case of marine wildlife incidents and to receive reports at the conclusion of Project installation.
- The MWMCP shall be submitted to the CSLC and CCC for review at least 60 days before starting marine installation activities.

SEA TURTLES

Sea turtles are not expected to occur within the MSA. Little scientific information is known about the effects of anthropogenic underwater noise on sea turtles or at what potential threshold levels acute or behavioral responses may occur (Williams et al. 2015). Sea turtles appear to be sensitive to low-frequency sounds, with a functional hearing range of approximately 100 Hz to 1.1 kHz (Grebner and Kim 2015). Scientific information on direct measurements of underwater noise sources on sea turtles concerns impulsive sound sources (not generated from the Project-related activities), such as airguns and dynamite explosions (not part of the proposed Project-related activities). These studies indicated that marine turtles may be somewhat resistant to successive dynamite blasts (Erbe 2012) and can detect and exhibit avoidance behavior in response to 175 dB RMS-generating impulsive airgun sounds (Weilgart 2012) when roughly 1 mile away from the source.

The Acoustical Society of America developed guidelines for sound exposure criteria for fishes and turtles, and suggested that (1) sea turtle hearing probably was more similar to that of fishes than marine mammals; and (2) when assessing potential underwater noise effects on sea turtles, the peak SPL and acute threshold level for fishes of 206 dB might be an appropriate measure (Grebner and Kim 2015).

As indicated above, potential Project-related underwater peak SPL noise levels are expected to be in the 170- to 180-dB range, which is well below the 206-dB level for acute impacts. Based on the behavioral responses to impulsive sound sources, it is anticipated that any sea turtles approaching Project-related active cable installation activities would avoid Project work vessels. If avoidance does not occur and a sea turtle approached a Project work vessel, an onboard observer (**MM BIO-9**) would observe the sea turtle and stop cable installation activities until the sea turtle had transited a safe distance away from operations. Implementing this MM would further prevent exposing sea turtles, porpoises, and other marine mammals to underwater noise levels of sufficient magnitude to result in any effect and would reduce potential impacts to less than significant levels.

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, U.S. Fish and Wildlife Service?

Less than Significant with Mitigation.

<u>Terrestrial Components</u>

The area of the cable landing site is designated as Coastal Dependent Industrial (MC), and the pipelines serving offshore facilities are a coastal-dependent use identified in the 2014 Humboldt County LCP (Section 30255). The project is specifically in an area where industrial-related uses, including underground utilities, are permitted by the LCP (Section 30240).

Sensitive Natural Community and Wetland ESHAs

Two areas of coastal dune willow thickets in the BSA are recognized as a sensitive natural community by CDFW and as wetland habitat ESHAs. The willow thickets occur outside the cable landing site work area but within the ESHA buffer identified for the BSA. The two willow thickets would not be directly affected by Project-related activities. However, they could be indirectly affected by Project activities on the paved access road leading to the cable landing site if the planned fencing of the ESHA were compromised and if construction crews were unaware of their protected status. The existing road use for maintenance of the buried pipes and outbuildings maintained by the Humboldt Bay Municipal Water District is a regular occurrence in this area. The small amount of permanent belowground landing vault and ocean ground bed installations would not effectively reduce wetland buffer distances as these project installations are comparable to the existing infrastructure surrounding the cable landing site and are not likely to contribute to the degradation of these ESHAs.

Two degraded dune mat habitat patches (totaling 0.288 acre) are within the cable landing site. Although degraded, these areas could be classified as a dune mat sensitive natural community because they contain up to 25% local dune mat indicator species. However, the presence of invading pampas and European beach grass indicate that the open sandy conditions necessary to maintain dune mat composition and diversity will decline as the dominance of the invading species increases. The western dune mat polygon also contains dark-eyed gilia and would be considered an ESHA because it is rare plant habitat. This dune mat habitat will be avoided by fencing and other measures to ensure that the access road entering the cable landing site from the west, if used, is properly sited. The remaining dune mat habitat to the east is degraded; it is threatened by the continued encroachment of European beach grass from the south, west, and north of the cable landing site, as well as a patch of invading pampas grass within the degraded dune mat area. The cable landing site is on leased land managed for coastal-dependent industrial uses that historically have experienced regular disturbance. Routine driving and land use disturbance at this site is expected to continue in the future. Given that the area is *already disturbed and degraded by human activities and developments,* this area of dune mat habitat is not considered an ESHA (italicized text from Section 30107.5 ESHA definition). This determination is in accordance with local precedent established for degraded dune mat in this area of the Samoa peninsula (GHD 2012; CCC 2013).

No work is proposed within an ESHA at the cable landing site. The work adjacent to the willow and degraded dune mat ESHAs is an allowable use by the Humboldt County LCP and is not likely to substantially affect the total area or the quality of dune mat and willow habitats in the area. The Project is not likely to increase the risk of disturbance or degradation in the area.

ESHA delineation in the BSA includes nesting habitat for white-tailed kite and northern harrier, and foraging habitat for western bumble bee. Bird nesting habitat in the BSA could be directly affected by construction noise. Foraging habitat for the western bumble bee could be directly affected by ground disturbance associated with mobilization of equipment. The cable landing site does not support nesting habitat for northern harrier or white-tailed kite and lacks soils, woody debris, and other substrates that could support a western bumble beehive or nest. Work would occur adjacent to suitable nesting habitat and nectar and pollen sources. Because of the availability of alternative nesting and foraging habitat in the Project vicinity and the limited footprint of construction activities at the cable landing site, ESHA for terrestrial wildlife would not be substantially affected.

Implementing **MM BIO-1** through **MM BIO-3**, **MM BIO-5,** and **MM BIO 6** would reduce potential direct and indirect impacts on ESHAs to a less than significant level. A stormwater pollution prevention plan (SWPPP) would ensure that no construction materials, spoils, soil, debris, or waste would be placed or stored where it may be subject to entering coastal waters or environmentally sensitive areas.

Less than Significant with Mitigation.

<u>Marine Components</u>

The proposed marine cable route does not transit any areas of special biological importance (e.g., Areas of Special Biological Significance, Significant Ecological Areas, Marine Protected Areas, State Marine Reserves, State Marine Parks, State Marine Conservation Areas, and ESHAs). The cable route does pass through portions of the MSA marked as rocky reef and generally defined as a HAPC and EFH for groundfish. Other sensitive marine habitats may include communities of deep-sea corals and sponges. No kelp forests are known to exist along the proposed cable route. The nearest kelp forest is 27 miles south of the MSA near False Cape. No deep-sea corals are known to occur along the proposed cable route within the MSA. Some combination of mixed- to high-relief hard substrate habitat appears to occur approximately from 656 to 1,969 feet (from 200 to 600 meters) north and south of proposed cable routes, in water depths from 207 to 266 feet where soft and hard corals might occur.

Soft Substrate Communities

Impacts on soft substrate benthos may include disturbance of mobile organisms and localized displacement or mortality of infauna and epifauna from cable burial and installation and seaward completion of the landing pipes. Project components with the potential to affect soft substrate communities are the pre-lay grapnel run, cable installation with the cable plow, ROV operation, diver activities associated with exiting the landing pipes at the seaward terminal point, and repairs (if needed). Cable installation would extend from the landing pipe exits and continue offshore along the transpacific routes.

The potential scale and duration of ocean floor disturbance caused by Project installation and maintenance activities would be limited, resulting in predominantly localized and temporary disturbance to the ocean floor. In undisturbed areas adjacent to cable laying, benthic infauna are expected to begin recolonizing the affected area in a matter of weeks, as demonstrated in studies of the ATOC/Pioneer seamount cable (Kogan et al. 2006), the PAC fiber optic cable in the Olympic Coast National Marine Sanctuary (Antrim et al. 2018), and the MARS fiber optic cable in the Monterey Bay National Marine Sanctuary (Kuhnz et al. 2015); full recovery should be achieved within a few years. In the assessment of the ATOC/Pioneer cable, it was noted that the cable provided an artificial hard substrate for anchorage that quickly was colonized by *M. farcimen* and *Urticina* spp. anemones, occasional sponges, and other low-relief colonizing taxa (Kogan et al. 2006); in the sediments, the cable actually had higher species diversity and established a microcosm that attracted fish and crab taxa (Kogan et al. 2006). Marine invertebrates, fishes, and other wildlife are anticipated to move away from, and thus avoid, all physical disturbances and to recolonize the area after the disturbance has occurred. Consequently, any impact of Project activities on soft substrate habitat and associated biological communities would be less than significant.

Burying cables through soft sediment ocean floor areas also could temporarily increase turbidity in the pelagic zone. Any resuspended sediments would resettle onto the ocean floor quickly. Implementing **MM BIO-5** would address any potential inadvertent return during HDD. Consequently, any increased water turbidity is expected to cause a less than significant effect on pelagic marine habitats and associated biological resources.

Hard Substrate Communities

Cable installation along hard bottom substrate, if unavoidable and if the cable is installed directly onto these habitats, could directly affect hard substrate habitats and associated marine biological resources. Biota associated with hard substrate habitat are predominantly slow growing and susceptible to crushing, dislodgement, and other physical disturbances. Preliminary ocean floor mapping of the proposed southernmost cable routes (Figure 3.4-3) does not cross hard substrate habitats. The un-surveyed northernmost cable routes intend to avoid crossing any hard substrate habitats (Figure 3.4-3). Although the routing of one of the two southernmost cables (Figure 3.4-3) appears to cross hard substrate habitat, review of the cable routing ocean floor mapping indicates that the cable route does not cross any hard substrate habitat (EGS 2020).

In the event that one of the unmapped cables must cross hard substrate habitat, any potential impact would be restricted to an area proportional to the width (approximately 3 inches) and length of the cable through the hard substrate area and would affect less-sensitive hard substrate organisms. Laying the cable on moderate- and high-relief hard substrate features exposes the cable to unnecessary suspension, increased tension stress, and possible damage; therefore, it is strongly avoided.

Installing a fiber optic cable on any potential low-relief (less than 3.3 feet high) hard substrate could be expected to bury or crush any taxa attached to the hard substrate directly under the cable. As observed and documented in visual surveys of cable routes in California coastal waters, low-relief hard substrate habitats often are exposed to cycles of periodic burial by sand as well as increased turbidity (AMS 2015). This typically results in lower species diversity and abundances of the taxa inhabiting these features than occurs in high-relief (more than 3.3 feet high) hard substrate communities. These harsh physical conditions have been observed to support a more ephemeral community that is dominated by organisms more tolerant of high turbidity and sand scouring, or whose individual growth is enough to avoid burial (AMS 2020). Typical taxa observed in prior habitat and macrobenthic taxa surveys conducted by ROVs for cable routes in nearby marine protected areas include cup corals, puffballs, and other similar sponges; gorgonian soft corals; and some species of anemones, such as *Stomphia* spp. and *Urticina* spp. (AMS 2020).

High-relief hard substrate areas typically have higher species diversity than low-relief habitats because their elevation results in lower turbidity, less sand scouring, and less periodic burial. Such areas typically support organisms sensitive to physical disturbances such as erect turf species, hard and soft hydrocorals, branching corals, and branching and erect sponges. High-relief hard substrate areas generally are more sensitive to physical impacts than low-relief hard substrate habitat.

The potential for post-lay effects on hard substrate areas depends on the location of the individual cable. The cable would be placed on the ocean floor at all water levels in a way that avoids suspension; suspension can result in some movement of the cable in response to currents and wave action in shallow depths (i.e., less than 100 feet). This causes continuous abrasion of hard substrate habitat and damage to attached biota, as well as unnecessary cable tension stress and possible damage. There is no hard substrate habitat in the MSA in water depths less than 656 feet; therefore, the potential for abrasion of the cable into the hard substrate is not expected to occur. In addition, the

Applicant would avoid any hard substrate habitat areas along the nearshore coastal route whenever possible; moreover, the cable would be buried in soft substrate to a water depth of 5,904 feet.

Past cable route and post-lay surveys conducted in California coastal waters have observed minimal impacts on hard substrate communities. During a survey of the AT&T Asia-America Gateway S-5 cable, which ran parallel to previously laid fiber optic cables in low-relief hard substrate, AMS (2008) reported no noticeable impacts from previously laid cables in the area. Two years after laying cable offshore British Columbia, Dunham et al. (2015) reported that glass sponge reefs had recovered to approximately 85% of natural growth and cover when compared to control sites. Summaries from other surveys indicated that large erect sponges and other sessile invertebrate species were observed growing on or over exposed cables (AMS 2020).

The marine segments of the path of cables are designed to maximize installation along soft substrate (where the cables can be buried) and avoid areas identified as hard substrate where feasible. Anchoring of support vessels would be kept to a minimum and would result in only minor, temporary disturbances of soft substrate ocean floor sediments. Implementing **MM BIO-10** would further minimize potential impacts on hard substrate habitat areas during cable installation. If any hard substrates are affected, **MM BIO-11** would provide compensation for the impairment or loss of hard substrate-associated marine taxa and their role in marine ecosystems in the marine MSA (Figure 3.4-3).

MM BIO-10: Minimize Crossing of Hard Bottom Substrate. At least 30 days before starting construction of Phase I, a pre-construction ocean floor survey shall be conducted and provided to CSLC covering the proposed cable lease area and the temporary construction corridor (including construction vessels anchoring areas and depicting ocean floor contours, all significant bottom features, hard bottom areas, sensitive habitats, the presence of any existing wellheads, pipelines, and other existing utilities) to identify any hard bottom habitat, eelgrass, kelp, existing utilities (including but not limited to pipelines), and power cables. The proposed cable routes and anchoring locations shall be set to avoid hard bottom habitat (to the extent feasible), eelgrass, kelp, existing utilities (including but not limited to pipelines), and power cables, as identified in the ocean floor survey.

MM BIO-11: Contribute Compensation to Hard Substrate Mitigation Fund. The following would be proposed if slow-growing hard substrate organisms are damaged:

- CCC compensation fees (based on past projects) will be required to fund the U.C. Davis Wildlife Health Center's California Lost Fishing Gear Recovery Project or other conservation programs for impacts on high-relief hard substrate affected by the Project. The amount of the hardbottom mitigation fee shall be calculated by applying a 3:1 mitigation ratio to the total square footage of affected hard bottom and multiplying that square footage by a compensation rate of $14.30 per square foot.

- A final determination of the amount of high-relief hard substrate affected (used to calculate the total compensation fee) will be based on a review of the final burial report from the cable installation. The total assessment and methods used to calculate this figure will be provided to the CSLC and CCC for review and approval. Both the CSLC and CCC also will be provided documentation of the total amount of mitigation paid and the activities for which the funds will be used.

Introduction of Non-Native and Invasive Species

As discussed in Section 3.4.1.2, *Marine Biological Resources*, many non-native and invasive species can be introduced by vessels—either as encrusting organisms on the hulls or other submerged parts of the vessels, or when ballast water is discharged from the vessels. No introduction of marine invasive species through ballast water exchange is anticipated in the MSA because Project vessels would not exchange ballast water within the MSA (Figure 3.4-3). Implementing **MM BIO-12** would further reduce any potential Project-related contribution to the spread of invasive non-native species to a less than significant level.

MM BIO-12: Control of Marine Invasive Species. The Applicant shall ensure that the underwater surfaces of all Project vessels are clear of biofouling organisms prior to arrival in State waters. The determination of underwater surface cleanliness shall be made in consultation with CSLC staff. Regardless of vessel size, ballast water for all Project vessels must be managed consistent with CSLC's ballast management regulations, and Biofouling Removal and Hull Husbandry Reporting Forms shall be submitted to CSLC staff as required by regulation. No exchange of ballast water for Project vessels shall occur in waters shallower than the 5,904-foot isobath.

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 with Mitigation.

<u>Terrestrial Components</u>

See discussion above under b). The Project would avoid impacts on coastal dune willow thickets, a CCC wetland within the terrestrial BSA. There are no other state- or federally protected wetlands in the BSA. Implementing **MM BIO-1** through **MM BIO-3** would reduce potential indirect impacts on the coastal dune willow thicket to a less than significant level.

No Impact.

Marine Components

Because no federally protected wetlands occur in the ocean, there would be no impact. The Applicant would obtain the appropriate state and federal permit authorizations to comply with Sections 404 and 401 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. All permit conditions would be implemented as part of the Project. Potential water quality impacts associated with disturbance of ocean sediments are addressed in Section 3.10, *Hydrology and Water Quality*.

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.

Terrestrial Components

Based on current conditions and the proposed Project design, construction would not substantially impede the movement of fish or wildlife species, block or interfere with resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

The BSA (Figure 3.4-1) consists mostly of open sand, disturbed dune habitat, ruderal/developed, and invasive grasses A small portion of the land cover in the BSA consists of coastal dune willow thickets, non-native Monterey pine and cypress stands, and coyote brush scrub. This area could be used by resident terrestrial wildlife; however, the area is not part of an established movement or migratory corridor, and Project activities would not substantially impede wildlife movements. Natural areas in the BSA include coyote brush scrub and coastal dune willow thickets that also could be used as a movement corridor by wildlife species. However, the Project would not impede wildlife movements through these habitats.

Less than Significant Impact.

Marine Components

Marine fish and mammals could be present in the Project area at any time of the year. Movement and noise from Project work vessels during cable installation or repair have the potential to temporarily disturb individuals' movements and activities. Based on previous observations, it is generally expected that any fish, marine mammals, or sea turtles would avoid Project vessels and activities. Ship strikes of large marine mammals have become a growing concern; however, ship strikes during cable installation are unlikely because the speed of the ship during cable-laying activities is very slow (approximately 0.5 to 1.5 nautical miles per hour [0.5 to 1.5 knots] while plowing) compared with the speed of sea lions or migrating whales (AMS 2020). Work vessel movement and noise often result in disruption of animal movements or altered behavior. Such disturbances usually are temporary and confined to the immediate vicinity of the vessel. Disruption caused by Project vessels (e.g., noise) would not be substantially different from that resulting from normal ship traffic in the MSA (AMS 2020). According to the Large Whale Ship Strike Database, most strikes involve vessels traveling between 13 and 15 knots, and no strikes have been reported for vessels traveling slower than 2 knots (Jensen and Silber 2003).

The likelihood of offshore construction vessels interfering substantially with the movement of any native, resident, or migratory fish—or with established, native, resident, or migratory wildlife—is considered negligible and less than significant.

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

Less than Significant Impact.

<u>Terrestrial Components</u>

The area of the cable landing site is designated as Coastal Dependent Industrial (MC). The pipelines serving offshore facilities are a coastal-dependent use identified in the 2014 Humboldt County LCP (Section 30255) and are located in an area where industrial-related uses, including underground utilities, are permitted (Section 30240).

Project activities would not conflict with Section 30240 (a) and (b) (Policy 3.30 – Natural Resources Protection Policies and Standards) which state that "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" and "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 such areas, and shall be compatible with the continuance of such habitat areas." The Project has been designed to avoid significant disruption of habitat values and impacts on ESHAs. The Project would not conflict with local policies or ordinances, and potential impacts would be less than significant.

Less than Significant Impact.

<u>Marine Components</u>

Although no local policies or ordinances pertain to the marine components of the Project, installing cables would entail work in an area identified as federal EFH for commercially important fish species under the Magnuson-Stevens Act. Impacts caused by installation and maintenance of the marine segments of the cable would be temporary, and the affected area would be very small relative to the extent of EFH in the broader Eureka offshore region and within the MSA. The Project would not introduce permanent structures that would block emigration or immigration, and invertebrate forage organisms are expected to quickly recruit into the affected area and repopulate. Consequently, any potential effects on EFH along the cable route would be less than significant.

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.

All Project Components

There are no local, regional, or state habitat conservation plans or natural community conservation plans in the Project area; therefore, there would be no impact.

3.4.4 Mitigation Summary

Implementation of the following mitigation measure(s) would reduce the potential for Project-related impacts on biological resources to less than significant:

- MM BIO-1: Provide Worker Environmental Awareness Training
- MM BIO-2: Conduct Biological Surveying and Monitoring
- MM BIO-3: Delineate Work Limits to Protect Sensitive Biological Resources
- MM BIO-4: Install Covers or Some Kind of Escape Ramps in Open Trenches
- MM BIO-5: Prepare and Implement an Inadvertent Return Contingency Plan
- MM BIO-6: Conduct Pre-Construction Nesting Bird Surveys and Implement Avoidance Measures
- MM BIO-7: Implement Best Management Practices for Horizontal Directional Drilling Activities
- MM BIO-8: Cable Entanglements and Gear Retrieval
- MM BIO-9: Prepare and Implement a Marine Wildlife Monitoring and Contingency Plan
- MM BIO-10: Minimize Crossing of Hard Bottom Substrate
- MM BIO-11: Contribute Compensation to Hard Substrate Mitigation Fund
- MM BIO-12: Control of Marine Invasive Species
- MM HAZ-1: Develop and Implement Spill Contingency and Hazardous Materials Management Plans
- APM-1: Fishing Agreement
- APM-3: Cable Burial Surveys

3.5 CULTURAL RESOURCES

CULTURAL RESOURCES - Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**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?	☐	☒	☐	☐

3.5.1 Environmental Setting

3.5.1.1 Marine Components

The Project area for marine cultural resources consists of the four proposed cable routes and a 10-nm buffer around each route, beginning at the mean high tide line of the North Spit of the Humboldt Bay Bar situated between Fairhaven and Samoa and westward to the continental shelf break. A total of 146 documented shipwrecks, unknown wreckage, and debris locations are reported within the Project area. Sources consulted for shipwreck data included cultural resource inventories provided by the CSLC, BOEM Pacific OCS Region (BOEM 2013; former Bureau of Land Management Pacific OCS Region [Stickel & Marshack] 1979), the Minerals Management Service (MMS 1990 [Gearhart et al.]), and the National Oceanic and Atmospheric Administration (NOAA) Automated Wreck and Obstructions Information System (AWOIS) database (1988). A majority of these vessels were built between 1838 and 1899. No record could be found in the historic literature of any historic landings along the North or South Spits of the Humboldt Bay Bar, where vessels offshore would have anchored and lightered (process of transferring cargo between vessels of different sizes) in their cargos.

A search of the CSLC Shipwrecks Database (https://www.slc.ca.gov/shipwrecks/) revealed at least five shipwrecks directly offshore along the Samoan peninsula. Except as verified by actual surveys, CSLC data on shipwrecks was taken from books, old newspapers, and other contemporary accounts that do not contain precise locations. The CSLC Shipwrecks Database reflects information from many sources and generally does not reflect actual fieldwork. Additionally, not all shipwrecks are listed in the CSLC Shipwrecks Database and their listed locations may be inaccurate, as ships often were salvaged or re-floated. One shipwreck to note is the USS Milwaukee, which can be seen at low tide and whose memorial is located approximately 0.5 mile north of the landing site.

Historic-period shipwrecks may consist of the remains of watercraft that were used as early as the 16th century in the Project area to traverse Pacific waters. The majority of shipwrecks reported in this area may occur near natural hazards such as rocky shoals, headlands, and reefs and in the vicinity of coves, historic landings, anchorages, wharves and lighthouses, or other ports-of-call. However, they also may occur in deeper waters such as those associated with historically established shipping lanes. Ports-of-call are accessed from the coastal shipping lanes. These historic watercrafts most often sank due to numerous causes, such as equipment failure; inclement weather; and associated marine casualties such as capsizing, foundering, stranding, explosion, fire, and collision occurring during their travels on the Pacific Ocean. They also may be present due to purposeful scuttling. Their *in-situ* remains may be partially or wholly obscured by sediments and in rocky strata along the ocean floor in the Project area.

3.5.1.2 Terrestrial Components

The cable landing site is the only terrestrial Project component (further discussed in Section 2.3, *Detailed Terrestrial Project Components*) needed to install four cables (coming from Asia or Australia) and their related structures on land in an unoccupied area of the Harbor District.

3.5.1.3 Cultural Setting

Historic Context

This section discusses Cultural and Historic resources, as well as prehistoric archaeological resources that are not affiliated with the Native people who have inhabited the Humboldt and Eureka area for millennia. The ethnographic and archaeological context related to the Native American society and culture in the Project vicinity is discussed in Section 3.6, *Cultural Resources – Tribal*.

Background research conducted for the Project revealed several key themes that frame the post-European influence historical context for which cultural resources in the Project area are best understood (e.g., early exploration and community development, including the lumber industry and railways). A discussion of these themes follows. The ethnographic and archaeological context related to Native American occupation of the Project vicinity is discussed in Section 3.6, *Cultural Resources – Tribal*.

<u>Early Exploration and European American Contact</u>

Juan Rodriguez Cabrillo, a Portuguese pilot and navigator, commanded an expedition to explore the California coast north of Cedros Island in Baja California. With the hope of locating the fabled northwest passage, the “Strait of Annan,” and determining whether Asia could be reached by following the Pacific Coast north, he departed Navidad near Acapulco in June 1542, in the *San Salvador* and the *Victoria* (Bancroft 1886). Cabrillo’s was the first European expedition to explore along the California coast. Cabrillo died during the voyage, and his remains are believed to be buried on one of the Channel Islands, possibly San Miguel Island (Moriarty and Keistman 1973). When Cabrillo died, Bartolome Ferrer assumed command of the expedition and led it as far north as the southern Oregon border.

Although explorers Juan Rodriquez Cabrillo and Sir Francis Drake had sailed the Humboldt County coastline, it was not until 1775 that a Spanish vessel captained by Juan Francisco de Bodega landed at Patricks Point in Trinidad and claimed the land for the King of Spain. Trinidad Bay located north of the Project area served as a port for fur trading and Chinese trade expeditions.

The first significant contacts by Europeans with the Native Americans of northwestern California by Juan Francisco de la Bodega y Quadra in 1775 and George Vancouver in 1793 were with the Yurok People, the northern coastal neighbors of the Wiyot Tribe.

During the following period of Spanish rule, George Vancouver, an Englishman, explored much of the Pacific coast between 1791 and 1795; this was the last documented exploration of coastal California by ship.

Given the relative difficulty of reaching the area overland and its distance from existing European and colonial American settlements, European American arrival in Humboldt Bay occurred relatively late in time. The first documented European American to arrive in Humboldt Bay was Captain Jonathan Winship in 1806 during a Russian-American fur trading expedition. Winship's men, primarily members of the Aleutian and Kodiak tribes (Giesecke 1997) had encountered the bay while hunting sea otter along the coast. At the time, Winship named the bay "the Bay of Indians," noting a high density of native villages along the rim of the bay (Davidson 1891).

There were no further European colonizers until 1849, with the arrival of Dr. Josiah Gregg, and in 1850 with the arrival of Lieutenant Douglass Ottinger in command of the ship the *Laura Virginia.* Exploration by these groups was driven in general by the ongoing California Gold Rush and in particular by the discovery of gold on the Trinity River (Krause 2010).

Contact with European Americans and ensuing encroachment on native lands led to escalating conflict between 1850 and 1865. This drove the U.S. Government to establish a military fort in the area as a means of mediating disputes, with a heavy emphasis on the protection of settlers and their interests; this fort, Fort Humboldt, was built in 1853 on a bluff above Humboldt Bay (California State Parks 2020). These hostilities culminated in the unprovoked massacre of 50 to 250 Wiyot people on Gunther Island by white settlers (Elsasser 1978).

Development of Timber Operations

Exploration, exploitation, and development of timber operations in the area was meant largely to develop and support gold mining operations in the area. This was driven by the region-wide California Gold Rush following the discovery of gold at Sutter's Mill (now Coloma) in El Dorado County in 1848, and the discovery of gold along the Trinity River the following year (Krause 2010). This focus on gold is reflected in construction of the first rail line servicing the Humboldt area, the Arcata and Mad River Railroad. Established in 1854, this rail ran directly from Humboldt Bay to mines along the Trinity River (OHP 2020).

While timber operations first focused on supplying gold mining operations, it became clear that timber harvesting itself was the more lucrative endeavor. Increased timber production for export rather than for supply to mining operations resulted in the development of additional rail lines throughout Humboldt County. Timber from Humboldt County soon was being exported for construction elsewhere. Redwood from this area was used extensively in the construction of housing and infrastructure in the San Francisco Bay area, especially following the 1906 San Francisco Fire (Timber Heritage Association 2020a).

The original sawmill in Samoa was 270 acres, with 1 mile of waterfront. The land was bought by heirs to the Humboldt logging magnate John Vance's fortune in 1893, who in turn improved the land and built the lumber mill, the railroad, and other industrial buildings on the site. The mill produced its first wood in 1894, and the Vance company extended their railroad, the Eureka & Klamath River Railroad, south to Samoa to service the mill by 1896. The mill and railroad were bought by Andrew Hammond in 1900 for $1 million. By 1912, Hammond also had purchased the housing stock in Samoa to turn the area into a company town dominated by Hammond Lumber. The mill and its associated shops were the biggest in Humboldt County and were operated under the Hammond name for 56 years before being bought by Georgia Pacific in 1956, by which time the Hammond Lumber Railroad (HLRR) servicing the mill had been largely abandoned (Timber Heritage Association 2020b, 2020c).

Timber operations remained a major part of the area's economy into the modern era; as of 1974, the Humboldt area supplied 25% of the State of California's lumber and, despite impacts on the timber industry since this period, timber still accounts for over half of Humboldt County's manufacturing (Eschker et al. 2008).

Development of Nearby Communities

As the Wiyot People were forcibly displaced from their lands directly adjacent to the Humboldt and Arcata Bays, a number of small European American settlements formed to support mining and logging operations in the surrounding areas and to support milling and shipping operations in the immediate vicinity. These communities include Humboldt City, Bucksport, Eureka, Uniontown, and Arcata. While some of these smaller communities are visible on historic maps, most had been absorbed into the growing borders of Eureka and Arcata, the dominant settlements of the region by the 1920s (USACE 1922). While timber harvesting grew to become the dominant economic activity of the region, with the Homestead Act, the 1860s saw an increase in agricultural growth and development of orchards and cattle ranches across Humboldt County (Krause 2010).

Development of the Samoa Peninsula began in 1889; with investment from prominent Eureka businessmen, the area was organized under the name “the Samoa Land and Improvement Company.” The group hoped to develop Samoa as the “Coney Island of Humboldt Bay,” with an emphasis on recreation and lavish amenities for residents. The Samoa Land and Improvement Company failed to generate interest in this development, and in 1893 sold their holdings to the Vance Lumber Company. The Vance Lumber Company developed the peninsula as a sprawling timber processing complex including a mill and company town. In 1900, the company was acquired by the Hammond Lumber Company, who further expanded and developed timber operations in the area, including construction of the HLRR (McCormick 1989).

The history of timber harvesting in the region is obvious not only through the presence of historic and modern mills throughout the area but also in other prominent historic resources in the Project vicinity. These include the Carson Mansion in Eureka and the Samoa Cookhouse on the Samoa Peninsula. The Carson Mansion, perhaps the most imposing historic home in Eureka, was built in the Victorian style between 1884 and 1886. The mansion was owned by the wealthy lumber magnate William Carson, the man credited as being the first to mill redwood lumber in the area (Historic American Buildings Survey 2020). The Samoa Cookhouse, located near the Project area, was constructed in 1900 to feed workers at the Hammond Lumber Company. The cookhouse operates now as a working restaurant and small museum dedicated to the history of timber harvesting in the region (Samoa Cookhouse Museum 2020).

Existing Conditions

<u>Terrestrial Archaeological and Built Environment Records Search</u>

The California Historical Resources Information System (CHRIS) Northwest Information Center (NWIC) in Rohnert Park maintains the California Office of Historic Preservation (OHP) cultural resource records for Humboldt County. On June 30, 2020, the NWIC provided record search results for the terrestrial Project area and an additional 0.25-mile radius surrounding the Project area.

The records search found that eight (8) cultural resources studies had been conducted in the record search radius, with three of those encompassing portions of the Project (Table 3.5-1). These studies collectively covered the entire Project area; however, the studies were conducted over 20 years ago. The records search also found that one previously recorded historic-era built environment resource, a segment of the HLRR, is located in the Project area (Table 3.5-2).

Table 3.5-1. Previously Conducted Cultural Resources Studies in the Project Area

NWIC Study No.	Year	Author(s)	Title
S-00886	1977	Benson, Fredrickson, McGrew	*Humboldt Bay Wastewater Authority, Regional Water Pollution Control Board Facility, Archaeological Resource Analysis: Archaeological Reconnaissance of the Humboldt Bay Area*
S-16879	1975	Fredrickson, Tamez, Roberts	*An Archaeological Survey of the Proposed McKinleyville Sewage Collection and Treatment Facility*
S-30202	2000	URS Greiner Woodward Clyde Federal Services	*Restoration of the Northwestern Pacific Railroad, Humboldt, Trinity, and Mendocino Counties*

Term:
NWIC = Northwest Information Center

Table 3.5-2. Previously Recorded Cultural Resources in the Project Area

Primary/ Trinomial	Age/Type	Description	CHRS Code
P-12-003142/ CA-HUM-1495H	1896/Historic-era built environment	Hammond Lumber Railroad	N/A

Term:
CHRS = California Historical Resource Status

On August 5, 2020, ICF sent letters to the Humboldt County Historical Society, the Eureka Heritage Society, and the Clarke Historical Museum to request historical resources information about the Project area. To date, ICF has not received responses from any of these interest groups.

Additional sources of information, such as historic maps from the USGS and General Land Office, and historic aerial photographs were selectively reviewed to gather historical data and to determine areas with a high potential for the presence of historic and prehistoric sites. The following sources were reviewed:

- National Park Service's National Register of Historic Places (NRHP) Digital Archive website
- OHP's California Historical Landmarks website
- Historic General Land Office plat maps (1855 to 1902)
- Historical USGS topographic maps (1922 to 1987)
- Historical aerial photographs (1931 to 1972)

The OHP California Historical Landmarks website and the National Park Service's NRHP Digital Archive website did not identify any California Historical Landmarks, historical resources, or historic properties in the Project area. Staff at the NWIC reviewed the *Archaeological Determination of Eligibility* for Humboldt County and provided OHP's *Built Environment Resources Directory*. No historic properties or historical resources were identified in the Project area.

A review of historical maps and aerial photographs indicated that, with the exception of the railroad grade, the Project area was not built upon or visibly modified until the mid-1960s, when the adjacent Kraft Pulp Mill was built

<u>Marine Cultural Resources Records Search</u>

Research methods were limited to an archival and records search to inventory marine cultural resources. All marine cultural resources cited consisted of shipwrecks. No downed aircraft or prehistoric archaeological sites and isolated artifacts were listed. The inventory completed for the marine Project area covers the four potential cable routes plus a 10-nm buffer. No remote sensing survey of the ocean floor for shipwrecks and other debris or predictive modeling for prehistoric archaeological resources has yet been completed for the marine portion of the Project area. A complete list of sources consulted is included in the Marine Cultural Resources Report (Appendix D).

Sources consulted for marine cultural resources included:

- CSLC (cultural resource inventories – shipwreck and downed aircraft listings)
- NOAA Automated Wreck and Obstructions Information System database (1988)
- U.S. Army Corps of Engineers (USACE) Los Angeles and San Francisco Districts
- National Maritime Museum in San Francisco
- Los Angeles Maritime Museum
- Commerce Department files at the National Archives in Washington D.C.
- San Bruno, Regional Records Centers at Laguna Nigel, and San Bruno
- The Huntington Library in San Marino
- Published volumes of Lloyds of London Ships Registry 1850–1980 and 1885–1950
- U.S. Department of Commerce Merchant Vessels of the United States 1867–1933
- USCG Merchant Vessels of the United States 1933–1982 (and supplements 1982–1988)

As part of this analysis, shipwrecks were mapped in relation to the alternate cable routes based on their reported coordinates or other relevant information. Centered on the North Spit of Humboldt Bay cable origin, the marine Project area extends 10 nm (18.5 km) north to include waters offshore of Camel Rock south of Trinidad Head, excluding the immediate inshore area of that location and southward to the Eel River.

The records search yielded no maritime finds of prehistoric origin within the Project area. All known underwater prehistoric resources on file appear to be in Oregon and southern California waters. It should be noted that there is a recognized potential for the remains of prehistoric and historic sites, artifacts, and Native American watercraft to be present offshore—although there is a lower potential for their *in-situ* preservation.

A total of 146 documented shipwrecks, unknown wreckage, and debris locations are reported within the marine Project area. The majority of these vessels were built between 1838 and 1899. No record could be found in the historic literature of any historic landings along the North or South Spits of the Humboldt Bay Bar where vessels offshore would have anchored and lightered in their cargoes. The references consulted as part of the records search for submerged historic period cultural resources provided information on shipwrecks, unknown wreckage, and debris locations. As previously referenced, these historic-period watercraft came to rest on the ocean floor due to marine casualties such as foundering (casualties due to leaking or capsizing of vessels, vessels lost at sea not due to collision or burning, and vessels not reported after sailing), stranding (casualties due to vessels running aground on a sandbar or reef, striking rocks, or becalming),[29] colliding (collision between vessels), burning (casualties due to fire and explosion), or from being abandoned (abandonment at sea not due to age) during travel on the ocean. Vessels that foundered are those that took on water and sank below the surface of the water.

None of the 146 shipwrecks reported in the Project area have been previously evaluated for their significance or importance in California history, and no degree of accuracy of location has been evaluated previously for any of the shipwrecks.

The reported locations of historic-period shipwrecks are characterized by inaccuracies. Many, if not most, vessels reported as lost in the Project area have not been accurately located or assessed for their eligibility for listing in the California Register of Historical Resources (CRHR). Therefore, the potential for the Project to affect these shipwrecks cannot be accurately assessed. However, given the large number of shipwrecks reported within or near the Project area, it is likely that one or more may be found by site-specific remote sensing surveys for each of the four cable routes.

[29] *Stranding* is often misused by mariners to indicate running out of fuel, engine trouble, or trouble with the ship's machinery rather than the vessel itself.

<u>Fieldwork</u>

A cultural resources survey of the Project area was conducted by archaeologist Stephen Pappas of ICF on August 11, 2020. The surveyed area consisted of heavily disturbed areas east of New Navy Base Road and west of the Kraft Pulp Mill facilities bound by an access road and dense vegetation to the south and an artificial waste management mound to the north.

The archaeological survey consisted of a pedestrian inspection, walking a maximum of 15-meter-wide transects in the survey area. All exposed ground surface was intensively inspected for any indications of archaeological sites or artifacts. Overall surface visibility was excellent to moderate in the Project area; however, the majority of the ground surface appeared disturbed due to installation of underground water treatment facilities and placement of fill for the waste management mound along the northern portion of the Project area. The location of the landing site appeared to be excavated as a result of waste management operations associated with the pulp mill, revealing sandy soils approximately 2 to 3 feet below the surrounding ground surface. No newly identified archaeological resources were observed or recorded within the Project area during identification efforts.

ICF architectural historians conducted a desktop survey of the Project area. An ICF cultural resources specialist revisited and documented a segment of the HLRR identified in the Project area during the cultural resources' fieldwork on August 11, 2020. Some of the subject segment of rail was covered in dense vegetation that obscured the grade. In general, the visible portions of the subject segment ranged from no rail, track, or ballast remaining on the grade to the remains of two steel rails lacking ties or ballast. At the southern end of the subject segment, the grade was clear of vegetation and contained two steel rails and remnant ties.

3.5.1.4 Findings

Built Environment Resources

ICF cultural resources specialists identified one historic-era built environment architectural resource in the Project area: a segment of the HLRR.

<u>Hammond Lumber Railroad (P-12-003142; CA-HUM-001495H)</u>

A 300-foot-long segment of the HLRR is located in the eastern end of the Project area. The HLRR is an abandoned railroad that has been out of commission for over 70 years. The HLRR was constructed in 1896 and served as a logging line, bringing heavy timber harvests from the forests to the company's lumber mills in Samoa for processing timber and then distributing lumber products to markets. Dozens of similar small service lines crisscrossed the Humboldt region. Forest fires at Hammond holdings destroyed rail trestles at Big Lagoon and Little River in 1945, and service on the line was abandoned in 1948. Desktop review and field survey revealed that the segment of the resource in the Project area was no longer in use, and most of its components were no longer present.

ICF architectural historians evaluated the railroad in the Project area and recommended the structure ineligible for inclusion in the NRHP or CRHR due to lack of integrity. Therefore, the rail segment is not considered a historical resource for purposes of CEQA.

Archaeological Resources

Terrestrial Archaeological Resources

The records search and pedestrian survey revealed no terrestrial archaeological resources in the Project area.

Submerged Offshore Archaeological Resources

The records search, including the shipwrecks database search, revealed no submerged offshore prehistoric resources in the Project area. A total of 146 documented historic shipwrecks, unknown wreckage, and debris locations are reported within the Project area. Sources consulted for shipwreck data included cultural resource inventories provided by the CSLC, BOEM Pacific OCS Region (BOEM 2013; former Bureau of Land Management Pacific OCS Region [Stickel & Marshack] 1979), the Minerals Management Service (MMS 1990 [Gearhart et al.]), and the National Oceanic and Atmospheric Administration (NOAA) Automated Wreck and Obstructions Information System (AWOIS) database (1988). The majority of these vessels were built between 1838 and 1899. All resources that could be placed to within 10 nm of each of the proposed routes have been included for consideration.

Of the 146 shipwrecks documented within the Project area, 12 potentially may be eligible for listing in the NRHP based on age of construction and lives lost. As noted, any resource eligible for listing in the NRHP also is eligible for listing in the CRHR. The eligibility of the remaining 134 shipwrecks reported in the Project area remains undetermined.

3.5.2 Regulatory Setting

Appendix A contains the federal and state laws and regulations pertaining to cultural resources relevant to the Project. At the local level, the following policies and programs are included in Chapter 3.18 of the *Humboldt County Humboldt Bay Area Plan*, which incorporates the Humboldt County LCP (Humboldt County 2014).

3.5.2.1 Humboldt County Bay Area Plan

Where new development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

A. Planned Uses

The Native American Wiyot tribe, part of the Algonkian family, once occupied the Humboldt Bay area. The Humboldt County Department of Public Works has identified 117 known archaeological sites in this planning area. The Wiyots depended heavily upon the resources of Humboldt Bay, and their heritage is an important resource within the Humboldt Bay area. Areas with great archaeological and paleontological values have been identified within the planning area, as identified with the Humboldt County Public Works, Natural Resource Division.

B. Development Policies

1. Reasonable mitigation measures may include but are not limited to:
    a. Changing building and construction sites and/or road locations to avoid sensitive areas.
    b. Providing protective cover for sites that cannot be avoided.
    c. Where appropriate and with the approval of all parties concerned, provide for the removal or transfer of culturally significant material by a professional archaeologist or geologist.

3.5.3 Impact Analysis

Potential impacts of the proposed Project on cultural resources are discussed in the context of State CEQA Guidelines Appendix G checklist items.

a) Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?

No Impact.

All Project Components

The proposed Project would not result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 because the cultural resources investigation for the Project did not identify any historical resources in the Project area that meet the criteria of significance under CEQA and would be affected by the proposed Project. There is no impact, and no mitigation is required.

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

Less than Significant with Mitigation.

<u>All Project Components</u>

The proposed Project would not cause a substantial adverse change in the significance of a unique archaeological resource as defined in section 15064.5 because no archaeological resources were identified in the Project area. However, if previously unknown archaeological resources (terrestrial or submerged) are encountered during construction of the proposed Project, they could be adversely affected. Implementing **MM CUL-1/TCR-1**, **MM CUL-2/TCR-2**, and **MM CUL-6/TCR-3** would reduce potential impacts on previously unknown terrestrial archaeological resources to a less than significant level. The CUL/TCR MMs apply to both cultural resources and tribal cultural resources. In addition, implementing **MM CUL-3**, **MM CUL-4**, and **MM CUL-5** would reduce potential impacts on previously unknown offshore archaeological resources to a less than significant level.

MM CUL-1/TCR-1: Discovery of Previously Unknown Cultural or Tribal Resources. In the event that potential cultural or tribal cultural resources are discovered during Project implementation, all earth-disturbing work within 50 feet of the find shall be temporarily suspended or redirected until a qualified archaeologist retained by the Applicant can adequately assess the find and determine whether the resource requires further study. In the event that a cultural or tribal cultural resource discovery is potentially significant, the Applicant, CSLC, and any local, state, or federal agency with approval or permitting authority over the Project that has requested/required notification shall be notified within 48 hours.

For all discoveries known or likely to be associated with Native American heritage (precontact sites and select post contact historic-period sites), the Tribal Historic Preservation Officers (THPOs) for the Bear River Band of Rohnerville Ranchería, Blue Lake Ranchería, and Wiyot Tribe shall be contacted immediately by the CSLC to evaluate the discovery and, in consultation with the Applicant and a qualified archaeologist, develop a treatment plan in any instance where significant impacts cannot be avoided. The treatment plan shall be submitted to the CSLC staff and any participating tribe for review and approval prior to its implementation, and additional work in the vicinity of the discovery shall not proceed until the plan is in place.

The location of any such finds must be kept confidential, and measures shall be taken to secure the area from site disturbance and potential vandalism. Impacts on previously unknown significant cultural or tribal cultural resources shall be avoided through preservation in place, if feasible. Damaging effects on tribal cultural resources shall be avoided or minimized following the measures identified in Public Resources Code section 21084.3, subdivision (b), if feasible, unless other measures are mutually agreed to by the lead archaeologist and culturally affiliated tribes that would be as or more effective.

Title to all shipwrecks, archaeological sites, and historic or cultural resources on or in the tide and submerged lands of California is vested in the State and under CSLC jurisdiction. The final disposition of shipwrecks, archaeological, historical, and tribal cultural resources recovered on State lands under CSLC jurisdiction must be approved by the CSLC.

MM CUL-2/TCR-2: Cultural Resources Contractor Awareness Training. Prior to beginning construction, the Applicant shall retain a qualified archaeologist to prepare a Cultural Resources Contractor Awareness Training subject to CSLC approval. The training shall be given to all construction personnel prior to working on the Project, and the training shall include, but not be limited to, the following:

- Guidance on identification of potential cultural resources that may be encountered
- The probability of exposing cultural resources
- Clear direction on procedures if a find is encountered

The archeologist shall provide construction personnel with an orientation on the requirements of the treatment plan, including the probability of exposing cultural resources, guidance on recognizing such resources, and direction on procedures if a find is encountered.

MM CUL-3: Conduct a Pre-Construction Offshore Archaeological Resources Survey. Using the results of an acoustic survey (e.g., a CHIRP [compressed high-intensity radiated pulse] system survey) for evidence of erosion/incision of natural channels, the nature of internal channel-fill reflectors and the overall geometry of the seabed, paleochannels, and the surrounding areas shall be analyzed for their potential to contain intact remains of the past landscape with prehistoric archaeological deposits. The analysis shall include core sampling in various areas, including but not limited to, paleochannels to verify the seismic data analysis. Based on the CHIRP survey and coring data, a Marine Archaeological Resources Assessment Report shall be produced by a qualified maritime archaeologist and reviewed by the California Coastal Commission or the State Historic Preservation Officer and the CSLC to document effects on potentially historic properties.

MM CUL-4: Conduct a Pre-Construction Offshore Historic Shipwreck Survey. A qualified maritime archaeologist, in consultation with the CSLC, shall conduct an archaeological survey of the proposed cable routes. The archaeological survey and analysis shall be conducted following current CSLC, BOEM, and U.S. Army Corps of Engineers (San Francisco and Sacramento Districts) standard specifications for underwater/marine remote sensing archaeological surveys (*Guidelines for Providing Geological and Geophysical, Hazards, and Archaeological Information* pursuant to 30 CFR part 585).

The archaeological analysis shall identify and analyze all magnetic and side-scan sonar anomalies that occur in each cable corridor, defined by a lateral distance of 0.5 kilometer on each side of the proposed cable route. This analysis shall not be limited to side-scan and magnetometer data and may include shallow acoustic (subbottom) data as well as autonomous underwater vehicle and multibeam data that may have a bearing on identification of anomalies representative of potential historic properties. The analysis shall include evaluation to the extent possible of the potential significance of each anomaly that cannot be avoided within the cable corridor. If sufficient data are not available to identify the anomaly and make a recommendation of potential significance, the resource(s) shall be considered as potentially eligible for listing in the NRHP and CRHR and treated as a historic property.

If any cultural resources are discovered as the result of the marine remote sensing archaeological survey, the proposed cable route or installation procedures shall be modified to avoid the potentially historic property. BOEM administratively treats identified submerged potentially historic properties as eligible for inclusion in the NRHP under Criterion D and requires project proponents to avoid them unless the proponent chooses to conduct additional investigations to confirm or refute their qualifying characteristics. BOEM typically determines a buffer (e.g., 164 feet from the center point of any given find beyond which the project must be moved, in order to ensure that adverse effects on the potential historic property will be avoided during construction).

MM CUL-5: Prepare and Implement an Avoidance Plan for Marine Archaeological Resources. An avoidance plan shall be developed and implemented to avoid all documented resources from the Marine Archaeological Resources Assessment Report and the Offshore Historic Shipwreck Survey Report, address discoveries of as yet unidentified resources encountered during the planned marine survey and construction, and provide mitigation monitoring if deemed necessary during construction to ensure compliance.

c) Disturb any human remains, including those interred outside of formal cemeteries?

Less than Significant with Mitigation.

All Project Components

No human remains are known to be in or near the Project area. However, the possibility always exists that unmarked burials may be unearthed during subsurface construction activities. Consequently, there is the potential for the Project to disturb human remains during construction, including those outside of formal cemeteries. This impact is considered potentially significant but would be reduced to a less than significant level by implementing **MM CUL-6/TCR-3.**

MM CUL-6/TCR-3: Unanticipated Discovery of Human Remains. If human remains, including Native American remains or burials are encountered, all provisions provided in California Health and Safety Code section 7050.5 and Pub. Resources Code § section 5097.98 shall be followed. Work shall stop within 100 feet of the discovery, and both the archaeologist retained by the Applicant and CSLC staff must be contacted within 24 hours. The archaeologist shall consult with the County Coroner. If human remains are of Native American origin, the County Coroner shall notify the Native American Heritage Commission (see at http://www.nahc.ca.gov/profguide.html) within 24 hours of this determination, and a Most Likely Descendent shall be identified. No work is to proceed in the discovery area until consultation is complete and procedures to avoid or recover the remains have been implemented.

3.5.4 Mitigation Summary

Implementation of the following mitigation measures would reduce the potential for Project-related impacts on cultural resources to a less than significant level; the CUL/TCR MMs apply to both cultural resources and tribal cultural resources:

- MM CUL-1/TCR-1: Discovery of Previously Unknown Cultural or Tribal Cultural Resources
- MM CUL-2/TCR-2: Cultural Resources Contractor Awareness Training
- MM CUL-3: Conduct a Pre-Construction Offshore Archaeological Resources Survey
- MM CUL-4: Conduct a Pre-Construction Offshore Historic Shipwreck Survey
- MM CUL-5: Prepare and Implement an Avoidance Plan for Marine Archaeological Resources
- MM CUL-6/TCR-3: Unanticipated Discovery of Human Remains

3.6 CULTURAL RESOURCES – TRIBAL

CULTURAL RESOURCES – TRIBAL: 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:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1, subdivision (k), or	☐	☒	☐	☐
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

3.6.1 Environmental Setting

3.6.1.1 Ethnographic Context

The Project area falls within the ethnographic territory of the Wiyot Tribe. For his 1918 publication, *Ethnogeography and Archaeology of the Wiyot Territory* (Loud 1918), anthropologist Llewellyn Loud interviewed the Wiyot Tribe members and the European American settlers, which ultimately led him to document Wiyot cultural practices as well as 172 archaeological and active cultural sites in Wiyot Tribal lands. None of Loud's sites are located within the Project. Additionally, Loud conducted an archaeological excavation of the Wiyot village of Tuluwat (CA-HUM-67), work which was continued by successive researchers through the 1940s. Another academic resource is Elsasser's Wiyot chapter in the *Handbook of North American Indians Volume 8*, which synthesizes Elsasser's ethnographic work and that of many others (Elsasser 1978). This ethnographic context is largely adapted from these volumes.

The Wiyot are one of two groups of Algic language stock; the neighboring Yurok are also Algic speakers with the languages having diverged in the fairly distant past. The Algic language group, and likely the Wiyot and Yurok by extension, are distantly related to the Algonquian people of eastern North America (Shipley 1978).The following is excerpted from the Wiyot Tribe's official website describing a brief history of the Tribe (Wiyot Tribe 2020):

> "Wiyot people have lived in the Humboldt Bay region for thousands of years. The North Coast of California is rich with abundant terrestrial, riverine, estuarine, and marine resources.
>
> Wiyot people lived in permanent villages along the waterways which also served as travel and trade routes. Seasonal camps were made on the tribal lands and prairies, and mountainous regions provided berries, acorns, pine nuts, wild game, and basketry materials.
>
> Wiyot people actively managed their resources, burning for open grasslands, cultivating edible bulbs, and following strict hunting and fishing protocols."

Loud's ethnographic and archaeological work suggest that principal subsistence plants included gray pine and other acorn-producing pines, huckleberry, seed-producing grasses, and bulbs such as *Brodiaea coronaria* or "Indian potato" (Loud 1918). Mammals hunted by the Wiyot included elk, deer, Pacific harbor seal, Steller sea lion, whale, and sea otter. Loud characterizes Wiyot hunting technique and technology as focused on trapping over bow-and-arrow hunting. Numerous bird species were important to the Wiyot, but subsistence activities were focused on waterfowl, including ducks, geese, mud-hens, swans, cranes, pelicans, gulls, and cormorants (Loud 1918).

Salmon was by far the most important fish species for subsistence to the Wiyot, but other important species included sturgeon, smelt, and sardine. Shellfish including clams, cockles, snails, and abalone also were commonly gathered in the same areas where ocean fishing was conducted (Loud 1918).

Known Wiyot villages of the ethnographic period are clustered along the Mad River near the northern extent of their territory and along the Eel River near the southern extent of their territory, with a scattering of smaller villages along the coast and along smaller rivers and tributaries (Elsasser 1978). Elsasser noted a number of villages located along the coastline that were abandoned before the ethnographic period. The Project area is located near some of these known archaeological village sites on the Samoa Peninsula between Humboldt and Arcata Bay (Elsasser 1978, Figure 1). Wiyot villages would likely contain rectangular dwellings and a large, singular sweathouse used for both recreation and ceremonies. In Elsasser's view, the Wiyot like most other northwestern California tribes, had no formal tribal organization or clan system. Descent among the Wiyot was patrilineal, and residence after marriage was typically patrilocal. Of primary importance to Wiyot religious life and ritual, Elsasser wrote that the practice of "World Renewal" or the "Big Time;" other religious practices were smaller affairs and included the practice of employing shamans to cure diseases caused by soul loss and breaches of taboo, and performance of small ritual dances (Elsasser 1978).

The Wiyot were largely dispossessed of their land and displaced between the late 1800s and the mid-1900s. These began with individual shootings of Wiyot Tribal people around 1852 and evolved into full-on massacres of the Wiyot Tribe, such as the massacre of a group near Gunther Island in 1860. As many as 50-250 individuals were killed as part of this massacre (Elsasser 1978). In the early 1900s, the Table Bluff Ranchería of Wiyot Indians was formed to house the remaining, and now largely homeless, population of Wiyot Indians. The legal status of this Tribe was terminated by the California Ranchería Act of 1961; but following a successful lawsuit against the federal government, the legal status of the Table Bluff Tribe of Wiyot was restored. Today, the Tribe consists of over 600 members and is active in the preservation of the Wiyot language and lifeways (Wiyot Tribe 2020).

3.6.1.2 Tribal Coordination

Pursuant to Executive Order B-10-11 concerning coordination with tribal governments in public decision making (Appendix A), the CSLC adopted a Tribal Consultation Policy in August 2016 to provide guidance and consistency in its interactions with California Native American Tribes (CSLC 2016). The Tribal Consultation Policy, which was developed in collaboration with tribes, other state agencies and departments, and the Governor's Tribal Advisor, recognizes that tribes have a connection to areas that may be affected by CSLC actions and "that these Tribes and their members have unique and valuable knowledge and practices for conserving and using these resources sustainably" (CSLC 2016).

Under AB 52, lead agencies must avoid damaging effects on tribal cultural resources, when feasible, whether consultation occurred or is required. The CSLC contacted the Native American Heritage Commission (NAHC), which maintains two databases to assist specialists in identifying cultural resources of concern to California Native Americans (Sacred Lands File and Native American Contacts). A request was sent to the NAHC for a sacred lands file search of the Project area and a list of Native American representatives who may be able to provide information about resources of concern located within or adjacent to the Project area.

On June 1, 2020, the NAHC responded to the CSLC request with a list of seven tribal contacts associated with these four tribes:

- Bear River Band of Rohnerville Ranchería
- Blue Lake Ranchería
- Cher-Ae Heights Indian Community of the Trinidad Ranchería
- Wiyot Tribe

The NAHC's reply from June 1, 2020, also stated that no records were identified in the Sacred Lands File record search for the Project area.

On July 15, 2020, CSLC staff provided CEQA notice of the Project to all tribes on the NAHC list. In addition to CEQA notice letters, the CSLC staff sent out notification of consultation AB 52 letter~~s~~ to the Blue Lake Ranchería who had previously requested to be notified of CSLC projects.

~~Two~~ One response~~s~~ was~~were~~ received from the AB 52 invitation letter~~s~~ and two~~one~~ responses were received from CEQA outreach letters. To date, no response has been received from the Cher-Ae Heights Indian Community of the Trinidad Ranchería. On August 7, 2020, Janet P. Eidsness, Tribal Historic Preservation Officer for the Blue Lake Ranchería, responded to the AB 52 invitation letter, declining the invitation to consult further on the Project. Ms. Eidsness stated she was not aware of any known tribal or other cultural resources in the area of the Project. She also stated that the area has a low archaeological sensitivity as the dune field has been greatly modified in the past. She did provide an inadvertent archaeological discovery protocol that has been incorporated into **MM CUL-1/TCR-1** and **MM CUL-6/TCR-3**.

Two responses were received from the CEQA outreach letters. One was o~~O~~n August 13, 2020, from Ted Hernandez, Chairman/Cultural Director of the Wiyot Tribe, replied to the ~~AB 52 invitation~~ CEQA outreach letter, stating that he concurred with the Blue Lake Ranchería Tribal Historic Preservation Officer's recommendations for the Project as well as incorporating the inadvertent discovery protocol presented by Ms. Eidsness.

~~One~~ The second response was received ~~as a result of the CEQA outreach letters~~ on September 3, 2020, from Ms. Erika Cooper of the Bear River Band of Rohnerville Ranchería ~~responded via email on September 3, 2020~~, stating that she was not aware of any known resources in the Project area. Ms. Cooper also indicated her agreement with the inadvertent discovery protocol recommendations (MM CUL-1/TCR-1 and MM CUL-6/TCR-3 as seen in Attached Exhibit C) provided by Ms. Eidsness. ~~To date, no response has been received from the Cher-Ae Heights Indian Community of the Trinidad Rancheria.~~

3.6.2 Regulatory Setting

Appendix A contains the federal and state laws and regulations pertaining to Tribal cultural resources relevant to the Project. At the local government level, no goals, policies, or regulations are applicable to this issue area for the Project because of its location and the nature of the activity.

3.6.3 Impact Analysis

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:

(i) Listed or eligible for listing in the California Register of Historical Resources (CRHR), or in a local register of historical resources as defined in Public Resources Code section 5020.1, subdivision (k), or

(ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Less than Significant with Mitigation.

<u>All Project Components</u>

The results from a records search of the NAHC's Sacred Lands Files did not identify any Native American cultural sites within the Project area. The CSLC staff conducted outreach to the tribe who had requested AB 52 notifications for CSLC projects. Three additional tribes listed by the NAHC were sent CEQA outreach letters to seek further information about known tribal cultural resource sites or any other tribal cultural resources in or near the Project area. To avoid potential impacts on tribal cultural resources or mitigate them to less than significant levels, **MM CUL-1/TCR-1**, **MM CUL-2/TCR-2**, and **MM CUL-6/TCR-3** would be implemented (see Section 3.5, *Cultural Resources* for full text).

3.6.4 Mitigation Summary

Implementation of the following mitigation measures would reduce the potential for Project-related impacts on tribal cultural resources to a less than significant level; the CUL/TCR mitigation measures apply to both cultural resources and tribal cultural resources:

- MM CUL-1/TCR-1: Discovery of Previously Unknown Cultural or Tribal Cultural Resources
- MM CUL-2/TCR-2: Cultural Resources Contractor Awareness Training
- MM CUL-6/TCR-3: Unanticipated Discovery of Human Remains

3.7 ENERGY

ENERGY - Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Result in 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?	☐	☐	☐	☒

3.7.1 Environmental Setting

Energy users on the Samoa Peninsula rely on Pacific Gas and Electric Company (PG&E) for electricity. Homes in Samoa do not currently have natural gas service, but many homes have propane tanks, served by AmeriGas. Power is transmitted to Samoa through 115 kilovolts (kV) lines to a PG&E substation located in Fairhaven. Electricity is distributed via private lines, and each structure has its own meter.

3.7.2 Regulatory Setting

Appendix A contains the federal and state laws and regulations pertaining to utilities and service systems relevant to the Project. At the local level, the Humboldt County General Plan does not include any policies applicable to the Project about energy resources.

A local cable owner would be responsible for operation of the marine and terrestrial cable network. These activities are not part of the proposed Project and are part of a separate CEQA analysis. Accordingly, Project operations are not discussed further.

3.7.3 Impact Analysis

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

No Impact.

<u>All Project Components</u>

The Project's use of energy during construction is necessary to provide for improved telecommunications services and is not wasteful or inefficient. No impact would occur.

During construction, the Project would use a variety of terrestrial equipment and marine vessels, including heavy equipment, trucks, cars, and cable-laying and support vessels. The Project encompasses four phases (see Section 2.2.1, *Work Phases*). Most of the energy would be consumed during the first phase from installing the four landing pipes and landing vaults (LVs).Installation of all the landing pipes and LVs in Phase 1 is efficient because there is no need to separately mobilize the construction equipment needed for these activities in future phases. In Phases 2 through 4, most of the energy would be expended laying cable across the ocean floor and pulling cable onshore.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

No Impact.

All Project Components

The Project would not obstruct any state or local plans for renewable energy or energy efficiency; therefore, no impact would occur.

3.7.4 Mitigation Summary

The Project would not affect energy resources; therefore, no mitigation is required.

3.8 GEOLOGY, SOILS, AND PALEONTOLOGICAL RESOURCES

GEOLOGY, SOILS, AND PALEONTOLOGICAL RESOURCES - Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**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 waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐

3.8.1 Environmental Setting

3.8.1.1 Regional Setting

Humboldt County is a relatively hazardous area in terms of land sliding and soil erosion, and an extremely hazardous area in terms of groundshaking and fault rupture. Humboldt County is located within two of the highest of five seismic risk zones specified by the Uniform Building Code. The subducting Gorda and Juan de Fuca Plates form the "Cascadia Subduction Zone," which runs north offshore of Humboldt County, Del Norte

County, Oregon, and Washington. Research shows that this system produced a series of great earthquakes (magnitude 8 to 9) over the last 20,000 years at intervals of 300–500 years. The last great earthquake occurred about 300 years ago. (Humboldt County 2017)

3.8.1.2 Site-Specific Setting

Topography

The Project area is on the Samoa Peninsula between the unincorporated communities of Samoa and Fairhaven, with elevations ranging from sea level to approximately 62 feet above mean sea level. The coastal topography of the Samoa Peninsula is predominantly flat to gently rolling, with dunes on the landward side of the beach.

Geology

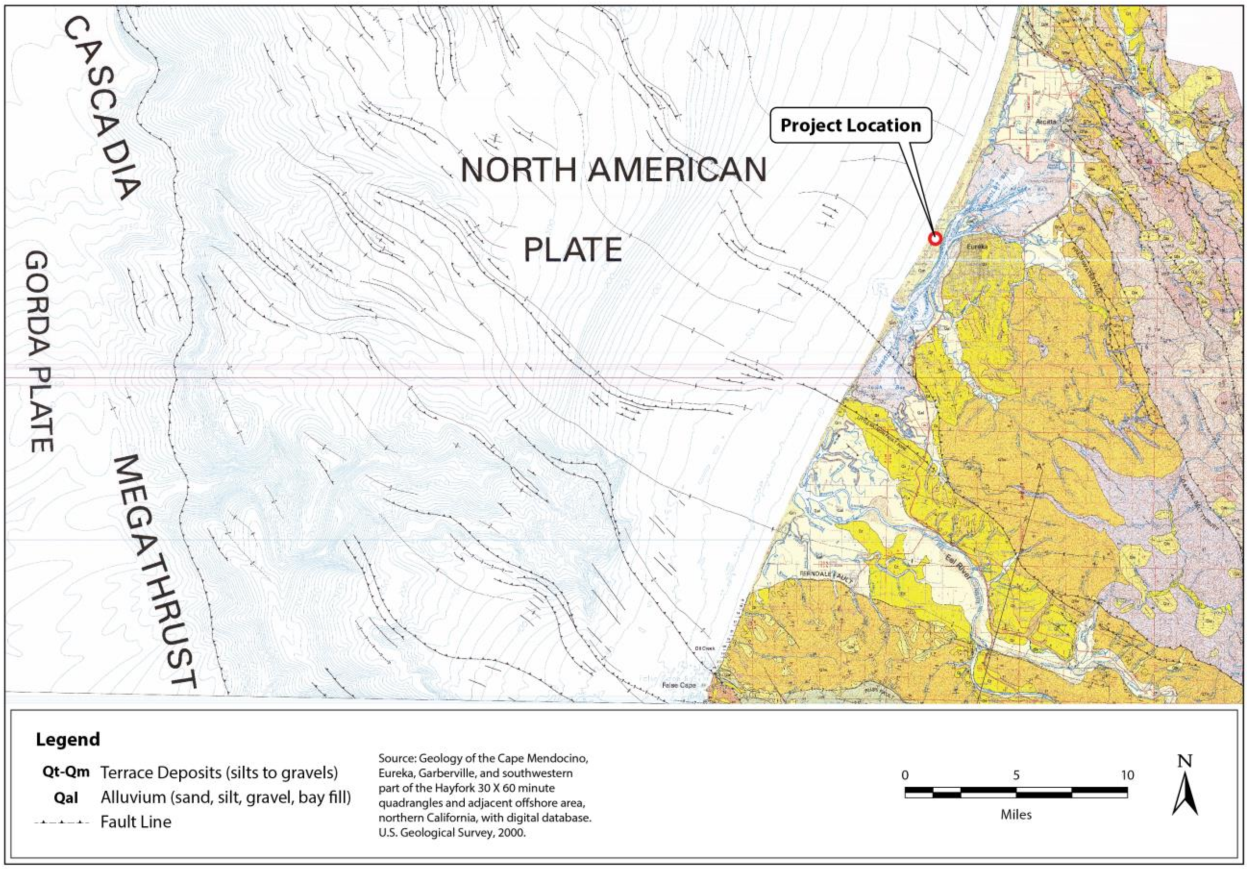
The bedrock geology of the County is divided generally into two provinces: the Klamath Mountains province in the northeast and the Coast Ranges province in the central and southwest portion. The Project area is in the Coast Ranges province. The Coast Ranges province is the dominant geologic province in the County, trending northwest and drained by the Mad, Eel, and Mattole River drainages. The Franciscan and Yager complexes dominate inland, with sand and other alluvial deposits characterizing the lower reaches of the river basins and the area surrounding Humboldt Bay (Figure 3.8-1). (Humboldt County 2017)

Seismicity

Surface Fault Rupture

Surface fault rupture is a particular type of seismic hazard that is specifically addressed by State legislation, the Alquist-Priolo Earthquake Fault Zoning Act. This act generally requires disclosure and avoidance. Humboldt County has a number of fault zones mapped under this law. The County uses a combining zone designation (“G”) to flag these areas where special geologic study is required to identify the precise location of active fault traces to ensure that structures for human occupancy are not placed astride them (Humboldt County 2017). According to Humboldt County’s Web GIS, the Project site is not on an Alquist-Priolo fault (Humboldt County 2020a). The nearest historical quaternary fault is the Little Salmon fault zone approximately 2 miles to the south (Figure 3.8-1). The nearest Alquist-Priolo fault is approximately 5 miles to the south.

Figure 3.8-1. Geologic Map of the Project Area and Vicinity



Liquefaction, Landsliding, and Lateral Spreading

Groundshaking gives rise to two secondary natural hazards, liquefaction and landsliding. Liquefaction involves a sudden loss in strength of a water-saturated soil and results in temporary transformation of the soil into a fluid mass. Recent alluvial floodplain soils and coastal sand deposits exhibit the highest liquefaction hazard. To mitigate this hazard, soils engineering investigations can assess the potential for liquefaction and specify appropriate foundation and building design (Humboldt County 2017). According to Humboldt County's Web GIS, the cable landing site is in an area subject to potential liquefaction (Humboldt County 2020a).

Groundshaking can induce landslides, especially under saturated conditions. Again, soils engineering investigations can evaluate the seismic stability of slopes and prescribe appropriate setbacks. The cable landing site is relatively flat. According to Humboldt County's Web GIS, the Samoa Peninsula is not in an area susceptible to historical landslides, and the cable landing site is on land considered Relatively Stable with slopes primarily less than 15 percent (Humboldt County 2020a).

Lateral spreading is a failure of soil and sediment within a nearly horizontal zone that causes the soil to move toward a free face (such as a streambank or canal) or down a gentle slope. Lateral spreading can occur on slopes as gentle as 0.5 percent. Even a relatively thin seam of liquefiable sediment can create planes of weakness that could result in continuous lateral spreading over large areas (CGS 2008).

Soils

The Samoa Peninsula is made up of typically well-drained soils (coarse sands) and topographic features that do not require addressing runoff issues. Potential soil concerns in the Project area includes expansive soils. Expansive, or plastic, soils expand and contract with changes in moisture content and can damage buried features, as well as structures. Project site soils consist of Samoa-Clambeach complex, 0- to 50-percent slopes with non-plastic (i.e., non-expansive) properties (NRCS 2020).

The susceptibility of soils to erode in the Project area is mainly related to slope. According to Humboldt County's Web GIS, the cable landing site is on land with 0- to 15-percent slopes (Humboldt County 2020a). As shown in Figure 3.1-2c, the pulp mounds in the Project area came from the former pulp mill east of the cable landing site.

Paleontological Resources

The primary source used to collect information on existing paleontological resources in the Project area was the paleontological database at the University of California, Berkeley. Effects on paleontological resources were analyzed qualitatively, based on professional judgment and the Society of Vertebrate Paleontology's *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* (SVP 2010). These guidelines reflect the accepted standard of care for paleontological resources and identify two key phases in the process for protecting paleontological resources from Project effects:

- Assess the likelihood that the area contains significant nonrenewable paleontological resources that could be directly or indirectly affected, damaged, or destroyed because of the project.
- Formulate and implement measures to mitigate potential adverse effects.

The assessment of paleontological sensitivity is based on the paleontological potential of the stratigraphic units present, the local geology and geomorphology, and other factors relevant to fossil preservation and potential yield. The criteria in the Society's guidelines for determining sensitivity are (1) the potential for a geological unit to yield abundant or significant vertebrate fossils or to yield a few significant fossils, large or small, vertebrate, invertebrate, or paleobotanical remains; and (2) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecological, or stratigraphic data (Table 3.8-1).

Table 3.8-1. Paleontological Sensitivity Ratings

Potential	Definition
High	Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Paleontological potential consists of both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data.
Undetermined	Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources.
Low	Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus, will only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule.
No	Some rock units, such as high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites), have no potential to contain significant paleontological resources. Rock units with no potential require neither protection nor impact mitigation measures relative to paleontological resources.

Source: SVP 2010

In evaluating a proposed project’s potential to disturb or damage significant paleontological resources, the following factors are considered: first, most vertebrate fossils are rare and therefore are considered important paleontological resources. Second, unlike archaeological sites, which are narrowly defined, paleontological sites are defined by the entire extent (both areal and stratigraphic) of a unit or formation. In other words, once a unit is identified as containing vertebrate fossils, or other rare fossils, the entire unit is a paleontological site (SVP 2010).

According to the Humboldt County General Plan, prehistoric deposits are known to exist within Humboldt County. However, the Project area soils are geologically young and there are no known paleontological resources within the cable landing site (Humboldt County 2017).

3.8.2 Regulatory Setting

Appendix A contains the federal and state laws and regulations pertaining to geology and soils relevant to the Project. At the local level, the County addresses the potential for ground shaking, liquefaction, landslides, and erosion in the Safety Element of its General Plan (Humboldt County 2017).

For the cable landing site, the relevant local hazard mitigation plan relative to geological hazards appears in the Humboldt Bay Area Plan (HBAP) of the Humboldt County LCP (Humboldt County 2014). As stated within the HBAP, sections marked *** contain relevant Coastal Act policies that also have been enacted as County policy. The pertinent section follows:

Section 3.17 (Hazards) states in part:

> *** 30253. New Development shall:
>
> 1. Minimize risks to life and property in areas of high geologic, flood and fire hazard.
> 2. Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding areas or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

Section A of the HBAP addresses “Planned Uses.” The hazard policies apply to all new development within the planning area. For the most part these policies have been extracted from Humboldt County’s adopted Seismic Safety Element.

The only area with any significant instability problem planned for more intense development is on Humboldt Hill, east of Highway 101, which is classified as an area of “moderate instability,” according to County seismic safety maps. Another significant hazard to development within most of the agricultural lands and along both the North and South Spits is liquefaction. Much of this same area is also within the limit of the 100-year floodplain and is in an area of potential tsunami runup. Maps of slope stability hazards are included in Appendix D of the Humboldt County LCP and are referenced in policies from the Seismic Safety element of the General Plan, which are reiterated below. The numerical index on these maps indicate relative slope stability and are to be used with the risk rating matrix in Appendix C of the Humboldt County LCP. The risk rating matrix indicates where a site investigation would be required prior to issuance of a development permit (see Development Policy 2 below). The Project is not included on the list of building/land use types in the risk rating matrix.

Section B of the HBAP addresses “Development Policies,” as quoted below.

> 1. New development shall be consistent with the adopted Humboldt County Safety and Seismic Safety element of the General Plan. Of particular interest, when siting new development, the Natural Hazards/Land Use Risk Rating Matrix on Figure 3-5, Section 3300 of Vol. 1 should be used in conjunction with Plate III. Plate III is a map delineating seismic zones relating to earthquake shaking as well as land stability and other natural hazard conformation.

2. The County shall amend Chapter 70, Section 7006, of the Uniform Building Code to require soil engineering and geological engineering investigations, prepared by a registered geologist or by a professional civil engineer with experience in soil mechanics or foundation engineering, or by a certified engineering geologist, for classes of development and hazard areas as shown in Table 1 and Plate III and DNOD maps as attached (See Appendices C, D & E).
   a. The report should consider, describe and analyze the following.
      (1) Cliff geometry and site topography, extending the surveying work beyond the site as needed to depict unusual geomorphic conditions that might affect the site;
      (2) Historic, current and foreseeable cliff erosion, including investigation of recorded land surveys and tax assessment records in addition to the use of historic maps and photographs where available and possible changes in shore configuration and sand transport;
      (3) Geologic conditions, including soil, sediment and rock types and characteristics in addition to structural features, such as bedding, joint and faults;
      (4) Evidence of past or potential landslide conditions, the implications of such conditions for the proposed development, and the potential effects of the development on landslide activity;
      (5) Impact of construction activity on the stability of the site and adjacent area;
      (6) Ground and surface water conditions and variations, including hydrologic changes caused by the development (i.e. introduction of sewage effluent and irrigation water to the ground water system; alterations in surface drainage);
      (7) Potential erodibility of site and mitigating measures to be used to ensure minimized erosion problems during and after construction (i.e. landscaping and drainage design);
      (8) Effects of marine erosion on seacliffs;
      (9) Potential effects of seismic forces resulting from a maximum credible earthquake;
      (10) Any other factors that might affect slope stability.
   b. The report should evaluate the off-site impacts of development (e.g., development contributing to geological instability on access roads) and the additional impacts that might occur due to the proposed development (e.g., increased soil moisture from a septic system). The report should also detail

mitigation measures for any potential impacts and should outline alternative solutions. The report should express a professional opinion as to whether the project can be designed so that it will neither be subject to nor contribute to significant geologic instability throughout the lifespan of the project. The report should use a currently acceptable engineering stability analysis method and should also describe the degree of uncertainty of analytical results due to assumptions and unknowns. The degree of analysis required should be appropriate to the degree of potential risk presented by the site and the proposed project.

c. The developments permitted in the hazard areas shall be sited and designed to assure stability and structural integrity for their expected economic life spans while minimizing alteration of natural landforms. Bluff and cliff developments (including related storm runoff, foot traffic, site preparation, construction activity, irrigation, waste water disposal and other activities and facilities accompanying such development) shall not create or contribute significantly to problems of erosion or geologic instability on the site or on surrounding geologically hazardous areas.

d. Alteration of cliffs and bluff tops, faces, or bases by excavation or other means shall be minimized. Cliff retaining walls shall be allowed only to stabilize slopes.

3. Tsunamis–New development below the level of the 100 year tsunami run-up elevation described in Tsunami Predictions for the West Coast of the Continental United States (Technical Report H-78-26 by the Corps of Engineers) shall be limited to public access, boating, public recreation facilities, agriculture, wildlife management, habitat restoration, and ocean intakes, outfalls, and pipelines, and dredge spoils disposal. New subdivisions or development projects which could result in one or more additional dwelling units within a potential tsunami run-up area shall require submission of a tsunami vulnerability report which provides a site-specific prediction of tsunami run-up elevation resultant from a local Cascadia subduction zone major earthquake.

3.8.3 Impact Analysis

The evaluation of the geology, seismicity, soils, and paleontological impacts in this section is based on information from published maps, reports, and other documents that describe the geologic, seismic, soil, and paleontological conditions of the Project area and vicinity, and on professional judgment. The analysis assumes that the Project would conform to the latest California Building Standards Code, the seismic safety standards of the County General Plan and LCP, and National Pollutant Discharge Elimination System (NPDES) requirements.

Project components that could cause impacts related to geology, seismicity, soils, and paleontology are above ground and below ground terrestrial construction, such as minor grading for the cable landing site, excavating for the LVs, HDD to install the landing pipes, and the presence of Project features that could be damaged.

In accordance with CEQA, this analysis addresses the potential impacts of the Project on the environment; it does not address the potential impact that the environment could inflict on the Project. As stated by the California Supreme Court, “agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future users or residents. But when a proposed project risks exacerbating those environmental hazards or conditions that already exist, an agency must analyze the potential impact of such hazards on future residents or users.” (*California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369, 386).

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?

Less than Significant Impact.

<u>All Project Components</u>

According Humboldt County’s Web GIS website, no Alquist-Priolo Fault Zones or other active or potentially active faults with the potential for surface fault rupture are known to pass directly under or near the cable landing site (Humboldt County 2020a) (Figure 3.8-1). Therefore, the restrictions of the California Alquist-Priolo Earthquake Fault Zoning Act do not apply to the Project. The Project does not include construction of a structure for human occupation. The HDD activities would not be sufficiently strong to trigger an earthquake, liquefaction, or landslides. Because HDD would not affect the dunes since it would be well under the dunes, it would not trigger erosion or landslides.

A Coastal Development Permit would be necessary for Project approval, and its requirements may supplement the requirements of the California Building Standards Code with respect to standard engineering practices and design criteria relative to seismic and geologic hazards. Additionally, the engineers would provide detailed engineering drawings as part of the permit conditions with a supporting site-specific geotechnical report and calculations before HDD operations. These drawings would depict the horizontal and vertical alignment best fitting the site conditions based on the site-specific geotechnical report.

b) Result in substantial soil erosion or the loss of topsoil?

Less than Significant Impact.

All Project Components

The Project area is underlain by loose dune sand with a high erosion potential. Because the cable landing site is relatively flat, the potential for Project components to generate erosion, even in loose dune sands, is relatively low. All construction activities would occur on or well below unpaved surfaces and would not result in substantial soil erosion or loss of topsoil. The bore pits for the landing pipes would be expanded to accommodate installation of the LVs. Topsoil from the expanded bore pits would be stockpiled during LV installation and used to restore the cable landing site. These underground facilities would not cause erosion. Therefore, the Project's potential impact on soil erosion would be less than significant.

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?

Less than Significant Impact.

All Project Components

The cable landing site is located on a low-gradient, sand-covered coastal peninsula. Although liquefaction is a potential hazard during strong seismic shaking, the area is not subject to "unstable" soils that would be affected by the Project. Nor would the Project alter soil conditions such that previously "stable" soils become "unstable." The HDD construction method does not involve strong vibration activities, such as pile driving, that would result in liquefaction or subsidence. The scale and type of HDD construction method used to install the four landing pipes would lessen the potential risks associated with lateral spread and subsidence because this method would avoid impacts on the surface area of the shore and surf zone. Before HDD operations would commence, the engineers would provide detailed engineering drawings with a supporting site-specific geotechnical report and calculations to CSLC staff and regulatory agency staff for their review (as described in **MM BIO-7**). These drawings would depict the horizontal and vertical alignment best fitting the site conditions based on the site-specific geotechnical report.

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?

No Impact.

All Project Components

The cable landing site is underlain by sandy soils that are not associated with the potential for soil expansion. Geotechnical testing of soils from the Samoa Peninsula have not identified soils subject to potential expansivity (GHD 2019). Therefore, there would be no impact.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

No Impact.

All Project Components

The Project does not include the use of septic tanks or alternative wastewater disposal systems, such as leach fields. Therefore, there would be no impact.

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less than Significant Impact.

All Project Components

Excavation during Project construction could damage paleontological resources by physically disturbing or damaging (e.g., crushing) them or by removing them from their stratigraphic context. The factors that determine the potential to damage paleontological resources are the paleontological sensitivity of the unit and the depth and extent of excavation. Because Project area soils are geologically young, terrestrial HDD is relatively shallow, and the construction footprint is small, the potential for impacts on paleontological resources is considered less than significant.

3.8.4 Mitigation Summary

The Project would not result in significant impacts on geology, soils, or paleontological resources; therefore, no mitigation is required.

3.9 GREENHOUSE GAS EMISSIONS

GREENHOUSE GAS EMISSIONS - Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**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?	☐	☐	☒	☐

3.9.1 Environmental Setting

A *greenhouse gas* is defined as any gas that absorbs infrared radiation in the atmosphere. These gases include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. These GHGs lead to the trapping and buildup of heat in the atmosphere near the earth's surface, commonly known as the *greenhouse effect*. There is overwhelming scientific consensus that human-related emissions of GHGs above natural levels have contributed significantly to global climate change by increasing the concentrations of the gases responsible for the greenhouse effect, which causes atmospheric warming above natural conditions.

According to NOAA, the atmospheric concentration of CO_2 measured at Mauna Loa, Hawaii in June 2020 was 416 ppm (NOAA 2020a) compared to the pre-industrial levels of 280 ppm +/- 20 ppm (IPCC 2007). The NOAA Mauna Loa data also show that the mean annual CO_2 concentration growth rate is accelerating. In the 1960s, it was about 0.9 ppm per year; in the first decade of the 2000s, the average annual concentration was 2.0 ppm per year; and in the last 3 years (2016 to 2019), the average annual concentration was 2.4 ppm (NOAA 2020b). Because GHG emissions are known to increase atmospheric concentrations of GHGs, and increased GHG concentrations in the atmosphere exacerbate global warming, a project that adds to the atmospheric load of GHGs adds to the problem. To avoid disruptive and potentially catastrophic climate change, annual GHG emissions not only must be stabilized but also must be substantially reduced. The impact on climate change from the increase in ambient concentrations of GHGs differs from criteria pollutants (Section 3.3, *Air Quality*) in that GHG emissions from a specific project do not cause direct, adverse, localized human health effects. Rather, the direct environmental effect of GHG emissions is the cumulative effect of an overall increase in global temperatures, which in turn has numerous indirect effects on the environment and humans.

The Intergovernmental Panel on Climate Change completed a Fifth Assessment Report in 2014 that contains information on the state of scientific, technical, and socioeconomic knowledge about climate change. The Fifth Assessment Report includes working group reports on basics of the science, potential impacts and vulnerability, and mitigation strategies.[30] Global climate change has caused physical, social, and economic impacts in California (e.g., land surface and ocean warming; decreasing snow and ice; rising sea levels; increased frequency and intensity of droughts, storms, and floods; and increased rates of coastal erosion). In its *Climate Change 2014 Synthesis Report* (IPCC 2014), which is part of the Fifth Assessment Report, the Panel notes:

> Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems. Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen.

Although modeling indicates that climate change will occur globally and regionally, uncertainty remains about characterizing the precise local climate characteristics and predicting precisely how various ecological and social systems will react to any changes in the existing climate at the local level. Regardless of this uncertainty, it is widely understood that some degree of climate change is expected because of past and future GHG emissions.

The potential of a gas or aerosol to trap heat in the atmosphere is called its *global warming potential* (GWP). The GWP of different GHGs varies because they absorb different amounts of heat. CO_2, the most ubiquitous GHG, is used to relate the amount of heat absorbed to the amount of the gas emissions; this is referred to as the *CO_2 equivalent* (CO_2e). The CO_2e is the amount of GHG emitted multiplied by the GWP. The GWP of CO_2, as the reference GHG, is 1. CH_4 has a GWP of 25; therefore, 1 pound of methane equates to 25 pounds of CO_2e. Table 3.9-1 provides a range of gases with GWP over a 100-year timeframe and their estimated lifetime in the atmosphere.

Table 3.9-1. Lifetimes and Global Warming Potentials of Key Greenhouse Gases

Greenhouse Gas	100-Year Global Warming Potential (average)	Life in Atmosphere (years)
Carbon dioxide (CO_2)	1	50–200
Methane (CH_4)	25	12
Nitrous oxide (N_2O)	298	114
Hydrofluorocarbons	124 to 14,800	1 to 270
Perfluorocarbons	7,390 to 12,200	3,200 to 50,000
Sulfur hexafluoride	22,800	3,200

Source: CARB 2020e

[30] For additional information on the Fifth Assessment Report, see https://www.ipcc.ch/report/ar5/.

3.9.1.1 Emission Inventories and Projections

A GHG inventory is a quantification of all GHG emissions and sinks[31] within a selected physical or economic boundary. Table 3.9-2 outlines the most recent global, national, statewide, and local GHG inventories to provide context for the magnitude of Project emissions.

Table 3.9-2. Global, National, State, and Local Greenhouse Gas Emissions Inventories

Emissions Inventory	CO_2e (metric tons)
2010 Intergovernmental Panel on Climate Change global GHG emissions inventory	52,000,000,000
2018 U.S. Environmental Protection Agency national GHG emissions inventory	6,677,000,000
2017 California Air Resources Board state GHG emissions inventory	424,100,000
2015 Humboldt County GHG emissions inventory	822,509

Sources: IPCC 2014; EPA 2020c; CARB 2020f; Humboldt County n.d.
Terms:
CO_2e = carbon dioxide equivalent
GHG = greenhouse gas

3.9.1.2 National Inventory

The primary source of GHG in the United States is energy-use related activities, which include fuel combustion and energy production, transmission, storage, and distribution. The electricity and transportation sectors generated 55 percent of the total U.S. emissions in 2018 (transportation representing 28 percent of total emissions, and electricity 27 percent), with CO_2 being the primary GHG (81 percent of total emissions). The United States, which has about 4.3 percent of the global population, emits roughly 13 percent of all global GHG emissions (Table 3.9-2).

3.9.1.3 State Inventory

California has approximately 0.53 percent of the global population and emits less than 0.85 percent of the total global GHG emissions, which is approximately 40 percent lower per capita than the overall U.S. average. Despite growing population and gross domestic product, GHG emissions in California continue to decrease, as do emissions per capita (per capita emissions have dropped from a 2001 peak of 14.1 metric tons to 10.7 metric tons in 2017), exhibiting a major decline in the "carbon intensity" of California's overall economy (CARB 2019a). The transportation sector remains responsible for the largest share of GHG emissions in the 2017 state inventory, accounting for approximately 41 percent of the total. While GHG emissions generated by most sectors have been flat

[31] A *GHG sink* is a process, activity, or mechanism that removes a GHG from the atmosphere.

or decreasing, emissions within the transportation sector have been increasing since 2013. However, the transportation sector saw only a 1-percent increase in emissions in 2017 over 2016 levels, the lowest annual growth rate over the past 4 years (CARB 2019a).

Even though California is aggressively moving to reduce its annual GHG emissions, it already is experiencing the effects of GHG-related climate change, which is a relevant aspect of the environmental setting. A 2018 report entitled *Indicators of Climate Change in California* (OEHHA 2018a) concludes that the changes occurring in California are largely consistent with those observed globally. These climate change indicators show the following:

- Annual average temperatures in California are on the rise, including increases in daily minimum and maximum temperatures.
- Extreme events, including wildfires and heat waves, are more frequent.
- Spring runoff volumes are declining as a result of a diminished snowpack.
- The number of “winter chill hours” crucial for the production of high-value fruit and nut crops, are declining.
- Species are on the move, showing up at different times and locations than previously recorded, including both flora and fauna at higher elevations.

3.9.1.4 Local Inventory

Humboldt County emitted 822,509 metric tons CO_2e in 2005, which is approximately 0.19 percent of the 2017 statewide inventory. The transportation sector was the largest contributor of emissions (54 percent), followed by the stationary combustion and livestock (each 13 percent). Emissions from refrigerants, wastewater treatment, solid waste, industrial sources, and electricity consumption represented approximately 20 percent of total emissions in 2005 (Humboldt County n.d.).

3.9.2 Regulatory Setting

Currently, no overarching federal law specifically relates to climate change or the reduction of GHG emissions. During the Obama administration, the EPA developed regulations under the CAA and adopted the Clean Power Plan. However, on February 9, 2016, the Supreme Court issued a stay of prior regulations, pending litigation. In addition, former EPA Administrator Scott Pruitt signed a measure to repeal the Clean Power Plan. The fate of federal GHG regulations is uncertain, given the current federal administration and the pending deliberations in federal courts.

California has adopted statewide legislation to address various aspects of climate change and mitigation for GHG emissions. Much of this legislation establishes a broad framework for long-term reduction of the state's GHG emissions and for the climate change adaptation program. Of importance are AB 32 and SB 32, which outline the state's GHG emissions reduction goals (i.e., 1990 emissions levels by 2020 and 40 percent below 1990 emissions levels by 2030).

In 2008, CARB adopted the initial AB 32 Scoping Plan that described its approach to meeting the AB 32 goal (CARB 2008). The First Update to the Climate Change Scoping Plan was approved in 2014 and builds on the initial Scoping Plan with new strategies and recommendations (CARB 2014). With enactment of SB 32, CARB prepared a 2017 Climate Change Scoping Plan (2017 Scoping Plan) (CARB 2017). CARB also maintains an online inventory of GHG emissions in California. The most recent inventory, released in 2019, includes emissions from 2000 to 2017 (see Table 3.9-2 for the 2017 inventory results). This inventory is an important companion to the Scoping Plans because it documents the historical emission trends and progress toward meeting the 2020 and 2030 targets, which are 431 million metric tons (MMT) CO_2e and 260 MMTCO_2e, respectively.

To monitor progress in emissions reduction, the 2017 Scoping Plan includes a modeled reference scenario, or "business as usual (BAU) projection that estimates future emissions based on current emissions; expected regulatory implementation; and other technological, social, economic, and behavioral patterns. Prior BAU emissions estimates assisted CARB in demonstrating progress toward meeting the 2020 goal of 431 MMTCO_2e. The 2030 BAU reference scenario was modeled for the 2017 Scoping Plan, representing forecasted state GHG emissions with existing policies and programs but without additional action beyond that to reduce GHGs. This modeling indicates that California is expected to achieve the 2020 target but that a significant increase in the rate of GHG reductions is needed to meet the State's long-term targets (CARB 2019b).

As discussed in Section 3.3, *Air Quality*, the NCUAQMD is responsible for air quality planning within the NCAB. The NCUAQMD has not published CEQA GHG thresholds. In 2011, the NCUAQMD adopted Rule 111, Federal Permitting Requirements for Sources of GHGs, to establish a limit above which federal Title V permitting applies and to establish federally enforceable limits on the potential to emit GHGs for stationary sources. However, unlike their Best Available Control Technology (BACT) emission rates for criteria pollutants established under Rule 110 (see Table 3.3-2 in Section 3.3, *Air Quality*), the NCUAQMD specifically states that these limits are applicable only to stationary sources and should not be used as a threshold of significance (NCUAQMD 2020).

There is no adopted climate action plan for Humboldt County. Humboldt County is in the process of developing a regional plan with local agencies. The climate action plan would explore locally oriented strategies to reduce emissions from vehicle travel, livestock, electricity consumption, and other sources of GHGs (Humboldt County 2020b).

3.9.3 Impact Analysis

The impact analysis includes construction emissions generated by all terrestrial activity and marine vessels operating within 24 nm offshore. While this distance goes beyond the area typically analyzed in CEQA documents (3 nm), CSLC staff has conservatively elected to analyze emissions to 24 nm for consistency with the State's GHG inventory and reduction planning framework (CARB 2017).

The cable owner is responsible for repair and maintenance of the cable. No routine maintenance is planned for the submerged cable network. Monthly inspection trips and routine testing of emergency generators for the terrestrial cable network would be conducted by the local cable provider. These activities are not part of the proposed Project and are part of a separate CEQA analysis. Accordingly, Project operations on land are not discussed further.

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

Less than Significant with Mitigation.

<u>All Project Components</u>

As discussed in Section 3.3, *Air Quality*, construction of the proposed Project would require both terrestrial (e.g., conduit installation) and marine activities. Off-road equipment, on-road vehicles, and marine vessels would emit CO_2, CH_4, and N_2O. Emissions were estimated using the methods described in Appendix B and are summarized in Table 3.9-3. During Phase 1, the majority (53 percent) of emissions would be generated by activities within State waters, with most of those emissions originating from marine vessels within 3 nm offshore (67 percent) and on-road vehicle miles traveled (VMT) (18 percent). The remaining emissions within State waters would be generated by off-road equipment (14 percent).

During Phases 2 through 4, the majority (70 percent) of emissions would be generated by activities outside State waters (i.e., marine vessels operating between 3 and 24 nm offshore). Emissions from marine vessels within 3 nm offshore are expected to generate about 26 percent of total GHGs. Emissions from off-road equipment and on-road vehicles during these later phases would be minor (about 3 percent of total phase emissions).

Table 3.9-3. Estimated Construction Greenhouse Gas Emissions (metric tons)

Phase	Carbon Dioxide (CO_2)	Methane (CH_4)	Nitrous Oxide (N_2O)	Carbon Dioxide Equivalent (CO_2e)
Phase 1				
Off-road equipment	61	<1	<1	61
On-road vehicles	76	<1	<1	79
Marine within 3 nautical miles (nm)	286	<1	<1	290
Marine between 3 and 24 nm	379	<1	<1	384
Phase 2				
Off-road equipment	2	<1	<1	2
On-road vehicles	16	<1	<1	17
Marine within 3 nm	141	<1	<1	143
Marine between 3 and 24 nm	379	<1	<1	384
Phase 3				
Off-road equipment	2	<1	<1	2
On-road vehicles	16	<1	<1	16
Marine within 3 nm	141	<1	<1	143
Marine between 3 and 24 nm	379	<1	<1	384
Phase 4				
Off-road equipment	2	<1	<1	2
On-road vehicles	15	<1	<1	16
Marine within 3 nm	141	<1	<1	143
Marine between 3 and 24 nm	379	<1	<1	384
Total	**2,413**	**<1**	**<1**	**2,451**

For this analysis, because construction is the primary emission source associated with the Project, the CSLC has conservatively determined that any substantial increase in construction-related GHG emissions above net zero would result in a significant impact.

Construction of the Project would generate 2,451 metric tons CO_2e (Table 3.9-3). These emissions would occur only during the brief construction period. However, they would result in a net increase in GHG emissions. This is a potentially significant impact. The CSLC would require the Applicant to implement **MM GHG-1** to completely offset GHG emissions during construction to net zero (2,451 metric tons CO_2e). With implementation of MM GHG-1, the impact would be less than significant.

MM GHG-1: Purchase GHG Carbon Offsets for Construction Emissions. The Applicant shall purchase all offsets prior to groundbreaking and provide copies of the offset retirement verification to the CSLC. The Applicant shall purchase carbon offsets equivalent to the Project's projected GHG emissions (2,451 metric tons CO_2e) to achieve a net zero increase in GHG emissions during the construction phase for emissions within 24 nm (even though only required for within 3 nm) of the California coast.

A *carbon offset* is a credit derived from the reduction of GHG emissions through a separate reduction project, often in a different location from the emission source. To be acceptable for an emissions reduction credit, the carbon offset must be real, permanent, quantifiable, verifiable, enforceable, and additional (per the definition in California Health and Safety Code Sections 38562[d][1] and [2]). Several existing voluntary offset exchanges have been validated by the CARB, including the California Action Reserve Voluntary Offset Registry, American Carbon Registry, and Verified Carbon Standard.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less than Significant Impact.

<u>All Project Components</u>

AB 32 and SB 32 are the State's plans for reducing GHG emissions. The Project's consistency with AB 32 and SB 32 was assessed to determine the significance of this potential impact. The analysis also considers consistency with the State's long-term emissions reduction trajectory (as articulated under Executive Order B-55-18[32]).

AB 32 codifies the State's GHG emissions reduction targets for 2020. The CARB adopted the 2008 Scoping Plan and 2014 first update as a framework for achieving AB 32 (CARB 2008, 2014). The 2008 scoping plan and 2014 first update outlined a series of technologically feasible and cost-effective measures to reduce statewide GHG emissions. In November 2017, CARB adopted the 2017 Scoping Plan as a framework for achieving the 2030 GHG emissions reduction goal described in SB 32 (CARB 2017).

The 2008 and 2014 Scoping Plans indicate that reductions would need to happen from the following sources of GHG emissions:

- Vehicle emissions
- Mileage standards
- Sources of electricity
- Increased energy efficiency at existing facilities
- State and local plans, policies, or regulations to lower carbon emissions, relative to BAU conditions

The 2017 Scoping Plan (CARB 2017) carries forward GHG emissions reduction measures from the 2014 first update as well as new measures to help achieve the State's 2030 target across all sectors of the California economy. The majority of measures target

[32] Executive Order B-55-18 identifies a statewide reduction target of carbon neutrality by 2045.

energy and transportation emissions from commercial and residential development and therefore are not directly applicable to the Project. Measures that expand the transit network and support electric vehicles may reduce emissions from the monthly employee trip to the Project site.

Policies in the 2017 Scoping Plan are State programs (e.g., SB 350) that require no action at the local or project level. The Project does not entail any features or elements that would obstruct implementation of these State programs. Short-term construction emissions would be offset to net zero through implementing **MM GHG-1**. Therefore, the Project would not conflict with achieving the State's adopted GHG reduction goals under AB 32 and SB 32, or its long-term emissions reduction trajectory. This impact is considered less than significant.

3.9.4 Mitigation Summary

Implementation of the following mitigation measure would reduce the potential for Project-related GHG impacts to a less than significant level:

- MM GHG-1: Purchase GHG Carbon Offsets for Construction Emissions

3.10 HAZARDS AND HAZARDOUS MATERIALS

HAZARDS AND HAZARDOUS MATERIALS - Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**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 0.25 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 2 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?	☐	☐	☐	☒

3.10.1 Environmental Setting

3.10.1.1 Project Location and Surroundings

The Project area is located on the Samoa Peninsula between the unincorporated Humboldt County communities of Samoa and Fairhaven. The closest school to the Project site (1.4 miles), Peninsula Union Elementary School, is located at 909 Vance Avenue in Samoa. The closest airport is the public use Samoa Field Airport, approximately 1.6 miles south of the cable landing site. Fire suppression services in the Project vicinity are provided by the Samoa Peninsula Fire Protection District. Law enforcement services are provided by the Humboldt County Sheriff’s Office. The California Highway Patrol is responsible for enforcing traffic laws on roadways within the unincorporated areas and on state highways throughout the County.

3.10.1.2 Online Review

The California Environmental Protection Agency's Cortese List Data Resources website was searched on June 11, 2020. No listings on the Samoa Peninsula pertaining to the Project area were found during the online review of the California Department of Toxic Substances Control Envirostor database (DTSC 2020a). The SWRCB Geotracker site did not identify any active cleanup sites on the Samoa Peninsula (SWRCB 2020a). No sites in Humboldt County were identified on the SWRCB's Sites Identified with Waste Constituents above Hazardous Waste Levels Outside the Waste Management Unit (SWRCB 2020b). Additionally, no sites in Humboldt County are on the California Environmental Protection Agency's list of hazardous waste facilities subject to corrective action pursuant to section 25187.5 of the Health and Safety Code, identified by the California Department of Toxic Substances Control (DTSC 2020b).

The former Samoa Pulp Mill, just east of the cable landing site, is listed on the SWRCB's Cease and Desist Orders and Cleanup and Abatement Orders list (SWRCB 2020c). The Samoa Pulp Mill site was developed in 1964 as a bleached kraft pulp mill by Georgia-Pacific. In 1994, Louisiana-Pacific converted the pulp mill into a chlorine-free operation. Louisiana-Pacific sold the mill in 2001. Several companies have operated the mill after 2001; the most recent company was Evergreen Pulp Incorporated. The mill shut down in October 2008 and has not operated since. Freshwater Pulp Company owned the site beginning in February 2009 and was involved with decommissioning or demolition of various areas of the mill. In August 2013, Freshwater Pulp Company transferred ownership to the Humboldt Bay Harbor Recreation and Conservation District (SHN 2019; EPA 2016b).

In September 2014, EPA completed the removal action of approximately 2.7 million gallons of spent pulping liquors that previously were stored in multiple onsite aboveground storage tanks (SHN 2019; EPA 2016b). Removal of residual sludge from the aboveground storage tanks was completed in June 2016 (SHN 2019; EPA 2016b). As part of the Remedial Action Plan, groundwater testing continues, with no additional cleanup actions reported since 2016 (SWRCB 2020d).

A landfill associated with the former Samoa Pulp Mill is within 100 feet of Project boundaries. The site is described as consisting of 98 percent wood ash, and less than 1 percent each of slaker grits (unreacted lime nodules), pulp rejects, wood chips, and construction debris. According to the Final Closure and Postclosure Maintenance Plan for the mill dated March 1998, the Samoa Ash Disposal Site is a Class III landfill (i.e., a landfill that accepts only non-hazardous waste) operating since 1973. Approximately 100 cubic yards per day of wood ash from the mill's power boiler was disposed at the site through 1991. However, there is no record of what was dumped at the site before 1973.

3.10.2 Regulatory Setting

The term *hazardous material* is defined by the State of California, Health and Safety Code, Chapter 6.95, section 25501(o) as “any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment.” Federal and state laws and regulations pertaining to hazards and hazardous materials that are relevant to the Project are identified in Appendix A. No policies from the Humboldt County LCP are applicable to the Project (Humboldt County 2014).

3.10.3 Impact Analysis

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 0.25 mile of an existing or proposed school?

(a to c) Less than Significant with Mitigation.

All Project Components

The Project would involve routine transport, storage, use, and disposal of small quantities of hazardous materials during construction such as gasoline, diesel, lubricants, and solvents. The use, handling, transportation, storage, and disposal of these hazardous materials (necessary for Project-related work) would be regulated by existing laws and regulations. The Project would not create a health hazard as stated in questions a), b), and c) above. Safe handling of hazardous materials would be considered during all phases of Project construction (terrestrial and marine) to protect the public, school children, Project personnel, and the environment. The closest school is Peninsula Union Elementary School at 909 Vance Avenue in Samoa, which is 1.4 miles away from any Project-related activities (Figure 3.1-1). No aspect of the Project would affect the school.

The Project is not anticipated to emit any hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste. However, as described above, the former Samoa Pulp Mill is within 100 feet of Project boundaries. Therefore, it is possible that site workers, the public, and the environment could be inadvertently exposed to accumulated landfill gases generated by buried waste during Project construction (i.e., vault and trenches) causing significant health and safety hazards. Implementation of **MM HAZ-1**, which includes specifying measures for reducing landfill gases during construction and requiring soil and waste management during construction would reduce the potential for exposure to hazards and hazardous materials to a less than significant level.

Project work vehicles would be refueled offsite. The HDD machine would be refueled by a mobile fuel truck in a designated fueling area (**MM BIO-3**). At the end of construction, all disturbed areas would be returned to their natural state, leaving no potential health hazard.

The offshore vessels and both the offshore and onshore equipment may accidentally release hazardous materials (possible environmental and human exposure) from accidental petroleum (including diesel fuel) spills. Implementing **MM HAZ-1** would avoid potential impacts associated with the accidental release of hazardous substances or reduce them to a less than significant level.

MM HAZ-1 Develop and Implement Spill Contingency and Hazardous Materials Management Plans. At least 30 days before start of construction of the Project ~~construction starts~~, the Applicant shall submit Spill Contingency and Hazardous Materials Management Plans for onshore and offshore operations to the CSLC for review and approval. Prior to construction, the Applicant shall develop and implement the following Plans: ~~se plans that shall include, but not be limited to, procedures to be implemented, specific designation of the onsite person who will be responsible for implementing the Plans, onsite spill response materials/ tools/equipment, and spill notification protocol and procedures~~.

Worker Health and Safety Plan (WHSP)

At least 30 days prior to the start of construction of the Project, the Applicant shall submit to the CSLC a final Worker Health and Safety Plan that has been reviewed and approved by the Humboldt County Division of Environmental Health that addresses measures to minimize risks from landfill gases and potential worker exposure to hazardous materials associated with construction activities at the cable landing site and within 1,000 feet of the Samoa Ash Landfill. The WHSP shall be prepared by a qualified geologist or engineer.

A. The WHSP shall include, at a minimum, measures to:

   i. Address the potential for the presence and migration of landfill gases during construction

   ii. Minimize risks of exposure by construction workers to anticipated hazardous materials (e.g., wood ash), to potential unanticipated waste types (e.g., municipal solid waste), and to potential landfill gas accumulation post-construction by operational and maintenance personnel

   iii. Assure Project stability and structural integrity associated with any incompetent waste fill material that may be present

B. The Applicant shall undertake development in accordance with the approved final WHSP. Any proposed changes to the approved final WHSP shall be reported to the CSLC and Humboldt County Division of Environmental Health. No changes to the approved final WHSP shall occur without written approval from the CSLC and Humboldt County Division of Environmental Health.

Soil and Waste Excavation and Management Plan (SWEMP)

At least 30 days prior to the start of construction of the Project, the Applicant shall submit to the CSLC a final SWEMP that has been reviewed and approved by the Humboldt County Division of Environmental Health. The SWEMP shall address soil and waste management for construction activities at the cable landing site (within 1,000 feet of the Samoa Ash Landfill). The SWEMP shall be prepared by a qualified geologist or engineer.

C. The SWEMP shall include, at a minimum, the following:

   i. A description of the specific locations, methods, and procedures for staging, stockpiling, managing, characterizing, testing, and disposing of soil (including bentonite material), groundwater, and waste material expected to be encountered during construction

   ii. Procedures for managing unanticipated waste types (i.e., municipal solid waste) that may be encountered during construction

   iii. BMPs for odor and dust control, including, but not limited to, measures to reduce the potential for exposure of staged and stockpiled materials to wind and stormwater runoff

   iv. Provisions for characterizing and testing soil, groundwater, and waste material in accordance with California Department of Toxic Substances Control (DTSC) Protocol for Burn Dump Site Investigation and Characterization. Testing should include, at a minimum, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), dioxins/furans, organochlorine pesticides (OCPs), and California Administrative Metals (CAM-17) heavy metals

   v. Provisions for proper waste disposal at authorized facilities capable of receiving the waste(s)

D. The Applicant shall undertake development in accordance with the approved final SWEMP. Any proposed changes to the approved final SWEMP shall be reported to the CSLC and Humboldt County Division of Environmental Health. No changes to the approved final SWEMP shall occur without written approval from the CSLC and Humboldt County Division of Environmental Health.

Spill Contingency and Hazardous Materials Terrestrial Plan (SCHMTP)

~~A.Terrestrial Work:~~ Measures for terrestrial operations shall include, but not be limited to, identifying appropriate fueling and maintenance areas for equipment, a daily equipment inspection schedule, and spill response procedures including maintaining spill response supplies onsite. The SCHMTP could be prepared separately or the elements of the SCHMTP could be included in the Solid Waste Excavation and Management Plan (SWEMP).

The terrestrial SCHMTP~~Plan~~ will identify the actions and notifications to occur if contaminated soil is encountered during onshore excavation. The Applicant shall notify the County of Humboldt Division of Environmental Health within 24 hours of discovering contaminated materials during Project construction activities. Work in the area suspected of contamination shall stop until the notified agencies, together with the Applicant, have determined the next steps.

The terrestrial SCHMTP~~Plans~~ will identify, at a minimum, implementing the following BMPs related to using hazardous substances:

- Follow manufacturer's recommendations on use, storage, and disposal of chemical products used in construction.
- Avoid overtopping construction equipment fuel gas tanks.
- During routine maintenance of construction equipment, properly contain and remove grease and oils.
- Conduct all fueling of equipment at least 100 feet from wetlands and other waterbodies.
- Properly dispose of discarded containers of fuels and other chemicals.
- Maintain a complete list of agencies (with their telephone number) to be notified of potential hazardous material spills, including but not limited to, the CSLC's 24-hour emergency notification number (562) 590-5201 and the California Governor's Office of Emergency Services (Cal OES) contact number (800) 852-7550.

Spill Contingency and Hazardous Materials Offshore Plan (SCHMOP)

~~B.Offshore Work:~~ For offshore activities involving work vessels, the primary work vessel (dive support vessel) will be required to carry onboard a minimum 400 feet of sorbent boom, 5 bales of sorbent pads at least 18-inches by 18-inches square, and a small powered vessel for rapid deployment to contain and clean up any small hazardous material spill or sheen on the water surface. The offshore plan

SCHMOP ~~Plans~~ shall provide for the immediate call out of additional spill containment and clean-up resources in the event of an incident that exceeds the rapid clean-up capability of the onsite work force. These offshore measures may be provided as part of a separate offshore plan (SCHMOP) or combined with the terrestrial plan (SCHMTP) as described above.

Spill response training, including the locations of spill response supplies, would be required as part of the environmental awareness training for personnel in **MM BIO-1**. **MM BIO-3** would require equipment staging and fueling areas to be delineated before construction begins to protect environmentally sensitive areas and resources. Potential impacts stemming from an inadvertent return of drilling fluid (consisting of bentonite and water) and associated mitigation measures are discussed in Section 3.4, *Biological Resources* (**MM BIO-5** and **BIO-7**).

During operations, no aspect of the Project would create a significant hazard to the public or the environment through reasonably foreseeable upset or accident conditions involving the release of hazardous materials; therefore, no impact would occur.

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?

Less Than Significant Impact.

All Project Components

As noted in Section 3.10.1, *Environmental Setting,* the California Environmental Protection Agency's Cortese List Data Resources website was searched on June 11, 2020, for potential hazardous materials and leaking underground storage tank sites in the Project area. No active hazardous materials sites were identified within the Project area during the online review for each of the databases. One site, the Samoa Pulp Mill, is listed as a cleanup program under the SWRCB (SWRCB 2020c). Remediation activities in 2014 removed hazardous materials, and subsequent monitoring has not indicated any further actions. The cable landing site is not located on a site with known hazardous materials. Therefore, impacts associated with hazardous materials sites would be less than significant. **MM HAZ-1** identifies actions to be taken if previously unidentified, potentially hazardous materials are encountered during Project construction.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 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?

No Impact.

All Project Components

The closest airport to the Project site is the public use Samoa Field Airport, approximately 1.6 miles south of the cable landing site. The Samoa Field Airport (formerly called the Eureka Municipal Airport) is owned and operated by the City of Eureka. *The Airport Land Use Compatibility Plan: Humboldt County Airports* does not contain specific policies or compatibility zones for the Samoa Field Airport. There would be no impact because no aspect of the proposed Project would create a safety hazard or excessive noise for people residing or working in the Project area. The Project does not include any structures for human occupation. This question does not apply to the offshore Project components. No impact would occur.

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

No Impact.

All Project Components

The cable landing site would be located on the east side of New Navy Base Road and on the west side of Vance Avenue, in an unoccupied area of the Harbor District within APN 401-112-021 (Figure 1-1). Emergency access along local roadways would be maintained during Project construction, staging, and access activities. Proposed construction activities would occur at the Project site and would not block roads or emergency evacuation routes. The Project would not impair implementation of, or physically interfere with, the *County of Humboldt Emergency Operations Plan* (Humboldt County Sheriff's Office, Office of Emergency Services 2015) because the Project would not alter existing conditions for emergency response either during or after construction. Therefore, no impact would result.

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?

No Impact.

All Project Components

Public Resources Code sections 4201–4204 direct the California Department of Forestry and Fire Protection to map fire hazards within State Responsibility Areas, based on relevant factors such as fuels, terrain, and weather. The Project site is on the Samoa Peninsula between the unincorporated communities of Samoa and Fairhaven, which is in a Local Responsibility Area. Fire suppression services in the Project vicinity are provided by the Samoa Peninsula Fire Protection District; however, a reorganization was approved (by the Humboldt County Local Agency Formation Commission Resolution No. 17-08 [LAFCo 2017]) to reorganize the Samoa Peninsula Fire Protection District into the

Peninsula Community Services District (PCSD). All of the terrestrial Project activity would take place within APN 401-112-021 west of Vance Avenue (Figure 2-1). This area west of Vance Avenue is undeveloped. According to Humboldt County's Web GIS, the Project area is within a Moderate fire hazard severity zone (Humboldt County 2020a). The Project would not require construction crews to traverse wildlands. The Project would not require the use of ignition sources, except for operation of construction vehicles. This question does not apply to the offshore Project components. Because neither people nor structures would be exposed to a significant risk of wildland fire, there would be no impact.

3.10.4 Mitigation Summary

Implementation of the following mitigation measures would reduce the potential for impacts related to hazards and hazardous materials to a less than significant level:

- MM HAZ-1: Develop and Implement Spill Contingency and Hazardous Materials Management Plans
- MM BIO-1: Provide Environmental Awareness Training
- MM BIO-3: Delineate Work Limits to Protect Sensitive Biological Resources
- MM BIO-5: Prepare and Implement an Inadvertent Return Contingency Plan
- MM BIO-7: Implement Best Management Practices for Horizontal Directional Drilling Activities

3.11 HYDROLOGY AND WATER QUALITY

HYDROLOGY AND WATER QUALITY - Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	☐	☒	☐	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒
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 that would:				
i) Result in substantial erosion or siltation on- or offsite;	☐	☒	☐	☐
ii) Substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or offsite;	☐	☒	☐	☐
iii) Create or contribute runoff water that 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?	☐	☐	☐	☒

3.11.1 Environmental Setting

3.11.1.1 Surface Waters

Terrestrial Components

The surface water resources near the terrestrial Project components include the Pacific Ocean to the west and Humboldt Bay to the east (Figure 1-2). Surface drainage is conveyed by ditches. The entire Project area is within the Eureka Plain watershed (Figure 3.11-1). The watershed encompasses Humboldt Bay and the watersheds that drain into Humboldt Bay—primary among them, Jacoby, Freshwater, and Salmon Creeks and Elk River.

The entirety of Humboldt Bay is listed as an impaired water body in the Eureka Plain Hydrologic Unit. Pollutants affecting Humboldt Bay include dioxin toxic equivalents and polychlorinated biphenyls (NCRWQCB 2017) from lumber mill sites in past decades.

Marine Components

Offshore, water transport along the northern portions of the California coast primarily is driven by the California Current. The California Current generally is characterized as a broad, shallow, slow-moving southward current. During winter, the California Current occasionally is displaced by the northward-moving Davidson Current. The nearshore manifestations of the California Current can vary in both speed and direction as winds, tides, and surf conditions can dramatically alter local conditions.

Along the northern coast, northwest winds may blow briefly at any time of year. These winds push the surface waters offshore, allowing cold, nutrient-rich water to rise from the depths, a process called *upwelling*. Upwelling in the California Current is influenced by seasonal changes in the intensity of northwesterly winds. The upwelling season is most pronounced in spring and summer, when northwesterly winds are at their highest of the year. Upwelling is reduced in fall and winter, when winds relax and are more variable (Education Development Center 2017). The discussion above is about normal seasonal upwelling. The Section 5.2, *Commercial and Recreational Fishing,* discusses upwelling specific to commercial and recreational fishing.

3.11.1.2 Groundwater

The near-sea-level ground elevation and influence of tidal waters on the Samoa Peninsula result in a shallow groundwater table, susceptible to further rise in conjunction with fluctuations of sea level (Figure 3.11-1). Groundwater is present at a relatively shallow depth throughout the Project area. Subsurface investigations have encountered groundwater typically within about 10 feet of sea level. Therefore, in low elevation areas south of Samoa, groundwater is expected to occur within the upper 5 to 10 feet of the ground surface. (GHD 2019).

3.11.1.3 Flooding

According to the Federal Emergency Management Agency (FEMA) National Flood Insurance Program flood insurance rate map for Humboldt County, the cable landing site is outside the 100-year and 500-year flood zones (Humboldt County 2020a). The lands west of New Navy Base Road are within the 100-year flood zone. Figure 3.11-1 shows the FEMA flood zones in the Project area.

3.11.1.4 Tsunami Inundation

The Project area is located in a low-lying coastal setting directly onshore of an active subduction zone (Cascadia Subduction Zone) capable of generating very large magnitude earthquakes (Figure 3.8-1). Earthquakes along subduction zones historically have been one of the principal sources of tsunami generation. Significant geologic evidence along the coast of much of the Pacific Northwest documents the occurrence and effects of past tsunamis. In addition, there is local geologic evidence of past tsunamis, in the form of clean sand layers (interpreted as a tsunami deposit) that bury coastal wetlands surrounding Humboldt Bay (GHD 2019).

Much of the low-lying Samoa Peninsula is subject to tsunami inundation and is at substantial risk in the event of a large, locally generated tsunami event. Other than isolated high dunes northwest of the town of Samoa, the entire Samoa Peninsula typically is modeled as being subject to inundation during moderate to large tsunami events. A tsunami that inundates the Samoa Peninsula would result in catastrophic conditions over the entire Project area. The arrival time of a near-source tsunami generally is understood to be short, due to the small site-to-source distance. On the Samoa Peninsula, tsunami signs indicate where one is “entering” or “leaving” a tsunami inundation area and point to an established “Tsunami Evacuation Zone”, which is inland approximately 1.5 miles from the Project site and varies in distance along the coast (GHD 2019).

3.11.2 Regulatory Setting

Appendix A contains the federal and state laws and regulations pertaining to hydrology and water quality relevant to the Project. At the local level, the County’s Humboldt Bay Area Plan (HBAP) of the LCP discusses the potential for concerns related to water quality, flooding, and erosion. As stated within the HBAP, sections marked *** contain relevant Coastal Act policies that also have been enacted as County policy. The pertinent section follows:

Section 3.17 (Hazards) states in part:

> *** 30253. New Development shall:
>
> 1. Minimize risks to life and property in areas of high geologic, flood and fire hazard.
> 2. Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding areas. The tsunami hazard policy in the Humboldt Bay Area Plan was amended in 2012 to prohibit new habitable living space below the predicted tsunami run-up elevation calculated at maximum tide plus a minimum of three (3) feet to account for future sea level rise and one foot of freeboard

space, as well as other measures to reduce tsunami hazard (Section 3.17[B][3)].

Section 3.17 (Hazards, Development Policies) states in part:

3. Tsunamis–New development below the level of the 100 year tsunami run-up elevation described in Tsunami Predictions for the West Coast of the Continental United States (Technical Report H-78-26 by the Corps of Engineers) shall be limited to public access, boating, public recreation facilities, agriculture, wildlife management, habitat restoration, and ocean intakes, outfalls, and pipelines, and dredge spoils disposal. New subdivisions or development projects which could result in one or more additional dwelling units within a potential tsunami run-up area shall require submission of a tsunami vulnerability report which provides a site-specific prediction of tsunami run-up elevation resultant from a local Cascadia subduction zone major earthquake.

4. Flood Plains–No critical facilities should be permitted to locate within the 100 year flood plain. Utility lines may cross hazard zones if there is no reasonable alternative and provisions are made to mitigate the hazard. Non-critical facilities should be permitted in the 100 year flood plain only if adequate flood control measures, such as control works, compact fill, etc., that would result in a site being beyond or above the 100 year flood extend, are provided. Further, the County will continue to review development in light of and impose conditions consistent with the National Flood Insurance Program.

Section 3.30(B) (Natural Resources Protection Policies and Standards, Development Policies) states in part:

8. Coastal Streams, Riparian Vegetation And Marine Resources

*** 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 waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

Figure 3.11-1. FEMA Flood Zones and Groundwater Basin

3.11.3 Impact Analysis

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

Less than Significant with Mitigation.

<u>All Project Components</u>

Construction activities associated with the proposed Project include ground-disturbing activities such as HDD, backfilling, and minor grading. Ground-disturbing activities and runoff from work areas could cause soil erosion and sedimentation, reducing water quality in adjacent wetlands (Figure 3.4-2). Potential impacts on water quality are related to sediment and sediment-bound pollutants that may be mobilized into drainage structures or other waterbodies. Additionally, hazardous materials (e.g., gasoline, oils, grease, and lubricants) from construction equipment could be released accidentally during construction. Accidental discharge of hazardous materials to surface waters during construction could temporarily adversely affect water quality or result in a violation of water quality standards. Contaminants from construction vehicles and equipment and sediment from soil erosion could increase the pollutant load in runoff being transported to receiving waters. **MM BIO-5** (preparing and implementing an Inadvertent Return Contingency Plan) and **MM BIO-7** (implementing BMPs for HDD activities) would reduce these potential impacts to less than significant levels. Erosion control BMPs would include source control measures such as wetting of dry and dusty surfaces to prevent fugitive dust emissions; preserving existing vegetation; and using effective soil cover (e.g., geotextiles, straw mulch, and hydroseeding) for inactive areas and finished slopes to prevent sediments from being dislodged by wind, rain, or flowing water. Sediment control BMPs would include measures such as installation of fiber rolls and sediment basins to capture and remove particles that already have been dislodged.

Measures for hazardous materials management, such as identification of appropriate fueling and maintenance areas for equipment, are provided in **MM HAZ-1** (develop and implement Spill Contingency and Hazardous Materials Management Plans). In addition, if contaminated material is encountered during Project construction, these Plans would be implemented. The Plans identify the actions and notifications to occur if evidence of soil contamination is encountered during onshore excavation.

Excavation for the landing pipes would be 35 feet (minimum) below the beach. Shallow groundwater is likely to occur in the subsurface of the landing pipes where HDD would be conducted. Construction dewatering in areas of shallow groundwater may be required during excavation activities, which could result in exposure of pollutants from spills or other activities that may contaminate groundwater. For water to be discharged to surface waters, the contractor would need to notify the North Coast Regional Water Quality Control Board and comply with the Board's requirements related to the quality of water and discharges. The NPDES Construction General Permit includes dewatering activities as authorized non-stormwater discharges if dischargers prove the quality of water to be adequate and not likely to affect beneficial uses. The permit also includes discharge sampling, monitoring, and reporting requirements. In addition to the requirements outlined in the Construction General Permit, the Project would comply with the Waste Discharge Requirements for Discharges to Land with a Low Threat to Water Quality of the State Water Resources Control Board (SWRCB) (Water Quality Order No. 2003-0003-DWQ). If it is found that the groundwater does not meet water quality standards, it must (1) be treated as necessary prior to discharge so that all applicable water quality objectives (as designated in the *Water Quality Control Plan for the North Coast Region* are met; or (2) hauled offsite for treatment and disposal at an appropriate waste treatment facility that is permitted to receive such water.

During drilling of the bore hole, a drilling fluid (a non-toxic, inert material, typically a solution of bentonite clay and water) would be circulated. The drilling fluid minimizes fluid losses to permeable rock and soil types. To minimize the potential for release of material into the marine environment, the last 100 feet of the bore hole would be drilled using potable water as a drilling fluid. Spent drilling fluids (those used for drilling from under the cable landing site to offshore, except for those lost to the surrounding subsurface material) and cuttings (natural material that is drilled through as the HDD moves forward) would be collected and disposed of at a permitted landfill. The potential for significant releases of drilling fluids into the terrestrial environment would be minimized through implementing **MM BIO-5** and **MM BIO-7**.

As discussed in Section 3.4, *Biological Resources*, some drilling fluids might inadvertently be released into the sea water. Any drilling fluids released to the marine environment through subsurface fractures likely would be dispersed rapidly by currents and wave-induced turbulence. The potential for significant releases of drilling fluids into the marine environment would be minimized through implementing **MM BIO-5** and **MM BIO-7**.

All Project activities would be subject to existing regulatory requirements. Because land disturbance would be over 1 acre, a SWPPP with erosion control BMPs would be prepared, and a Notice of Intent would be submitted to support the NPDES. The proposed Project would be required to meet all applicable water quality objectives for surface waters and groundwater contained in the *Water Quality Control Plan for the North Coast Region* (NCRWQCB 2018), to act in accordance with related regulatory agencies guidelines, and to meet the goals and objectives of the County’s LCP. Further, discharge of pollutants from urban runoff would be minimized with implementation of practices required by other CEQA, federal, and state requirements. Because construction activities would not violate water quality standards or waste discharge requirements, impacts on water quality would be less than significant with mitigation.

During operation, no aspect of the Project would affect surface water or groundwater because Project components would be located underground, with no potential to release hazardous materials; therefore, no impact would occur.

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

No Impact.

<u>All Project Components</u>

The Project area is within the Eureka Plain groundwater basin (Figure 3.11-1). The Project would add minimal areas of additional impervious surface (i.e., the cast-iron covers of the LVs at the cable landing site). Recharge in the area would continue to occur through infiltration of precipitation. There is no intention to use surface water or groundwater for construction activities or Project operation, and no groundwater pumping is required. The Project's minimal use of water would not deplete or interfere with groundwater supply or recharge or impede sustainable groundwater management of the basin. Therefore, there would be no impact on groundwater supplies or recharge.

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 that would:

> ***i) Result in substantial erosion or siltation onsite- or offsite.***

> ***ii) Substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or offsite.***

Less than Significant with Mitigation.

<u>All Project Components</u>

During construction, existing drainage patterns could be altered temporarily through minor grading (Figures 3.1-2a through 3.1-2d), potentially resulting in temporary erosion. BMPs would be implemented through the SWPPP, in addition to implementing **MM BIO-5**, **MM BIO-7**, and **MM HAZ-1**.

Minimal additional impervious surface would be added as part of the Project (i.e., the cast-iron covers of the LVs at the cable landing site). The Project site would remain similar to its existing configuration, and the Project would not substantially alter the existing drainage pattern. Most construction activities and the primary staging area would occur on the cable landing site east of New Navy Base Road and west of Vance Avenue on APN 401-112-021.

An additional already paved secondary staging area would be used in a nearby location, not yet determined. Once the landing pipes are installed, the bore pit would be expanded to allow for installation of the LVs. Topsoil from the expanded bore pit would be stockpiled during LV installation and used to restore the cable landing site.

In addition, standard erosion and sediment control measures and other construction SWPPP BMPs would be implemented. As a result, surface runoff, excess soil disturbance, and soil erosion and siltation impacts would be reduced to a less than significant level with mitigation.

iii) Create or contribute runoff water that 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?

No Impact.

<u>All Project Components</u>

During construction, the drainage pattern of the cable landing site may be altered temporarily during the short-term construction period. Construction equipment would be located to minimize any potential for flood risks. The Project would install communication cables below ground. The Project would not create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. The Project would not impede or redirect flood flows. The site would be stabilized and restored immediately following construction activities. There would be no impact.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

No Impact.

<u>All Project Components</u>

The Project site is not located in a seiche zone. The cable landing site is outside the 100-year and 500-year flood zones; however, the lands west of New Navy Base Road are within the 100-year flood zone (Figure 3.11-1) (Humboldt County 2020a). The entire Samoa Peninsula is within the tsunami zone (Humboldt County 2020a). The four LVs could be inundated because of a tsunami; however, the LVs would not store pollutants. Therefore, if Project components were inundated, pollutants would not be released, and no impact would occur.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

No Impact.

<u>All Project Components</u>

The proposed Project would comply with the appropriate water quality objectives for the region. Commonly practiced BMPs would be implemented to control construction site runoff and to reduce the discharge of pollutants to storm drain systems from stormwater and other nonpoint-source runoff. As part of compliance with permit requirements during ground-disturbing or construction activities, and the preparation of a SWPPP, implementing water quality control measures and BMPs would ensure that water quality standards would be achieved, including the water quality objectives that protect designated beneficial uses of surface and groundwater as defined in the *Water Quality Control Plan for the North Coast Region* (NCRWQCB 2017). The NPDES Construction General Permit requires that stormwater discharges not contain pollutants that cause or contribute to an exceedance of any applicable water quality objectives or water quality standards, including designated beneficial uses. In addition, implementing the appropriate Humboldt County LCP policies involves protection of groundwater recharge areas and groundwater resources, as required by a sustainable groundwater management plan.

3.11.4 Mitigation Summary

Implementation of the following mitigation measures would reduce the potential for Project-related impacts on hydrology and water quality to a less than significant level:

- MM BIO-3: Delineate Work Limits to Protect Sensitive Biological Resources
- MM BIO-5: Prepare and Implement an Inadvertent Return Contingency Plan
- MM BIO-7: Implement Best Management Practices for Horizontal Directional Drilling Activities
- MM HAZ-1: Develop and Implement Spill Contingency and Hazardous Materials Management Plans

3.12 LAND USE AND PLANNING

LAND USE AND PLANNING - Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**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?	☐	☐	☐	☒

3.12.1 Environmental Setting

The Samoa Peninsula is a sparsely populated narrow coastal landform known as a "spit" that forms a barrier between the Pacific Ocean to the west and Humboldt Bay to the east. Connected to the mainland on the northern end, it is accessible from the City of Arcata, which is located at the north end of Humboldt Bay (Figure 1-1). On the south, the spit is open to the navigation channel that allows access from the Pacific Ocean to Humboldt Bay. Existing land uses in the Project vicinity are a mixture of industrial and undeveloped land. Residential uses generally are concentrated in the unincorporated communities of Samoa, Finntown, and Fairhaven, which predominately have single-family residences with some multi-family developments. Large industrial uses exist between the residential areas.

The Project alignment and facilities would be within the following County zoning districts: Industrial General (MG), Industrial/Coastal Dependent/Archaeological Resource Area Outside Shelter Cove (MC/A), Natural Resources/Coastal Wetlands, Beach and Dune Areas (NR/W, B).

Samoa Beach is the long strand of beach on the ocean side of the Samoa Peninsula. Access to Samoa Beach can be found in multiple locations along New Navy Base Road in the Project vicinity. The Samoa Dunes Recreation Area is a sandy off-highway vehicle play area located on the south end of the North Jetty at the entrance to Humboldt Bay.

The cable landing site would be located on a private Harbor District parcel (APN 401-112-021), on undeveloped land. The land east of Vance Avenue, on the same parcel, is the site of the former pulp mill. Lands to the north and south are undeveloped or industrial, with the Pacific Ocean to the west and Humboldt Bay to the east.

Each of the landing pipes would be installed from each of the LVs and would extend offshore into the Pacific Ocean. Land above the landing pipes on the terrestrial portion is undeveloped.

3.12.2 Regulatory Setting

Appendix A contains the federal and state laws and regulations pertaining to land use and planning relevant to the Project. At the local level, the Project area is under the jurisdiction of the County's LCP. No LCP policies are specifically applicable to the Project with respect to land use and planning.

3.12.3 Impact Analysis

a) Physically divide an established community?

No Impact.

<u>All Project Components</u>

The cable landing site, primary staging area, LVs, and landing pipes would be on undeveloped land on the Samoa Peninsula between the unincorporated communities of Samoa and Fairhaven. The Project would not physically divide a 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?

No Impact.

<u>All Project Components</u>

The Project would install communication cables below ground and under the ocean. The cable landing site would be located on undeveloped land that is not within any habitat conservation plan or natural community conservation plan area. The aboveground land uses would not change, and there would be no land use impact. Because the Project would not change an existing land use, there would be no conflict with local land use policies.

3.12.4 Mitigation Summary

The Project would have no impacts related to land use and planning; therefore, no mitigation is required.

3.13 MINERAL RESOURCES

MINERAL RESOURCES - Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	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?	☐	☐	☐	☒

3.13.1 Environmental Setting

No mineral resource areas of value to the region or residents of the state, or of local importance are present near the Project (Division of Mine Reclamation 2016). The closest active quarry (stone) is the Halvorsen Quarry located northeast of the City of Eureka.

3.13.2 Regulatory Setting

Appendix A contains federal and state laws and regulations pertaining to mineral resources relevant to the Project. At the local level, the Project area is under the jurisdiction of the County's LCP. No LCP policies are specifically applicable to the Project with respect to mineral resources.

3.13.3 Impact Analysis

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?

(a and b) No Impact.

<u>All Project Components</u>

No known mineral resources exist in or near the Project area, and neither construction nor operation of the Project would hinder access to a mineral resource zone.

3.13.4 Mitigation Summary

The Project would have no impacts on mineral resources of regional, state, or local importance; therefore, no mitigation is required.

3.14 NOISE

NOISE - Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Generate 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) Generate excessive ground-borne vibration or ground-borne noise levels?	☐	☐	☒	☐
c) Be 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 and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

3.14.1 Environmental Setting

3.14.1.1 Existing Land Uses

Noise-sensitive land uses generally are defined as locations where people reside or where the presence of unwanted sound could adversely affect use of the land. Noise-sensitive land uses typically include single- and multi-family residential areas, health care facilities, lodging facilities, and schools. Recreational areas where quiet is an important part of the environment also can be considered sensitive to noise. Some commercial areas may be considered noise sensitive as well, such as outdoor restaurant seating areas.

As shown in Figure 3.1-1 no noise-sensitive land uses are in the vicinity of the Project. The closest residence to the cable landing site is approximately 0.5 mile southeast on Fay Street and Bay Street. People recreating on Samoa Beach would be approximately 0.2 mile west of the cable landing site. There are no health care facilities or lodging in the Project area. The closest school is Peninsula Union Elementary School at 909 Vance Avenue in Samoa, which is 1.4 miles away from any Project-related activities.

Although Samoa Beach is a recreational area, it is not considered noise sensitive. This recreational area is frequently used by all-terrain vehicles on the beach. Because the ambient noise environment at the beach area currently is characterized by noise from relatively loud vehicles, in addition to the constant sound of waves breaking on the beach, it is not considered a noise-sensitive land use.

3.14.1.1 Existing Ambient Noise Levels

The ambient noise environment in the Project area and in the vicinity is characteristic of a rural environment (e.g., minimal local traffic and aircraft overflights, and industrial noise sources). Vehicle traffic on local roadways such as New Navy Base Road and Vance Avenue; all-terrain vehicles on the beach; and aircraft overflight noise are the dominant noise sources in the area. Natural noise sources, such as bird vocalizations, leaves rustling in the wind, and waves breaking at the shoreline, also are audible in the Project area. Section 3.4, *Biological Resources*, addresses noise associated with offshore work.

3.14.2 Regulatory Setting

Appendix A contains the federal and state laws and regulations pertaining to noise relevant to the Project. At the local level, noise is addressed through the implementation of General Plan policies, including noise and land use compatibility guidelines. General Plan policies provide guidelines for determining whether a noise environment is appropriate for a proposed or planned land use. Humboldt County does not have an adopted noise ordinance.

3.14.2.1 Humboldt County General Plan

The Humboldt County General Plan Noise Element includes a number of policies with regard to noise. The following policies are most applicable to the Project.

- **Policy N-P1. Minimize Noise from Stationary and Mobile Sources.** Minimize stationary noise sources and noise emanating from temporary activities by applying appropriate standards for average and short-term noise levels during permit review and subsequent monitoring.
- **Policy N-P4. Protection from Excessive Noise.** Protect persons from existing or future excessive levels of noise which interfere with sleep, communication, relaxation, health or legally permitted use of property.

The Humboldt County General Plan also provides the following standards applicable to the Project.

- **Short-term Noise Performance Standards (L_{max}).** The following noise standards, unless otherwise specifically indicated, shall apply to all property within their assigned noise zones and such standards shall constitute the maximum permissible noise level within the respective zones (Included in this MND as Short-Term Noise Standards [L_{max}], Table 3.14-1).
- **Exceptions.** The Short-Term Noise levels [included in this MND as Table 3.14-1] shall not apply to uses such as, but not limited to:

1. Portable generator use in areas served by public electricity when electrical service is interrupted during emergencies as determined by the Planning Director.
2. Temporary events in conformance with an approved Conditional Use Permit.
3. Use of chainsaws for cutting firewood and power equipment used for landscape maintenance when accessory to permitted onsite uses.
4. Heavy equipment and power tools used during construction of permitted structures when conforming to the terms of the approved permit.
5. Emergency vehicles.

Table 3.14-1. Humboldt County Short-Term Noise Standards (L_{max})

Zoning Classification	Day (maximum) 6:00 a.m. to 10:00 p.m. dBA	Night (maximum) 10:00 p.m. to 6:00 a.m. dBA
MG, MC, AE, TPZ, TC, AG, FP, FR, MH	80	70
CN, MB, ML, RRA, CG, CR, C-1, C-2, C-3	75	65
RM, R-3, R-4	65	60
RS, R-1, R-2, NR	65	60

Source: Humboldt County 2017
Terms:
MG = Industrial General
MC = Industrial/Coastal Dependent
AE = Agriculture Exclusive
TPZ = Timber Production Zone
AG = Agriculture General
FP = Flood Plain
FR = Forestry Recreation
MH = Heavy Industrial
CN = Neighborhood Commercial
MB = Business Park
ML = Light Industrial
RRA = Rural Residential Agriculture
CG = Commercial General
CR = Commercial Recreation
C-1 = Neighborhood Commercial
C-2 = Community Commercial
C-3 = Industrial Commerce
RM = Residential Multi-Family
R-3 = Residential Multiple Family
R-4 = Apartment Professional
RS = Residential Suburban
R-1 = Residential One-Family
R-2 = Residential Two-Family
NR = Natural Resources

3.14.3 Impact Analysis

a) Generate 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 with Mitigation.

<u>Marine Components</u>

The Project involves the use of marine equipment that would increase the level of noise above existing conditions. Marine-based activities would take place in the ocean, and equipment for laying cable (24 hours per day) would not be used near any human noise-sensitive land uses that could be affected. Thus, marine-based activities would not result in noise impacts on human noise-sensitive land uses. The noise impacts of marine-based activities on aquatic species are discussed in Section 3.4, *Biological Resources*; these impacts would be reduced through implementing a marine mammal monitoring program (**MM BIO-9**). The submerged marine cable network would not generate noise.

<u>Terrestrial Components</u>

Terrestrial construction activities would occur during day-time hours and involve noise-generating equipment (see Appendix B for a list of equipment). The equipment used at the cable landing site would be used on land in an unoccupied parcel owned by the Harbor District. Activities at the cable landing site could occur for up to 63 days, which would be the time that the marine HDD machines would operate and the LVs would be installed. During this time, equipment at the cable landing site would generate noise ranging from 82 to 83 dBA L_{eq}[33] and from 87 to 88 dBA L_{max} at 50 feet. Because the cable landing site is located on land zoned MG, the County's Short-Term Noise Standard restriction of 80 dBA would apply. At 50 feet, the commercial noise limit would be exceeded due to construction noise levels reaching 87–88 dBA L_{max}. Although no noise-sensitive land uses are within 50 feet of where construction equipment would operate, the Land Use/Noise Compatibility Standards of the General Plan could be violated, and this impact would be significant. Construction activity at the cable landing site would comply with **MM NOI-1**, which includes noise-reduction measures to attenuate noise for compliance with the General Plan. Implementing **MM NOI-1** would reduce this impact to a less than significant level.

[33] L_{eq} is the equivalent continuous sound level in decibels, equivalent to the total sound energy measured over a stated period of time; L_{max} is the maximum sound level during a measurement period or a noise event. The A-weighted decibel scale (dBA) measures not only the intensity of a sound but how the human ear responds.

MM NOI-1: Implement Construction Noise Control Measures. The Applicant will ensure that its contractor implements site specific noise attenuation measures to ensure compliance with applicable County noise limits for the duration of the construction period. Noise attenuation measures shall be implemented to keep noise levels below the limits specified in the County's General Plan (Table 13-C Land Use/Noise Compatibility Standards). Noise measures shall include the following and shall be included in the construction specifications:

- Require that all construction equipment powered by gasoline or diesel engines have sound control devices 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.
- Prohibit gasoline or diesel engines from having unmuffled exhaust systems.
- Ensure that equipment and trucks for Project construction use the best available noise control techniques (e.g., improved mufflers, redesigned equipment, intake silencers, ducts, engine enclosures, acoustically attenuating shields or shrouds) wherever feasible.
- Use "quiet" gasoline-powered or electrically powered compressors as well as electric rather than gasoline- or diesel-powered forklifts for small lifting, where feasible.

b) Generate excessive ground-borne vibration or ground-borne noise levels?

Less than Significant Impact.

<u>All Project Components</u>

Project construction would occur only during day-time hours. While the Project would require temporary use of heavy construction equipment, none of it is considered impact equipment (such as pile drivers), as defined by the Federal Highway Administration (FHWA 2006). Nevertheless, non-impact equipment can generate noticeable ground-borne vibration. Table 3.14-2 shows the ground-borne vibration levels in terms of peak particle velocity (PPV) for equipment that could be used for Project construction activities.

Tables 3.14-3 and 3.14-4 summarize the guidelines developed by Caltrans for damage and annoyance potential from the transient and continuous vibration that usually is associated with construction activity. Activities that typically cause single-impact (transient) or low-rate, repeated impact vibration include drop balls; blasting; and the use of impact pile drivers, "pogo stick" compactors, and crack-and-seat equipment. Activities that typically generate continuous vibration include the use of excavation equipment, static compaction equipment, tracked vehicles, vehicles on a highway, vibratory pile drivers, pile-extraction equipment, and vibratory compaction equipment (Caltrans 2013).

Table 3.14-2. Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 Feet	PPV at 50 Feet	PPV at 75 Feet	PPV at 100 Feet	PPV at 175 Feet
Large bulldozer	0.089	0.0315	0.0171	0.0111	0.0048
Caisson drilling	0.089	0.0315	0.0171	0.0111	0.0048
Loaded truck	0.076	0.0269	0.0146	0.0095	0.0041
Jackhammer	0.035	0.0124	0.0067	0.0044	0.0019
Small bulldozer	0.003	0.0011	0.0006	0.0004	0.0002

Source: Caltrans 2013
Term:
PPV = peak particle velocity

Table 3.14-3. Threshold Criteria Guidelines for Vibration Damage Potential

Structure and Condition	Maximum PPV (inches per second)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, and ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Caltrans 2013
Term:
PPV = peak particle velocity
Note: Transient sources create a single, isolated vibration event (e.g., blasting or drop balls). Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 3.14-4. Criteria Guidelines for Vibration Annoyance Potential

Human Response	Maximum PPV (inches per second)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Source: Caltrans 2013
Term:
PPV = peak particle velocity
Note: Transient sources create a single, isolated vibration event (e.g., blasting or drop balls). Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

At 25 feet, which is typically the closest distance from construction activities to a residence, when construction occurs in the road right-of-way, the vibration levels generated by construction equipment would be approximately 0.089 inch per second for the equipment with the greatest potential for ground-borne vibration (e.g., a drill rig used to bore under the ground surface). At 25 feet, vibration would be more than distinctly perceptible but less than strongly perceptible, based on the human response values in Table 3.14-4. Beyond 40 feet, ground-borne vibration would attenuate to levels that are less than distinctly perceptible; and at 80 feet and greater, vibration would not be perceptible. Because construction activities are more than 0.5 mile from noise-sensitive land uses (Fay Street and Bay Street), vibration would not be perceptible. The impact is less than significant.

Damage to buildings or structures during construction is not anticipated because no extremely fragile historic buildings, ruins, or ancient monuments are in the Project area. After construction activities are completed, permanent ground-borne vibration would not occur.

c) Be 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 and expose people residing or working in the Project area to excessive noise levels?

No impact.

<u>All Project Components</u>

No private airstrips are in the vicinity of the cable landing site. The closest airport is the public use Samoa Field Airport, approximately 1.6 miles south of the cable landing site. This airport is owned by the City of Eureka and is the only airport located within 2 miles of the Project footprint. Based on the Humboldt County Draft Airport Land Use Compatibility Plan, no Project components are located within a Safety Zone of the Samoa Field Airport (ESA 2020). The Project does not include construction of residences, and aircraft activity at the airport would not be expected to expose workers to excessive noise levels. No impact would be related to excessive aircraft noise from public airports or private airstrips.

3.14.4 Mitigation Summary

Implementation of the following mitigation measures would reduce the potential for Project-related impacts associated with noise to a less than significant level:

- MM NOI-1: Implement Construction Noise Control Measures
- MM BIO-9: Prepare and Implement a Marine Wildlife Monitoring and Contingency Plan

3.15 POPULATION AND HOUSING

POPULATION AND HOUSING - Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	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?	☐	☐	☐	☒

3.15.1 Environmental Setting

The cable landing site is in Census Tract 001300, Block 1206 in Humboldt County, which covers the entire Samoa Peninsula and lands to the north, has an estimated population of 1,377 (California Census 2020).

3.15.2 Regulatory Setting

No federal or state laws relevant to population and housing apply to the Project. Implementing the Project would not involve acquisition of any property or relocation of any existing residents, businesses, or other uses. No housing goals or policies are applicable to the Project area or Project activities.

3.15.3 Impact Analysis

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?

(a and b) No Impact.

<u>All Project Components</u>

The Project would not directly or indirectly induce population growth or displace anyone. A maximum of 10 people would be working on Project construction at any one time and staying in temporary (rental) housing or hotel amenities.

3.15.4 Mitigation Summary

The Project would not affect population or housing; therefore, no mitigation is required.

3.16 PUBLIC SERVICES

PUBLIC SERVICES	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) 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:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

3.16.1 Environmental Setting

3.16.1.1 Fire Protection

Because the cable landing site is in an unincorporated area, the County would provide most of the fire protection services. The Peninsula Community Services District (PCSD), formerly the Samoa Peninsula Fire Protection District, provides fire protection services to the Project area. The PCSD is an all-volunteer district that is based at the station at 1982 Gass Street in the Fairhaven area. A second station in Samoa primarily is used to store equipment. The PCSD has a Chief Officer vehicle and a beach rescue vehicle (both four-wheel drive pickups). These emergency response vehicles are stocked with defibrillators and general medical equipment. (Humboldt County LAFCo 2017).

3.16.1.2 Police Protection

Police protection in all unincorporated areas are provided by the Humboldt County Sheriff’s Office. Services include criminal investigation, court services, and corrections. The California Highway Patrol is responsible for enforcing traffic laws on roadways within the unincorporated areas and on State highways throughout the County. Sheriff's deputies in the Patrol Unit are responsible for responding to emergency calls for service, criminal investigations, and crime prevention through neighborhood and beat patrols. The Main Station in Eureka patrols the Samoa Peninsula. The Sheriff’s Office also has mutual aid agreements with cities and the California Highway Patrol.

3.16.1.3 Schools

Only one school, the Peninsula Union Elementary School, is located on the Samoa Peninsula. It is located 1.4 miles north of the cable landing site at 909 Vance Avenue in Samoa. This school is the only school within the Peninsula Union School District and had a student body of approximately 43 students in 2014–2015 and 35 students in 2018–2019 (Education Data Partnership 2020).

3.16.1.4 Parks and Recreation Facilities

Within the Samoa Peninsula, Humboldt County owns and maintains one park and two beach parking areas. The park, the Samoa Boat Ramp and Campground, provides 13 RV sites and 25 tent sites, as well as restroom and shower facilities. The Samoa Dunes Recreation Area, which is adjacent to the Samoa Boat Ramp and Campground, is managed by the Bureau of Land Management. Additionally, Peninsula Union Elementary School’s baseball and soccer fields are available for public use. Other private recreation facilities include the Women’s Club and grounds on Rideout Avenue (GHD 2019).

3.16.2 Regulatory Setting

Appendix A contains federal and state laws and regulations pertaining to public services relevant to the Project. At the local level, the County’s LCP includes goals and policies regarding public services. No public services goals or policies are applicable to the Project.

3.16.3 Impact Analysis

a) 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:

Fire Protection? Police Protection? Schools? Parks? and Other Public Facilities?

No Impact.

<u>All Project Components</u>

The Project is not anticipated to create a significant fire or security hazard, or to generate a need for additional fire or law enforcement personnel since there would be no full-time employees and the equipment would be contained within enclosed LVs. There would be no new permanent residents using the schools, parks, or other public facilities.

3.16.4 Mitigation Summary

The Project would not result in significant impacts on public services; therefore, no mitigation is required.

3.17 RECREATION

RECREATION	Potentially Significant Impact	Less Than Significant with Mitigation	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?	☐	☐	☐	☒
Would the project interfere with existing use of offshore recreational boating opportunities?[34]	☐	☒	☐	☐

3.17.1 Environmental Setting

Refer to Section 3.16.1, *Environmental Setting* in the Public Services resource area above for information on recreational facilities and resources in the Project vicinity.

3.17.2 Regulatory Setting

Appendix A contains federal and state laws and regulations pertaining to recreation relevant to the Project. At the local level, no goals, policies, or regulations related to recreation are applicable to the Project.

3.17.3 Impact Analysis

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?

(a and b) No Impact.

[34] The CSLC has chosen to analyze this impact in addition to the impact analyses set forth in CEQA Guidelines Appendix G. Although use of the Appendix G checklist meets the requirements for an initial study, "public agencies are free to devise their own format." (State CEQA Guidelines § 15063, subd. (f).)

All Project Components

No recreational facilities or residential units would be used or built. No access to any terrestrial recreational sites would be hindered. Construction workers staying in the area during non-working days could occasionally use the area's recreational facilities.

Would the project interfere with existing use of offshore recreational boating opportunities?

Less than Significant with Mitigation.

No aspect of the Project would affect the recreational activities of Samoa Beach because none of the Project components would be within the tidal zone or along the beach (Figure 2-1). Offshore recreational activities (e.g., pleasure boating, recreational fishing, surfing and kayaking) in the immediate offshore area may be affected for a short period during cable-laying activities. The affected area would be minimal, and users would have advance notice by implementing **MM REC-1**.

MM REC-1: Advanced Local Notice to Mariners. At least 15 days before (1) start of the HDD operation, and (2) start of offshore cable laying activity, a Local Notice to Mariners (https://www.dco.uscg.mil/Featured-Content/Mariners/Local-Notice-to-Mariners-LNMs/District-11/) shall be submitted to USCG describing all offshore activities. A copy of the published notice shall be provided immediately to CSLC. The notice shall include:

- Type of operation (i.e., dredging, diving operations, construction).
- Specific location of operation or repair activities (including whether there is a possibility of exposed cable), including latitude and longitude and geographical position, if applicable.
- Estimated schedule of activities (operation or repair), including start and completion dates (if these dates change, the USCG needs to be notified).
- Vessels involved in the operation.
- VHF-FM radio frequencies monitored by vessels on the scene.
- Point of contact and 24-hour phone number.
- Chart number for the area of operation.

3.17.4 Mitigation Summary

Although the Project would not affect recreational facilities, implementation of the following mitigation measure would reduce the potential for Project-related impacts on offshore recreation to a less than significant level:

- MM REC-1: Advanced Local Notice to Mariners

3.18 TRANSPORTATION

TRANSPORTATION - Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**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) Conflict or be inconsistent with State 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?	☐	☐	☐	☒

3.18.1 Environmental Setting

3.18.1.1 Onshore Transportation

Roadways

The Project is on the Samoa Peninsula in unincorporated Humboldt County (Figure 1-2). Humboldt County generally is served by a multimodal transportation system comprised of a highway system, county roads, local roads, bicycle and pedestrian facilities, rail system, and airport facilities. New Navy Base Road is the primary roadway extending from State Route 255 (Samoa Boulevard) south along the Samoa Peninsula. New Navy Base Road turns into State Route 255 just north of Samoa, which falls under the jurisdiction of Caltrans. State Route 255 heads north then east to Arcata and southeast to Eureka from Samoa. The County identified New Navy Base Road as a Regionally Significant Street and Roadway (arterial) as part of the 2008 Regional Transportation Plan (GHD 2019).

County roadways within the Project area that may be encroached upon during construction include portions of Vance Avenue, New Navy Base Road, and Bay Street. Each of these County roads are two-way roads with one travel lane in each direction.

Level of service (LOS) is a ranking used for traffic flow. LOS ranges from A to F, with A indicating very good free-flowing traffic operations and F indicating stop-and-go conditions. Intersections within the Project area were identified as operating at a LOS C (worst case like during commute times or the weekends) or better in 2006 (County of Humboldt 2006).

Pedestrian and Bicycle Facilities

Because roadways in the Project area do not include sidewalks, pedestrians must walk along the roadway shoulder or in the road right-of-way. As specified in the Humboldt County Regional Transportation Plan, all streets, roadways, and highways in Humboldt County are open to bicycle use (HCAOG 2018). Humboldt County's bikeways are generally classified according to Caltrans' definitions for Class I (shared use path), Class II (bike lane), and Class III bikeways (bike route).

Airports

The closest airport to the Project site is the public use Samoa Field Airport, approximately 1.6 miles south of the cable landing site. The Samoa Field Airport (formerly called the Eureka Municipal Airport) is owned and operated by the City of Eureka.

3.18.1.2 Offshore Transportation

Humboldt Bay is east of the Project site and includes marina vessel launching facilities. Shipping lanes along the California coast are generally 4 to 20 nm offshore. Members of the Western States Petroleum Association voluntarily keep laden vessels (i.e., vessels loaded with cargo) a minimum of 50 nm from the shoreline (Oil & Gas Journal 1992).

3.18.2 Regulatory Setting

Appendix A contains federal and state laws and regulations pertaining to transportation relevant to the Project. The County does not include any policies or programs within the LCP associated with short-term construction projects.

3.18.3 Impact Analysis

a) Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

No Impact.

<u>All Project Components</u>

The Project would not need to block any roads or change traffic volume on area roadways, including Vance Avenue, New Navy Base Road and Bay Street; therefore, the Project would not conflict with established measures of effectiveness stated in a plan, ordinance, or policy.

b) Conflict or be inconsistent with State CEQA Guidelines section 15064.3, subdivision (b)?

Less than Significant with Mitigation.

<u>Terrestrial Components</u>

CEQA Guidelines section 15064.3(b) indicates that VMT is the most appropriate measure for transportation impacts. In December 2018, the Governor's Office of Planning and Research provided an updated Technical Advisory to evaluate transportation impacts in CEQA. In particular, the advisory suggests that a project generating or attracting fewer than 110 one-way trips per day generally may be assumed to cause a less than significant transportation impact (OPR 2018a).

Transportation of workers, materials, and equipment to and from the Project area would generate vehicle trips. Terrestrial and nearshore construction would occur during daylight hours, 7 days a week, to comply with Humboldt County noise standards for construction. Installing landing pipes and cable pulling would require up to 48 hours of continuous work to pull the cable from offshore to the landing pipe that would bring the cable into the LV. The Applicant would obtain an encroachment permit from the County.

Most traffic related to terrestrial activities would travel along New Navy Base Road/Vance Avenue. Approximately 30 tractor-trailer loads of construction equipment and materials would be delivered directly to both staging areas when starting construction. In addition, one fuel truck would make a daily delivery of fuel. There would be about three deliveries of materials and supplies weekly. Based on conservative worker estimates, the Project would create an estimated total of 10 trips per day from local residences or hotels where construction workers would stay, 5 tractor-trailer trips per day, and 1 fuel and miscellaneous delivery trip per day. This would total 16 trips per day during construction, primarily on New Navy Base Road/Vance Avenue. This increase in vehicles on local roadways would not reduce the existing LOS designation. Considering the capacity of local roads, the estimated numbers of Project trips, and coordination with the County as needed for traffic control, the Project is not expected to significantly affect local traffic congestion. In addition, the peak trips that would occur in any one day is significantly below the number identified in the Technical Advisory's guidance (OPR 2018a).

<u>Marine Components</u>

Cable laying and plowing, as described in detail in Section 2, *Project Description*, could interfere with local marine vessel traffic, including commercial and recreational fishing operations (Section 5.2, *Commercial and Recreational Fishing*). To minimize interference and ensure safe marine construction, the work would be conducted in accordance with the Applicant's proposed Marine Anchor Plan (**APM-2**), which would be included with the Contractor Work Plan. The Applicant would file an advanced local notice (**MM REC-1**) with the USCG to inform local mariners of Project activities because the USCG is responsible for maintaining aids to navigation and safe waterways. The notice would include information such as type, duration, and location of operations and a phone number for a point of contact for the Project. Implementing **APM-2** and **MM REC-1** would minimize potentially significant impacts on marine vessel traffic to less than significant levels.

APM-2: Marine Anchor Plan. At least 30 days before starting construction, the Applicant will submit a Marine Anchor Plan to CSLC staff for review with the following:

- Map of the proposed acceptable anchor locations and exclusion zones or offshore temporary anchoring or mooring for work vessels.
- Narrative description of the anchor setting and retrieval procedures to be employed that will result in minimal impacts on the ocean bottom. Please note that anchor dragging along ocean bottom is not allowed.
- Coordinates of all dropped anchor points during construction shall be recorded and included on the post-construction ocean floor survey map.

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?

(c and d) No Impact.

<u>All Project Components</u>

The Project does not include any design features or introduce incompatible uses that would increase hazards on local roadways. Primary access to the terrestrial facilities and locations would be from local roads (Figure 2-1). Traffic would be controlled and coordinated with the County if needed. Traffic control would conform to the specifications of the County. Emergency access along local roadways would be maintained during Project construction, staging, and access activities (Figure 2-1). No impact on emergency access to the Project area or adjoining properties is anticipated.

3.18.4 Mitigation Summary

Implementation of the following mitigation measure would reduce the potential for Project-related impacts on transportation to a less than significant level:

- MM REC-1: Advanced Local Notice to Mariners
- APM-2: Marine Anchor Plan

3.19 UTILITIES AND SERVICE SYSTEMS

UTILITIES AND SERVICE SYSTEMS - Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, 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?	☐	☐	☒	☐

3.19.1 Environmental Setting

The Humboldt Bay Municipal Water District provides wholesale and retail water services to the Samoa Peninsula. The water district maintains two separate pipeline systems delivering treated drinking water and untreated raw water (for irrigation purposes) to its customers in the area. The Project would not use any water for operations. The only central sewer treatment system on the Samoa Peninsula is within the town of Samoa. The remaining areas are served by individual septic tanks and leachfield systems. The Samoa Peninsula is made up of typically well-drained soils (coarse sands) and topographic features that do not require addressing runoff issues. No formal storm systems, other than a few drainage ditches on some of the industrial properties, are located between the railroad tracks and Humboldt Bay.

Solid waste and recyclables pickup within the Samoa Peninsula are collected by Recology, which also has a recycling plant on the Samoa Peninsula. The County, through Humboldt Waste Management Authority, has been trucking its solid waste approximately 175 miles to two out-of-county landfills. One-third of this waste is shipped to the Dry Creek Landfill near Medford, Oregon under a long-term contract. The remaining two-thirds of solid waste is hauled to the Anderson landfill located near Redding, California. Dry Creek Landfill's projected operational life exceeds 100 years under any scenario. The Anderson Landfill is located at 18703 Cambridge Road in Anderson, California. The landowner is Waste Management of California, Inc., a subsidiary of Waste Management, Inc. The landfill's maximum permitted throughput is 1,850 tons per day. The remaining capacity is 11,914,025 cubic yards. The estimated closure date is 2055. Together, these two landfills would allow the County to meet its landfill disposal needs over the next 20 years (GHD 2019).

Electricity and natural gas are provided to the Samoa Peninsula by PG&E. Residences in the Project vicinity do not currently have natural gas service. Many homes instead have propane tanks, which are serviced by AmeriGas (GHD 2019).

3.19.2 Regulatory Setting

Appendix A contains the federal and state laws and regulations pertaining to utilities and service systems relevant to the Project. The County does not include any policies or programs within the LCP associated with short-term construction projects and telecommunications.

3.19.3 Impact Analysis

a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, 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?

(a to c) No Impact.

<u>All Project Components</u>

The Project does not involve construction of new water or wastewater treatment facilities. The Project would not create any new stormwater sources or require construction of new stormwater drainage, electric power, telecommunication, or natural gas facilities.

Water would be used during construction for the boring machine, dust suppression, and drinking water. Project activities would occur at onshore staging or work areas as well as onboard Project vessels. Water required for personal consumption and sanitary purposes would be minimal. Supplies would be portable and brought onsite for the duration of Project activities. After the Project is complete, no additional water usage would be necessary.

The Project would not generate wastewater that would require treatment by the central sewer treatment system in the town of Samoa.

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?

Less than Significant Impact.

All Project Components

Waste generated by the Project would include general construction waste, ocean floor debris (e.g., discarded fishing gear recovered during the pre-lay grapnel run), spent drilling fluids and cuttings, and trash from workers. All such materials would be taken to a local transfer station that receives waste for export to an approved landfill. Both the Dry Creek and Anderson landfills have adequate capacity to accommodate the Project and all other users in the County (GHD 2019). The impact would be less than significant.

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Less than Significant Impact.

All Project Components

All debris associated with construction and operations would be recycled to the extent feasible. Solid waste would be disposed of in accordance with local, state, and federal laws and regulations as required by the Project plans and specifications. Solid waste would be transported to an approved transfer station, with a final destination at either the Dry Creek or Anderson landfills or diverted to recycling facilities. The impact would be less than significant.

3.19.4 Mitigation Summary

The Project would not result in significant impacts on utilities or service systems; therefore, no mitigation is required.

3.20 WILDFIRE

WILDFIRE - If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**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 of, 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 on 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?	☐	☐	☐	☒

3.20.1 Environmental Setting

The Project site is on the Samoa Peninsula between the unincorporated communities of Samoa and Fairhaven, which is in a Local Responsibility Area for fire suppression. Fire suppression services in the Project vicinity are provided by the PCSD, formerly the Samoa Peninsula Fire Protection District. All of the terrestrial Project activity would take place within APN 401-112-021, west of Vance Avenue (Figure 2-1). This area west of Vance Avenue is undeveloped. According to Humboldt County's Web GIS, the Project area is within a Moderate fire hazard severity zone (Humboldt County 2020a).

3.20.2 Regulatory Setting

Appendix A contains the relevant federal and state laws and regulations pertaining to wildfire relevant to the Project. The County does not include any policies or programs within the LCP associated with short-term construction projects and wildfire.

3.20.3 Impact Analysis

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks of, 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 on 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?

(a to d) No Impact.

<u>All Project Components</u>

The Project would not affect issues related to wildfire because it includes buried cable infrastructure. and equipment located inside a buried vault. The Project area is not classified as a high or very high fire hazard severity zone (Humboldt County 2020a). Construction would be a temporary activity; an active working crew would control any potential combustible materials through standard Occupational Safety and Health Administration worker protection requirements. Routine operations would not increase the amount of available fuel or create potential ignition sources (such as overhead power lines) in proximity to wildland areas. The cables would be installed underground and underwater; they would be grounded, which would prevent the potential for electrical shorts or arcing. Project construction would not hinder any potential emergency response (Section 3.16, *Public Services*) or impair an adopted emergency response plan or emergency evacuation plan.

3.20.4 Mitigation Summary

The Project does not have the potential to affect adopted emergency response or evacuation plans, or to exacerbate wildfire risks; therefore, no mitigation is required.

3.21 MANDATORY FINDINGS OF SIGNIFICANCE

The lead agency shall find that a project may have a significant effect on the environment and thereby require an EIR to be prepared where there is substantial evidence, in light of the whole record, that any of the following conditions may occur. Where prior to commencement of the environmental analysis, a project proponent agrees to mitigation measures or project modifications that would avoid any significant effect on the environment or would mitigate the significant environmental effects, a lead agency need not prepare an EIR solely because without mitigation the environmental effects would have been significant (per State CEQA Guidelines, § 15065).

MANDATORY FINDINGS OF SIGNIFICANCE	Potentially Significant Impact	Less Than Significant with Mitigation	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 significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of past, present and probable future projects.)	☐	☒	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

3.21.1 Impact Analysis

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, 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?

Less than Significant with Mitigation.

<u>All Project Components</u>

As described in Section 3.4, *Biological Resources*, the Project would not significantly adversely affect fish or wildlife habitat; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or reduce the number or restrict the range of an endangered, rare, or threatened species. With implementation of **MM BIO-1** through **MM BIO-12**, **MM HAZ-1**, **APM-1,** and **APM-3**—in addition to construction BMPs, the minor, brief, and localized impacts on special-status species and their habitats would be less than significant.

The Project's potential effects on historic and archaeological resources are described in Section 3.5, *Cultural Resources* and Section 3.6, *Cultural Resources – Tribal*. Based on cultural resources records review of the Project area, no cultural resources are known to be present within the Project footprint. Implementing **MM CUL 1/TCR-1**, **MM CUL-2/ TCR-2**, **MM CUL-3**, **MM CUL-4**, **CUL-5**, and **MM CUL-6/TCR-3** would reduce the potential for Project-related impacts on previously undiscovered cultural and tribal cultural resources to a less than significant level.

b) Does the project have impacts that would be 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 with Mitigation.

<u>All Project Components</u>

No past, current, or reasonably foreseeable project on the Samoa Peninsula could be individually limited but cumulatively considerable with the addition of the proposed Project. The local telecommunications company project has a separate and independent utility from the Project analyzed in this MND and requires a separate CEQA analysis. No aspect of that project and the proposed Project would contribute to a cumulative effect. As provided in this MND, the Project has the potential to significantly affect the following environmental disciplines: Biological Resources, Cultural Resources, Cultural Resources – Tribal, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Recreation, and Transportation. However, mitigation measures have been identified that would reduce these impacts to a level of less than significant. For any Project-related impact to contribute cumulatively to the impacts of past, present, or reasonably foreseeable projects, the other projects would need to result in an impact on the same resource area, occur at the same time, or occur within an area overlapping the proposed Project. No such project was identified that would result in a cumulative impact; therefore, this impact would be less than significant with mitigation as proposed throughout this MND.

c) Does the project have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?

Less than Significant with Mitigation.

<u>All Project Components</u>

The Project's potential to adversely affect human beings is addressed throughout this document. As discussed in sections on Aesthetics (Section 3.1) and Public Services (Section 3.16), the Project would not affect resources used or enjoyed by the public, residents, or others in the Project area. The Project would not affect Agriculture or Forestry Resources (Section 3.2), Energy (Section 3.7), Land Use and Planning (Section 3.12), Mineral Resources (Section 3.13), Population and Housing (Section 3.15), Recreation (Section 3.17), Utilities and Service Systems (Section 3.20), Commercial and Recreational Fishing (Section 5.2), or Environmental Justice (Section 5.3).

Potential Project-related effects on public safety and well-being are discussed in sections on Cultural Resources (Section 3.5, **MM CUL 1/TCR-1**, **MM CUL-2/TCR-2, MM CUL-3**, **MM CUL-4**, **MM CUL-5**, and **MM CUL-6/TCR-3**); Cultural Resources – Tribal (Section 3.6, **MM CUL-1/TCR-1**, **MM CUL-2/TCR-2**, and **MM CUL-6/TCR-3**); Geology, Soils, and Paleontology (Section 3.8); Greenhouse Gas Emissions (Section 3.9, **MM GHG-1**); Hazards and Hazardous Materials (Section 3.10**, MM HAZ-1**, **MM BIO-1**, **MM BIO-3**, **MM BIO-5,** and **MM BIO-7**); Hydrology and Water Quality (Section 3.11, **MM BIO-5, MM BIO-7,** and **MM HAZ-1**); Noise (Section 3.14, **MM NOI-1** and **MM BIO-9**); Recreation (Section 3.17, **MM REC-1**); Transportation (Section 3.18, **MM REC-1**); Utilities and Service Systems (Section 3.19); Wildfire (Section 3.20); and Commercial and Recreational Fishing (Section 5.2, **APM-1** through **APM-3** and **MM REC-1**).

None of these analyses identified a potential adverse effect on human beings that could not be avoided or minimized through implementing identified mitigation measures and Applicant proposed measures or compliance with standard regulatory requirements. With mitigation in place, all Project impacts on human beings would be less than significant.

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4.0 MITIGATION MONITORING PROGRAM

The California State Lands Commission (CSLC) is the lead agency under the California Environmental Quality Act (CEQA) for the RTI Infrastructure, Inc. Eureka Subsea Fiber Optic Cables Project (Project). In conjunction with approval of this Project, the CSLC adopts this Mitigation Monitoring Program (MMP) for implementation of mitigation measures (MMs) for the Project to comply with Public Resources Code § 21081.6, subdivision (a) and State CEQA Guidelines §§ 15074, subdivision (d), and 15097.

The Project authorizes RTI Infrastructure, Inc. (Applicant or RTI) to build infrastructure in terrestrial and marine areas in and offshore south of the unincorporated community of Samoa in Humboldt County to connect a total of four fiber optic cables (cables) coming from Asia (e.g., Singapore, Taiwan, and Japan) and Australia.

4.1 PURPOSE

It is important that significant impacts from the Project are mitigated to the maximum extent feasible. The purpose of an MMP is to confirm compliance and implementation of MMs; this MMP will be used as a working guide for implementation, monitoring, and reporting for the Project's MMs.

4.2 ENFORCEMENT AND COMPLIANCE

The CSLC is responsible for enforcing this MMP. The Applicant is responsible for successful implementation of and compliance with the MMs and Applicant Proposed Measures (APMs) identified in this MMP. The term Applicant, in this context, includes all field personnel and contractors working for the Applicant.

4.3 MONITORING

CSLC staff may delegate duties and responsibilities for monitoring to other environmental monitors or consultants, as necessary. The CSLC or its designee shall ensure that qualified environmental monitors are assigned to the Project.

Environmental Monitors. To confirm implementation and success of the MMs, an environmental monitor must be onsite during all Project activities with the potential to create significant environmental impacts or impacts for which mitigation is required. Along with CSLC staff, the environmental monitor(s) are responsible for:

- Confirming that the Applicant has obtained all applicable agency reviews and approvals.
- Coordinating with the Applicant to integrate the mitigation monitoring procedures during Project implementation.
- Confirming that the MMP is followed.

The environmental monitor shall immediately report any deviation from the procedures identified in this MMP to CSLC staff or its designee. CSLC staff or its designee shall note any deviation and its correction.

Workforce Personnel. Implementation of the MMP requires the full cooperation of Project personnel and supervisors. Many of the MMs require action from site supervisors and their crews. Any relevant mitigation procedures shall be written into contracts between the Applicant and any contractors to facilitate successful implementation.

General Reporting Procedures. A monitoring record form shall be submitted to the Applicant; and once the Project is complete, a compilation of all the logs shall be submitted to CSLC staff. CSLC staff or its designated environmental monitor shall develop a checklist to track all procedures required for each MM and shall confirm that the timing specified for the procedures is followed. The environmental monitor shall note any issues that may occur and take appropriate action to resolve them.

Public Access to Records. Records and reports are open to the public and are to be provided upon request.

4.4 MITIGATION MONITORING TABLE

This section presents the mitigation monitoring table (Table 4-1) for Biological Resources; Cultural Resources; Cultural Resources–Tribal; Greenhouse Gas Emissions; Hazards and Hazardous Materials; Hydrology and Water Quality; Noise; Recreation; and Transportation. In addition, Applicant Proposed Measures (**APM-1**, **APM-2**, and **APM-3**) for Biological Resources and Commercial and Recreational Fisheries are included in the table. All other environmental disciplines were found to have less than significant or no impacts; therefore, they are not included in the table. The table lists the following information by column:

- Potential Impact
- Mitigation Measure (full text of the measure)
- Location (where impact occurs and where MM should be applied)
- Monitoring/Reporting Action (action to be taken by monitor or lead agency)
- Effectiveness Criteria (how the agency can determine whether the measure is effective)
- Responsible Party (entity responsible to ensure MM compliance)
- Timing (e.g., before, during, or after construction; during operation)

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
Biological Resources						
Impacts on Special-Status Species and Habitats	**MM BIO-1: Provide Worker Environmental Awareness Training.** The Applicant shall provide an environmental awareness training before starting construction activities for all construction personnel (including new personnel as they are added to the Project) working on the terrestrial and marine Project components. This training would be given by biological monitors and cultural monitors (approved by CSLC staff) to help the trainees understand the following: • Surrounding common and special-status species and their habitats • Applicable regulatory requirements • MMs designed to avoid or minimize impacts on sensitive resource areas The training materials shall be developed and approved by the CSLC staff at least 30 days before starting Project activities in the terrestrial and marine work areas. The biological monitors shall maintain a list of all contractors who have been trained and shall submit this list and the final training material to CSLC staff within 30 days after construction starts and shall provide an updated final list after construction is completed. The lead environmental monitor shall be the main contact for reporting any special-status species observed in or near the Project area by any employee or	Terrestrial and marine Project areas	Training materials approved by CSLC staff 30 days before construction starts Onsite monitor to submit list of trained personnel and training materials to CSLC within 30 days after construction starts and after construction is completed	Implementing MM will educate construction workers regarding special-status species and habitat	Applicant and CSLC	Before, during, and after construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	contractor. The Applicant shall provide the contact information for the lead environmental monitor and the biological monitors to onsite construction workers, USFWS, CDFW, and CSLC staff before construction starts.					
Impacts on Special-Status Species and Habitats (cont.)	**MM BIO-2: Conduct Biological Surveying and Monitoring.** A biological monitor (typically with a college degree in a field of biology or environmental science, knowledge of species surveying for, and experience with pre-construction and construction monitoring), approved by CSLC staff, shall be present onsite to survey the work area for special-status species and nesting birds (as applicable) prior to starting work in the terrestrial work area to minimize potential impacts on any special-status species or other wildlife that may be present during Project construction. The biological monitor shall be onsite full-time during the initial equipment mobilization and site preparation (including fence installation) and during the final demobilization phase of construction at the cable landing site. In addition, the monitor will make weekly site visits during Project construction for all work on the cable landing site. While on site, if the biological monitor observes special-status species on the Project site, the biological monitor shall have the authority to stop all work, and the Applicant shall contact the appropriate agency, (i.e., CDFW or USFWS and	Terrestrial and marine Project areas	Onsite monitor to verify Submit daily monitoring report for work within CSLC's jurisdiction and weekly report for work outside CSLC's jurisdiction	Implementing MM will reduce the potential for impacts on special-status species and habitat	Applicant and CSLC	Before and during construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	CSLC staff) to discuss ways to protect the special-status species. If a biological monitor was not monitoring the Project site during construction when a special-status species was observed on the site, the lead environmental monitor for the Project would be contacted immediately to determine the appropriate course of action. Construction monitoring reports for marine work under CSLC's jurisdiction shall be submitted daily, and for terrestrial work outside of the CSLC's jurisdiction shall be submitted weekly.					
Impacts on Special-Status Species and Habitats (cont.)	**MM BIO-3: Delineate Work Limits to Protect Sensitive Biological Resources.** Natural areas outside the construction work area shall not be disturbed. Before starting Project construction, sensitive biological resource areas within and adjacent to the cable landing station work area shall be staked and flagged by the biological monitor (**MM BIO-2**). The special-status plant (dark-eyed gilia) located along the southern edge of the cable landing site work area will be protected with orange construction barrier fencings. The location of the staking and flagging and barrier fencing will be documented in the daily monitoring log and provided to CSLC prior to the start of construction. These demarcated areas shall be inspected daily throughout construction to ensure that they are visible for construction personnel.	Terrestrial Project area	Onsite monitor to document in the monitoring log	Implementing MM will reduce the potential for impacts on special-status species and habitat	Applicant and CSLC	Before and during construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
Impacts on Sensitive Biological Resources	**MM BIO-4: Install Covers or Some Kind of Escape Ramps in Open Trenches.** To prevent accidental entrapment of wildlife species during construction, all excavated holes that will be left open overnight shall have a cover or some kind of soil ramp installed, allowing wildlife an opportunity to exit. If escape ramps are installed, construction inspector/ biological monitor shall inspect excavations before starting construction each day to confirm that no wildlife species are entrapped or to remove wildlife species that are unable to escape on their own. Any wildlife handling will be conducted under the biological monitor's applicable collection permit or as authorized by the appropriate wildlife agency. If a biological monitor is not onsite, a local biologist (with appropriate permits) would be called out to remove any species.	Terrestrial Project area	Onsite construction inspector/monitor to inspect daily before starting construction	Implementing MM will reduce the potential for impacts on special-status species and habitat	Applicant and CSLC	During construction
Impacts from Horizontal Directional Drilling (HDD) Activities	**MM BIO-5: Prepare and Implement an Inadvertent Return Contingency Plan.** A Final Inadvertent Return Contingency Plan (either one report that describes a plan for both terrestrial and marine areas or separate reports for each area) for the HDD shall be submitted to CSLC staff for review and approval at least 30 days before starting construction in terrestrial and marine areas. The plan shall include the following: • Measures to stop work, maintain appropriate control materials onsite, contain and remove drilling mud	Terrestrial and marine Project areas	Submit report to the CSLC 30 days before starting construction Onshore or offshore biological monitor to identify signs of an inadvertent release of drilling fluids	Implementing MM will reduce the potential for impacts on special-status species and habitat	Applicant and CSLC	Before and during construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	before demobilization, prevent further migration of drilling mud into the waterbody, and notify all applicable authorities. • Control measures of constructing a dugout/ settling basin at the bore exit site to contain drilling mud to prevent sediment and other deleterious substances from entering waterbodies. • Onshore and offshore biological monitors shall monitor the onshore and offshore to identify signs of an inadvertent release of drilling fluids. • An abandonment contingency plan in case the HDD operations are forced to be suspended and a partially completed bore hole abandoned. • Complete list of the agencies (with telephone number) to be notified, including but not limited to the CSLC's 24-hour emergency notification number (562) 590-5201, and the California Governor's Office of Emergency Services (Cal OES) contact number (800) 852-7550.					
Impacts on Nesting Birds	**MM BIO-6: Conduct Pre-Construction Nesting Bird Surveys and Implement Avoidance Measures.** If construction occurs during the nesting season (typically from February 1 to September 1), the following conditions (designed to protect both special-status and non–special-status birds) shall be implemented: • Areas within the BSA: No more than 1 week before starting Project-related	Terrestrial Project area	If construction occurs during nesting season, conduct surveys 1 week before start of construction Onsite monitor to verify;	Implementing MM will reduce the potential for impacts on nesting birds	Applicant and CSLC	Before and during construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	construction, a biological monitor, approved by CSLC staff, shall survey the Project areas within the BSA to look for nesting activity. • Areas outside the terrestrial BSA: Areas outside the BSA (but within the line-of-sight from active construction) would be surveyed using binoculars and accessing the site. • If no active nests are detected during these surveys, no additional measures are required. • If an active nest is found, an appropriate avoidance buffer (based on the species as explained below) shall be established around the nest site to avoid disturbance or destruction of the nest until the end of the breeding season (generally August 31) or until after the biological monitor determines that the young have fledged and moved out of the area (this date varies by species). Suitable buffer distances may vary between species. The extent of these buffers shall be determined by the biological monitor in coordination with the applicable wildlife agency (i.e., CDFW and/or USFWS) and will depend on the bird species, level of construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. No disturbances shall occur within the protective buffer(s) until all young birds have		coordination with USFWS/ CDFW			

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	fledged, as confirmed by the biological monitor. • A biological monitor shall be retained by the Applicant (**MM BIO-2**) and shall be onsite everyday if construction activities happen during bird nesting season and a nest is identified within the buffer area.					
Impacts from Horizontal Directional Drilling Activities	**MM BIO-7: Implement Best Management Practices for Horizontal Directional Drilling Activities.** When using the large HDD equipment to install landing pipes, the following shall be submitted to CSLC staff for review and approval at least 60 days prior to construction of Phase 1 as defined in the MND: • Engineering design drawings for construction certified by a California-registered Civil/Structural Engineer. • A site-specific geotechnical report certified (stamped, signed, and dated) by a California-registered Geotechnical Engineer, including boring logs and any geotechnical recommendations (including, but not limited to, identification of reasonably foreseeable risks during HDD installation and proposed risk mitigations) for safe HDD installation. • If HDD is under CSLC jurisdiction, a minimum depth of 35 feet is required unless a shallower depth is recommended by a California-registered Geotechnical Engineer.	Marine Project area	Submit engineering design drawings and geotechnical report to CSLC at least 60 days prior to construction of Phase 1 as defined in the MND On-site monitor to verify BMPs during construction	Implementing MM will reduce the potential for impacts on marine wildlife and water quality associated with HDD activities	Applicant and CSLC	Before and during construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	• The Applicant shall incorporate any BMPs identified in the reports or reviews into the HDD plans in order to minimize potential impacts on marine wildlife and water quality.					
Impacts on Marine Wildlife	**MM BIO-8: Cable Entanglements and Gear Retrieval.** If fishers snag a cable and lose or cut gear or if the Applicant snags fishing gear, the Applicant shall use all feasible measures to retrieve the fishing gear or inanimate object. Retrieval shall occur no later than 42 days after discovering or receiving notice of the incident. If full removal of gear is not feasible, the Applicant shall remove as much gear as practicable to minimize harm to wildlife (e.g., fishes, birds, and marine mammals). Within 14 days of completing the recovery operation, the Applicant shall submit to CSLC staff a report describing the following: • Nature and location of the entanglement (with a map). • Method used for removing the entangled gear or object, or the method used for minimizing harm to wildlife if gear retrieval proves infeasible.	Marine Project are	Retrieval within 42 days of discovery Submit recovery report to CSLC within 14 days of completing the recovery operation	Implementing MM will reduce the potential for impacts on marine species	Applicant and CSLC	Before, during, and after construction
Impacts on Marine Mammals and Sea Turtles	**MM BIO-9: Prepare and Implement a Marine Wildlife Monitoring and Contingency Plan.** The Applicant shall prepare and implement a Marine Wildlife Monitoring and Contingency Plan (MWMCP) for installing or repairing cables with the following elements, procedures, and response actions:	Marine Project area	Submit the MWMCP to CSLC and CCC for review and approval at least 60 days before starting marine	Implementing MM will reduce the potential for impacts on marine species	Applicant and CSLC	Before and during construction, and during maintenance or repairs

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	• Awareness training for Project vessel crew that includes identification of common marine wildlife and avoidance procedures included in the MWMCP for Project activities. • Have two qualified shipboard marine mammal observers onboard all cable installation vessels during cable installation activities. The MWMCP shall establish the qualifications of and required equipment for the observers. • In consultation with NMFS, establish a safety work zone around all Project work vessels that defines the distance from each work vessel that marine mammals and sea turtles may approach before all operations must stop until the marine mammal or sea turtle has moved beyond. • Project-specific control measures for Project vessels (including support vessels) and actions to be undertaken when marine wildlife is present, such as reduced vessel speeds or suspended operations. • Reporting requirements and procedures for wildlife sightings and contacts made to be reported in the post-installation reports. The MWMCP shall identify the resource agencies to be contacted in case of marine wildlife incidents and to receive reports at the conclusion of Project installation. • The MWMCP shall be submitted to the CSLC and CCC for review and		installation activities			

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	approval at least 60 days before starting marine installation activities.					
Impacts on Hard Substrate Habitat Area	**MM BIO-10: Minimize Crossing of Hard Bottom Substrate.** At least 30 days before starting construction of Phase I, a pre-construction ocean floor survey shall be conducted and provided to CSLC covering the proposed cable lease area and the temporary construction corridor (including construction vessels anchoring areas and depicting ocean floor contours, all significant bottom features, hard bottom areas, sensitive habitats, the presence of any existing wellheads, pipelines, and other existing utilities) to identify any hard bottom habitat, eelgrass, kelp, existing utilities (including but not limited to pipelines), and power cables. The proposed cable routes and anchoring locations shall be set to avoid hard bottom habitat (to the extent feasible), eelgrass, kelp, existing utilities (including but not limited to pipelines), and power cables, as identified in the ocean floor survey.	Marine Project area	Conduct pre-construction ocean floor survey and submit results (with maps) to CSLC at least 30 days before starting construction of Phase I.	Implementing MM will reduce the potential for impacts on hard bottom habitat areas and associated marine biological resources	Applicant and CSLC	Before starting marine construction
Impacts on Hard Substrate Organisms	**MM BIO-11: Contribute Compensation to Hard Substrate Mitigation Fund.** The following would be proposed if slow-growing hard substrate organisms are damaged: • CCC compensation fees (based on past projects) will be required to fund the U.C. Davis Wildlife Health Center's California Lost Fishing Gear Recovery Project or other conservation	Marine Project area	Applicant will provide documentation to CSLC and CCC for (1) assessment and methods used to calculate total compensation fee; and (2)	Compensation fees will help reduce impacts on hard substrate habitat and associated marine biological resources	Applicant	After Project construction and after determination based on final burial report

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	programs for impacts on high-relief hard substrate affected by the Project. The amount of the hardbottom mitigation fee shall be calculated by applying a 3:1 mitigation ratio to the total square footage of affected hard bottom and multiplying that square footage by a compensation rate of $14.30 per square foot. • A final determination of the amount of high-relief hard substrate affected (used to calculate the total compensation fee) will be based on a review of the final burial report from the cable installation. The total assessment and methods used to calculate this figure will be provided to the CSLC and CCC for review and approval. Both the CSLC and CCC also will be provided documentation of the total amount of mitigation paid and the activities for which the funds will be used.		total amount of mitigation paid and the activities for which the funds will be used.			
Impacts on Marine Native Species	**MM BIO-12: Control of Marine Invasive Species.** The Applicant shall ensure that the underwater surfaces of all Project vessels are clear of biofouling organisms prior to arrival in State waters. The determination of underwater surface cleanliness shall be made in consultation with CSLC staff. Regardless of vessel size, ballast water for all Project vessels must be managed consistent with CSLC's ballast management regulations, and Biofouling Removal and Hull Husbandry Reporting Forms shall be submitted to CSLC staff as required by	Marine Project area	Onsite monitor to verify	Implementing MM will reduce the potential for impacts on marine native species	Applicant and CSLC	During construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	regulation. No exchange of ballast water for Project vessels shall occur in waters shallower than the 5,904-foot isobath.					
Cultural Resources						
Disturbance of Shipwrecks; Archaeological Sites; Historic, Cultural, or Tribal Cultural Resources	**MM CUL-1/TCR-1: Discovery of Previously Unknown Cultural or Tribal Cultural Resources.** In the event that potential cultural or tribal cultural resources are discovered during Project implementation, all earth-disturbing work within 50 feet of the find shall be temporarily suspended or redirected until a qualified archaeologist retained by the Applicant can adequately assess the find and determine whether the resource requires further study. In the event that a cultural or tribal cultural resource discovery is potentially significant, the Applicant; CSLC; and any local, state, or federal agency with approval or permitting authority over the Project that has requested/required notification shall be notified within 48 hours. For all discoveries known or likely to be associated with Native American heritage (pre-contact sites and select post-contact historic-period sites), the THPOs for the Bear River Band of Rohnerville Ranchería, Blue Lake Ranchería, and Wiyot Tribe shall be contacted immediately by the CSLC to evaluate the discovery and, in consultation with the Applicant and a qualified archaeologist, develop a treatment plan in any instance where significant impacts cannot be avoided. The treatment plan shall be	Terrestrial Project area	Qualified archaeologist, notification of permitting agencies, treatment plan if needed	Implementing MM will reduce potential impacts on archaeological resources	Applicant and CSLC	Prior to and throughout construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	submitted to the CSLC staff and any participating tribe for review and approval prior to its implementation, and additional work in the vicinity of the discovery shall not proceed until the plan is in place. The location of any such finds must be kept confidential, and measures shall be taken to secure the area from site disturbance and potential vandalism. Impacts on previously unknown significant cultural or tribal cultural resources shall be avoided through preservation in place, if feasible. Damaging effects on tribal cultural resources shall be avoided or minimized following the measures identified in Pub. Resources Code section 21084.3 subdivision (b), if feasible, unless other measures are mutually agreed to by the lead archaeologist and culturally affiliated tribes that would be as or more effective. Title to all shipwrecks, archaeological sites, and historic or cultural resources on or in the tide and submerged lands of California is vested in the State and under CSLC jurisdiction. The final disposition of shipwrecks, archaeological, historical, and tribal cultural resources recovered on State lands under CSLC jurisdiction must be approved by the CSLC.					

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
Potential Impacts on Previously Unknown Terrestrial Archaeological Resources	**MM CUL-2/TCR-2: Cultural Resources Contractor Awareness Training.** Prior to beginning construction, the Applicant shall retain a qualified archaeologist to prepare a Cultural Resources Contractor Awareness Training subject to CSLC approval. The training shall be given to all construction personnel prior to working on the Project, and the training shall include, but not be limited to, the following: • Guidance on identification of potential cultural resources that may be encountered. • The probability of exposing cultural resources. • Clear direction on procedures if a find is encountered. The archeologist shall provide construction personnel with an orientation on the requirements of the treatment plan, including the probability of exposing cultural resources, guidance on recognizing such resources, and direction on procedures if a find is encountered.	Terrestrial Project area	Qualified archaeologist, training for all construction personnel prior to working on the Project, including identification and handling of previously unknown cultural resources	Implementing MM will reduce potential impacts on archaeological resources	Applicant and CSLC	Prior to construction
Disturbance of marine archaeological resources	**MM CUL-3: Conduct a Pre-Construction Offshore Archaeological Resources Survey.** Using the results of an acoustic survey (e.g., a CHIRP [compressed high-intensity radiated pulse] system survey) for evidence of erosion/incision of natural channels, the nature of internal channel-fill reflectors and the overall geometry of the seabed, paleochannels, and the surrounding areas shall be analyzed for their potential	Marine Project area	Qualified archaeologist, Marine Archaeological Resources Assessment Report, if needed	Implementing MM will reduce potential impacts on marine archaeological resources	Applicant and CSLC	Before construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	to contain intact remains of the past landscape with prehistoric archaeological deposits. The analysis shall include core sampling in various areas, including but not limited to, paleochannels to verify the seismic data analysis. Based on the CHIRP survey and coring data, a Marine Archaeological Resources Assessment Report shall be produced by a qualified maritime archaeologist and reviewed by the CCC or the SHPO and the CSLC to document effects on potentially historic properties.					
Disturbance of Marine Archaeological Resources (Offshore Historic Shipwrecks)	**MM CUL-4: Conduct a Pre-Construction Offshore Historic Shipwreck Survey.** A qualified maritime archaeologist, in consultation with the CSLC, shall conduct an archaeological survey of the proposed cable routes. The archaeological survey and analysis shall be conducted following current CSLC, BOEM, and USACE (San Francisco and Sacramento Districts) standard specifications for underwater/marine remote sensing archaeological surveys (*Guidelines for Providing Geological and Geophysical, Hazards, and Archaeological Information* pursuant to 30 CFR part 585). The archaeological analysis shall identify and analyze all magnetic and side-scan sonar anomalies that occur in each cable corridor, defined by a lateral distance of 0.5 km on each side of the proposed cable route. This analysis shall not be limited to side-scan and magnetometer	Marine Project area	Qualified maritime archaeologist	Implementing MM will reduce potential impacts on marine archaeological resources	Applicant and CSLC	Before construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	data and may include shallow acoustic (subbottom) data as well as autonomous underwater vehicle and multibeam data that may have a bearing on identification of anomalies representative of potential historic properties. The analysis shall include evaluation to the extent possible of the potential significance of each anomaly that cannot be avoided within the cable corridor. If sufficient data are not available to identify the anomaly and make a recommendation of potential significance, the resource(s) shall be considered as potentially eligible for listing in the NRHP and CRHR and treated as a historic property. If any cultural resources are discovered as the result of the marine remote sensing archaeological survey, the proposed cable route or installation procedures shall be modified to avoid the potentially historic property. BOEM administratively treats identified submerged potentially historic properties as eligible for inclusion in the NRHP under Criterion D and requires project proponents to avoid them unless the proponent chooses to conduct additional investigations to confirm or refute their qualifying characteristics. BOEM typically determines a buffer (e.g., 50 meters) from the center point of any given find beyond which the project must be moved, in order to ensure that adverse effects on the potential historic property will be avoided during construction.					

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
Disturbance of Marine Archaeological Resources	**MM CUL-5: Prepare and Implement an Avoidance Plan for Marine Archaeological Resources.** An avoidance plan shall be developed and implemented to avoid all documented resources from the Marine Archaeological Resources Assessment Report and the Offshore Historic Shipwreck Survey Report, address discoveries of as yet unidentified resources encountered during the planned marine survey and construction, and provide mitigation monitoring if deemed necessary during construction to ensure compliance.	Marine Project area	Qualified maritime archaeologist	Implementing MM will reduce potential impacts on marine archaeological resources	Applicant and CSLC	Before and throughout construction
Disturbance of Human Remains	**MM CUL-6/TCR-3: Unanticipated Discovery of Human Remains.** If human remains are encountered, all provisions provided in California Health and Safety Code section 7050.5 and Pub. Resources Code section 5097.98 shall be followed. Work shall stop within 100 feet of the discovery, and both the archaeologist retained by the Applicant and CSLC staff must be contacted within 24 hours. The archaeologist shall consult with the County Coroner. If human remains are of Native American origin, the County Coroner shall notify the Native American Heritage Commission (see at http://www.nahc.ca.gov/profguide.html) within 24 hours of this determination, and a Most Likely Descendent shall be identified. No work is to proceed in the discovery area until consultation is complete and procedures to avoid or recover the remains have been implemented.	Terrestrial Project area	Contact archaeologist and CSLC within 24 hours; archaeologist consults with County Coroner	Implementing MM will reduce potential impacts on human remains	Applicant and CSLC	Throughout construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
Cultural Resources – Tribal						
	Implement **MM CUL-1/TCR-1: Discovery of Previously Unknown Cultural or Tribal Cultural Resources** (see above) Implement **MM CUL-2/TCR-2: Cultural Resources Contractor Awareness Training** (see above) Implement **MM CUL-6/TCR-3: Unanticipated Discovery of Human Remains** (see above)					
Greenhouse Gas Emissions						
Greenhouse Gas Emissions during Construction	**MM GHG-1: Purchase GHG Carbon Offsets for Construction Emissions.** The Applicant shall purchase all offsets prior to groundbreaking and provide copies of the offset retirement verification to the CSLC. The Applicant shall purchase carbon offsets equivalent to the Project's projected GHG emissions (2,451 metric tons CO2e) to achieve a net zero increase in GHG emissions during the construction phase for emissions within 24 nm (even though only required for within 3 nm) of the California coast. A carbon offset is a credit derived from the reduction of GHG emissions through a separate reduction project, often in a different location from the emission source. To be acceptable for an emissions reduction credit, the carbon offset must be real, permanent, quantifiable, verifiable, enforceable, and additional (per the definition in California Health and Safety Code sections 38562[d][1] and [2]). Several existing voluntary offset exchanges have been validated by the CARB, including the California Action Reserve Voluntary Offset Registry, American Carbon Registry, and Verified Carbon Standard.	Within 24 nm off the California coast	Applicant will provide verification of offset purchase to the CSLC prior to ground-breaking	Purchase of carbon offsets will reduce GHG emissions impacts	Applicant	Before construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
Hazards and Hazardous Materials						
Accidental Release of Hazardous Materials	**MM HAZ-1 Develop and Implement Spill Contingency and Hazardous Materials Management Plans.** At least 30 days before start of construction of the Project ~~construction starts~~, the Applicant shall submit Spill Contingency and Hazardous Materials Management Plans for onshore and offshore operations to the CSLC for review and approval. Prior to construction, the Applicant shall develop and implement the following Plans: ~~se plans that shall include, but not be limited to, procedures to be implemented, specific designation of the onsite person who will be responsible for implementing the Plans, onsite spill response materials/ tools/equipment, and spill notification protocol and procedures~~. **Worker Health and Safety Plan (WHSP)** At least 30 days prior to the start of construction of the Project, the Applicant shall submit to the CSLC a final Worker Health and Safety Plan that has been reviewed and approved by the Humboldt County Division of Environmental Health that addresses measures to minimize risks from landfill gases and potential worker exposure to hazardous materials associated with construction activities at the cable landing site and within 1,000 feet of the Samoa Ash Landfill. The	Terrestrial and marine Project areas	Submit Plans to CSLC 30 days prior to construction of the offshore and onshore Project components	Implementing MM will reduce potential for release of hazardous materials into the environment	Applicant	Before and during construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	WHSP shall be prepared by a qualified geologist or engineer. A. The WHSP shall include, at a minimum, measures to: i. Address the potential for the presence and migration of landfill gases during construction ii. Minimize risks of exposure by construction workers to anticipated hazardous materials (e.g., wood ash), to potential unanticipated waste types (e.g., municipal solid waste), and to potential landfill gas accumulation post-construction by operational and maintenance personnel iii. Assure Project stability and structural integrity associated with any incompetent waste fill material that may be present. B. The Applicant shall undertake development in accordance with the approved final WHSP. Any proposed changes to the approved final WHSP shall be reported to the CSLC and Humboldt County Division of Environmental Health. No changes to the approved final WHSP shall occur without written approval from the CSLC and Humboldt County Division of Environmental Health.					

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	Soil and Waste Excavation and Management Plan (SWEMP) At least 30 days prior to the start of construction of the Project, the Applicant shall submit to the CSLC a final SWEMP that has been reviewed and approved by the Humboldt County Division of Environmental Health. The SWEMP shall address soil and waste management for construction activities at the cable landing site (within 1,000 feet of the Samoa Ash Landfill). The SWEMP shall be prepared by a qualified geologist or engineer. C. The SWEMP shall include, at a minimum, the following: i. A description of the specific locations, methods, and procedures for staging, stockpiling, managing, characterizing, testing, and disposing of soil (including bentonite material), groundwater, and waste material expected to be encountered during construction ii. Procedures for managing unanticipated waste types (i.e., municipal solid waste) that may be encountered during construction iii. BMPs for odor and dust control, including, but not limited to, measures to reduce the potential for exposure of staged and stockpiled materials to wind and stormwater runoff					

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	iv. Provisions for characterizing and testing soil, groundwater, and waste material in accordance with California Department of Toxic Substances Control (DTSC) Protocol for Burn Dump Site Investigation and Characterization. Testing should include, at a minimum, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), dioxins/furans, organochlorine pesticides (OCPs), and California Administrative Metals (CAM-17) heavy metals v. Provisions for proper waste disposal at authorized facilities capable of receiving the waste(s) D. The Applicant shall undertake development in accordance with the approved final SWEMP. Any proposed changes to the approved final SWEMP shall be reported to the CSLC and Humboldt County Division of Environmental Health. No changes to the approved final SWEMP shall occur without written approval from the CSLC and Humboldt County Division of Environmental Health.					

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	Spill Contingency and Hazardous Materials Terrestrial Plan (SCHMTP) ~~A.Terrestrial Work:~~ Measures for terrestrial operations shall include, but not be limited to, identifying appropriate fueling and maintenance areas for equipment, a daily equipment inspection schedule, and spill response procedures including maintaining spill response supplies onsite. The SCHMTP could be prepared separately or the elements of the SCHMTP could be included in the Solid Waste Excavation and Management Plan (SWEMP). The terrestrial SCHMTP~~Plan~~ will identify the actions and notifications to occur if contaminated soil is encountered during onshore excavation. The Applicant shall notify the County of Humboldt Division of Environmental Health within 24 hours of discovering contaminated materials during Project construction activities. Work in the area suspected of contamination shall stop until the notified agencies, together with the Applicant, have determined the next steps. The terrestrial SCHMTP~~Plans~~ will identify, at a minimum, implementing the following BMPs related to using hazardous substances: • Follow manufacturer's recommendations on use, storage, and disposal of chemical products used in construction.					

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	• Avoid overtopping construction equipment fuel gas tanks. • During routine maintenance of construction equipment, properly contain and remove grease and oils. • Conduct all fueling of equipment at least 100 feet from wetlands and other waterbodies. • Properly dispose of discarded containers of fuels and other chemicals. • Maintain a complete list of agencies (with their telephone number) to be notified of potential hazardous material spills, including but not limited to, the CSLC's 24-hour emergency notification number (562) 590-5201 and the California Governor's Office of Emergency Services (Cal OES) contact number (800) 852-7550. **Spill Contingency and Hazardous Materials Offshore Plan (SCHMOP)** ~~B.Offshore Work:~~ For offshore activities involving work vessels, the primary work vessel (dive support vessel) will be required to carry onboard a minimum 400 feet of sorbent boom, 5 bales of sorbent pads at least 18-inches by 18-inches square, and a small powered vessel for rapid deployment to contain and clean up any small hazardous material spill or sheen on the water surface. The offshore plan SCHMOP ~~Plans~~ shall provide for the immediate call out of additional spill containment and					

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	clean-up resources in the event of an incident that exceeds the rapid clean-up capability of the onsite work force. <u>These offshore measures may be provided as part of a separate offshore plan (SCHMOP) or combined with the terrestrial plan (SCHMTP) as described above.</u>					
	Implement **MM BIO-1: Provide Environmental Awareness Training** (see above) Implement **MM BIO-3: Delineate Work Limits to Protect Sensitive Biological Resources** (see above) Implement **MM BIO-5: Prepare and Implement an Inadvertent Return Contingency Plan** (see above)					
Hydrology and Water Quality						
Violation of Water Quality Standards	Implement **MM BIO-3: Delineate Work Limits to Protect Sensitive Biological Resources** (see above) Implement **MM BIO-5: Prepare and Implement an Inadvertent Return Contingency Plan** (see above) Implement **MM HAZ-1: Develop and Implement Spill Contingency and Hazardous Materials Management Plans** (see above)					
Noise						
Construction Noise	**MM NOI-1: Implement Construction Noise Control Measures.** The Applicant will ensure that its contractor implements site specific noise attenuation measures to ensure compliance with applicable County noise limits for the duration of the construction period. Noise attenuation	Terrestrial Project area	Contract specifications	Implementing MM will reduce construction noise impacts on sensitive receptors	Applicant	During construction
	measures shall be implemented to keep noise levels below the limits specified in the County's General Plan (Table 13-C Land Use/Noise Compatibility Standards). Noise measures shall include the following and shall be included in the construction specifications:					

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	• Require that all construction equipment powered by gasoline or diesel engines have sound control devices 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. • Prohibit gasoline or diesel engines from having unmuffled exhaust systems. • Ensure that equipment and trucks for Project construction use the best available noise control techniques (e.g., improved mufflers, redesigned equipment, intake silencers, ducts, engine enclosures, acoustically attenuating shields or shrouds) wherever feasible. • Use “quiet” gasoline powered or electrically powered compressors as well as electric rather than gasoline or diesel powered forklifts for small lifting, where feasible.					
	Implement **MM BIO-9: Prepare and Implement a Marine Wildlife Monitoring and Contingency Plan** (see above)					

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
Recreation						
Impacts on Offshore Recreational Activities	**MM REC-1: Advanced Local Notice to Mariners.** At least 15 days before (1) start of the HDD operation, and (2) start of offshore cable laying activity, a Local Notice to Mariners (https://www.dco.uscg.mil/Featured-Content/Mariners/Local-Notice-to-Mariners-LNMs/District-11/) shall be submitted to the USCG describing all offshore operations. A copy of the published notice shall be provided immediately to the CSLC. The notice shall include: • Type of operation (i.e., dredging, diving operations, construction). • Specific location of operation or repair activities (including whether there is a possibility of exposed cable), including latitude and longitude and geographical position, if applicable. • Estimated schedule of activities (operation or repair), including start and completion dates (if these dates change, the USCG needs to be notified). • Vessels involved in the operation. • VHF-FM radio frequencies monitored by vessels on the scene. • Point of contact and 24-hour phone number. • Chart number for the area of operation.	Marine Project area	Local Notice to Mariners submitted to USCG at least 15 days before (1) start of the HDD operation, and (2) start of offshore cable laying activity. Copy of published notice submitted to CSLC immediately	Implementing MM will reduce Project impacts on offshore recreation	Applicant and CSLC	Before and after construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
Transportation						
Interference with Local Marine Vessel Traffic	Implement **MM REC-1: Advanced Local Notice to Mariners** (see above) Implement **APM-2: Marine Anchor Plan** (see below)					
Commercial and Recreational Fishing						
Disruption of Commercial Fishing	**APM-1: Fishing Agreement.** The Applicant is actively involved in a Fishing Agreement with the regional commercial fishing cable liaison committee. This agreement, in part, establishes the following: • A cable/fishing liaison committee that manages the interactions between the fishers and the cable companies. • Policies for how the fishers will work around the cables and what to do if they think their fishing gear is hung up on a cable or similar issue. • Methods of gear replacement and costs claims in the unlikely event that fishing gear is entangled in cable owned by the Applicant. • Design and installation procedures to minimize impacts on fishing activities, such as: ◦ Burying cable where possible. ◦ Allowing fishing representatives to review marine survey data and participate in cable alignment selection. • Communication and notification procedures. • Contributions to fishing improvement funds.	Marine Project area	Provide Fishing Agreement to CSLC prior to construction	Implementing this APM will reduce the potential for gear entangle-ment, cable unburial, and uncompen-sated loss of gear	Applicant	During construction and maintenance

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
Impacts on ocean bottom from marine anchoring	**APM-2: Marine Anchor Plan.** At least 30 days before starting construction, the Applicant will submit a Marine Anchor Plan to CSLC staff for review with the following: • Map of the proposed acceptable anchor locations and exclusion zones or offshore temporary anchoring or mooring for work vessels. • Narrative description of the anchor setting and retrieval procedures to be employed that will result in minimal impacts on the ocean bottom. Please note that anchor dragging along ocean bottom is not allowed. • Coordinates of all dropped anchor points during construction shall be recorded and included on the post construction ocean floor survey map.	Marine anchoring areas only	Provide plan to CSLC 30 days before starting construction	Implementing this APM will ensure safety for anchoring operations	Applicant; Applicant's contractor	Before and during construction
Entanglement of marine species from exposed cable	**APM-3: Cable Burial Surveys.** The Applicant will conduct initial and periodic post-lay surveys of all installed cables between the mean-high tide line to where Project operations extend into federal waters and out to the 5,904-foot depth contour to verify that the cable was and remains buried as initially planned, or to the maximum extent feasible as determined by the initial post-lay assessment. These surveys will assess and report to the CSLC and the CCC the following: • The depth of burial achieved along the cable route.	Marine Project area	Conduct post-lay survey within 60 days of cable installation and every 5 years after, or until Applicant can demonstrate after subsequent burial survey that cable remains buried; distribute	Implementing this APM will avoid exposure of cable and potential for entanglement	Applicant and CSLC	After construction

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	• Any areas of cable suspension greater than 3.3 feet from the ocean floor and an explanation of why the cable could not be re-routed to avoid suspension. • The consistency of cable installation with the Project description. These post-lay surveys and assessments will be conducted as follows: • Within 60 days of cable installation. • Every 5 years after cable installation or until such time that the Applicant can demonstrate following one or more post-lay burial surveys that the cable remains buried. • After any incident or activity, including but not limited to, potential commercial fishing gear snags, a severe earthquake in the vicinity of the cable, or an extreme storm event that could cause excessive ocean floor scouring and result in cable exposure to the ocean floor surface. Should the cable become unburied in any location where it should have been buried or had been previously buried, the Applicant shall ensure that the cable is reburied to the initial cable burial depth at that location. A survey/burial report will be prepared and distributed to responsible State agencies following each survey.		survey/burial report to responsible State agencies following each survey			

Table 4-1. Mitigation Monitoring Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Party	Timing
	Implement **MM REC-1: Advanced Local Notice to Mariners** (see above)					

Terms:

APM = Applicant Proposed Measure
Applicant = RTI Infrastructure, Inc.
AUV = autonomous underwater vehicle
BMP = best management practice
BOEM = Bureau of Ocean Energy Management
BSA = biological study area
CARB = California Air Resources Board
CCC = California Coastal Commission
CDFW = California Department of Fish and Wildlife
CFR = Code of Federal Regulations
CO_2e = CO_2 equivalent
CRHR = California Register of Historic Resources
CSLC = California State Lands Commission
dB = decibel(s)
ESHA = environmentally sensitive habitat area
GHG = greenhouse gas
HDD = horizontal directional drilling
nm = nautical mile(s)
NMFS = National Marine Fisheries Service
NRHP = National Register of Historic Places
SHPO = State Historic Preservation Officer
THPO = Tribal Historic Preservation Officer
USACE = U.S. Army Corps of Engineers
USCG = U.S. Coast Guard
USFWS = U.S. Fish and Wildlife Service

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5.0 OTHER STATE LANDS COMMISSION CONSIDERATIONS

In addition to the environmental review required pursuant to the California Environmental Quality Act (CEQA), a public agency may consider other information and policies in its decision-making process. This section presents information relevant to the California State Lands Commission's (CSLC) consideration of the Project. The considerations addressed below are:

- Climate change and sea-level rise
- Commercial and recreational fishing
- Environmental justice

Other considerations may be addressed in the staff report presented at the time of the CSLC's consideration of the Project.

5.1 CLIMATE CHANGE AND SEA-LEVEL RISE

Sea-level rise as a function of global climate change is not expected to affect the Project because none of the permanent infrastructure is proposed in areas subject to coastal flooding (greater than a 1 percent chance, annually) or increased erosion with anticipated sea-level rise (Humboldt County 2020a). The marine component of the Project would be buried approximately 3.3 feet beneath the ocean floor in State waters starting at approximately 3,600 feet offshore and ending at approximately 32 miles offshore. The offshore Project components would not be impacted by sea-level rise. The fiber optic cables (cables) between the cable landing site and where the landing pipes emerge would be drilled deep (approximately 35 feet below the beach) and thus would not be subject to increased erosion over time (Figure 1-2). The following discussion provides background information on climate change and sea-level rise in the Project area.

Climate change and sea-level rise accelerate and exacerbate natural coastal processes, such as the intensity and frequency of storms, erosion and sediment transport, currents, wave action, and ocean chemistry. Sea-level rise is driven by the melting of polar ice caps and land ice, as well as thermal expansion of sea water. Accelerating rates of sea-level rise are attributed to increasing global temperatures associated with climate change. Estimates of projected sea-level rise vary regionally and are a function of different greenhouse gas emissions scenarios, rates of ice melt, and local vertical land movement.

The California Ocean Protection Council (OPC) updated the State of California Sea-Level Rise Guidance in 2018 to provide a synthesis of the best available science on sea-level rise projections and rates. CSLC staff evaluated the "high emissions," "medium-high risk aversion" scenario to apply a conservative approach based on both current emission trajectories and the lease location. The North Spit tide gauge, which is approximately 3 miles south of the cable landing site was used for the projected sea-level rise scenario and indicates a current extreme high tide (1% interval) of 10.2 feet (NAVD 88) (Northern Hydrology & Engineering 2015). Based on the 2018 OPC guidance projections for the North Spit gauge, the Project area could see 1.0 foot of sea-level rise by 2030, 1.6 feet by 2040, 2.3 feet by 2050, and 7.6 feet by 2100 (OPC 2018). Since the cable landing site is at an elevation of 23 feet (NAVD 88), it is well above the current extreme (1%) high tide plus the sea level rise projections for 2100 for the "high" emissions"/"medium-high risk aversion scenario", which would be 17.8 feet (NAVD 88). The range in potential sea-level rise indicates the complexity and uncertainty of projecting these future changes—which depend on the rate and extent of ice melt—particularly in the second half of the century.

Along with higher sea levels, winter storms of greater intensity and frequency resulting from climate change will further affect coastal areas. The combination of these conditions likely will result in increased wave run up, storm surge, and flooding in coastal and near-coastal areas. In rivers and tidally influenced waterways, more frequent and powerful storms can result in increased flooding conditions and damage from storm-generated debris. Climate change and sea-level rise also will affect coastal and riverine areas by changing erosion and sedimentation rates. Beaches, coastal landscapes, and near-coastal riverine areas exposed to increased wave force, run up, and total water levels potentially could erode more quickly than before. However, rivers and creeks also are predicted to experience flashier[35] sedimentation pulse events from strong winter storms, punctuated by periods of drought. Therefore, depending on precipitation patterns, sediment deposition and accretion may accelerate along some shorelines and coasts.

Weather systems and extreme storms also can uncover dangerous coastal hazards on shorelines; however, there are no known coastal hazards in the Project area. When funding is available, CSLC implements a program to remove coastal hazards along the California coast (CSLC 2017). Examples of hazards are remnants of coastal structures, piers, oil wells and pilings, and deteriorated electric cables and old pipelines. Many coastal hazards are located on Public Trust lands set aside for commerce, navigation, fishing, and recreation; these hazards can impede coastal uses as well as threaten public health and safety. Governor Brown's Executive Order B-30-15 instructed all state agencies to take climate change into account in their planning and investment decisions, and to give priority to actions that build climate preparedness. The preceding discussion of climate change and sea-level rise is intended to provide the local/regional overview and context that CSLC staff considered pursuant to this Executive Order; additionally, it will facilitate CSLC's consideration of the Project.

[35] The flashiness of a stream reflects how quickly flow in a river or stream increases and decreases during a storm.

5.2 COMMERCIAL AND RECREATIONAL FISHING

5.2.1 Environmental Setting

The marine biological study area (MSA) (Figure 3.4-3) extends westward into the Pacific Ocean and south of the Samoa State Marine Conservation Area, as discussed in Section 3.4.2, *Marine Components*. The specific notes listed before Figure 3.4-3 further explain the content displayed on the figure that also could be relevant for a reader interested in the commercial and recreational fishing analysis. The MSA extends offshore to the 5,904-foot depth contour from the mean high-tide line and comprises the coastal waters and intertidal and subtidal habitats located offshore of the cable landing site. It also extends approximately 1,650 feet (about 0.5 mile) up-coast and down-coast of the proposed cable routes. The analysis of ocean floor habitats and associated marine taxa presented in Section 3.4.2, *Marine Components* and presented in more detail in Appendix C covers the water depth range of 0–600 feet. For fish and marine mammals, the analysis extends out to the 5,904-foot water depth.

Within the California territorial seas (3 nautical miles [nm] from shore), the seafloor habitat is exclusively soft substrate, shifting from coarse sand to silty-clays with increasing water depth (Appendix C). Soft substrate continues along the proposed cable routes to water depths of approximately 1,600 feet, where isolated hard substrate features appear (Figure 3.4-3). As illustrated in Figure 3.4-3, the hard substrate areas identified by the National Oceanic and Atmospheric Administration (NOAA) as potential habitat areas of particular concern (HAPCs) occur within the MSA. The precise aerial extent of these mappings is uncertain because of the inherent limitations of the data collection protocols used to generate the map layer. Prior to installation, a specific cable route would be surveyed at a higher resolution to verify and avoid hard substrate habitat. As stated in Section 2, *Project Description*, the Project would avoid hard substrate habitat areas to the greatest extent feasible. As illustrated in Figure 3.4-3, the southernmost proposed and surveyed cable route skirts an area identified by NOAA as potential HAPC hard bottom substrate. Careful review of the cable route survey data (EGS 2020) indicates that the proposed cable alignment skirts an area of hard substrate to the south but avoids potential hard substrate outcropping and remains in soft substrate habitat.

~~Fish assemblages along the northern California Coast are not completely well known or studied, although their distribution is influenced by a variety of oceanic conditions, including water depth, substrate type, ocean currents, and temperature. Management of commercial fisheries along the northern California Coast area falls under four different fishery management plans (FMPs) for four designated essential fish habitats (EFHs) (AMS 2020):~~

- ~~Pacific Coast Groundfish FMP~~
- ~~Coastal Pelagic Species FMP~~

- ~~Pacific Coast Salmon FMP~~
- ~~Highly Migratory Species FMP.~~

Four fishery management plans (FMPs) are responsible for overseeing commercial fisheries operating along the Northern California Coast. NMFS has adopted FMPs for Groundfish, Salmon, Coastal Pelagic Species and Highly Migratory Species. California has adopted FMPs to govern the Market Squid fishery and nearshore waters of the State. The Dungeness crab fishery is also managed by CDFW under the Risk Assessment and Mitigation Program (RAMP), as of the 2019-2020 commercial season to limit potential impact on migrating and resident marine mammals. Catch limits for the Pacific halibut fishery are established under the International Pacific Halibut Commission and the Pacific Fishery Management Council's Halibut Catch Sharing Plan.

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) define EFH as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity."

5.2.1.1 Commercial Fishing

From 2013 to 2018, over 90 fish species were commercially landed at Eureka (Table 6.2 in Appendix C). Of these 90 species, 12 accounted for over 90 percent of the landings by tonnage. Those taxa that accounted individually for more than 0.7 percent[36] of the total landings between 2013 and 2018 included Dungeness crab (*Metacarcinus magister*), ocean pink shrimp (*Pandalus jordani*), Dover sole (*M. pacificus*), market squid (*Doryteuthis opalescens*), sablefish (*Anoplopoma fimbria*), Petrale sole (*E. jordani*), hagfish (*Myxini*), longnose skate (*Raja rhina*), longspine thornyhead (*S. altivelis*), night smelt (*Spirinchus starksi*), shortspine thornyhead (*Sebastolobus alascanus*), and albacore tuna (*Thunnus alalonga*). Commercial fishing methods used to land these species include bottom trawling, mid-water trawling or purse seining, trolling, and trapping. Although accounting for less than 1 percent of the total landed tonnage in the Eureka area, Chinook salmon (*Oncorhynchus tshawytscha*) remains a high-value and important recreational and commercial fishery for the region (AMS 2020).

5.2.1.2 Recreational Fishing

Recreational fishing that primarily was conducted from rocky shores and breakwalls, armored shorelines, sandy beaches, docks, private boats, and commercial party boats landed approximately 100 fish taxa between 2013 and 2018. Only 19 of these taxa

[36] The statement is that 12 of 90 taxa accounted for 90% of the landings. These 12 taxa individually accounted for 0.7% or more of the catch. Essentially, the remaining 78 taxa collectively accounted for less than 10% of the total landings over a 5-year period; individually, each taxon accounted for less than 0.7 % of the total catch. Essentially the statement is clarifying that, although a lot of fish and invertebrate taxa are caught, only a few species represent the commercial fisheries economics of the region.

accounted for more than 90 percent of the landings in tonnage or in individual numbers of fish landed. The dominant fish taxa caught by recreational fishers included lingcod (*Ophiodon elongatus*); assorted rockfishes, including blue rockfish (*Sebastes mystinus*), vermillion rockfish (*S. miniatus*), yellowtail rockfish (*S. flavidus*), Quilback rockfish (*S. maliger*), copper rockfish (*S. caurinus*), brown rockfish (*S. auriculatus*), black rockfish (*S. malanops*), olive rockfish (*S. serranoides*), China rockfish (*S. goodei*), and canary rockfish (*S. pinniger)*; cabezon (*Scorpaenichthys marmoratus*); Dungeness crab; Pacific halibut (*Paralichthys californicus*); Pacific sanddab (*Citharichtys sordidus*), and Petrale sole*.* Other fish species sought after by recreational fishers that do not account for large quantities of fish landed include albacore and surf smelt (*Hypomesus pretiosus)* (Table 6.3 in Appendix C).

5.2.1.3 Fishing Season, Capture Method, and Preferred Habitat

Table 5-1 provides detailed information on the fishing season, capture method, and preferred habitat for the more commonly landed commercial and recreationally fished species in the Eureka area. As illustrated in Table 5-1, the types of commercial and recreational fisheries gear operating in the Eureka area include longline, bottom trawl, midwater trawl, trolling (hook and line), shoreline hook and line, offshore hook and line, and various forms of trapping.

Table 5-1. Fishing Season, Method, and Habitat for Commonly Fished Species off Samoa, California

Species	Fishing Season	Fishing Method (Most Common)	Habitat	Top Species Commercial/ Recreational
Dungeness crab	Recreation opens first Saturday of November and closes July 30. Subject to change based on modifications prescribed by RAMP. Commercial season starts later and often ends in late June. Subject to change as prescribed by RAMP	Round steel mesh trap	Depths approximately from the intertidal zone out to 750 feet; sandy and soft-bottomed ocean floor	Commercial/ recreational

Table 5-1. Fishing Season, Method, and Habitat for Commonly Fished Species off Samoa, California

Species	Fishing Season	Fishing Method (Most Common)	Habitat	Top Species Commercial/ Recreational
Ocean pink shrimp	Open mid-April through late October	Benthic trawl with bycatch reduction device	Depths from 150 to 1,200 feet; aggregate near bottom during day and ascend through water column at night	Commercial
Dover sole	Year-round	~~Limited entry~~ b Bottom trawl and fixed gear	Can reach depths greater than 1,400 feet; ocean floor flatfish	Commercial
Market squid	Year-round	~~Mid water trawls (~~pPurse seine, drum seine, lampara net, brail gear~~)~~	Inshore and offshore pelagic waters; bottom substrate during spawning; nearshore over sandy bottom habitats	Commercial
Pacific halibut	Peak season June–July	Trolling, long-line, hook and line	Offshore 250–350 feet of water	Commercial/Recreational
Sablefish	Year-round; lower catch limits during winter	Baited longlines, baited traps, occasionally bottom trawls	Ocean bottom fish at depths of 650 feet and deeper; some down to 9,800 feet	Commercial
Petrale sole	Year-round	Bottom trawl; limited entry; sometimes incidental take	Bottom fish at depths to 1,370 feet; usually 330 to 500 feet; soft sediments	Commercial
Longnose skate	Year-round	Bottom trawl (often incidental take)	Intertidal to 390 feet; sandy or muddy bottoms or in kelp	Commercial
Longspine thornyhead	Year-round	Bottom trawl, longline	Can range from 663- to 5,795-foot depth; muddy or rocky bottoms	Commercial
Night smelt	January through September	Shore fishing with A-frame dip nets, mid-water trawls	Surf and depths to approximately 400 feet	Commercial

Table 5-1. Fishing Season, Method, and Habitat for Commonly Fished Species off Samoa, California

Species	Fishing Season	Fishing Method (Most Common)	Habitat	Top Species Commercial/ Recreational
Shortspine thornyhead	Year-round	Bottom trawl, longline, pot gear	Ranges from depths of 180 to 1,525 feet	Commercial
Albacore tuna	Year-round; highest availability in July and August	Longline, drift gillnet, pole and line, purse seine, trolling	Pelagic	Commercial
Hagfish	Year-round	Hagfish trapping	Bottom fish in depths ranging between 30 and 3,800 feet, depending on species.	Commercial
Lingcod	Boat-based trawling and trap, divers, and shore-based anglers: year-round; boat-based anglers: May through December	Trawling, trap, and hook and line and trap	Rocky outcrops, rocky jetties and armored shoreline, and kelp; prohibited to take seaward of 180-foot water depth from May through October	Commercial/ recreational
Rockfish	Boat-based: anglers and trawling: May through December	Trawling and hook and line	Rocky outcrops, rocky jetties and armored shoreline, and kelp	Commercial/ recreational
Cabezon	Divers and shore-based anglers: year-round; boat-based anglers, trawling: May through December	Trawling, hook and line, SCUBA spearfishing	Rocky outcrops, rocky jetties and armored shoreline, and kelp	Commercial/ recreational
Barred surfperch	Year-round	Hook and line	Shallow water, sandy-shore areas	Recreational
California halibut	Year-round; trawl fishery	Trolling, hook and line	Live on ocean floor; sandy sediments; from 100 to 330 feet deep	Commercial/ recreational

Table 5-1. Fishing Season, Method, and Habitat for Commonly Fished Species off Samoa, California

Species	Fishing Season	Fishing Method (Most Common)	Habitat	Top Species Commercial/ Recreational
Jacksmelt	Year-round	Hook and line	Prefer shallow water less than 100 feet deep; most common in 5- to 50-foot depths	Recreational
Pacific chub mackerel	Year-round	Hook and line	Pelagic	Recreational
Pacific sanddab	Year-round	Hook and line	Most abundant from 120 to 300 feet deep; sandy substrate	Recreational

Sources: CDFW 2020g, 2020h; FishChoice 2020; Monterey Bay Aquarium Seafood Watch 2020; NOAA 2020; Sea Grant California 2020; Voices of the Bay 2011

5.2.2 Commercial and Recreational Fishing Methods

To better understand the potential for Project-associated activities (described in Section 2, *Project Description*) to affect commercial and recreational fishing activities, it is helpful to understand the different types of fishing gear and methods.

Commercial fishing gear and methods generally can be classified as the following:

- Mobile gear types that contact the ocean floor
- Fixed gear types that contact the ocean floor
- Gear types that do not contact the ocean floor

5.2.1.4 Mobile Gear Types That Contact the Ocean Floor

Mobile fishing gear consists of bottom trawls that are towed by a vessel near, or in contact with, the ocean floor. These nets include heavy equipment that can penetrate 10 to 20 inches (0.8–1.7 feet) into the ocean floor, depending on the substrate density, vessel speed, and method of the trawl operator. Trawl gear is dragged along the ocean floor to harvest benthic-dwelling fishes and invertebrates such as shrimp, crab, and echinoderms (sea cucumbers) that reside near or on the ocean floor.

Bottom trawl gear is optimally designed to skim the ocean floor to avoid significant penetration (no more than 1.7 feet). However, variations in ocean floor depth and substrate density often create an imprecise and variable contact with the seabed. All fishers and interested entities would be notified of the work offshore to install and bury cables through **MM REC-1** (Advanced Local Notice to Mariners)**.** In locations where target burial of a cable is not possible and the cable is exposed on the ocean floor or shallowly buried, the trawl gear could come into contact with or even snag the cable. The fishers also would be notified of these unburied or shallowly buried cables through **APM-1** (Fishing Agreement).

5.2.1.5 Fixed Gear Types That Contact the Ocean Floor

Fixed fishing gear used in Northern California that are not towed but instead rest on the ocean floor by their own weight or by use of anchors or ballasts include traps for crab, prawn, and some fish species such as sablefish; bottom longlines with hooks; and hagfish pots comprised of perforated, baited 5-gallon buckets set in strings on the seabed with a lightweight anchor or ballast at either end. Recreational fishing gear that falls into this category includes hook and line rigs for bottom fish and assorted traps for crab. Wherever the ocean floor geologic conditions are favorable for cable burial, there is virtually no potential for impact on these types of fixed gear after the cable is installed. During the brief installation period, there may be short-term and localized requests for fishers to shift gear to the north or south of the cable path. Based on the ocean floor mapping data currently available, all cables should be fully buried. The post-burial survey would identify burial depths of the cable. Where burial is not possible, information would be communicated to the fishers through **APM-1** (Fishing Agreement). All fishers and interested entities would be notified of the work offshore through **MM REC-1** (Advanced Local Notice to Mariners).

Bottom longline gear targeting mixed fish species and longline pot gear targeting hagfish or “slime eel” are set on the ocean floor with small weights or anchors at each end of the string of gear. This gear type typically is set along bathymetric contours at varying depths where the target species are found. The depth of seabed penetration of these anchors or weights is negligible, generally less than a few inches, therefore minimizing or eliminating any potential for interaction between the commercial fishing equipment and a buried cable. Because of the “fixed” positioning on the ocean floor, the greatest potential for impact on these fishing gear types would occur during the brief phase of route clearance and cable installation operations. Implementation of **APM-1** and **MM REC-1** would inform interested parties about this proposed work.

Recreational fishers frequently use hook and line fishing gear with heavy weights to place baited hooks on or near the ocean floor, depending on the target species. Recreational fishers also use various sizes and designs of crab pots to harvest crabs and use surf nets for catching night smelt.

5.2.1.6 Gear Types That Do Not Contact the Ocean Floor

Commercial fishing gear types used in Northern California that target mid-water fish species generally are restricted to different types of pelagic trawl or net gear, such as mid-water or beam trawl nets, purse seines, drum seines, lampara nets, and brail gear. They also may include drift gillnets, trolling hook and line, and hook and line. Recreational fishing gear that falls into this category include hook and line rigs for pelagic fish and trolling gear[37] for salmon and tuna. These gear types are towed or deployed in the water column and have little or no contact with the ocean floor. All of these gear types are mobile but are restricted to the location of the target fish species. Another recreational fishing method commonly used by SCUBA divers is spearfishing, or harvesting by hand, bottom and water column fish or invertebrates such as abalone. This method of recreational fishing generally is restricted to nearshore and shallow-water portions of the coast. Similar to fixed commercial and recreational fishing gear types, the greatest potential for disturbance of these fishing gear types would occur during the brief phase of route clearance and cable installation. Implementation of **APM-1** (Fishing Agreement) and **MM REC-1** (Advanced Local Notice to Mariners) would inform interested parties about this proposed work.

5.2.2 Special-Status Marine Species

As described above in Section 5.2.1, the ocean waters within the MSA offshore Eureka are designated as EFH under four Magnuson-Stevens Act FMPs. An EFH assessment is being prepared and will be submitted to the National Marine Fisheries Service with a biological assessment for the Project.

Under the Magnuson-Stevens Act, NOAA has identified potential HAPCs within the MSA. These HAPCs are restricted to potential hard substrate areas scattered throughout the MSA. As noted in Section 2, *Project Description,* and the discussion above, all proposed or mapped cable routes currently avoid hard substrate habitats. Prior to installation, a specific cable route would be surveyed at a higher resolution to verify and ensure that hard substrate habitat is avoided.

5.2.3 Regulatory Setting

Appendix A contains the federal and state laws and regulations pertaining to biological resources relevant to the Project.

5.2.4 Impact Analysis

As shown in Figure 2-5, the four separate landing pipes (approximately 5 to 6 inches in diameter and about approximately 4,600 feet long) would be installed from the landing vault and exit offshore at about 3,600 feet (0.5 nm or 0.6 mile) offshore at a water depth of approximately 40 feet (just beyond the surf zone). The landing pipes would be installed at least 35 feet under the cable landing site and beach using the horizontal directional

[37] **Trolling** is a method of fishing where one or more fishing lines, baited with lures or bait fish, are drawn through the water.

drilling construction method. Therefore, the cables offshore would start where the landing pipes exit at about 40-foot depth (about 0.5 nm). These cables would be buried approximately 3.3 feet under the ocean floor from about 40 feet water depth until the 5,904-foot depth where the deep ocean starts.

An evaluation of the potential impacts of a marine-based project on commercial and recreational fishing must consider multiple sources of potential direct and indirect impacts. Direct impacts include lost or reduced fishing area; lost or reduced fishing time in a specific area; reduced "soak" or fishing time per piece of equipment, as a result of the need to remove and relocate the fixed fishing gear (e.g., crab traps); and lost or damaged fishing equipment that has become entangled and lost/discarded on project-related equipment. Indirect impacts include permanent or temporary damage to the marine habitat(s) supportive of, or essential to, the fish and invertebrate species being commercially or recreationally sought. All of these impacts have potential financial consequences to commercial and recreational fishers and were assessed in accordance with the following significance criteria developed for Project-related commercial and recreational fishing impacts.

Project activities or installations would:

- Temporarily reduce any fishery in the Project vicinity by 10 percent or more during a season, or reduce any fishery by 5 percent or more for more than one season; or
- Affect 5 percent or more of kelp and aquaculture harvest areas; or
- Cause a loss in harvesting time due to impacts on living marine resources and habitat or cause a loss of equipment or vessel damage, or replacement; or
- Result in a significant loss[38] to EFH or alter the ocean floor in such a manner to reduce the availability of that area to commercial trawling or other commercial gear types.

An evaluation of potential Project impacts based on the above significance criteria follows.

Would the Project activities or installations temporarily reduce any fishery in the Project vicinity by 10 percent or more during a season, or reduce any fishery by 5 percent or more for more than one season?

Less Than Significant Impact.

Potential Conflicts by Space-Time Use. Installation of the marine components of the Project (from mid-July through early to mid-November) and maintenance have the potential to result in short-term restrictions to commercial and recreational fishing

[38] "Significant loss" is generally interpreted to mean that sufficient loss of habitat might occur that alters food web dynamics, biological composition of the fish community in the area, or something similar.

activities in a small, finite area of the coastal waters of the MSA. Restricted access to the offshore landing pipe exit location could occur for several days when preparing for the onshore landing vault to receive the cable coming from Asia or Australia. Restricted access of several hours could occur when occupying a specific area of the ocean surface and ocean floor, while the cable lay ship is installing and burying the cable along the designated cable route. In the former case, the commercial divers and their support boat would be working in a small region of the water column and ocean floor where the landing pipe exits the ocean floor in water depths less than 50 feet. In the latter case, the area of restricted or limited access would be a small area offshore Eureka occupied by the cable lay ship and directly behind the cable lay ship where the cable would be lowered to the ocean floor or around a support ship when a remotely operated vehicle would be required to bury the cable (see Section 2, *Project Description*). These time- and space-limited Project-related activities are not anticipated to result in substantive reductions in fish landings, as work vessels would be in an isolated location for a relatively short period, and comparable coastal water and ocean floor habitat immediately adjacent to the area occupied by Project-related work vessels would be available for fishing. This limited access would be comparable to avoiding another vessel or ship transiting through the area. Consequently, neither of these two activities is expected to prohibit commercial fishers from operating in adjacent areas of the nearshore coastal waters nor to result in any detectable decrease in or impact on commercial landings of fish and invertebrates.

Potential Conflicts by Individual Fishery Season and Location. As noted in Table 5-1, on a fishery-by-fishery basis, nine of the commercially important fish species landed[39] in the Eureka region have year-round fisheries. The three species with specific seasons include Dungeness crab, ocean pink shrimp, and night smelt. Dungeness crab is a fixed-gear fishery, ocean pink shrimp is a bottom trawl net fishery, and night smelt is a trawl or surf net fishery. Consequently, at no time in the year could Project-related construction and installation activities completely avoid any of the three specific fishery seasons because they overlap. At least one of the three fisheries is being harvested at any time of the year.

Ocean Pink Shrimp

Ocean pink shrimp have a season from mid-spring through fall, and planned landing pipe activities most likely would take place in the middle of shrimping season. The landing pipes portion of the cables would not restrict commercial fishing of ocean pink shrimp because the boring and offshore cable landing work would be conducted in water depths less than 50 feet and within State waters (see Section 2, *Project Description*), which is substantially inshore of the ocean pink shrimp fishing grounds and within California banned trawling areas. Thus, this fishery is not expected to be affected by Project horizontal directional drilling (HDD) construction methods and landing pipe activities.

[39] Landings – Commercial fish and shellfish that are harvested and brought to port and sold.

Depending on when actual installation of the cable occurs, potential space-time use conflicts with Project work vessels could occur with commercial ocean pink shrimp fishers trawling farther offshore, as the cable is laid and buried. As discussed above, these potential space-time conflicts would last for hours and would occur over very small geographic areas occupied by and surrounding the cable lay ship. Communication with the ocean pink shrimp commercial fishers through implementation of the Fishing Agreement (**APM-1**) would provide the ocean pink shrimp fleet with the planned schedule of Project activities, allowing them to temporarily avoid fishing in those locations and in adjacent waters during the period of cable installation. Once the cable is installed and the lay vessels depart the area, trawling can continue. Surrounding ocean pink shrimp fishing grounds offshore Eureka would remain available for unrestricted harvesting; therefore, Project cable installation activities are not expected to affect the landing of ocean pink shrimp.

<u>Night Smelt</u>

Like the ocean pink shrimp fishery, the night smelt season extends from January to September. The end of the season would overlap with the beginning of the proposed construction period. Because night smelt primarily are fished at night from the surf or beach, the fishery is not expected to be affected by any Project construction activities since no Project activities are planned to occur on the beach at night. During HDD construction work, the landing pipes would pass under the beach and surf zone. Therefore, Project work would not pose any threat to the fishers' activities from the beach in the surf zone.

<u>Dungeness Crab</u>

The Dungeness crab season in Northern California typically begins on December 1 and runs through June to mid-July. The start of the crabbing season is determined by many factors, including negotiations over market price, crab meat fill content after recovering from molting, toxic domoic acid levels in crab meat, fluctuating whale migration routes that can lead to increased whale mortality from crab buoy line entanglement, and other factors (CDFW 2020f). In 2019 for example, the commercial crab season was delayed until December 31 (Lost Coast Staff 2019). The start of the recreational crabbing season also varies annually. The California Department of Fish and Wildlife currently states that the season is expected to re-open on November 7, 2020 (CDFW 2020g).

As indicated above and discussed in more detail in Section 2, *Project Description*, construction activities for all phases of the proposed Project are planned for summer and fall 2021 (Table 2-1). This time window (from mid-July through early to mid-November) is expected and intended to avoid interaction between Project marine-oriented activities and the commercial Dungeness crabbing season. Additionally, most of the commercial crabbing occurs in depths of 48 to 660 feet (CDFW 2020f), which represents only a small distance of planned cable routes installed offshore Eureka. Consequently, potential Project-related interference or interaction with commercial crabbers is expected to be minimal to non-existent. Implementation of **APM-1: Fishing Agreement** (requiring communication with and notification to the commercial crabbing industry in 2021) is specifically intended to prevent or avoid space-use conflicts should Project construction and installation delays result in any substantive or unavoidable overlap with the Dungeness crab fishing season. Therefore, no significant impacts on Dungeness crab landings are expected from Project activities.

Chinook Salmon

Chinook salmon, although not a top tonnage landed species, historically has been a high-revenue commercial and recreational fishery (Pomeroy et al. 2011). Like ocean pink shrimp, Dungeness crab, and night smelt, salmon has a specific fishing season. The commercial and recreational season is scheduled annually based on a review of the previous year's spawning escapements, abundance forecasts, management objectives, and other relevant issues. Unfortunately, opportunities for salmon fishing have become more limited over time (Pomeroy et al. 2011). In 2020, the recreational ocean salmon fishery in the area closed on August 10 (CDFW 2020h), and the commercial fishery will not open offshore Eureka. The status of the 2021 commercial salmon fishery remains unknown. Regardless, commercial salmon fishing is a limited-entry fishery in California and a valid fishing license from the California Department of Fish and Wildlife is required. The Fishing Agreement (**APM-1**) requires notification and communication with the fishing community[40] should any space-time use conflicts occur and provides means for fishers to plan trips outside of active construction areas. Therefore, the Project is not expected to significantly reduce any commercial or recreational salmon landings.

Potential Conflicts by Fishing Gear Type. Based on the types of fishing equipment, methods, seasons, and areas used by a particular fishery, fisheries that use bottom contact (either mobile or fixed) have the greatest potential for negative impacts when needed to move gear to accommodate Project-related construction and installation activities. Of the major fisheries in the Eureka MSA, the Dungeness crab and bottom longline fisheries are the principal fisheries that could be most affected by cable installation or maintenance operations nearshore, and the bottom trawling fisheries could be most affected farther offshore. No routine maintenance is planned nor anticipated for the submerged cable network. Marine cables typically operate for at least 25 years. Because of the stability of the ocean bottom environment, regular maintenance is unnecessary (Section 2.5.2, *Emergency Cable Repair* [*Marine*]). As discussed in more detail in Section 2, *Project Description*, maintenance of the cable generally only occurs in the event of a break in the cable. In the event of a break, the cable/cable ends would be

[40] All fishers are covered by the agreement even if they are not on the Fishing Agreement. The fishers on the Fishing Agreement would be the liaisons and provide communication and coordination with all fishers in their area of responsibility.

recovered in the break area, and the cable would be repaired and reburied. If any maintenance is necessary, commercial fishers would be notified of pending vessel locations and movements through the fishers' liaison committee (**APM-1**) and posted U.S. Coast Guard Notice to Mariners (**MM REC-1**).

Project-related installation operations in the shallower nearshore waters require completion of the offshore end of the landing pipes boring and installation and burial of the cable across the shelf. Operations farther offshore are restricted to cable installation and burial. Overall, the time span and restricted geographic footprint of these activities are limited to hours per day and the ocean surface occupied by the cable lay ship and immediately behind the lay vessel. Implementation of **APM-1** (requiring communication with and notification to the commercial crabbing industry in 2021[41] when the cable would be installed) is specifically intended to prevent space-time use conflicts with not only the Dungeness crab fleet but also all longline and other trap fishers. In addition, during the brief cable installation period that may co-occur with the Dungeness crab, other longline, or other fixed-gear fishing seasons, there may be short-term and localized requests for fishers to move previously installed gear to the north or south of the identified cable route to avoid the cable installation zone. The time spent laying and burying the cable in water depths between 48 and 660 feet would be limited to a few days over a 7- to 8-month fishing season. The potential for interaction with bottom longline and other fixed-bottom gear fisheries during this period would be avoided or minimized by using the established commercial fishers' liaison groups (**APM-1**) to keep commercial fishers in and around Eureka apprised of upcoming Project-related activities. Pre-installation notices would be posted through the U.S. Coast Guard-issued Local Notice to Mariners (**MM REC-1**), and interactions with local fishers' associations would be ongoing.

As described above, bottom trawling gear is another fixed-bottom fishing gear type with some potential to be affected by Project marine-oriented activities. Bottom trawling currently is banned in State waters (NOAA 2020), and the landing pipes and related cable installation activities would occur in State waters under 50 feet of water depth (see Section 2, *Project Description*). Therefore, Project HDD and cable landing activities are not expected to affect bottom trawling fisheries at this depth. However, bottom trawling does occur in the offshore coastal waters of the MSA for ocean pink shrimp, Dover sole, Petrale sole, longnose skate, two species of thornyhead, and other less important fish species. Any potential conflict between bottom trawling for these and other species and Project marine activities would occur during installation and burial of the cable. As mentioned previously, the space-time use conflict between commercial fishers using bottom trawls would last only a few hours within any single day and would occur in a specific water column location occupied by the cable lay ship and for a short distance

[41] The agreement specifically states avoiding the 2021 crab fishery season. After that, the disturbance would be significantly reduced since the cable would be installed. After 2021, the agreement would remain in effect for possible entanglements.

behind the vessel. All ocean surface and ocean floor locations surrounding the area temporarily occupied by the cable lay ship would be available for trawling. As with the other fixed-bottom gear fisheries, potential space-time use conflicts with bottom-trawling fishers would be avoided by early, frequent, and effective communication with area commercial fishers through posting pre-installation notices through the local fishing associations (as required by **APM-1**) and through the U.S. Coast Guard-issued Local Notice to Mariners (**MM REC-1**). Therefore, no significant loss in commercial fish landings by bottom trawl fishers is expected to occur because of Project activities.

Potential Conflicts with Recreational Fishers. The fishing season for the recreational fisheries listed in Table 5-1, other than Dungeness crab, are expected to overlap with the Project's marine construction period. Most of the recreational fishing in the region is hook and line (Table 5-1) that is conducted from shore or in charter or private boats. All recreational fishing from shore would not be affected or restricted by the Project marine components. Fishing from charter boats or private vessels could be affected by the same kind of time-space use conflicts potentially occurring with commercial fishers, as discussed above, but to a much lesser extent as recreational anglers typically restrict their fishing to locations close to shore or port. While some species are widely dispersed, such as various flatfish, most recreational fishers focus their efforts on more valuable species such as rockfish, Cabezon, and lingcod—all of which have limited distributions across specific habitats like seamounts, offshore banks and canyons, estuaries, sea grass beds, kelp stands, and rocky reefs. These HAPCs have been identified along the proposed cable installation routes (AMS 2020) and have been avoided to the greatest extent possible. Those that cannot be avoided are located at significant distances from shore and not expected to be frequented by many recreational fishers, given their distance from shore.

Salmon and tuna also support popular recreational fisheries in the Project area (AMS 2020). These species are recreationally harvested with trolling gear or hook and line. These methods are non-bottom contact, making entanglement with buried cable highly unlikely. Space-time use conflicts between cable installation activities and recreational fishers are expected to be similar in nature and severity as those for the commercial fishing enterprises and fisheries discussed above, resulting in temporary displacement of recreational fishers from limited geographic locations for short periods of time. No significant reduction in recreational fishing landings is expected because of the Project.

In summary, the potential for Project related impacts on commercial and recreational fishing that might reduce landings or catch is determined to be less than significant. Implementation of **APM-1** would ensure that potential impacts would remain at a less than significant level.

Would the Project activities or installations affect 5 percent or more of kelp and aquaculture harvest areas?

No Impact.

At present, there are no offshore aquaculture or mariculture operations or kelp harvest areas within the MSA. Oysters are cultured in Humboldt Bay by multiple companies; these operations, by their physical locations within Humboldt Bay and outside the MSA, are not expected to have any interaction with Project activities. A new land-based salmon/steelhead aquaculture operation has been proposed by Nordic Fish Farms at the former Evergreen pulp mill facility (Humboldt Bay Keeper 2020), which is adjacent to the proposed Project landing location (see Section 2, *Project Description*). The Nordic Fish Farms project is in the planning and permitting stage, and the expected timing of construction and initiation of operations would occur after installation of the proposed Project cable landings (Humboldt Bay Keeper 2020). Finally, the offshore cable installation and operations components of the proposed Project are not expected to interfere with operation of the Nordic Fish Farm onshore aquaculture operations. Therefore, the Project is not expected to affect future aquaculture operations.

Would the Project activities or installations cause a loss in harvesting time due to impacts on living marine resources and habitat or cause a loss of equipment or vessel, damage, or replacement?

Less than Significant Impact.

As presented in Section 3.4.2, *Marine Components,* the Project is not expected to significantly affect marine habitats or associated marine biological resources, including commercially important fishes. Burial of the cable to a target depth of 3.3 feet is expected to result in short-term disturbances of soft substrate marine sediments and associated invertebrate fauna, including some potential for short-term and minimal loss of habitat value of the ocean floor overlying the buried cable. Recovery of infauna is expected to occur rapidly, and the surrounding non-disturbed ocean floor habitat would provide more than adequate foraging and life cycle habitat for commercially important fishes (AMS 2020). Although potential hard substrate is present within the MSA, the cable route always is selected to avoid or minimize the distance required to transit this habitat type, due to technical concerns for the safety of the cable and the potential risk any exposed cable may pose to the environment as well as to commercial fishing activities. If hard substrate cannot be avoided, cable placement on mixed- to moderate-relief hard substrate habitat is not expected to result in any long-term or substantive loss of habitat or habitat value within the MSA. This finding has been documented by recent studies investigating cable installation in soft and hard substrates along the Oregon and California coasts and around the world (AMS 2020). In addition, as noted in Section 3.4.2, *Marine Components*, implementation of **MM BIO-10** and **MM BIO-11** is expected (1) to further reduce any potential impacts of Project cables on hard substrate habitat; and (2) to provide financial compensation for any perceivable impacts that directly pose ecological and fisheries resource impacts on commercial fishers and regional fisheries through the California Lost Fishing Gear Recovery Project.

The United Nations Environment Program International Cable Protection Committee conducted a literature review of recent cable installation impact studies. They concluded that disturbances occurring during the construction period of cable installation activities, when considered in the context of their frequency and extent (geographically) do not cause harmful changes to the marine environment—primarily due to their small size and minimal environmental footprint (Davenport 2012). Based on these study findings, any temporary disturbance of marine habitats resulting from Project cable installation activities offshore Eureka are not expected to result in a substantial loss in fishing time or effort, or to result in significant impacts on marine resources or habitats.

As discussed in detail above, the small footprint of disturbed ocean floor that might occur because of cable installation is insignificant when compared to the comparable undisturbed ocean floor habitat adjacent to and surrounding the cable route that is available for commercial fishing activities. In fact, scientific studies on the impacts of commercial bottom trawling on marine habitat and recovery have shown that these efforts may be more damaging to marine ecosystems than installation and burial of a fiber optic cable, depending on their frequency and longevity of occurrence and the geographic location of the trawling activities (Thrush and Dayton 2002; Sanchez et al. 2000; Lambert et al. 2014; Hixon and Tissot 2007; Engel and Kvitek 1998).

As stated previously, the initial burial of the cable to a depth of 3.3 feet is key to avoiding potential loss of fishing habitat for ocean floor-oriented commercial fisheries as well as possible entanglement and loss of gear. Additionally, given the burial depth of the cable and the water depths through which the cable is routed, the potential for direct contact between the cable and any fishing vessel is essentially non-existent and therefore poses no risk. Ensuring that the cable remains buried is therefore an additional Project concern. As detailed in **APM-3** (see Section 3.4, *Biological Resources*), the Applicant is committed to conducting post-lay surveys immediately following initial installation, every 5 years thereafter until repeated survey data confirm burial, and following a potential cable exposure event. This APM ensures that any cable exposure will be detected and that reburial[42] will occur to prevent the possibility of future fishing gear entanglements.

To reduce potential equipment loss, damage, and entanglement with cable Project infrastructure, the cable would be buried to a depth of 3.3 feet between where the landing pipes exit and to 5,904-foot water depth, where deep water starts (see Section 2, *Project Description*). This burial is required to minimize potential entanglement between the cable

[42] No cable has been exposed in California since 2000. If a cable is exposed, it would be reburied as soon as a vessel is available. In the meantime, fishers would be notified of the issue, and per the agreement, compensation if warranted would be provided.

and commercial and recreational fishing gear, specifically bottom-contact gear such as trawling, longline, and pot or trap equipment. As part of the site-specific geophysical ocean floor mapping for a cable route, potential depth of burial in the nearshore and offshore waters is evaluated. For both cable routes surveyed to date, the potential for burial out to the 5,904-foot depth is excellent. Consequently, gear entanglement with the installed cables is highly unlikely.

Since the 1990s, approximately 32 HDD-based cable landings (landing pipes to pull the cables through) and 23 actual subsea cables have been installed in California, and approximately 14 cable landings and transoceanic cables have been installed in Oregon. Over this roughly 20-year period, there has been only one potential instance of fishing gear entanglement with a cable offshore California. In this case, the fisher was instructed to abandon his gear in lieu of using grappling hooks for recovery and immediately was reimbursed for the loss of his equipment (SBCFLC pers. comm.). Offshore of Oregon, there have been two potential longline fishing gear entanglements that resulted in immediate reimbursement and eight paid claims for entangled bottom trawl gear (Oregon Fishermen’s Cable Committee pers. comm.). As a result of improved communication and coordination between the Oregon Fishermen’s Cable Committee and Oregon trawlers, there have been no claims for potentially entangled gear since 2009 (Oregon Fishermen’s Cable Committee pers. comm.).

In each of these incidents, it is uncertain whether the commercial fishing gear actually was entangled with the buried cable. Because of the proximity of the snagged gear to a buried cable, the coordinating commercial fishers’ cable liaison committee defers to an assumption that gear could be entangled, requires the commercial fishers to abandon their gear, and reimburses them for the loss (Oregon Fishermen’s Cable Committee pers. comm.; SBCFLC pers. comm.; Central California Joint Cable Fisheries/Fisheries Liaison Committee pers. comm.). Although the potential for fishing gear entanglement with buried cables in Eureka is also very unlikely, establishment and support of local commercial fishers’ liaison groups (**APM-1**) strengthens the avoidance of potential entanglements and space-time use conflicts with cable installations or maintenance, provides an efficient mechanism for avoiding potential entanglements or damage to buried cables, and creates a clear and efficient way to reimburse lost or abandoned gear.

The Applicant is actively involved with the regional commercial fishing cable liaison committee (**APM-1**) established for Northern California and specifically the Eureka area, as well as other associations in California and Oregon to enhance communication concerning Project construction and work locations, avoid space-time use conflicts, and establish a process to compensate commercial fishers for lost/abandoned gear near buried cables. The established commercial fishers’ cable liaison committees in both California and Oregon represent and support all commercial fishers operating within their area of responsibility (Oregon Fishermen’s Cable Committee pers. comm.; SBCFLC pers.

comm.; Central California Joint Cable Fisheries/Fisheries Liaison Committee pers. comm.).

In summary, Project-related marine-oriented activities and the methods and approaches used in their execution are not expected to result in any significant impact on marine resources, sensitive or special-status habitats, or cause a loss of significant quantities of commercial or recreational fishing gear. Should commercial fishing gear become entangled with a buried cable or near a buried cable, mechanisms and procedures are established to compensate the commercial fishers for the lost gear.

Would the Project activities or installations result in a significant loss to an essential fish habitat or alter the seafloor in such a manner to reduce the availability of that area to commercial trawling or other commercial gear types?

Less than Significant Impact.

As discussed in greater detail in Section 3.4.2 (*Marine Components*), in Appendix C, and as presented above, cable installation along the northern California coast is expected to result in only short-term impacts on soft substrate and associated biological taxa used for foraging habitat by commercially important fishes. This temporary loss of habitat would be restricted to the few feet of ocean floor where the cable trench is dug, would be refilled after cable placement, and would not affect adjacent ocean floor habitats. Based on recent ocean floor mapping surveys of proposed southern cable routes (EGS 2020) and projected routing of the proposed northern cable routes (Section 3.4.2, *Marine Components*), no hard-bottom habitat is anticipated to be transited. However, if either of the two northern proposed Project cable routes should be required to be installed over hard bottom substrate, as discussed in more detail in Section 3.4.2, *Marine Components,* no significant impact or loss of habitat or forage taxa important to commercial or recreational fishes is expected.

No long-term or permanent loss of habitat for fishes, including EFH, or accessibility to commercial or recreational fishing is anticipated. Proposed cable routes always transit primarily soft substrate habitat where cables would be buried to a 3.3-foot depth to avoid possible entanglements with commercial fishing gear. Implementation of APMs would further ensure minimal Project impact on commercial fishing efforts, grounds, and gear use. Reports from other areas of California and Oregon where commercial fishers' cable liaison organizations are active, state that installation and other cable lay operations have not resulted in any substantive restrictions to commercial fishing activities, gear use, or fishing ground accessibility (Oregon Fishermen's Cable Committee pers. comm.; SBCFLC pers. comm.; Central California Joint Cable Fisheries/Fisheries Liaison Committee pers. comm.). Therefore, the Project is expected to result in a less than significant impact on commercial fishing activities from alterations to EFH or the ocean floor.

5.2.5 Mitigation Summary

Implementation of the following Applicant proposed measures and mitigation measures can be expected to further ensure that any potential Project-related impacts on commercial and recreational fishing remain at a less than significant level:

- APM-1: Fishing Agreement
- APM-3: Cable Burial Surveys
- MM BIO-10: Minimize Crossing of Hard Bottom Substrate
- MM BIO-11: Contribute Compensation to Hard Substrate Mitigation Fund
- MM REC-1: Advanced Local Notice to Mariners

5.3 ENVIRONMENTAL JUSTICE

Environmental justice is defined by California law as “the fair treatment and meaningful involvement of people of all races, cultures, incomes, and national origins, with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies” (Gov. Code, § 65040.12, subd. (e)). This definition is consistent with the Public Trust Doctrine principle that the management of trust lands is for the benefit of all people. CSLC adopted an Environmental Justice Policy in December 2018 (Item 75, December 2018) to ensure that environmental justice is an essential consideration in CSLC’s processes, decisions, and programs.[43] Through its policy, the CSLC reaffirms its commitment to an informed and open process in which all people are treated equitably and with dignity, and in which its decisions are tempered by environmental justice considerations. Among other goals, the policy commits the CSLC to, “Strive to minimize additional burdens on and increase benefits to marginalized and disadvantaged communities resulting from a proposed project or lease.”

5.3.1 U.S. Census Bureau Statistics

Table 5-2 presents income, employment, and race data for the State, County and local study area in the Project vicinity, based on the most recently available information from the U.S. Census Bureau’s 2018 American Community Survey 5-Year Estimates Data Profiles.[44] The local study area is “Census Tract 13,” which covers the Samoa Peninsula and lands to the north, in unincorporated Humboldt County. Data at the block and block group for the Project area is not available.

[43] See https://www.slc.ca.gov/envirojustice/.

[44] U.S. Census 2018 American Community Survey estimates come from a sample population but are more current statistics than the most recent full census of 2010. Because they are based on a sample of population, a certain level of variability is associated with the estimates. Supporting documentation on American Community Survey data accuracy and statistical testing can be found on the American Community Survey website here: https://www.census.gov/newsroom/press-kits/2018/acs-5year.html.

5.3.2 Population and Economic Characteristics

From a regional standpoint, the Project area contains below-average income levels ($39,107) compared to Humboldt County ($45,528) and California as a whole ($67,179) (Table 5-2). The median household income in Census Tract 13 ($39,107) is lower than that of Humboldt County and the State, but the percentage of residents living below the poverty level in Census Tract 13 and Humboldt County is lower than in California overall.

By income, 19.5 percent of the 1,377 residents in Census Tract 13, 20.3 percent of residents in Humboldt County, and 15.1 percent of people in California are living below the poverty level (Table 5-2). Therefore, the population of Census Tract 13 does not appear to be disproportionately burdened by poverty compared to the County as a whole.

By race, 73.6 percent of residents in Census Tract 13 identify as “White,” and 17.7 percent identify as “Hispanic or Latino” (please note that 2010 U.S. Census data is used for Census Tract 13 because 2018 data is unavailable). About 11.3 percent of the County’s population and about 38.8 percent of California’s population are Hispanic or Latino (Table 5-2). People who identified as “White Only” make up 83.3 percent of Census Tract 13 population.[45] If the minority population in Census Tract 13 was over 50 percent, further analysis would be appropriate according to the Council on Environmental Quality. No aspect of the Project would disproportionately affect low-income or minority populations.

5.3.3 California Office of Environmental Health Hazard Assessment CalEnviroScreen Results

According to the California Office of Environmental Health Hazard Assessment California Communities Environmental Health Screening Tool (CalEnviroScreen 3.0) data (OEHHA 2018b), the Project site (within Census Tract 13) has a score in the 45th to 50th percentile, meaning that up to 55 percent of all census tracts in California have greater population vulnerability or environmental burdens (Figure 5-1). The existing pollution burden for this tract is in the 32nd percentile, with groundwater threats, hazardous waste, and solid waste as factors with the highest scores. This tract, with a population of 1,479 (according to CalEnviroScreen 3.0), has a population characteristics (vulnerability) score in the 57th percentile, which represents unemployment, housing burden and poverty components that could result in increased pollution vulnerability. In addition, the population is 73 percent white/non-minority and has low scores for public health concerns such as low birth rate and cardiovascular disease (i.e., heart attacks).

[45] Percentages add up to over 100 percent due to survey respondents reporting more than one race

Table 5-2. Environmental Justice Statistics

Subject		California	Humboldt County	Census Tract 13
Income and Population				
Total population		38,982,847	135,768	1,377
Median household income		$67,179	$45,528	$39,107
Percent below the poverty level[a]		15.1	20.3	19.5
Employment by Industry (by percentage)				
Agriculture, forestry, fishing and hunting, mining		2.3	4.8	4.4
Construction		6.1	6.8	4.4
Manufacturing		9.5	4.2	5.5
Wholesale trade		3.0	2.4	0.4
Retail trade		10.8	13.6	4.8
Transportation and warehousing, and utilities		5.0	3.8	3.6
Information		2.9	1.4	2.2
Finance and insurance, and real estate and rental and leasing		6.2	4.2	3.5
Professional, scientific, and management, and administrative and waste management services		13.2	8.8	10.3
Educational services and health care and social assistance		20.9	25.7	33.5
Arts, entertainment, and recreation, and accommodation and food services		10.4	12.7	8.3
Other services, except public administration		5.3	5.0	8.3
Public administration		4.4	6.7	10.9
Race (by percentage)				
Not Hispanic or Latino	White	37.9	80.1	73.6[b]
	Black	5.8	1.2	0.0[b]
	American Indian	0.7	5.0	3.3[b]
	Asian	14.1	3.1	1.2[b]
	Other	13.7	4.3	11.3[b]
Hispanic or Latino		38.8	11.3	17.7[b]

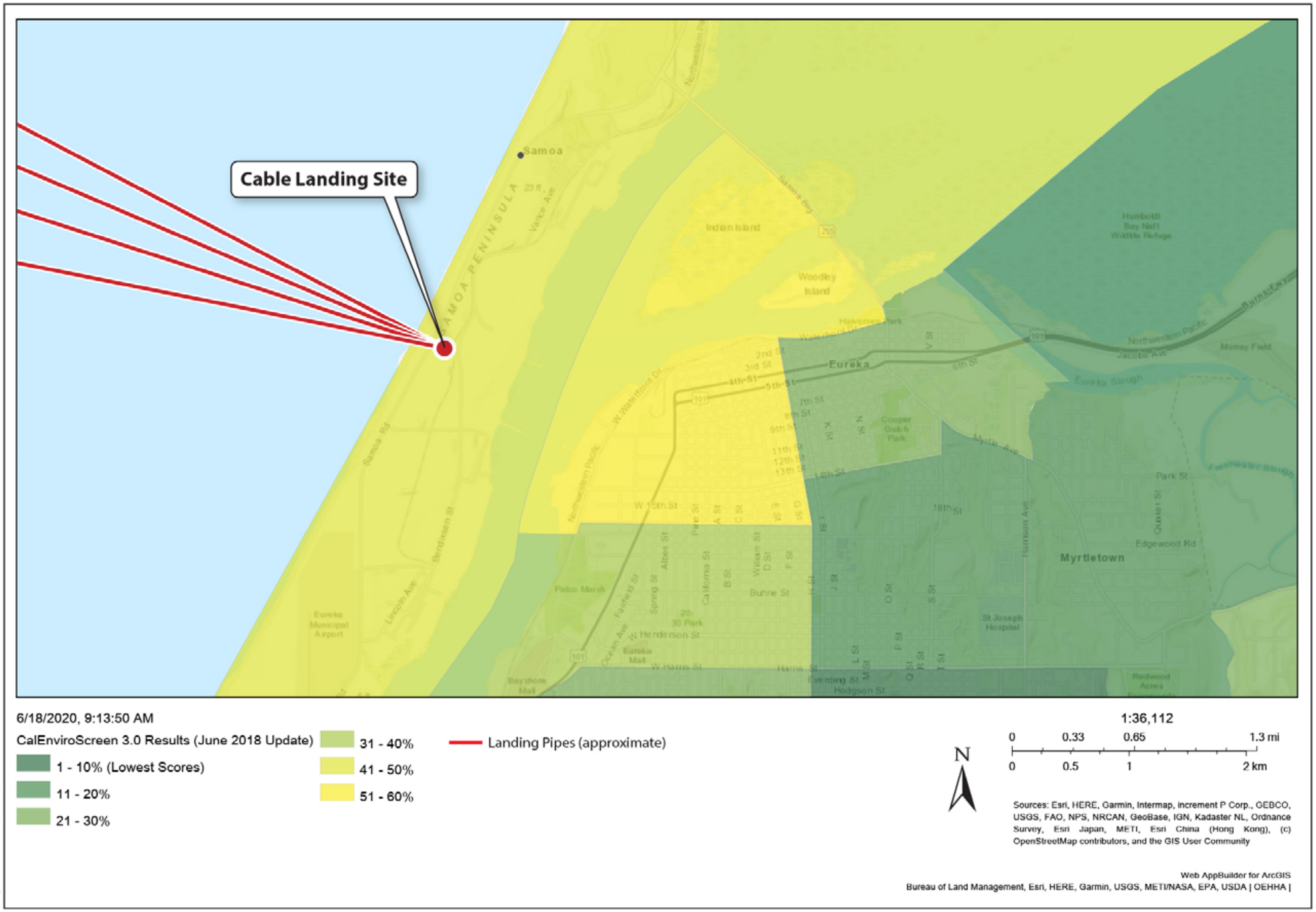
Sources: U.S. Census Bureau 2010, 2018

Notes:

[a] Poverty threshold as defined in the American Community Survey is not a singular threshold but varies by family size. Census data provide the total number of persons for whom the poverty status is determined and the number of people below the threshold. The percentage is derived from these data.

[b] Race and Ethnicity data is not available for Census Tract 13 for 2018; therefore, data from the 2010 Census is used.

Figure 5-1. CalEnviroScreen Assessment



5.3.4 Conclusion

Because the percentage of individuals designated as living below the poverty line in the affected community is not disproportionately higher than in the surrounding area, it does not appear that an environmental justice community would be disproportionately affected by this Project. The construction-related Project's impacts on nearby residential communities (Figure 3.1-1) would be temporary and minor, regardless of their socioeconomic makeup. As noted previously, the closest residences are 0.5 mile away.

6.0 MND PREPARATION SOURCES AND REFERENCES

This Mitigated Negative Declaration was prepared by the staff of the California State Lands Commission's Division of Environmental Planning and Management (DEPM), with assistance from ICF. The analysis in the document is based on information identified, acquired, reviewed, and synthesized based on DEPM guidance and recommendations.

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ICF	
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James Alcorn, Senior Environmental Planner	3.1, Aesthetics; 3.2, Agriculture and Forestry Resources; 3.7, Energy; 3.8, Geology, Soils, and Paleontological Resources; 3.10, Hazards and Hazardous Materials; 3.11, Hydrology and Water Quality; 3.12, Land Use and Planning; 3.13, Mineral Resources; 3.15, Population and Housing; 3.16, Public Services; 3.17, Recreation; 3.18, Transportation; 3.19, Utilities and Service Systems; 3.21, Wildfire; 5.2; 5.3, Environmental Justice
Laura Yoon, Senior Air Quality and Climate Change Manager	3.3, Air Quality; 3.8, Greenhouse Gas Emissions
Jordan Mayor, Senior Biologist (Botany)	3.4, Biological Resources –Terrestrial
Steve Yonge, Senior Biologist (Wildlife)	3.4, Biological Resources –Terrestrial
Steve Pappas, Archaeologist	3.5, Cultural Resources; 3.6, Cultural Resources – Tribal
Cory Matsui, Technical Specialist – Noise	3.14, Noise
Joan Lynn, egret, inc. – Editor	All
Applied Marine Sciences	
Jay Johnson, Ocean Scientist	3.4, Biological Resources – Marine 5.2, Commercial and Recreational Fishing

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APPENDIX A

Abridged List of Major Federal and State Laws, Regulations, and Policies Potentially Applicable to the RTI Infrastructure, Inc. Eureka Subsea Fiber Optic Cables Project

(Updated: February 2021)

Frequently Used Abbreviations

(see also List of Abbreviations and Acronyms in Table of Contents)

§	Section
AB	Assembly Bill
Cal. Code Regs.	California Code of Regulations
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCC	California Coastal Commission
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CO_2; CO_2e	Carbon Dioxide; Carbon Dioxide Equivalent
CSLC	California State Lands Commission
EO	Executive Order
Fed. Reg.	Federal Register
GHG	Greenhouse Gas
MOU	Memorandum of Understanding
NMFS	National Marine Fisheries Service
NOx	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
P.L.	Public Law
Pub. Resources Code	Public Resources Code
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SWRCB	State Water Resources Control Board
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

APPENDIX A MAJOR FEDERAL AND STATE LAWS, REGULATIONS, AND POLICIES

Appendix A identifies major federal and state laws, regulations and policies (local or regional are presented in each issue area (section) potentially applicable to the RTI Infrastructure, Inc. Eureka Subsea Fiber Optic Cables Project.[1]

MULTIPLE ENVIRONMENTAL ISSUES

Multiple Environmental Issues (Federal)
Coastal Zone Management Act (42 U.S.C. § 4321 et seq.)
The Coastal Zone Management Act recognizes a national interest in coastal zone resources and in the importance of balancing competing uses of those resources, giving full consideration to aesthetic, cultural and historic, ecological, recreational, and other values as well as the needs for compatible economic development. Pursuant to the Act, coastal states develop and implement comprehensive coastal management programs, authorities and enforceable policies, and coastal zone boundaries, among other elements. The Act also gives state coastal management agencies regulatory control ("federal consistency" review authority) over federal activities and federally licensed, permitted or assisted activities, if the activity affects coastal resources; such activities include military projects at coastal locations and outer continental shelf oil and gas leasing, exploration and development. The California Coastal Commission (CCC) and San Francisco Bay Conservation and Development Commission (BCDC) coordinate California's federally approved coastal management programs and federal consistency reviews within their respective jurisdictions.

Multiple Environmental Issues (State)
California Environmental Quality Act (CEQA; Pub. Resources Code, § 21000 et seq.)
CEQA requires state and local agencies to identify significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. A public agency must comply with CEQA when it undertakes an activity defined by CEQA as a "project" that must receive some discretionary approval (i.e., the agency has authority to deny the requested permit or approval) which may cause either a direct physical change, or a reasonably foreseeable indirect change, in the environment.

[1] Environmental issue areas are found in State California Environmental Quality Act Guidelines Appendix G (https://www.opr.ca.gov/docs/Appendix_G_AB_52_Update_2016.pdf).

Multiple Environmental Issues (State)
California State Lands Commission (CSLC) and the Common Law Public Trust
The CSLC has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways, as well as certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions (Pub. Resources Code, §§ 6301, 6306). All tidelands and submerged lands, granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the Common Law Public Trust. As general background, the State of California acquired sovereign ownership of all tidelands and submerged lands and beds of navigable lakes and waterways upon its admission to the U.S. in 1850. The State holds these lands for the benefit of all people of the State for statewide Public Trust purposes, which include but are not limited to waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. On tidal waterways, the State's sovereign fee ownership extends landward to the mean high tide line, except for areas of fill or artificial accretion. The CSLC's jurisdiction also includes a section of tidal and submerged land 3 nautical miles wide adjacent to the coast and offshore islands, including bays, estuaries, and lagoons; the waters and underlying beds of more than 120 rivers, lakes, streams, and sloughs; and 1.3 million acres of "school lands" granted to the State by the Federal government to support public education. The CSLC also has leasing jurisdiction, subject to certain conditions, over mineral extraction from State property owned and managed by other State agencies (Pub. Resources Code, § 68910, subd. (b)), and is responsible for implementing a variety of State regulations for activities affecting these State Trust Lands, including implementation of CEQA.
California Coastal Act (Pub. Resources Code, § 30000 et seq.) and California Federal Consistency Program
Pursuant to the Coastal Act, the CCC, in partnership with coastal cities and counties, plans and regulates the use of land and water in the coastal zone. The Coastal Act includes specific policies (see Chapter 3) that address issues such as shoreline public access and recreation, lower cost visitor accommodations, terrestrial and marine habitat protection, visual resources, landform alteration, agricultural lands, commercial fisheries, industrial uses, water quality, oil and gas development, transportation, development design, power plants, ports, and public works. Development activities in the coastal zone generally require a coastal permit from either the CCC or the local government: (1) the CCC retains jurisdiction over the immediate shoreline areas below the mean high tide line and offshore areas to the 3 nautical mile State water limit; and (2) following certification of county- and municipality-developed Local Coastal Programs, the CCC has delegated permit authority to many local governments for the portions of their jurisdictions within the coastal zone. The CCC also implements the Coastal Zone Management Act as it applies to federal activities (e.g., development projects, permits, and licenses) in the coastal zone by reviewing specified federal actions for consistency with the enforceable policies of Chapter 3 of the Coastal Act.

AESTHETICS

There are no major federal laws, regulations, and policies potentially applicable to this project

Aesthetics (State)
California Scenic Highway Program (Sts. & Hy. Code, § 260 et seq.)
The purpose of California's Scenic Highway Program, which was created by the Legislature in 1963 and is managed by the California Department of Transportation (Caltrans), is to preserve and protect scenic highway corridors from change which would diminish the aesthetic value of lands adjacent to highways. State highways identified as scenic, or eligible for designation, are listed in Streets and Highways Code section 260 et seq. A highway's status changes from eligible to officially designated when a local governmental agency has implemented a corridor protection program for an eligible highway that meets the standards of an official scenic highway (Caltrans 2008).
Coastal Act Chapter 3 policies (see *Multiple Environmental Issues*)
The Coastal Act is concerned with protecting the public viewshed, including views from public areas, such as roads, beaches, coastal trails, and access ways. Section 30251 states: 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 landforms, to be visually compatible with the character of the surrounding area, 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. Section 30253 states: New development shall, where appropriate, protect special communities and neighborhoods that, because of their unique characteristics, are popular visitor destination points for recreational uses.

AGRICULTURE AND FORESTRY RESOURCES

There are no major federal laws, regulations, and policies potentially applicable to this project

Agriculture and Forestry Resources (State)
Williamson Act (Gov. Code, §§ 51200-51207)
This Act enables local governments to enter into contracts with private landowners to restrict specific parcels of land to agricultural or related open space use, and provides landowners with lower property tax assessments in return. Local government planning departments are responsible for the enrollment of land into Williamson Act contracts and may also identify compatible uses permitted with a use permit. Generally, any commercial agricultural use would be permitted within any agricultural preserve.
Coastal Act Chapter 3 policies (see *Multiple Environmental Issues*)
The Coastal Act requires the protection of agricultural lands within the coastal zone by requiring that (1) the maximum amount of prime agricultural land be maintained in production to protect the agricultural economy and (2) conflicts between agricultural and urban uses be minimized through the application of development standards that ensure that new development will not diminish agricultural productivity. Development standards include establishing stable urban-rural boundaries, providing agricultural buffers, ensuring that non-agricultural development is directed first to lands not suitable for agriculture, restricting land divisions and controlling public service expansions. (See: Definitions [§§ 30100.2, 30113, 30106]; Agricultural related Policies [§§ 30222, 30241, 30241.5, 30242, 30243, 30250]; and other public access and resource protection policies that apply to projects on agricultural lands.)

AIR QUALITY

Air Quality (Federal)
Federal Clean Air Act (FCAA) (42 U.S.C. § 7401 et seq.)
The FCAA requires the EPA to identify National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. National standards are established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter (PM, or PM10 and PM2.5), and lead. The FCAA mandates that states submit and implement a State Implementation Plan (SIP) for local areas not meeting those standards; plans must include pollution control measures that demonstrate how the standards would be met. Pursuant to the 1990 FCAA amendments, the EPA also regulates hazardous air pollutants (HAPs), which are pollutants that result in harmful health effects, but are not specifically addressed through the establishment of NAAQS. HAPs require the use of the maximum or best available control technology to limit emissions. EPA classifies air basins (or portions thereof) as in "attainment" or "nonattainment" for each criteria air pollutant by comparing monitoring data with State and Federal standards to determine if the NAAQS are achieved. Areas are classified for a pollutant as follows: • "Attainment" – the pollutant concentration is lower than the standard. • "Nonattainment" – the pollutant concentration exceeds the standard. • "Unclassified" – there are not enough data available for comparisons. In 2007, the U.S. Supreme Court ruled that carbon dioxide (CO_2) is an air pollutant as defined under the FCAA, and that the USEPA has authority to regulate greenhouse gas (GHG) emissions. The FCAA allows delegation of the enforcement of many of the federal air quality regulations to the states. In California, the California Air Resources Board (CARB) is responsible for enforcing air pollution regulations in concert with regional air pollution control districts.
Marine Diesel Engine Emission Standards.
In March 2008, the EPA adopted more stringent emission standards for locomotives and marine compression-ignition engines (73 Fed. Reg. 37096 (USEPA 2008a)). To reduce emissions from Category 1 (at least 50 horsepower [hp] but less than 7 liters per cylinder displacement) and Category 2 (7 to 30 liters per cylinder displacement) marine diesel engines, the EPA has established emission standards for new engines, referred to as Tier 2 marine engine standards. The Tier 2 standards were phased in from 2004 to 2007 (year of manufacture), depending on the engine size (EPA 1999). The 2008 final rule includes the first-ever national emission standards for existing marine diesel engines, applying to engines larger than 600 kilowatts (kW) when they are remanufactured. The rule also sets Tier 3 emissions standards for newly built engines that began implementation phase-in in 2009. Finally, the rule establishes Tier 4 standards for newly built commercial marine diesel engines above 600 kW, based on the application of high-efficiency catalytic after-treatment technology that began implementation in 2014. The new diesel marine engine standards will reduce emissions of diesel particulate matter by 90 percent and emissions of nitrogen oxide (NOx) by 80 percent for engines meeting Tier 4 standards, in comparison with engines meeting the current Tier 2 standards. The EPA's three-part program: (1) tightened standards for existing marine diesel engines when they are remanufactured, taking effect as certified remanufacture systems are available starting in 2008; (2) sets near-term emission standards, referred to as Tier 3 standards, for newly built locomotive and diesel marine engines, which reflect the application of currently available technologies to reduce engine-out PM and NOx emissions and phase-in starting in 2009; and (3) applies the final long-term Tier 4 emissions standards to marine diesel engines. These standards are based on the application of high-efficiency catalytic after-treatment technology and would be phased in beginning in 2014 for marine diesel engines. These marine Tier 4 engine standards apply only to commercial marine diesel engines above 600 kW (800 hp) (EPA 2008b).

Air Quality (Federal)
Non-Road Diesel Engine Emission Standards. The EPA has established a series of cleaner emission standards for new off-road diesel engines culminating in the Tier 4 Final Rule of June 2004 (USEPA 2004a). The Tier 1, Tier 2, Tier 3, and Tier 4 standards require compliance with progressively more stringent emission standards. Tier 1 standards were phased in from 1996 to 2000 (year of manufacture), depending on the engine horsepower category. Tier 2 standards were phased in from 2001 to 2006, and the Tier 3 standards were phased in from 2006 to 2008. The Tier 4 standards complement the latest 2007 and later on-road heavy-duty engine standards by requiring 90 percent reductions in diesel particulate matter and NOx when compared against current emission levels. The Tier 4 standards were phased in starting with smaller engines in 2008 until all but the very largest diesel engines were to meet NOx and PM standards in 2015.
On-Road Trucks Emission Standards. To reduce emissions from on-road, heavy-duty diesel trucks, the EPA established a series of cleaner emission standards for new engines, starting in 1988. These emission standards regulations have been revised over time. The latest effective regulation, the 2007 Heavy-Duty Highway Rule, provides for reductions in PM, NOx, and non-methane hydrocarbon emissions that were phased in during the model years 2007 through 2010 (EPA 2000).
National Corporate Average Fuel Economy Standards (CAFÉ) The CAFÉ were first enacted in 1975 to improve the average fuel economy of cars and light duty trucks. On August 2, 2018, the National Highway Traffic Safety Administrative (NHTSA) and EPA proposed to amend the fuel efficiency standards for passenger cars and light trucks and establish new standards covering model years 2021 through 2026 by maintaining the current model year 2020 standards through 2026 (Safer Affordable Fuel-Efficient [SAFE] Vehicles Rule). On September 19, 2019, EPA and NHTSA issued a final action on the One National Program Rule, which is consider Part One of the SAFE Vehicles Rule and a precursor to the proposed fuel efficiency standards. The One National Program Rule enables EPA/NHTSA to provide nationwide uniform fuel economy and GHG vehicle standards, specifically by (1) clarifying that federal law preempts state and local tailpipe GHG standards, (2) affirming NHTSA's statutory authority to set nationally applicable fuel economy standards, and (3) withdrawing California's CAA preemption waiver to set state-specific standards. EPA and NHTSA published their decisions to withdraw California's waiver and finalize regulatory text related to the preemption on September 27, 2019 (84 Federal Register [Fed. Reg.] 51310). California, 22 other states, the District of Columbia, and two cities filed suit against Part One of the SAFE Vehicles Rule on September 20, 2019 (*California et al. v. United States Department of Transportation et a*l., 1:19-cv-02826, U.S. District Court for the District of Columbia). On October 28, 2019, the Union of Concerned Scientists, Environmental Defense Fund (EDF), and other groups filed a protective petition for review after the federal government sought to transfer the suit to the D.C. Circuit (Union of Concerned Scientists v. National Highway Traffic Safety Administration). Opening briefs for the petition are currently scheduled to be completed on November 23, 2020. The lawsuit filed by California and others is stayed pending resolution of the petition. EPA and NTHSA published final rules to amend and establish national CO2 and fuel economy standards on April 30, 2020 (Part Two of the SAFE Vehicles Rule) (85 Fed. Reg. 24174). The revised rule changes the national fuel economy standards for light duty vehicles from 50.4 mpg to 40.5 mpg in future years. California, 22 other states, the District of Columbia filed a petition for review of the final rule on May 27, 2020. The fate of the SAFE Vehicles Rule remains uncertain in the face of pending legal deliberations

Air Quality (State)

California Clean Air Act of 1988 (CCAA)

The CCAA requires all air districts in the State to endeavor, achieve and maintain State ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and particulate matter. CARB sets air quality standards for the State at levels to protect public health and welfare with an adequate margin of safety. The California Ambient Air Quality Standards (CAAQS) are generally stricter than national standards for the same pollutants; California also has standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. The CAAQS describe adverse conditions (i.e., pollution levels must be below these standards before a basin can attain the standard). Air quality is considered in "attainment" if pollutant levels are continuously below or equal to the standards and violate the standards no more than once each year. The 1992 CCAA Amendments divide ozone nonattainment areas into four categories of pollutant levels (moderate, serious, severe, and extreme) to which progressively more stringent requirements apply. CARB also regulates toxic air contaminants (TAC) (pollutants that result in harmful health effects, but are not specifically addressed by air quality standards) using air toxic control measures.

California Air Resources Board Programs, Regulations, and Standards

- **California Diesel Fuel Regulations** (Cal. Code Regs., tit. 13, §§ 2281-2285; Cal. Code Regs., tit. 17, § 93114). In 2004, the CARB set limits on the sulfur content of diesel fuel sold in California for use in on-road and off-road motor vehicles. Harbor craft and intrastate locomotives were later included by a 2004 rule amendment (CARB 2005a). Under this rule, diesel fuel used in motor vehicles except harbor craft and intrastate locomotives has been limited to 500 ppm sulfur since 1993. The sulfur limit was reduced to 15 ppm beginning on September 1, 2006. Diesel fuel used in harbor craft in the SCAB also was limited to 500 ppm sulfur starting January 1, 2006, and was lowered to 15 ppm sulfur on September 1, 2006. Diesel fuel used in intrastate locomotives (switch locomotives) was limited to 15 ppm sulfur starting on January 1, 2007.
- **California Diesel Risk Reduction Plan.** CARB has adopted several regulations that are meant to reduce the health risk associated with on- and off-road and stationary diesel engine operation. This plan recommends many control measures with the goal of an 85 percent reduction in diesel particulate matter emissions by 2020. The regulations noted below, which may also serve to significantly reduce other pollutant emissions, are all part of this risk reduction plan.
- **Commercial Harbor Craft Regulation** requires upgrades to Tier 2 or Tier 3 standards to reduce diesel particulate matter and NOx emissions from diesel engines used on commercial harbor craft (e.g., tugboats, crew and supply vessels, work boats, barges, dredges) operated in California Regulated Waters (internal waters, estuarine waters, ports and coastal waters within 24 nautical miles of the coast)
- **Emission Standards for On-Road and Off-Road Diesel Engines.** Similar to the EPA for on-road and off-road emissions described above, the CARB has established emission standards for new on-road and off-road diesel engines. These regulations have model year based emissions standards for NOx, hydrocarbons, CO, and PM.
- **Heavy Duty Diesel Truck Idling Rule – Heavy Duty Diesel Truck Idling Regulation.** This CARB rule became effective February 1, 2005, and prohibits heavy-duty diesel trucks from idling for longer than 5 minutes at a time, unless they are queuing and provided the queue is located beyond 100 feet from any homes or schools (CARB 2006).
- **In-Use Off-Road Vehicle Regulation** (Cal. Code Regs., tit. 13, § 2449). The State has also enacted a regulation to reduce diesel particulate matter and criteria pollutant emissions from in-use off-road diesel-fueled vehicles. This regulation provides target emission rates for PM and NOx emissions from owners of fleets of diesel-fueled off-road vehicles, and applies to off-road equipment fleets of three specific sizes, as follows:

Air Quality (State)
○ Small Fleet – Fleet or municipality with equipment totaling less than or equal to 2,500 hp, or municipal fleet in lower population area, captive attainment fleet, or non-profit training center regardless of horsepower. ○ Medium Fleet – Fleet with equipment totaling 2,501 to 5,000 hp. ○ Large Fleet – Fleet with equipment totaling more than 5,000 hp, or all State and federal government fleets regardless of total hp. The target emission rates for these fleets are reduced over time. Specific regulation requirements: ○ Limit on idling, requiring a written idling policy, and disclosure when selling vehicles; ○ Require all vehicles to be reported to CARB (using the Diesel Off-Road Online Reporting System, DOORS) and labeled; ○ Restrict the adding of older vehicles into fleets starting on January 1, 2014; and ○ Require fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies (i.e., exhaust retrofits). (CARB 2014) • **Ocean-Going Vessels Fuel Standards.** After January 1, 2014, ocean-going vessels within California Regulated Waters must use fuel with a maximum fuel sulfur content of 0.1 percent (using cleaner marine distillate fuels in larger ocean-going vessels reduces diesel particulate matter, NOx, and SOx emissions) • **Off-Road Mobile Sources Emission Reduction Program.** The CCAA mandates that CARB achieve the maximum degree of emission reductions from all off-road mobile sources (e.g., construction equipment, marine vessels, and harbor craft) to attain state ambient air quality standards. Tier 2, Tier 3, and Tier 4 exhaust emissions standards apply to off-road equipment. In addition, CARB fleet requirements specify how equipment that is already in use can be retrofitted to achieve lower emissions using the CARB-verified retrofit technologies. U.S. Environmental Protection Agency (USEPA) standards for marine compression-ignition engines address NOx and diesel particulate matter emissions, depending on engine size and year of manufacture. Tier 2 standards for marine engines were phased in for model years 2004 to 2007, and Tier 3 standards were phased in for currently available technologies to reduce NOx and PM, starting in 2009. • **Statewide Portable Equipment Registration Program (PERP)**. The PERP establishes a uniform program to regulate portable engines and portable engine-driven equipment units (CARB 2005b). Once registered in the PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts, if the equipment is located at a single location for no more than 12 months. • **Advanced Clean Truck Regulation**: CARB adopted the Advanced Clean Truck Regulation in June 2020 to accelerate a large-scale transition of zero-emission medium-and-heavy-duty vehicles. The regulation requires the sale of zero-emission medium-and-heavy-duty vehicles as an increasing percentage of total annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales would need to be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales. By 2045, every new medium-and-heavy-duty truck sold in California will be zero-emission. Large employers including retailers, manufacturers, brokers, and others are required to report information about shipments and shuttle services to better ensure that fleets purchase available zero-emission trucks.

Air Quality (State)
Health and Safety Code
• **Sections 25531-25543** set forth changes in four areas: (1) provides guidelines to identify a more realistic health risk; (2) requires high-risk facilities to submit an air toxic emission reduction plan; (3) holds air pollution control districts accountable for ensuring that plans achieve objectives; and (4) requires high-risk facilities to achieve their planned emission reductions • **The Air Toxics Hot Spots Information and Assessment Act (§ 44300 et seq.)** provides for the regulation of over 200 toxic air contaminants. Under the act, local air districts may request that a facility account for its toxic air contaminant emissions. Local air districts then prioritize facilities based on emissions; high priority designated facilities must submit a health risk assessment.
Coastal Act Chapter 3 policies (see *Multiple Environmental Issues*)
Section 30253, subdivision (c) requires that new development shall be consistent with requirements imposed by an air pollution control district or CARB as to each development.

BIOLOGICAL RESOURCES

Biological Resources (Federal)
Federal Endangered Species Act (FESA) (7 U.S.C. § 136, 16 U.S.C. § 1531 et seq.)
The FESA, which is administered in California by the USFWS and National Marine Fisheries Service (NMFS), provides protection to species listed as threatened or endangered, or proposed for listing as threatened or endangered. When applicants propose projects with a federal nexus that "may affect" a federally listed or proposed species, the federal agency must (1) consult with the USFWS or NMFS, as appropriate, under Section 7, and (2) ensure that any actions authorized, funded, or carried out by the agency are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of areas determined to be critical habitat. Section 9 prohibits the "take" of any member of a listed species. • **Take –** To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct • **Harass –** An intentional or negligent act or omission that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering • **Harm –** Significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering
Fish and Wildlife Coordination Act of 1958
This Act requires that whenever a body of water is proposed to be controlled or modified, the lead agency must consult with the state and federal agencies responsible for fish and wildlife management (e.g., USFWS, CDFW, and National Oceanic and Atmospheric Administration). The Act allows for recommendations addressing adverse impacts associated with a proposed project, and for mitigating or compensating for impacts on fish and wildlife.

Biological Resources (Federal)
Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. § 1801 et seq.)
The MSA governs marine fisheries management in Federal waters. The MSA was first enacted in 1976 and amended by the Sustainable Fisheries Act of 1996 and the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act in 2007. Amendments require the identification of Essential Fish Habitat (EFH) for federally managed species and the implementation of measures to conserve and enhance this habitat. Any project requiring Federal authorization, such as a U.S. Army Corps of Engineers permit, is required to complete and submit an EFH Assessment with the application and either show that no significant impacts to the essential habitat of managed species are expected or identify mitigations to reduce those impacts. Under the MSA, Congress defined EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. § 1802(10)). The EFH provisions of the MSA offer resource managers a means to heighten consideration of fish habitat in resource management. Federal agencies shall consult with the NMFS regarding any action they authorize, fund, or undertake that might adversely affect EFH (§ 305(b)(2)).
Marine Mammal Protection Act (MMPA) (16 U.S.C. § 1361 et seq.)
The MMPA is designed to protect and conserve marine mammals and their habitats. It prohibits takes of all marine mammals in the U.S. (including territorial seas) with few exceptions. The Act defines "take" as hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." "Harassment" is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild; or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering. The NMFS may issue a take permit under Section 104 if the activities are consistent with the purposes of the MMPA and applicable regulations at 50 CFR, Part 216. The NMFS must also find that the manner of taking is "humane" as defined in the MMPA. If lethal taking of a marine mammal is requested, the applicant must demonstrate that using a non-lethal method is not feasible. In 1994 a simplified process for obtaining "small take" exemptions was added for unintentional taking by incidental harassment only. Under this process, incidental take of small numbers of marine mammals by harassment can be authorized for periods of up to 1 year.
Migratory Bird Treaty Act (MBTA) (16 U.S.C. § 703-712)
The MBTA prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase, or barter, of any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit (50 CFR 21.11). The USFWS issues permits for take of migratory birds for activities such as scientific research, education, and depredation control, but does not issue permits for incidental take of migratory birds.
National Invasive Species Act (NISA) (33 CFR, Part 151, Subpart D)
NISA was originally passed in 1990 as the Nonindigenous Aquatic Nuisance Prevention and Control Act [16 U.S.C. § 4701-4751] and reauthorized, renamed and expanded in 1996. Under its provisions, the U.S. Coast Guard requires ballast water management (i.e., exchange) for vessels entering U.S. waters from outside the 200-nautical-mile U.S. Exclusive Economic Zone. The original Act was established to: (1) prevent unintentional introduction and dispersal of nonindigenous species into Waters of the U.S. through ballast water management and other requirements; (2) coordinate and disseminate information on federally conducted, funded, or authorized research, on the prevention and control of the zebra mussel and other aquatic nuisance species; (3) develop and carry out control methods to prevent, monitor, and control unintentional introductions of nonindigenous species from pathways other than ballast water exchange; (4) understand and minimize economic and ecological impacts of established nonindigenous aquatic nuisance species; and (5) establish a program of research and technology development and assistance to states in the management and removal of zebra mussels.

Biological Resources (Federal)

Executive Orders (EO)

- **EO 11990** requires federal agencies to provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Each agency, to the extent permitted by law, must (1) avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds there is no practical alternative to such construction or the proposed action includes all practical measures to minimize harm to wetlands that may result from such use; (2) take into account economic, environmental and other pertinent factors in making this finding; and (3) provide opportunity for early public review of any plans or proposals for new construction in wetlands.
- **EO 13112** requires federal agencies to use authorities to prevent introduction of invasive species, respond to and control invasions, and provide for restoration of native species and habitat conditions in invaded ecosystems; also established the Invasive Species Council, which prepares a National Invasive Species Management Plan that details and recommends performance-oriented goals and objectives and measures of success for federal agencies
- **EO 13158** requires federal agencies to (1) identify actions that affect natural or cultural resources that are within an MPA; and (2) in taking such actions, to avoid harm to the natural and cultural resources that are protected by a MPA.
- **EO 13186** sets forth responsibilities of federal agencies to protect migratory birds.

Other

- **Bald and Golden Eagle Protection Act** makes it illegal to import, export, take, sell, purchase or barter any bald eagle or golden eagle or parts thereof.
- **Clean Water Act and Rivers and Harbors Act** (*see Hydrology and Water Quality section*)
- **Coastal Zone Management Act** (see Multiple Environmental Issues)
- **Estuary Protection Act (16 U.S.C. § 1221-1226)** authorizes federal agencies to assess the impacts of commercial and industrial developments on estuaries.

Biological Resources (State)

California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.)

The CESA provides for the protection of rare, threatened, and endangered plants and animals, as recognized by the CDFW, and prohibits the taking of such species without its authorization. Furthermore, the CESA provides protection for those species that are designated as candidates for threatened or endangered listings. Under the CESA, the CDFW has the responsibility for maintaining a list of threatened species and endangered species (Fish & G. Code, § 2070). The CDFW also maintains a list of candidate species, which are species that the CDFW has formally noticed as under review for addition to the threatened or endangered species lists. The CDFW also maintains lists of Species of Special Concern that serve as watch lists. Pursuant to CESA requirements, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be present in the project site and determine whether the proposed project will have a significant impact on such species. The CDFW encourages informal consultation on any proposed project that may affect a candidate species. The CESA also requires a permit to take a State-listed species through incidental or otherwise lawful activities (§ 2081, subd. (b))

Lake and Streambed Alteration Program (Fish & G. Code, §§ 1600-1616)

These regulations require that the CDFW: be notified of activities that would interfere with the natural flow of, or substantially alter, the channel, bed, or bank of a lake, river, or stream; determines if the activity may substantially adversely affect an existing fish and wildlife resource; and issue a Streambed Alteration Agreement if applicable.

Biological Resources (State)
Marine Life Protection Act (MLPA) (Fish & G. Code, §§ 2850–2863) Pursuant to this Act, the CDFW established and manages a network of MPAs to, among other goals, protect marine life and habitats and preserve ecosystem integrity. For the purposes of MPA planning, California was divided into five distinct regions (four coastal and San Francisco Bay) each of which had its own MPA planning process. The coastal portion of California's MPA network is now in effect statewide; options for a planning process in San Francisco Bay have been developed for consideration at a future date. The MLPA establishes clear policy guidance and a scientifically sound planning process for the siting and design of MPAs such as: • State Marine Reserves (SMRs), which typically preclude all extractive activities (such as fishing or kelp harvesting) • State Marine Parks (SMPs), which do not allow any commercial extraction • State Marine Conservation Areas (SMCAs), which preclude some combination of commercial and/or recreational extraction
Other relevant California Fish and Game Code sections and Programs/Plans • **Section 1900 et seq.** (California Native Plant Protection Act) is intended to preserve, protect, and enhance endangered or rare native plants in California. Under section 1901, a species is endangered when its prospects for survival and reproduction are in immediate jeopardy from one or more causes. A species is rare when, although not threatened with immediate extinction, it is in such small numbers throughout its range that it may become endangered. The Act includes provisions that prohibit taking of listed rare or endangered plants from the wild and a salvage requirement for landowners. • **Sections 3503 & 3503.5** prohibit take and possession of native birds' nests and eggs from all forms of needless take and provide that it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nests or eggs of any such bird except as otherwise provided by this Code or any regulation adopted pursuant thereto. • **Sections 3511** (birds), **4700** (mammals), **5050** (reptiles and amphibians), & **5515** (fish) designate certain species as "fully protected;" such species, or parts thereof, may not be taken or possessed at any time without permission by the CDFW. • **Section 3513** does not include statutory or regulatory mechanism for obtaining an incidental take permit for the loss of non-game, migratory birds. • **California Aquatic Invasive Species Management Plan** provides a framework for agency coordination and identifies actions to minimize harmful effects of aquatic invasive species.
Marine Invasive Species Act (MISA) (Pub. Resources Code, § 71200 et seq.) (AB 433; Stats. 2003, ch. 491) Originally passed in 2003 and amended several times, the purpose of MISA is to move towards eliminating the discharge of nonindigenous species into waters of the state or waters that may impact waters of the state, based on the best available technology economically achievable. MISA requires mid-ocean exchange or retention of all ballast water and associated sediments for all vessels 300 gross registered tons or more, U.S. and foreign, carrying ballast water into the waters of the state after operating outside state waters. For all vessels 300 gross register tons or more arriving at a California port or place carrying ballast water from another port or place within the Pacific Coast Region, the Act mandates near-coast exchange or retention of all ballast water. MISA also requires completion and submission of Ballast Water Reporting Form 24 hours in advance of each port of call in California, annual submittal of the Hull Husbandry Reporting Form, the keeping of a ballast management plan and logs, and the application of "Good Housekeeping" Practices designed to minimize the transfer and introduction of invasive species. Compliance with MISA is the responsibility of vessel owners/operators. The California State Lands Commission has regulatory authority to manage and enforce MISA.

Biological Resources (State)
Coastal Act Chapter 3 policies *(see Multiple Environmental Issues)*
• **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, recreational, scientific, and educational purposes. • **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. • **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. • **Section 30233 –** applies in part to development activities within or affecting wetlands and other sensitive areas, identifies eight allowable uses, requires projects be the least environmentally damaging feasible alternative, and where applicable, requires feasible and appropriate mitigation. • **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.
Other • California Department of Food and Agriculture's California Noxious and Invasive Weed Action Plan seeks to prevent and control noxious and invasive weeds. • **Wetlands Conservation Policy** – no net loss of wetland acreage; long-term gain in the quantity, quality, and permanence of California's wetlands.

COMMERCIAL AND RECREATIONAL FISHING

Commercial and Recreational Fishing (State)
Coastal Act Chapter 3 Coastal Act Chapter 3 policies applicable to this issue area are: • Section 30234 states: Facilities serving the commercial fishing and recreational boating industries shall be protected and, where feasible, upgraded. Existing commercial fishing and recreational boating harbor space shall not be reduced unless the demand for those facilities no longer exists or adequate substitute space has been provided. Proposed recreational boating facilities shall, where feasible, be designed and located in such a fashion as not to interfere with the needs of the commercial fishing industry. • Section 30234.5 states: The economic, commercial, and recreational importance of fishing activities shall be recognized and protected.

Commercial and Recreational Fishing (State)
Fish and Game Code Section 9002, et seq., prohibits unlawful handling of legally set trap gear.
Other • California Commercial Fishing Laws and Licensing Requirements. Commercial fishing is regulated by a series of laws passed by the Fish and Game Commission and issued each year in a summary document. Seasonal and gear restrictions within the various CDFW Districts, licensing instructions and restrictions, and species-specific fishing requirements are provided in the document. Most of the MPAs have commercial fishing restrictions (based on the designation of each area), which are also listed in the summary document. • California Ocean Sport Fishing Regulations. Each year, the Fish and Game Commission issues regulations on the recreational fishing within the marine waters of the State, specifying the fishing season for species, size and bag limits, and gear restrictions, licensing requirements; a section on fishing restrictions within MPAs is also now included.

CULTURAL AND PALEONTOLOGICAL RESOURCES

Cultural and Paleontological Resources (Federal)
Abandoned Shipwreck Act of 1987 (43 U.S.C. § 2101–2106) and National Park Service (NPS) Abandoned Shipwreck Act Guidelines. Asserts U.S. Government title to three categories of abandoned shipwrecks: those embedded in a state's submerged lands; those embedded in coralline formations protected by a state on its submerged lands, and those located on a state's lands that are included or determined eligible for inclusion in the National Register of Historic Places. The law then transfers title for a majority of those shipwrecks to the respective states, and provides that states develop policies for management of the wrecks so as to protect natural resources, permit reasonable public access, and allow for recovery of shipwrecks consistent with the protection of historical values and environmental integrity of wrecks and sites. The NPS has issued guidelines that are intended to: maximize the enhancement of shipwreck resources; foster a partnership among sport divers, fishermen, archeologists, sailors, and other interests to manage shipwreck resources of the states and the U.S.; facilitate access and utilization by recreational interests; and recognize the interests of individuals and groups engaged in shipwreck discovery and salvage.
Archaeological and Historic Preservation Act (AHPA) The AHPA provides for the preservation of historical and archaeological data that might be irreparably lost or destroyed as a result of (1) flooding, the building of access roads, the erection of workmen's communities, the relocation of railroads and highways, and other alterations of terrain caused by the construction of a dam by an agency of the U.S. or by any private person or corporation holding a license issued by any such agency; or (2) any alteration of the terrain caused as a result of a federal construction project or federally licensed project, activity, or program. This Act requires federal agencies to notify the Secretary of the Interior when they find that any federally permitted activity or program may cause irreparable loss or destruction of significant scientific, prehistoric, historical, or archaeological data. The AHPA built upon national policy, set out in the Historic Sites Act of 1935, "...to provide for the preservation of historic American sites, buildings, objects, and antiquities of national significance...."

Cultural and Paleontological Resources (Federal)
Archaeological Resources Protection Act of 1979 (ARPA) (P.L. 96-95; 93 Stat. 712) The ARPA states that archaeological resources on public or Indian lands are an accessible and irreplaceable part of the nation's heritage and: • Establishes protection for archaeological resources to prevent loss and destruction due to uncontrolled excavations and pillaging; • Encourages increased cooperation and exchange of information between government authorities, the professional archaeological community, and private individuals having collections of archaeological resources prior to the enactment of this Act; • Establishes permit procedures to permit excavation or removal of archaeological resources (and associated activities) located on public or Indian land; and • Defines excavation, removal, damage, or other alteration or defacing of archaeological resources as a "prohibited act" and provides for criminal and monetary rewards to be paid to individuals furnishing information leading to the finding of a civil violation or conviction of a criminal violator. An anti-trafficking provision prohibits interstate or international sale, purchase, or transport of any archaeological resource excavated or removed in violation of a state or local law, ordinance, or regulation. ARPA's enforcement provision provides for criminal and civil penalties against violators of the Act. The ARPA's permitting component allows for recovery of certain artifacts consistent with NPS Federal Archeology Program standards and requirements.
National Historic Preservation Act of 1966 (NHPA) (16 U.S.C. § 470 et seq.) and implementing regulations (Protection of Historic Properties; 36 CFR 800) (applies only to federal undertakings) Archaeological resources are protected through the NHPA and its implementing regulation (Protection of Historic Properties; 36 CFR 800), the AHPA, and the ARPA. This Act presents a general policy of supporting and encouraging the preservation of prehistoric and historic resources for present and future generations by directing federal agencies to assume responsibility for considering the historic resources in their activities. The State implements the NHPA through its statewide comprehensive cultural resource surveys and preservation programs coordinated by the California Office of Historic Preservation (OHP) in the State Department of Parks and Recreation, which also advises federal agencies regarding potential effects on historic properties. The OHP also maintains the California Historic Resources Inventory. The State Historic Preservation Officer (SHPO) is an appointed official who implements historic preservation programs within the State's jurisdictions, including commenting on Federal undertakings. Under the NHPA, historic properties include "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places" (16 U.S.C. § 470w [5]).
Paleontological Resources Preservation Act (16 U.S.C. § 470) Enacted to preserve paleontological resources for current and future generations on federal lands under the jurisdiction of the National Park Service, Bureau of Land Management, Bureau of Reclamation, and USFWS, this Act identifies management requirements, collection requirements, curation requirements, authorizes criminal and civil penalties, rewards and forfeiture.
Executive Order (EO) 13158 EO 13158 requires federal agencies to (1) identify actions that affect natural or cultural resources that are within an MPA; and (2) in taking such actions, to avoid harm to the natural and cultural resources that are protected by a MPA.

Cultural and Paleontological Resources (State)
California Register of Historical Resources (CRHR) The CRHR is “an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the State and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change” (Pub. Resources Code, § 5024.1, subd. (a)). CRHR eligibility criteria are modeled after National Register of Historic Places (NRHP) criteria but focus on resources of statewide significance. Certain resources are determined by the statute to be automatically included in the CRHR, including California properties formally determined to be eligible for, or listed in, the NRHP. To be eligible for the CRHR, a prehistoric or historical period property must be significant at the local, state, or federal level under one or more of the following criteria (State CEQA Guidelines, § 15064.5, subd. (a)(3)): • Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage • Is associated with the lives of persons important in California’s past • Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values • Has yielded, or may be likely to yield, information important in prehistory or history A resource eligible for the CRHR must meet one of the criteria of significance above, and retain enough of its historic character or appearance (integrity) to be recognizable as an historical resource and to convey the reason for its significance. An historic resource that may not retain sufficient integrity to meet the criteria for listing in the NRHP, may still be eligible for listing in the CRHR. Properties listed, or formally designated as eligible for listing, on the National Register are automatically listed on the CRHR, as are certain State Landmarks and Points of Interest. A lead agency is not precluded from determining that the resource may be an historical resource as defined in Public Resources Code sections 5020.1, subdivision (j), or 5024.1 (State CEQA Guidelines, § 15064.5, subd. (a)(4)).
CEQA (Pub. Resources Code, § 21000 et seq.) CEQA section 21084.1 provides that a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. An “historical resource” includes: (1) a resource listed in, or eligible for listing in, the California Register of Historic Resources; (2) a resource included in a local register of historical or identified as significant in an historical resource surveys; and (3) any resource that a lead agency determines to be historically significant for the purposes of CEQA, when supported by substantial evidence in light of the whole record. Historical resources may include archaeological resources. Mitigation measures for significant impacts to historical resources must be identified and implemented if feasible. Two categories of cultural resources are specifically called out in the State CEQA Guidelines. The categories are historical resources (State CEQA Guidelines 15064.5[b]) and unique archaeological sites (State CEQA Guidelines 15064.5[c]; California Public Resources Code [PRC] 21083.2). Different legal rules apply to the two different categories of cultural resources. However, the two categories sometimes overlap where “an archaeological historical resource also qualifies as a “unique archaeological resource.” In such an instance, the more stringent rules for unique archaeological resources apply, as explained below. In most situations, resources that meet the definition of a unique archaeological resource also meet the definition of a historical resource. As a result, it is current professional practice to evaluate cultural resources for significance based on their eligibility for listing in the CRHR.

Cultural and Paleontological Resources (State)
Historical resources are those meeting the following requirements. Resources listed in or determined eligible for listing in the CRHR (State CEQA Guidelines 15064.5[a][1]). Resources included in a local register as defined in PRC Section 5020.1(k), "unless the preponderance of evidence demonstrates" that the resource "is not historically or culturally significant" (State CEQA Guidelines 15064.5[a][2]). Resources that are identified as significant in surveys that meet the standards provided in PRC Section 5024.1[g] (State CEQA Guidelines 15064.5[a][3]). Resources that the lead agency determines are significant, based on substantial evidence (State CEQA Guidelines 15064.5[a][3]).Unique archaeological resources, on the other hand, are defined in PRC Section 21083.2 as a resource that meets at least one of the following criteria. Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information. Has a special and particular quality such as being the oldest of its type or the best available example of its type. Is directly associated with a scientifically recognized important prehistoric or historic event or person. (PRC 21083.2[g]) The process for identifying historical resources is typically accomplished by applying the criteria for listing in the CRHR (14 CCR 4852). This section states that a historical resource must be significant at the local, state, or national level under one or more of the following four criteria. 1) It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage. 2) It is associated with the lives of persons important in our past. 3) It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values. 4) It has yielded, or may be likely to yield, information important in prehistory or history. To be considered a historical resource for the purpose of CEQA, the resource must also have integrity. Integrity is the authenticity of a resource's physical identity, evidenced by the survival of characteristics that existed during the resource's period of significance. Resources, therefore, must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling and association. It must also be judged with reference to the particular criteria under which a resource is eligible for listing in the CRHR (14 CCR 4852[c]). Integrity assessments made for CEQA purposes typically follow the National Park Service guidance used for integrity assessments for NRHP purposes. Even if a resource is not listed or eligible for listing in the CRHR, in a local register of historical resources, or identified in an historical resource survey, a lead agency may still determine that the resource is an historical resource as defined in PRC Section 5020.1j or 5024.1 (State CEQA Guidelines 15064.5[a][4]).

Cultural and Paleontological Resources (State)
Resources that meet the significance criteria and integrity considerations must be considered in the impacts analysis under CEQA. Notably, a project that causes a substantial adverse change in the significance of an historical resource is a project that may have significant impact under CEQA (State CEQA Guidelines 15064.5[b]). A substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired. The significance of an historical resource is materially impaired if the project demolishes or materially alters any qualities as follows. Qualities that justify the inclusion or eligibility for inclusion of a resource on the CRHR (State CEQA Guidelines 15064.5[b][2][A],[C]). Qualities that justify the inclusion of the resource on a local register (State CEQA Guidelines 15064.5[b][2][B]).
Coastal Act Chapter 3 policies (see *Multiple Environmental Issues*) Section 30244 states: Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.
Other • **Public Resources Code section 5097.5** prohibits excavation or removal of any “vertebrate paleontological site or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands” • **Penal Code section 623** provides for the protection of caves, including their natural, cultural, and paleontological contents. It specifies that no “material” (including all or any part of any paleontological item) will be removed from any natural geologically formed cavity or cave

CULTURAL RESOURCES – TRIBAL

Tribal Cultural Resources (Federal)
Native American Graves Protection and Repatriation Act of 1990 (P.L. 101-601; 104 Stat. 3049) • Assigns ownership or control of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that are excavated or discovered on federal lands or tribal lands after passage of the act to lineal descendants or affiliated Indian tribes or Native Hawaiian organizations; establishes criminal penalties for trafficking in human remains or cultural objects; requires federal agencies and museums that receive federal funding to inventory Native American human remains and associated funerary objects in their possession or control and identify their cultural and geographical affiliations within 5 years, and prepare summaries of information about Native American unassociated funerary objects, sacred objects, or objects of cultural patrimony. This is to provide for repatriation of such items when lineal descendants, Indian tribes, or Native Hawaiian organizations request it.
Executive Order (EO) 13007, Indian Sacred Sites EO 13007 requires federal agencies with administrative or legal responsibility to manage federal lands to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sites (to the extent practicable permitted by law and not clearly inconsistent with essential agency functions)

Tribal Cultural Resources (State)
CEQA (Pub. Resources Code, § 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2, and 21084.3) [AB 52 (Gatto, Stats. 2014, Ch. 532)] The AB 52 (effective July 1, 2015) amendments to CEQA relate to consultation with California Native American tribes, consideration of tribal cultural resources, and confidentiality. The definition of tribal cultural resources considers tribal cultural values in addition to scientific and archaeological values when determining impacts and mitigation. AB 52 provides procedural and substantive requirements for lead agency consultation with California Native American tribes and consideration of effects on tribal cultural resources, as well as examples of mitigation measures to avoid or minimize impacts to tribal cultural resources. AB 52 establishes that if a project may cause a substantial adverse change in the significance of a tribal cultural resource, that project may have a significant effect on the environment. Lead agencies must avoid damaging effects to tribal cultural resources, when feasible, and shall keep information submitted by tribes confidential.
Health and Safety Code section 7050.5 This section provides for treatment of human remains exposed during construction; no further disturbance may occur until the County Coroner makes findings as to origin and disposition pursuant to Public Resources Code section 5097.98. The Coroner has 24 hours to notify the Native American Heritage Commission (NAHC) if the remains are determined to be of Native American descent. The NAHC contacts most likely descendants about how to proceed.
Public Resources Code section 5097.98 This section provides (1) a protocol for notifying the most likely descendent from the deceased if human remains are determined to be Native American in origin and (2) mandated measures for appropriate treatment and disposition of exhumed remains.
Executive Order B-10-11 EO B-10-11 establishes as state policy that all agencies and departments shall encourage communication and consultation with California Indian Tribes and allow tribal governments to provide meaningful input into proposed decisions and policies that may affect tribal communities.
Assembly Bill 52 AB 52 (Chapter 532, Statutes of 2014) establishes a formal consultation process for California Native American tribes as part of CEQA and equates significant impacts on tribal cultural resources with significant environmental impacts (PRC 21084.2). PRC Section 21074 defines tribal cultural resources as follows: Sites, features, places, sacred places, and objects with cultural value to descendant communities or cultural landscapes defined in size and scope that are either: Included in or eligible for listing in the CRHR Included in a local register of historical resources A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. Sacred places can include Native American sanctified cemeteries, places of worship, religious or ceremonial sites, and sacred shrines. In addition, both unique and non-unique archaeological resources, as defined in PRC Section 21083.2, can be tribal cultural resources if they meet the criteria detailed above. The lead agency relies upon substantial evidence to make the determination that a resource qualifies as a tribal cultural resource when it is not already listed in the CRHR or a local register.

Tribal Cultural Resources (State)
AB 52 defines a *California Native American Tribe* (Tribe) as a Native American tribe located in California that is on the contact list maintained by the Native American Heritage Commission (PRC 21073). Under AB 52, formal consultation with Tribes is required prior to determining the level of environmental document if a Tribe has requested to be informed by the lead agency of proposed projects and if the Tribe, upon receiving notice of the project, accepts the opportunity to consult within 30 days of receipt of the notice. AB 52 also requires that consultation, if initiated, address project alternatives and mitigation measures for significant effects, if specifically requested by the Tribe. AB 52 states that consultation is considered concluded when either the parties agree to measures to mitigate or avoid a significant effect to tribal cultural resources, or when either the Tribe or the agency concludes that mutual agreement cannot be reached after making a reasonable, good-faith effort. Under AB 52, any mitigation measures recommended by the agency or agreed upon with the Tribe may be included in the final environmental document and in the adopted mitigation monitoring program if they were determined to avoid or lessen a significant impact on a tribal cultural resource. If the recommended measures are not included in the final environmental document, then the lead agency must consider the four mitigation methods described in PRC Section 21084.3 (PRC 21082.3[e]). Any information submitted by a Tribe during the consultation process is considered confidential and is not subject to public review or disclosure. It will be published in a confidential appendix to the environmental document unless the Tribe consents to disclosure of all or some of the information to the public.

ENERGY

Energy (State)
Protection of Underground Infrastructure (California Government Code § 4216)
Protection of Underground Infrastructure code requires that an excavator must contact a regional notification center (i.e., underground service alert) at least 2 days before excavation of any subsurface installations. The underground service alert then notifies utilities that may have buried lines within 1,000 feet of the excavation. Representatives of the utilities must mark the specific location of their facilities within the work area prior to the start of excavation. The construction contractor must probe and expose the underground facilities by hand prior to using power equipment.

GEOLOGY AND SOILS

Geology and Soils (Federal/International)
Building Codes
The design and construction of engineered facilities in California must comply with the requirements of the International Building Code (IBC) and the adoptions of that code by the State of California. The International Building Code sets design standards to accommodate a maximum considered earthquake (MCE), based on a project's regional location, site characteristics, and other factors.

Geology and Soils (State)
Alquist-Priolo Earthquake Fault Zoning Act (Pub. Resources Code, §§ 2621-2630)
This Act requires that "sufficiently active" and "well-defined" earthquake fault zones be delineated by the State Geologist and prohibits locating structures for human occupancy on active and potentially active surface faults. (Note that since only those potentially active faults that have a relatively high potential for ground rupture are identified as fault zones, not all potentially active faults are zoned under the Alquist-Priolo Earthquake Fault Zone, as designated by the State of California.)
California Building Code (Cal. Code Regs., tit. 23)
The California Building Code provides a minimum standard for building design, which is based on the UBC, but is modified for conditions unique to California. The Code, which is selectively adopted by local jurisdictions, based on local conditions, contains requirements pertaining to multiple activities, including: excavation, site demolition, foundations and retaining walls, grading activities including drainage and erosion control, and construction of pipelines alongside existing structures. For example, sections 3301.2 and 3301.3 contain provisions requiring protection of adjacent properties during excavations and require a 10-day written notice and access agreements with adjacent property owners. California's Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS), which are implemented by the California State Lands Commission, are codified in Chapter 31F—Marine Oil Terminals (Cal. Code Regs., tit. 24, § 3101F et seq.).
Seismic Hazards Mapping Act & Mapping Regs (Pub. Resources Code, § 2690; Cal. Code Regs., tit. 14, div. 2, ch. 8, art. 10).
These regulations were promulgated to promote public safety by protecting against the effects of strong ground shaking, liquefaction, landslides, other ground failures, or other hazards caused by earthquakes. The Act requires that site-specific geotechnical investigations be conducted identifying the hazard and formulating mitigation measures prior to permitting most developments designed for human occupancy. California Division of Mines and Geology Special Publication 117, *Guidelines for Evaluating and Mitigating Seismic Hazards in California* (1997), constitutes the guidelines for evaluating seismic hazards other than surface fault-rupture, and for recommending mitigation measures as required by Public Resources Code section 2695, subdivision (a). The Act does not apply offshore as the California Geological Survey has not zoned offshore California under the Act.
Coastal Act Chapter 3 policies *(see Multiple Environmental Issues)*
With respect to geological resources, Section 30253 requires, in part, that: New development shall: (a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard; and (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. Section 30243 also states in part that the long-term productivity of soils and timberlands shall be protected.
Coastal Development Permit
The Coastal Development Permit is the regulatory mechanism used to ensure that proposed developments in the coastal zone are in compliance with the policies of Chapter 3 of the Coastal Act. In Mendocino County, a permit application is reviewed by the Coastal Permit Administrator to determine if it can be processed administratively or if it must be processed as a Coastal Development Standard Permit. Granting of the permit requires a public hearing by the Planning Commission or Coastal Permit Administrator.

GREENHOUSE GAS EMISSIONS

Greenhouse Gas Emissions (Federal & International)
Federal Clean Air Act (FCAA) (42 U.S.C. § 7401 et seq.)
In 2007, the U.S. Supreme Court ruled that carbon dioxide (CO_2) is an air pollutant as defined under the FCAA, and that the EPA has authority to regulate GHG emissions.
Mandatory Greenhouse Gas Reporting (74 Fed. Reg. 56260)
On September 22, 2009, the EPA issued the Mandatory Reporting of Greenhouse Gases Rule, which requires reporting of GHG data and other relevant information from large sources (industrial facilities and power plants that emit more than 25,000 metric tons of carbon dioxide–equivalent ($MTCO_2e$) emissions per year) in the U.S. The purpose of the Rule is to collect accurate and timely GHG data to inform future policy decisions. The Rule is referred to as 40 CFR Part 98 (Part 98). Gases covered by implementation of Part 98 (GHG Reporting Program) are: CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers.
Kyoto Protocol, Paris Climate Agreement, and Under2 Coalition
On March 21, 1994, the Kyoto Protocol, the first international agreement to regulate GHG emissions, was signed. The Kyoto Protocol was a treaty made under the United Nations Framework Convention on Climate Change. If the commitments outlined in the Kyoto Protocol are met, global GHG emissions would be reduced by 5 percent from 1990 levels during the commitment period of 2008 to 2012. The U.S. was a signatory to the Kyoto Protocol; however, Congress has not ratified it and the U.S. is not bound by the Protocol's commitments. In April 2016, 174 states (including the United States) and the European Union signed Paris Climate Agreement. The overarching goal is to reduce pollution levels so that the rise in global temperatures is limited to no more than 2º Celsius (3.6º Fahrenheit). The Agreement includes voluntary commitments to cut or limit the growth of their GHG emissions and provide regular and transparent reporting of every country's carbon reductions. On November 4, 2019, President Donald Trump formally notified the United Nations that the United States would withdraw from the Paris Agreement. This announcement begins a one-year process for exiting the deal, which can occur no sooner than November 2020. The Under2 Coalition is an international coalition of jurisdictions that signed the Global Climate Leadership Memorandum of Understanding (Under2 MOU) following President Trump's decision to withdraw from the Paris Agreement. The Under2 MOU aims to limit global warming to 2°C, to limit GHGs to below 80 to 95% below 1990 levels, and/or achieve a per capita annual emissions goal of less than 2 metric tons by 2050. The Under2 MOU has been signed or endorsed by 135 jurisdictions (including California) that represent 32 countries and 6 continents.

Greenhouse Gas Emissions (State)
Sustainable Communities and Climate Protection Act of 2008 (SB 375, Chapter 728, Statutes of 2008)
Adopted in September 2008, SB 375 provides a new planning process to coordinate community development and land use planning with regional transportation plans in an effort to reduce sprawling land use patterns and dependence on private vehicles and thereby reduce vehicle miles traveled (VMT) and GHG associated with VMT. SB 375 is one major tool being used to meet the goals in the Global Warming Solutions Act (AB 32). Under SB 375, CARB sets GHG emission reduction targets for 2020 and 2035 for the metropolitan planning organizations in the state. Each metropolitan planning organization must then prepare a sustainable communities strategy that meets the GHG emission reduction targets set by CARB. The sustainable communities strategy has been incorporated into the region's regional transportation plan.

Greenhouse Gas Emissions (State)
California Global Warming Solutions Act of 2006 (AB 32, Stats. 2006, ch. 488)
Under AB 32, CARB is responsible for monitoring and reducing GHG emissions in the State and for establishing a statewide GHG emissions cap for 2020 based on 1990 emissions levels. CARB has adopted the AB 32 Climate Change Scoping Plan (Scoping Plan), initially approved in 2008 and updated in 2014, which contains the main strategies for California to implement to reduce CO_2e emissions by 169 million metric tons (MMT) from the State's projected 2020 emissions level of 596 MMT CO_2e under a business-as-usual scenario. The Scoping Plan breaks down the amount of GHG emissions reductions CARB recommends for each emissions sector of the State's GHG inventory, but does not directly discuss GHG emissions generated by construction activities.
Senate Bill 32, Stats. 2016, ch. 249)
The update made by SB 32 requires a reduction in statewide GHG emissions to 40 percent below 1990 levels by 2030 to meet the target set in EO B-30-15. The 2017 Climate Change Scoping Plan provides a path to meet the SB 32 GHG emissions reduction goals and provides several GHG emissions reduction strategies to meet the 2030 interim GHG emissions reduction target including implementation of the Sustainable Freight Action Plan, Diesel Risk Reduction Plan, Renewable Portfolio Standard (50 percent by 2030), Advanced Clean Cars policy, and Low Carbon Fuel Standard
Clean Energy and Pollution Reduction Act (SB 350; Stats. 2015, ch. 547)
This Act requires that the amount of electricity generated and sold to retail customers from renewable energy resources be increased to 50 percent by December 31, 2030, and that statewide energy efficiency savings in electricity and natural gas by retail customers be doubled by January 1, 2030.
Senate Bill 100 The state's existing renewables portfolio standard requires all retail sellers to procure a minimum quantity of electricity products from eligible renewable energy resources so that the total kilowatt-hours of those products sold to their retail end-use customers achieve 25 percent of retail sales by December 31, 2016 (achieved), 33 percent by December 31, 2020, 40 percent by December 31, 2024, 45 percent by December 31, 2027, and 50 percent by December 31, 2030 (as extended by SB 350). SB 100 revises and extends these renewable resource targets to 50 percent by December 31, 2026, 60 percent December 31, 2030, and 100 percent by December 31, 2045.
SB 97 (Stats. 2007, ch. 185)
Pursuant to SB 97, the State Office of Planning and Research prepared and the Natural Resources Agency adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. Effective as of March 2010, the revisions to the CEQA Environmental Checklist Form (Appendix G) and the Energy Conservation Appendix (Appendix F) provide a framework to address global climate change impacts in the CEQA process; State CEQA Guidelines section 15064.4 was also added to provide an approach to assessing impacts from GHGs. As discussed in State CEQA Guidelines section 15064.4, the determination of the significance of GHG emissions calls for a careful judgment by the lead agency, consistent with the provisions in section 15064. Section 15064.4 further provides that a lead agency should make a good-faith effort, to the extent possible, on scientific and factual data, to describe, calculate, or estimate the amount of GHG emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:

Greenhouse Gas Emissions (State)
• Use a model or methodology to quantify GHG emissions resulting from a project, and determine which model or methodology to use. The lead agency has discretion to select the model or methodology it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; and/or • Rely on a qualitative analysis or performance based standards. • Section 15064.4 also advises a lead agency to consider the following factors, among others, when assessing the significance of impacts from GHG emissions on the environment: the extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting; whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions
Other Legislation • **AB 1493** (Stats. 2002, ch. 200) required CARB to develop and implement regulations (stricter emissions standards) to reduce automobile and light truck GHG emissions beginning with model year 2009 • **AB 2800** (Stats. 2016, ch. 580) requires, in part, that state agencies, until 2020, take into account current and future climate change impacts when planning, designing, building, operating, maintaining, and investing in infrastructure • **SB 375** (Stats. 2008, ch. 728; effective 2009) required CARB to develop regional GHG emission reduction targets in regions covered by California's 18 metropolitan planning organizations (MPOs) and required the 18 MPOs to develop regional land use and transportation plans and demonstrate an ability to attain the proposed reduction targets by 2020 and 2035 • **SB 1383** (Stats. 2016, ch. 395) requires CARB to approve and begin implementing its Short-Lived Climate Pollutant Reduction Strategy by January 1, 2018, to achieve a 40 percent reduction in methane, 40 percent reduction in hydrofluorocarbon gases, and 50 percent reduction in anthropogenic black carbon by 2030, relative to 2013 levels • **SB 1425** (Stats. 2016, ch. 596) requires the California Environmental Protection Agency to oversee the development of a registry of GHG emissions resulting from the use of water, such as pumping, treatment, heating, and conveyance (the water-energy nexus), using the best available data • **SB 605** directed CARB, in coordination with other State agencies and local air districts, to develop a comprehensive Short-Lived Climate Pollutant (SLCP) Reduction Strategy • **SB 1383** directed CARB to approve and implement the SLCP Reduction Strategy to achieve the reductions in SLCPs. • **SB 743** required revisions to the CEQA Guidelines that establish new impact analysis criteria for the assessment of a project's transportation impacts. The intent behind SB 743 and revising the CEQA Guidelines is to integrate and better balance the needs of congestion management, infill development, active transportation, and GHG emissions reduction

Greenhouse Gas Emissions (State)

Executive Orders (EOs)

- **EO B-30-15** (Governor Brown, 2015) established a new interim statewide GHG emission reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030 to ensure California meets its target to reduce GHG emissions to 80 percent below 1990 levels by 2050. State agencies with jurisdiction over sources of GHG emissions to implement measures were also directed pursuant to statutory authority, to achieve GHG emissions reductions to meet the 2030 and 2050 targets.
- **EO S-21-09** (Governor Schwarzenegger, 2009) directed CARB to adopt a regulation consistent with the goal of EO S-14-08
- **EO S-14-08** (Governor Schwarzenegger, 2008) required all retail suppliers of electricity in California to serve 33 percent of their load with renewable energy by 2020.
- **EO S-13-08** (Governor Schwarzenegger, 2008) directed state agencies to take specified actions to assess and plan for impacts of global climate change, particularly sea-level rise
- **EO S-01-07** (Governor Schwarzenegger, 2007) set a low carbon fuel standard for California, and directed the carbon intensity of California's transportations fuels to be reduced by at least 10 percent by 2020
- **EO S-3-05** (Governor Schwarzenegger, 2005) directed reductions in GHG emissions to 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050
- **EO B-55-18 (**Governor Brown, 2018) establishes a new state goal to achieve carbon neutrality as soon as possible, and no later than 2045, and to achieve and maintain net negative emissions thereafter.

HAZARDS AND HAZARDOUS MATERIALS

Hazards and Hazardous Materials (Federal)

California Toxics Rule (40 CFR 131)

In 2000, the USEPA promulgated numeric water quality criteria for priority toxic pollutants and other water quality standards provisions to be applied to waters in California to protect human health and the environment. Under Clean Water Act section 303(c)(2)(B), the USEPA requires states to adopt numeric water quality criteria for priority toxic pollutants for which the USEPA has issued criteria guidance, and the presence or discharge of which could reasonably be expected to interfere with maintaining designated uses. These federal criteria are legally applicable in California for inland surface waters, enclosed bays, and estuaries.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C., Ch. 103)

CERCLA, commonly known as Superfund, provides broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA establishes requirements concerning closed and abandoned hazardous waste sites, provides for liability of persons responsible for releases of hazardous waste at these sites, and establishes a trust fund to provide for cleanup when no responsible party could be identified. CERCLA was amended by the Superfund Amendments and Reauthorization Act on October 17, 1986.

Occupational Safety and Health Act of 1970

Congress created the Occupational Safety and Health Administration (OSHA) to assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance. OSHA has entered into an agreement with California under which California regulations covers all private sector places of employment within the state with certain exceptions.

Hazards and Hazardous Materials (Federal)

Resource Conservation and Recovery Act (RCRA) (42 U.S.C. § 6901 et seq.)

The RCRA authorizes the USEPA to control hazardous waste from “cradle-to-grave” (generation, transportation, treatment, storage, and disposal). RCRA Hazardous and Solid Waste Amendments from 1984 include waste minimization, phasing out land disposal of hazardous waste, and corrective action for releases. The Department of Toxic Substances Control is the lead state agency for corrective action associated with RCRA facility investigations and remediation.

Toxic Substances Control Act (TSCA) (15 U.S.C. § 2601–2692)

The TSCA authorizes the USEPA to require reporting, record-keeping, testing requirements, and restrictions related to chemical substances and/or mixtures. It also addresses production, importation, use, and disposal of specific chemicals, such as polychlorinated biphenyls (PCBs), asbestos-containing materials, lead-based paint, and petroleum.

Other Relevant Laws, Regulations, and Recognized National Codes and Standards

- **33 CFR, Navigation and Navigable Waters** regulates aids to navigation, vessel operations, anchorages, bridges, security of vessels, waterfront facilities, marine pollution financial responsibility and compensation, prevention and control of releases of materials (including oil spills) from vessels, ports and waterways safety, boating safety, and deep-water ports
- **46 CFR parts 1 through 599 and Inspection and Regulation of Vessels (46 U.S.C. Subtitle II Part B)** provide that all commercial (e.g., passengers for hire, transport of cargoes, hazardous materials, and bulk solids) vessels operating offshore on specified routes (inland, near coastal, and oceans), including those under foreign registration, are subject to requirements applicable to vessel construction, condition, and operation. These regulations also allow for inspections to verify that vessels comply with applicable international conventions and U.S. laws and regulations.
- **Act of 1980 to Prevent Pollution from Ships** requires ships in U.S. waters, and all U.S. ships to comply with International Convention for the Prevention of Pollution from Ships (MARPOL)
- **Clean Water Act** (see Hydrology and Water Quality section)
- **Convention on the International Regulations for Preventing Collisions at Sea** establishes “rules of the road” such as rights-of-way, safe speed, actions to avoid collision, and procedures to observe in narrow channels and restricted visibility
- Hazardous Materials Transportation Act (*see Transportation/Traffic section*)
- **Safety and Corrosion Prevention Requirements** — ASME, National Association of Corrosion Engineers (NACE), ANSI

Hazards and Hazardous Materials (State)

California Occupational Safety and Health Act of 1973 and California Code of Regulations, title 8

California employers have many different responsibilities under the Cal/OSHA Regulations. The following represents several requirements**:**

- Establish, implement and maintain an Injury and Illness Prevention Program and update it periodically to keep employees safe.
- Inspect workplace(s) to identify and correct unsafe and hazardous conditions.
- Make sure employees have and use safe tools and equipment and properly maintain this equipment.
- Provide and pay for personal protective equipment.
- Use color codes, posters, labels or signs to warn employees of potential hazards.

Hazards and Hazardous Materials (State)
Clean Coast Act of 2005 (SB 771; Stats. 2005, ch. 588)
This Act (effective January 1, 2006) includes requirements to reduce pollution of California waters from large vessels, such as by: prohibiting and reporting of discharges of hazardous wastes, other wastes, or oily bilge water into California waters or a marine sanctuary; and prohibiting and reporting discharges of grey water and sewage into California waters from vessels with sufficient holding-tank capacity or vessels capable of discharging grey water or sewage to available shore-side reception facilities.
Coastal Act Chapter 3 policies (see *Multiple Environmental Issues*)
Section 30232 of the Coastal Act addresses hazardous materials spills and states that “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.”
Other
• **Hazardous Waste Control Act (Health & Saf. Code, ch. 6.5 & Cal. Code Regs., tit. 22 and 26)** establishes criteria for defining hazardous waste and its safe handling, storage, treatment, and disposal (law is designed to provide cradle-to-grave management of hazardous wastes and reduce the occurrence and severity of hazardous materials releases) • **Hazardous Material Release Response Plans and Inventory Law** (Health & Saf. Code, ch. 6.95) is designed to reduce the occurrence and severity of hazardous materials releases. This State law requires businesses to develop a Release Response Plan for hazardous materials emergencies if they handle more than 500 pounds, 55 gallons, or 200 cubic feet of hazardous materials. In addition, the business must prepare a Hazardous Materials Inventory of all hazardous materials stored or handled at the facility over the above thresholds, and all hazardous materials must be stored in a safe manner. • **California Code of Regulations, title 8, division 1** sets forth the Permissible Exposure Limit, the exposure, inhalation or dermal permissible exposure limit for numerous chemicals. Included are chemicals, mixture of chemicals, or pathogens for which there is statistically significant evidence, based on at least one study conducted in accordance with established scientific principles, that acute or chronic health effects may occur in exposed employees. Title 8 sections 5191 and 5194 require a Hazard Communication Plan to ensure both employers and employees understand how to identify potentially hazardous substances in the workplace, understand the associated health hazards, and follow safe work practices. • **California Code of Regulations, title 19, division 2** establishes minimum statewide standards for Hazardous Materials Business Plans. • **California Code of Regulations, title 22, division 4.5** regulates hazardous wastes and materials by implementation of a Unified Program to ensure consistency throughout the state in administration requirements, permits, inspections, and enforcement by Certified Unified Program Agencies (CUPAs) • **California Code of Regulations, title 24, part 9 (Fire Code regulations) –** state hazardous materials should be used and storage in compliance with the state fire codes • **Porter-Cologne Water Quality Control Act** (*see Hydrology and Water Quality section)* • Seismic Hazards Mapping Act/Regulations (*see Geology and Soils section)*

HYDROLOGY AND WATER QUALITY

Hydrology and Water Quality (Federal)

Federal Clean Water Act (CWA) (33 U.S.C. § 1251 et seq.)

The CWA is comprehensive legislation (it generally includes the Federal Water Pollution Control Act of 1972, its supplementation by the CWA of 1977, and amendments in 1981, 1987, and 1993) that seeks to protect the nation's water from pollution by setting water quality standards for surface water and by limiting the discharge of effluents into waters of the U.S. These water quality standards are promulgated by the USEPA and enforced in California by the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs). CWA sections include:

- **Section 303(d) (33 U.S.C. § 1313)** requires states to list waters that are not attaining water quality standards, which is known as the 303(d) List of impaired waters. These requirements have lead to the development of total maximum daily load (TMDL) guidance at the state level through the SWRCB and various RWQCBs.
- **Section 305(b) (33 U.S.C. § 1315)** requires states to assess and report on the water quality status of waters within the states.
- **Section 316(b) (33 U.S.C. § 1326)** was implemented by the SWRCB regulating the entrainment and impingement of marine life related to power generating facility intake structures. The policy establishes technology-based standards to reduce the harmful effects associated with ocean cooling water intake structures on marine and estuarine life. The policy applies to existing power plants that can withdraw from State coastal and estuarine waters using a single-pass system ("once-through cooling"). Closed-cycle wet cooling has been selected as best technology available. Permittees must either reduce intake flow and velocity or reduce impacts to aquatic life comparably by other means.
- **Section 401 (33 U.S.C. § 1341)** specifies that any applicant for a federal permit or license to conduct any activity which may result in any discharge into the navigable waters of the U.S. to obtain a certification or waiver thereof from the state in which the discharge originates that such a discharge will comply with established state effluent limitations and water quality standards. U.S. Army Corps of Engineers projects are required to obtain this certification.
- **Section 402 (33 U.S.C. § 1342)** establishes conditions and permitting for discharges of pollutants under the National Pollutant Discharge Elimination System) (NPDES). Under the NPDES Program, states establish standards specific to water bodies and designate the types of pollutants to be regulated, including total suspended solids and oil; all point sources that discharge directly into waterways are required to obtain a permit regulating their discharge. NPDES permits fall under the jurisdiction of the SWRCB or RWQCBs when the discharge occurs within state waters (out to 3 nautical miles).
- **Section 403 (33 U.S.C. § 1343)** provides permit issuance guidelines for ocean discharge. Section 403 provides that point source discharges to the territorial seas, contiguous zone, and oceans are subject to regulatory requirements in addition to the technology – or water quality-based requirements applicable to typical discharges. These requirements are intended to ensure that no unreasonable degradation of the marine environment will occur as a result of the discharge and to ensure that sensitive ecological communities are protected.
- **Section 404 (33 U.S.C. § 1344)** authorizes the U.S. Army Corps of Engineers to issue permits for the discharge of dredged or fill material into waters of the U.S., including wetlands, streams, rivers, lakes, coastal waters or other water bodies or aquatic areas that qualify as waters of the U.S.

Hydrology and Water Quality (Federal)

Marine Protection, Research, and Sanctuary Act (16 U.S.C. § 1431 et seq. and 33 U.S.C. § 1401 et seq.)

In 1972, this Act established the National Marine Sanctuary Program, administered by the National Oceanic and Atmospheric Administration, which has a primary goal to establish and maintain National Marine Sanctuaries and protect natural and cultural resources contained within their boundaries.

Rivers and Harbors Act (33 U.S.C. § 401)

This Act governs specified activities in "navigable waters" (waters subject to the ebb and flow of the tide or that are presently used, have been used in the past, or may be susceptible for use to transport interstate or foreign commerce). Section 10 provides that construction of any structure in or over any navigable water of the U.S., or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters, is unlawful unless the U.S. Army Corps of Engineers approves the work and issues a Rivers and Harbors Act section 10 Permit (which may occur concurrently with Clean Water Act Section 404 permits).

National Flood Insurance Program

In response to the increasing cost of disaster relief, Congress passed the National Flood Insurance Program (NFIP) of 1968 and the Flood Disaster Protection Act of 1973. FEMA administers the NFIP to provide subsidized flood insurance to communities that comply with FEMA regulations to limit development in floodplains. A FIRM is an official FEMA-prepared map of a community. It is used to delineate both the SFHAs and the flood-risk premium zones that are applicable to the community.

Other

- **Marine Plastic Pollution Research and Control Act** prohibits the discharge of plastic, garbage, and floating wood scraps within 3 nautical miles of land. Beyond 3 nautical miles, garbage must be ground to less than 1 inch, but discharge of plastic and floating wood scraps is still restricted. This Act requires manned offshore platforms, drilling rigs, and support vessels operating under a federal oil and gas lease to develop waste management plans.
- **Navigation and Navigable Waters (33 CFR) regulations** include requirements pertaining to prevention and control of releases of materials from vessels (e.g., oil spills), traffic control, and restricted areas, and general ports and waterways safety

Hydrology and Water Quality (State)

Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.) (Porter-Cologne)

Porter-Cologne is the principal law governing water quality in California. The Act established the SWRCB and nine RWQCBs, which have primary responsibility for protecting water quality and beneficial uses of state waters. Porter-Cologne also implements many provisions of the federal Clean Water Act, such as the NPDES permitting program. Pursuant to Clean Water Act section 401, applicants for a federal license or permit for activities that may result in any discharge to waters of the U.S. must seek a Water Quality Certification from the state in which the discharge originates; such Certification is based on a finding that the discharge will meet water quality standards and other appropriate requirements of state law. In California, RWQCBs issue or deny certification for discharges within their jurisdiction. The SWRCB has this responsibility where projects or activities affect waters in more than one RWQCB's jurisdiction. If the SWRCB or a RWQCB imposes a condition on its Certification, those conditions must be included in the federal permit or license. Plans that contain enforceable standards for the various waters they address include the following:

Hydrology and Water Quality (State)
• Basin Plan. Porter-Cologne (see § 13240) requires each RWQCB to formulate and adopt a Basin Plan for all areas within the region. Each RWQCB must establish water quality objectives to ensure the reasonable protection of beneficial uses, and an implementation program for achieving water quality objectives within the basin plan. In California, the beneficial uses and water quality objectives are the state's water quality standards. • California Ocean Plan (see § 13170.2) establishes water quality objectives for California's ocean waters and provides the basis for regulating wastes discharged into ocean and coastal waters. The plan applies to point and non-point sources. In addition, the Ocean Plan identifies applicable beneficial uses of marine waters and sets narrative and numerical water quality objectives to protect beneficial uses. The SWRCB first adopted this plan in 1972, and it reviews the plan at least every 3 years to ensure that current standards are adequate and are not allowing degradation to indigenous marine species or posing a threat to human health. • Other: Water Quality Control Plan for Enclosed Bays and Estuaries of California; Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan); and San Francisco Bay/Sacramento-San Joaquin Delta Estuary Water Quality Control Plan. RWQCBs also oversee on-site treatment of "California Designated, Non-Hazardous Waste" and enforces water quality thresholds and standards set forth in the Basin Plan. Applicants may be required to obtain a General Construction Activities Storm Water Permit under the NPDES program, and develop and implement a Storm Water Pollution Prevention Plan (SWPPP) that includes best management practices to control erosion, siltation, turbidity, and other contaminants associated with construction activities. The SWPPP would include best management practices to control or prevent the release of non-storm water discharges, such as crude oil, in storm water runoff.
NPDES General Construction Stormwater Permit The General NPDES Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-006-DWQ) (Construction General Permit) regulates stormwater discharges related to construction activities. Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that, in total, disturbs 1 or more acres, are required to obtain coverage under the Construction General Permit. The Construction General Permit requires development and implementation of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP must list best management practices (BMPs) that the discharger will use to reduce or eliminate pollutants associated with construction activities in stormwater runoff and document the placement and maintenance of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "nonvisible" pollutants, to be implemented in case of a BMP failure; and a monitoring plan for turbidity and pH for projects that meet defined risk criteria. The requirements of the SWPPP are based on the construction design specifications detailed in the final design plans of a project and the hydrology and geology of the site expected to be encountered during construction. The local or lead agency requires proof of coverage under the Construction General Permit prior to building permit issuance. The SWPPP is submitted to the State Water Board, and a copy is kept at the jobsite where it is updated during different phases of construction. The SWPPP must be available for inspection and review upon request.
State Water Board Phase II MS4 Permit Somoa is not within a Humboldt County Phase II MS4 Permit area (https://webgis.co.humboldt.ca.us/HCEGIS2.0/).

Hydrology and Water Quality (State)
Surface and Submerged Lands Lease Agreement The California State Lands Commission (CSLC) has exclusive jurisdiction over all of California's tidelands and submerged lands as well as the beds of naturally navigable rivers and lakes, sovereign lands, swamp and overflow lands, and state school lands (proprietary lands). CSLC has statutory authority (Division 6 of the California Resources Code) to approve appropriate uses for public property rights within these sovereign lands, such as water-borne commerce, navigation, fisheries, open space, recreation, or other recognized public trust purposes. CSLC management responsibilities include activities within submerged lands (from the mean high-tide line) as well as activities within an area 3 nautical miles offshore. These activities include oil and gas development, harbor development and management oversight, construction and operation of offshore pipelines or other facilities, dredging, reclamation, use of filled sovereign lands, topographical and geological studies, and other activities that occur on these lands. CSLC also surveys and maintains the title records of all state sovereign lands and settles issues regarding title and jurisdiction.
Coastal Act Chapter 3 policies (see *Multiple Environmental Issues*) Section 30231 states that 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.
Harbors and Navigation Code sections 650-674 This code specifies a State policy to "promote safety for persons and property in and connected with the use and equipment of vessels," and includes laws concerning marine navigation that are implemented by local city and county governments. This Code also regulates discharges from vessels within territorial waters of the State of California to prevent adverse impacts on the marine environment. This code regulates oil discharges and imposes civil penalties and liability for cleanup costs when oil is intentionally or negligently discharged to the waters of the State of California.
Marine Life Management Act The Marine Life Management Act of 1999 is a plan for managing fisheries and other marine life in the State.
Marine Life Protection Act (MLPA) (Fish & G. Code, §§ 2850–2863) Pursuant to this Act, the CDFW established and manages a network of Marine Protected Areas (MPAs) to, among other goals, protect marine life and habitats and preserve ecosystem integrity.
Marine Managed Areas Improvement Act. This Act established the California Marine Managed Areas System, extended State Parks' management jurisdiction into the marine environment, and gives priority to MPAs adjacent to protected terrestrial lands. For example, more than 25 percent of the California coastline is within the State Park System.

Hydrology and Water Quality (State)
Other sections
• Lake and Streambed Alteration Program (Fish & G. Code, §§ 1600-1616) (see *Biological Resources* section) • Water Code section 8710 requires that a reclamation board permit be obtained prior to the start of any work, including excavation and construction activities, if projects are located within floodways or levee sections. Structures for human habitation are not permitted within designated floodways • Water Code section 13142.5 provides marine water quality policies stating that wastewater discharges shall be treated to protect present and future beneficial uses, and, where feasible, to restore past beneficial uses of the receiving waters. The highest priority is given to improving or eliminating discharges that adversely affect wetlands, estuaries, and other biologically sensitive sites; areas important for water contact sports; areas that produce shellfish for human consumption; and ocean areas subject to massive waste discharge.

LAND USE AND PLANNING

Land Use and Planning (Federal)
Coastal Zone Management Act (see *Multiple Environmental Issues*)

Land Use and Planning (State)
Submerged Lands Act
The State of California owns tide and submerged lands waterward of the ordinary high watermark. State law gives primary responsibility for determination of the precise boundary between these public tidelands and private lands, and administrative responsibility over state tidelands, to the CSLC. Access and use of state shoreline areas can be obtained through purchase or lease agreements.
Coastal Act Chapter 3 policies (see *Multiple Environmental Issues*)
• **Section 30220 –** Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses. • **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. • **Section 30222 –** The use of private lands suitable for visitor-serving commercial recreational facilities designed to enhance public opportunities for coastal recreation shall have priority over private residential, general industrial, or general commercial development, but not over agriculture or coastal-dependent industry. • **Section 30223 –** Upland areas necessary to support coastal recreational uses shall be reserved for such uses, where feasible. • **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.

MINERAL RESOURCES

Mineral Resources (State)
Surface Mining and Reclamation Act (SMARA) (Pub. Resources Code, §§ 2710-2796).
The California Department of Conservation is the primary agency with regard to mineral resource protection. The Department, which is charged with conserving earth resources (Pub. Resources Code, §§ 600-690), has five program divisions: California Geological Survey (CGS); Division of Oil, Gas, and Geothermal Resources; Division of Land Resource Protection; State Mining and Geology Board (SMGB); and Division of Mine Reclamation. SMGB develops policy direction regarding the development and conservation of mineral resources and reclamation of mined lands. In accordance with SMARA, CGS classifies the regional significance of mineral resources and assists in designating lands containing significant aggregate resources. Four Mineral Resource Zones (MRZs) are designated to indicate the significance of mineral deposits. • MRZ-1 – Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence • MRZ-2 – Areas where adequate information indicates significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence • MRZ-3 – Areas containing mineral deposits the significance of which cannot be evaluated from available data • MRZ-4 – Areas where available information is inadequate for assignment to any other MRZ
The Warren-Alquist Act
This act was adopted in 1974 to encourage conservation of non-renewable energy resources.

NOISE

Noise (Federal)
Noise Control Act (42 U.S.C. § 4910) and NTIS 550\9-74-004, 1974
The Noise Control Act required the USEPA to establish noise emission criteria and noise testing methods (40 CFR Chapter 1, Subpart Q). These criteria generally apply to interstate rail carriers and to some types of construction and transportation equipment. In 1974, the USEPA provided guidance in NTIS 550\9-74-004 (“Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety;” referenced as the “Levels Document”) that established an L_{dn} of 55 dBA as the requisite level, with an adequate margin of safety, for areas of outdoor uses including residences and recreation areas. The recommendations do not consider technical or economic feasibility (i.e., the document identifies safe levels of environmental noise exposure without consideration for achieving these levels or other potentially relevant considerations), and therefore should not be construed as standards or regulations.
NTIS 550\9-74-004, 1974
In response to a Federal mandate, the USEPA provided guidance in NTIS 550\9-74-004, 1974 (“Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety”), commonly referenced as the “Levels Document” that establishes an Ldn of 55 dBA as the requisite level, with an adequate margin of safety, for areas of outdoor uses including residences and recreation areas. The USEPA recommendations contain a factor of safety and do not consider technical or economic feasibility (i.e., the document identifies safe levels of environmental noise exposure without consideration for achieving these levels or other potentially relevant considerations), and therefore should not be construed as standards or regulations.

Noise (State)
Land Use Compatibility Guidelines from the now defunct California Office of Noise Control
State regulations for limiting population exposure to physically and/or psychologically significant noise levels include established guidelines and ordinances for roadway and aviation noise under the California Department of Transportation and the now defunct California Office of Noise Control. Office of Noise Control land use compatibility guidelines provided the following: • For residences, an exterior noise level of 60 to 65 dBA Community Noise Equivalent Level (CNEL) is considered "normally acceptable;" a noise level of greater than 75 dBA CNEL is considered "clearly unacceptable." • A noise level of 70 dBA CNEL is considered "conditionally acceptable" (i.e., the upper limit of "normally acceptable" for sensitive uses [schools, libraries, hospitals, nursing homes, churches, parks, offices, commercial/professional businesses]).
Other
• **California Code of Regulations, title 24** establishes CNEL 45 dBA as the maximum allowable indoor noise level resulting from exterior noise sources for multi-family residences.

POPULATION AND HOUSING

There are no major federal or state laws, regulations, and policies potentially applicable to this project

PUBLIC SERVICES

Public Services (Federal)
CFR Title 29
• **29 CFR 1910.38** requires an employer, when required by an Occupational Safety and Health Administration (OSHA) standard, to have an Emergency Action Plan that must be in writing, kept in the workplace, and available to employees for review • **29 CFR 1910.39** requires an employer to have a Fire Prevention Plan (FPP) • **29 CFR 1910.155, Subpart L, Fire Protection** requires employers to place and keep in proper working order fire safety equipment within facilities

Public Services (State)
California Code of Regulations, title 19 (Public Safety)
California State Fire Marshal regulations establish minimum standards for the prevention of fire and for protection of life and property against fire, explosion, and panic.

RECREATION

There are no major federal laws, regulations, and policies potentially applicable to this project

Recreation (State)
Coastal Act Chapter 3 policies (see *Multiple Environmental Issues*)
• **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 • **Section 30220 –** Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses • **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 • **Section 30222.5 –** Oceanfront land that is suitable for coastal dependent aquaculture shall be protected for that use, and proposals for aquaculture facilities located on those sites shall be given priority, except over other coastal dependent developments or uses
Other
• **California Ocean Sport Fishing Regulations.** Each year, the Fish and Game Commission issues regulations on the recreational fishing within State marine waters. These regulations specify season, size and bag limits, gear restrictions, as well as licensing requirements. Following the development of the MPAs, a section on fishing restrictions within the MPAs was also included.

TRANSPORTATION / TRAFFIC

Transportation / Traffic (Federal)
Hazardous Materials Transportation Act (HMTA) (49 U.S.C. § 5901)
The HMTA delegates authority to the U.S. Department of Transportation to develop and implement regulations pertaining to the transport of hazardous materials and hazardous wastes by all modes of transportation. The USEPA's Hazardous Waste Manifest System is a set of forms, reports, and procedures for tracking hazardous waste from a generator's site to the disposal site. Applicable regulations are contained primarily in CFR Titles 40 and 49.
Ports and Waterways Safety Act
This Act provides the authority for the U.S. Coast Guard to increase vessel safety and protect the marine environment in ports, harbors, waterfront areas, and navigable waters, including by authorizing the Vessel Traffic Service, controlling vessel movement, and establishing requirements for vessel operation.

Transportation / Traffic (State)
California Vehicle Code
Chapter 2, article 3 defines the powers and duties of the California Highway Patrol, which enforces vehicle operation and highway use in the State. The California Department of Transportation is responsible for the design, construction, maintenance, and operation of the California State Highway System and the portion of the Interstate Highway System within State boundaries.
Caltrans has the discretionary authority to issue special permits for the use of California State highways for other than normal transportation purposes. Caltrans also reviews all requests from utility companies, developers, volunteers, nonprofit organizations, and others desiring to conduct various activities within the California Highway right of way. The Caltrans Highway Design Manual, prepared by the Office of Geometric Design Standards (Caltrans 2012), establishes uniform policies and procedures to carry out the highway design functions of Caltrans. Caltrans has also prepared a Guide for the Preparation of Traffic Impact Studies (Caltrans 2002). Objectives for the preparation of this guide include providing consistency and uniformity in the identification of traffic impacts generated by local land use proposals.
Harbors and Navigation Code sections 650-674
This code specifies a policy to "promote safety for persons and property in and connected with the use and equipment of vessels," and includes laws concerning marine navigation that are implemented by local city and county governments. This Code also regulates discharges from vessels within territorial waters of the State of California to prevent adverse impacts on the marine environment. This code regulates oil discharges and imposes civil penalties and liability for cleanup costs when oil is intentionally or negligently discharged to state waters.

UTILITIES AND SERVICE SYSTEMS

Utilities and Service Systems (Federal)
CFR Title 29 (see *Public Services*)

Utilities and Service Systems (State)
California Integrated Waste Management Act (AB 939; Stats. 1989, ch. 1095)
AB 939 mandates management of non-hazardous solid waste throughout California. Its purpose includes: reduce, recycle, and reuse solid waste generated in the state to the maximum extent feasible; improve regulation of existing solid waste landfills; ensure that new solid waste landfills are environmentally sound; streamline permitting procedures for solid waste management facilities; and specify local government responsibilities to develop and implement integrated waste management programs. AB 939 policies preferred waste management practices include the following. The highest priority is to reduce the amount of waste generated at its source (source reduction). Second is to reuse, by extending the life of existing products and recycling those wastes that can be reused as components or feed stock for the manufacture of new products, and by composting organic materials. Source reduction, reuse, recycling and composting are jointly referred to as waste diversion methods because they divert waste from disposal. Third is disposal by environmentally safe transformation in a landfill. All local jurisdictions, cities, and counties must divert 50 percent of the total waste stream from landfill disposal by the year 2000 and each year thereafter (with 1990 as the base year).

Utilities and Service Systems (State)
California Code of Regulations, title 19 (Public Safety)
Title 19, sets standards for the prevention of fire and protection of property and life by the Seismic Safety Commission, Office of Emergency Services, and Office of the Fire Marshall. It also contains guidelines and standards for general fire, construction, explosives, emergency management, earthquakes, and fire.
Coastal Act Chapter 3 policies (see *Multiple Environmental Issues*)
• **Section 30254 –** New or expanded public works facilities shall be designed and limited to accommodate needs generated by development or uses permitted consistent with the provisions of this division; provided, however, that it is the intent of the Legislature that State Highway Route 1 in rural areas of the coastal zone remain a scenic two-lane road. Special districts shall not be formed or expanded except where assessment for, and provision of, the service would not induce new development inconsistent with this division. Where existing or planned public works facilities can accommodate only a limited amount of new development, services to coastal-dependent land use, essential public services and basic industries vital to the economic health of the region, state, or nation, public recreation, commercial recreation, and visitor-serving land uses shall not be precluded by other development.

APPENDIX B

Air Quality and Greenhouse Gas Analysis Methodology and Results

APPENDIX B AIR QUALITY AND GREENHOUSE GAS ANALYSIS METHODOLOGY AND RESULTS

This appendix discusses the approach and methodology used to assess construction emissions associated with the proposed Project. The analysis evaluates daily and yearly emissions generated by terrestrial equipment and vehicles, and by marine activities within 24 nautical miles (nm) of the shore. Emissions analyzed include criteria pollutants of ozone precursors (reactive organic gases [ROGs] and nitrogen oxides [NOx]), carbon monoxide (CO), particulate matter (PM10 and PM2.5), and sulfur dioxide (SO_2); and greenhouse gases (GHG) of carbon dioxide (CO_2), methane (CH_4), and nitrous oxides (N_2O).

As discussed in Section 3.3., *Air Quality,* in the Initial Study/Mitigated Negative Declaration (MND), the criteria pollutant impact analysis is limited to emissions generated with 3 nm from the U.S. coastline. This is consistent with the regulatory authority of the California State Lands Commission (CSLC) under the California Environmental Quality Act (CEQA).

As discussed in Section 3.9, *Greenhouse Gases,* in the MND, the GHG impact analysis extends to 24 nm from the U.S. coastline. While this distance goes beyond the area typically analyzed in CEQA documents (3 nm), the CLSC has conservatively elected to analyze emissions up to 24 nm for consistency with the State's GHG emissions inventory and reduction planning goals.

Data and assumptions for the two analyses (3 nm and 24 nm) are included in the following sections and labeled as such, where applicable. Criteria pollutant emissions within 24 nm from the U.S. coastline are included for informational purposes at the end of this appendix.

B.1 CONSTRUCTION

Construction of the proposed Project requires both terrestrial (i.e., on land) and marine activities. Terrestrial activities include directional boring, fiber optic cable (cable) pulling, and construction of landing vaults. These activities would generate criteria pollutant and GHG emissions from off-road equipment (e.g., backhoes) and vehicles used for employee commuting and hauling. Fugitive dust and ROGs also would be generated by earthmoving (e.g., minor grading of the cable landing site) activities. Marine activities include laying and burying the cables. Vessels used to support these activities include a main lay vessel, dive support vessels, and a workboat.

The following sections summarize the methods used to assess each of the terrestrial and marine emission sources. An overview of the construction schedule also is provided.

B.1.1 Schedule

Each of the cables would be installed in four separate phases. Construction on the first cable is expected to begin in July 2021. Even if the work schedule changes beyond July 2021, it would not change the number of working days (Tables 1 and 2). Table 1 summarizes the construction equipment and vehicle working durations assumed in the emissions modeling for terrestrial and marine construction within 3 nm from the U.S. coastline. Table 2 summarizes the construction schedule for marine activities between 3 and 24 nm from the U.S. coastline.

Table 1. Schedule for Terrestrial and Marine Construction within 3 Nautical Miles from the U.S. Coastline

Phase and Description		Working Days
Phase 1 (2021)		
1-1	Terrestrial conduit installation	5
1-2	Landing Pipes – marine	28
1-3	Installation of ocean ground bed and landing vaults	14
1-6	Pre-lay grapnel run	1
1-7	Marine cable landing	1
1-8	Marine cable lay	1
1-9	Marine cable burial (diver-assisted)	2
1-10	Marine cable burial (ROV-assisted)	2
1-11	Worker/delivery	54
Phase 2 (2022)		
2-1	Ocean ground bed installation	5
2-4	Pre-lay grapnel run	1
2-5	Marine cable landing	1
2-6	Marine cable lay	1
2-7	Marine cable burial (diver-assisted)	2
2-8	Marine cable burial (ROV-assisted)	2
2-9	Worker/delivery	12
Phase 3 (2023)		
3-1	Ocean ground bed installation	5
3-4	Pre-lay grapnel run	1
3-5	Marine cable landing	1
3-6	Marine cable lay	1
3-7	Marine cable burial (diver-assisted)	2
3-8	Marine cable burial (ROV-assisted)	2
3-9	Worker/delivery	12

Table 1. Schedule for Terrestrial and Marine Construction within 3 Nautical Miles from the U.S. Coastline

Phase and Description		Working Days
Phase 4 (2024)		
4-1	Ocean ground bed installation	5
4-4	Pre-lay grapnel run	1
4-5	Marine cable landing	1
4-6	Marine cable lay	1
4-7	Marine cable burial (diver-assisted)	2
4-8	Marine cable burial (ROV-assisted)	2
4-9	Worker/delivery	12

Source: Brungardt pers. comm.

Term:

ROV = remotely operated vehicle

Note:

The phase descriptions and durations may differ slight from what is presented in Table 2-1 in the Chapter 2, *Project Description* in the main document. The phase names are specific to the air quality modeling assumptions. Likewise, the durations are reflective of expected equipment and vessel working days, as opposed to the overall phase length, which is presented in Table 2-1.

Table 2. Schedule for Marine Construction between 3 and 24 Nautical Miles

Phase and Description		Working Days
Phase 1 (2021)		
1-6	Pre-lay grapnel run	2
1-8	Marine cable lay	6
1-10	Marine cable burial (ROV-assisted)	4
Phase 2 (2022)		
2-4	Pre-lay grapnel run	2
2-6	Marine cable lay	6
2-8	Marine cable burial (ROV-assisted)	4
Phase 3 (2023)		
3-4	Pre-lay grapnel run	2
3-6	Marine cable lay	6
3-8	Marine cable burial (ROV-assisted)	4
Phase 4 (2024)		
4-4	Pre-lay grapnel run	2
4-6	Marine cable lay	6
4-8	Marine cable burial (ROV-assisted)	4

Source: Brungardt pers. comm.

Term:

ROV = remotely operated vehicle

Note:

The phase descriptions and durations may differ slight from what is presented in Table 2-1 in the Chapter 2, *Project Description* in the main document. The phase names are specific to the air quality modeling assumptions. Likewise, the durations are reflective of expected vessel working days, as opposed to the overall phase length, which is presented in Table 2-1.

B.1.2 Models and Methods for Emissions Quantification

Criteria pollutant and GHG emissions generated by construction of the proposed Project were assessed using standard and accepted models and tools. Combustion exhaust, and fugitive dust (PM10 and PM2.5) were estimated using a combination of emission factors and methodologies from CalEEMod, Version 2016.3.2; the California Air Resources Board's (CARB) EMFAC2017 model (https://arb.ca.gov/emfac/) and marine vessel guidance; and the U.S. Environmental Protection Agency's (EPA) (2006, 2011) *AP-42 Compilation of Air Pollutant Emission Factors* (AP-42) based on Project-specific construction data (e.g., schedule, equipment, and truck volumes). The following sections describe the quantification approach for each of the primary emission sources.

B.1.2.1 Off-Road Equipment

Emission factors for off-road construction equipment (e.g., loaders, graders, and bulldozers) were obtained from the CalEEMod (Version 2016.3.2) User's Guide appendix, which provides values per unit of activity (in grams per horsepower-hour) (Trinity Consultants 2017).[1] Pollutants were estimated by multiplying the CalEEMod emission factors by the equipment inventory shown in Table 3. Model defaults were assumed for equipment horsepower and load factors, except for the drill rig used during terrestrial boring. This equipment was assumed to use a 600-horsepower engine. All off-road equipment would be used for terrestrial construction (i.e., on land).

Table 3. Off-Road Equipment Inventory for Terrestrial Construction

Phase	Equipment	#/Day	Hours/Day	Horsepower
1-1	Concrete/industrial saws	1	2	81
1-1	Tractors/loaders/backhoes	1	8	97
1-1	Rollers	1	2	80
1-1	Plate compactors	1	1	8
1-2	Bore/drill rigs	1	10	600
1-2	Excavators	1	2	158
1-2	Welders	1	8	46
1-2	Generator sets	1	10	84
1-3	Tractors/loaders/backhoes	1	8	97
1-3	Bore/drill rigs	1	4	221
1-3	Plate compactors	1	1	8
2-1	Tractors/loaders/backhoes	1	8	97
2-1	Bore/drill rigs	1	4	221
2-1	Plate compactors	1	1	8

[1] CalEEMod does not include emission factors for N_2O. Emissions of N_2O were determined by scaling CO_2 emissions by the ratio of N_2O/CO_2 (0.000025) emissions expected per gallon of diesel fuel according to the Climate Registry (2019).

Table 3. Off-Road Equipment Inventory for Terrestrial Construction

Phase	Equipment	#/Day	Hours/Day	Horsepower
3-1	Tractors/loaders/backhoes	1	8	97
3-1	Bore/drill rigs	1	4	221
3-1	Plate compactors	1	1	8
4-1	Tractors/loaders/backhoes	1	8	97
4-1	Bore/drill rigs	1	4	221
4-1	Plate compactors	1	1	8
1-7	Tractors/loaders/backhoes	1	4	97
1-7	Other general industrial equipment	1	8	88
1-7	Cranes	1	2	231
1-7	Generator sets	1	4	84
2-5	Tractors/loaders/backhoes	1	4	97
2-5	Other general industrial equipment	1	8	88
2-5	Cranes	1	2	231
2-5	Generator sets	1	4	84
3-5	Tractors/loaders/backhoes	1	4	97
3-5	Other general industrial equipment	1	8	88
3-5	Cranes	1	2	231
3-5	Generator sets	1	4	84
4-5	Tractors/loaders/backhoes	1	4	97
4-5	Other general industrial equipment	1	8	88
4-5	Cranes	1	2	231
4-5	Generator sets	1	4	84

Source: Brungardt pers. comm.

B.1.2.2 On-Road Vehicles

On-road vehicles include vehicles used for material and equipment hauling, employee commuting, and onsite crew and material movement. Exhaust emissions from on-road vehicles were estimated using the EMFAC2017 emissions model. CARB's SAFE Vehicles Rule adjustment factors (CARB 2019, 2020) were applied to the emission factors for gasoline-powered vehicles. Emission factors for delivery and tractor trailer trucks were based on aggregated-speed emission rates for EMFAC's T7 Single and T7 Tractor vehicle categories, respectively. Emission factors for employee commute vehicles were based on a weighted average for all vehicle speeds for EMFAC's LDA/LDT vehicle categories. One-way employee commute trip lengths were conservatively assumed to be 50 miles. Offsite pick-up trucks required for crew movement and fuel delivery trucks were modeled using EMFAC's LDT and T6 Instate Heavy vehicle categories, respectively.

Emission factors for on-site trucks were based on 5 miles per hour emission rates. On-site dump trucks were modeled using EMFAC's T7 Single vehicle category, whereas onsite asphalt and equipment trucks were modeled using EMFAC's T6 Instate Heavy vehicle category. On-site cable-pulling trucks were modeled using EMFAC's T6 Utility vehicle category.

Fugitive re-entrained road dust emissions for all vehicle types were estimated using the EPA's AP-42, Sections 13.2.1 and 13.2.2 (EPA 2006, 2011).

Table 4 summarizes the on-road vehicle inventory assumed in the emissions modeling. All on-road vehicles would be used for terrestrial construction (i.e., on land).

Table 4. On-Road Vehicle Inventory for Terrestrial Construction

Phase	Vehicle	Vehicles/Day	Trips/Day	Miles/Day
1-1	Pick-up truck	1	2	10
1-1	Dump truck	1	2	20
1-1	Asphalt truck	1	2	10
1-2	Pick-up truck	1	2	15
1-2	Tractor trailer	1	2	20
1-3	One-ton truck	1	2	10
1-3	Pick-up truck	1	2	15
1-3	Delivery truck	1	2	10
1-3	Dump truck	1	2	10
2-1	One-ton truck	1	2	10
2-1	Pick-up truck	1	2	15
2-1	Delivery truck	1	2	10
2-1	Dump truck	1	2	10
3-1	One-ton truck	1	2	10
3-1	Pick-up truck	1	2	15
3-1	Delivery truck	1	2	10
3-1	Dump truck	1	2	10
4-1	One-ton truck	1	2	10
4-1	Pick-up truck	1	2	15
4-1	Delivery truck	1	2	10
4-1	Dump truck	1	2	10
1-11	Tractor trailer	2	5	500
2-9	Tractor trailer	2	5	500
3-9	Tractor trailer	2	5	500
4-9	Tractor trailer	2	5	500
1-11	Fuel and misc delivery	1	1	100
2-9	Fuel and misc delivery	1	1	100
3-9	Fuel and misc delivery	1	1	100
4-9	Fuel and misc delivery	1	1	100

Table 4. On-Road Vehicle Inventory for Terrestrial Construction

Phase	Vehicle	Vehicles/Day	Trips/Day	Miles/Day
1-7	Pick-up truck	1	2	15
2-5	Pick-up truck	1	2	15
3-5	Pick-up truck	1	2	15
4-5	Pick-up truck	1	2	15
1-11	Employee vehicle	10	10	1,000
2-9	Employee vehicle	10	10	1,000
3-9	Employee vehicle	10	10	1,000
4-9	Employee vehicle	10	10	1,000

Source: Brungardt pers. comm.

B.1.2.3 Earthmoving

Fugitive dust emissions from earth movement (i.e., site grading, excavation, and truck loading) were quantified using emission factors from the CalEEMod User's Guide (Trinity Consultants 2017). Grading acres and cut and fill quantities were provided by the Project applicant (Brungardt pers. comm.).

Table 5 summarizes the earthmoving quantities assumed in the emissions modeling. All earthmoving would occur during terrestrial construction (i.e., on land).

Table 5. Earthmoving Quantities for Terrestrial Construction

Phase	Grading (acres/day)	Cut/Fill (cubic yards/day)
1-1	0.07	44
1-2	0.09	0
1-3	0	14
2-1	0	14
3-1	0	14
4-1	0	14

B.1.2.4 Marine Vessels

Marine vessels used during construction include main lay vessels, support vessels, workboats, patrol boats, and tugboats. Criteria pollutant emissions from marine vessels were quantified using CARB's (2010a) *Updates on the Emissions Inventory for Commercial Harbor Craft Operating in California* (Harbor Craft Methodology) and several other sources. Emissions per vessel were determined using the equation below.

$$E = P \times LF \times A \times EF$$

Where E = *Emissions (grams)*
P = *Maximum Continuous Rating Power (horsepower)*
LF = *Load Factor (percent of vessel's total power)*
A = *Activity (hours)*
EF = *Emission Factor (grams per horsepower-hour [g/hp-hr])*

Emissions were calculated separately for propulsion and auxiliary engines for each vessel. The following section describes the vessels, engine horsepower assumptions, load factors, and emission factors used in the calculations. Activity hours were provided by the Project applicant and are summarized in Table 6 (Brungardt pers. comm.).

Table 6. Marine Vessel Inventory

Phase	Vessel	Hours per Day
U.S. Coastline to 3 Nautical Miles (air quality impact analysis)		
1-2	Work boat	6
1-2	Tug boat	5
1-2	Patrol boat	6
1-6	Main lay vessel (laying)	24
1-7	Main lay vessel (transit)	10
1-8	Main lay vessel (laying)	24
1-9	Support vessel	24
1-10	Main lay vessel (laying)	24
2-4	Main lay vessel (laying)	24
2-5	Main lay vessel (transit)	10
2-6	Main lay vessel (laying)	24
2-7	Support vessel	24
2-8	Main lay vessel (laying)	24
3-4	Main lay vessel (laying)	24
3-5	Main lay vessel (transit)	10
3-6	Main lay vessel (laying)	24
3-7	Support vessel	24
3-8	Main lay vessel (laying)	24
4-4	Main lay vessel (laying)	24
4-5	Main lay vessel (transit)	10
4-6	Main lay vessel (laying)	24
4-7	Support vessel	24
4-8	Main lay vessel (laying)	24

Table 6. Marine Vessel Inventory

Phase	Vessel	Hours per Day
3 to 24 Nautical Miles (greenhouse gas impact analysis)		
1-6	Main lay vessel (laying)	20
1-6	Main lay vessel (transit)	4
1-6	Support vessel	12
1-8	Main lay vessel (laying)	20
1-8	Main lay vessel (transit)	4
1-10	Main lay vessel (laying)	20
1-10	Main lay vessel (transit)	4
2-4	Main lay vessel (laying)	20
2-4	Main lay vessel (transit)	4
2-4	Support vessel	12
2-6	Main lay vessel (laying)	20
2-6	Main lay vessel (transit)	4
2-8	Main lay vessel (laying)	20
2-8	Main lay vessel (transit)	4
3-4	Main lay vessel (laying)	20
3-4	Main lay vessel (transit)	4
3-4	Support vessel	12
3-6	Main lay vessel (laying)	20
3-6	Main lay vessel (transit)	4
3-8	Main lay vessel (laying)	20
3-8	Main lay vessel (transit)	4
4-4	Main lay vessel (laying)	20
4-4	Main lay vessel (transit)	4
4-4	Support vessel	12
4-6	Main lay vessel (laying)	20
4-6	Main lay vessel (transit)	4
4-8	Main lay vessel (laying)	20
4-8	Main lay vessel (transit)	4

Source: Brungardt pers. comm.

Main Lay Vessel

The main lay vessel is modelled after the *Ile de Batz* (IMO # 9247041). It is a DPS-2 classed cable-lay and multi-purpose offshore support vessel used by Alcatel-Lucent for cable laying (CBS n.d.). This vessel will be laying the cable on the ocean. It will pull the cable plow that will be installing the cable to a depth of 1 meter below the ocean floor. It will come to the end of the landing pipe (about 3,600 feet offshore), feed the marine cable into the landing pipe, and then continue offshore with the cable and across the ocean.

The main lay vessel is a diesel-electric vessel powered by four 5,873-horsepower Mak 9M32 Category 3 diesel engines (IHS Markit n.d.). All four engines are connected to generators. Propulsion is driven by two 5,368-horsepower electric motors. Under CARB Harbor Craft guidance, the main lay vessel is considered an ocean-going vessel because it is longer than 400 feet. The vessel was built in 2001.

The main lay vessel will operate in two modes during construction. The first is "transit" back and forth to the construction site. Transit occurs at 12 knots. The second is during "cable laying" when the vessel is travelling at 8 knots and laying cable.

Propulsion load factors for the two modes were calculated using the propeller law equation below (Starcrest Consulting Group 2019). This load factor is applied to the two electric motors used for propulsion.

$$\textit{Propulsion Load Factor} = (\textit{actual speed}/\textit{maximum speed})^3$$

As the vessel has a maximum speed of 16.4 knots, the transit propulsion load factor is 0.39 and the cable-laying propulsion load factor is 0.12. Auxiliary engine loads and auxiliary boiler loads for the two modes were obtained from the Port of Los Angeles 2018 emissions inventory (Starcrest Consulting Group 2019). The calculations for the transit mode assumed an auxiliary load of 643 kilowatts (kW), while the cable-laying mode assumed an auxiliary load of 597 kW. Boiler loads were 33 kW during transit and 65 kW during cable laying.

Emission factors for the main lay vessel were obtained from the Port of Los Angeles 2014 emissions inventory,[2] assuming that all engines were Category 3 medium-speed engines running on 0.1% sulfur marine gasoil/marine diesel oil, which has been required within California waters since 2014 and within the North American Emission Control Area (up to 200 nm from the U.S. coastline) since 2015 (Starcrest Consulting Group 2015; CARB 2011a). The main lay emission factors are presented in Table 7.

Table 7. Main Lay Vessel Emission Factors (g/hp-hr)

Engine Type	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
Propulsion/Auxiliary	0.47	9.10	0.82	0.19	0.18	0.32	484	0.02	0.01
Boiler	0.09	1.49	0.15	0.10	0.10	0.45	688	0.06	0.001

Term:
g/hp-hr = grams per horsepower-hour
Note:
The emission factors from the 2014 emissions inventory have been corrected for use of 0.1% sulfur distillate fuel. Accordingly, application of a fuel correction factor is not required. Because deterioration factors are not applied to ocean-going vessels, per CARB guidance, the emission factors are held constant for all analysis years.

[2] Emission factors for ocean-going vessels have not changed since the 2014 emissions inventory and therefore are not repeated in subsequent inventories, including the latest 2018 emissions inventory.

Support Vessel

The support vessel is modeled after the *DSV Clean Ocean* (Aqueos n.d.). It is a 155-foot-long anchor, offshore supply, dive, and remotely operated vehicle (ROV) support vessel. The support vessel will be used for the prelay grapnel run (where it will pull a grapnel along the cable alignment to ensure that it is free of debris), and to support the main cable lay through control of ROVs. It also will be used during cable burial.

Under CARB's Harbor Craft regulations, the support vessel is in the category of crew and supply boat. It was repowered in 2015 under the CARB (2011b) Harbor Craft Rule. It is currently powered by two 750-horsepower Cummins QSK-19 Tier 3 engines and has two 133-horsepower auxiliary Tier 3 engines.

Load factors for this type of vessel were obtained from CARB's (2010a) Harbor Craft Methodology and were assumed to be 0.38 for the propulsion engines and 0.32 for the auxiliary engines. Uncorrected zero hour emission rates for NOx, PM10, ROG, and CO were derived from CARB's Harbor Craft Methodology. GHG and SO_2 emission factors were obtained from the Port of Los Angeles 2013 emissions inventory (Starcrest Consulting Group 2014)[3]. All harbor craft must use ultra-low sulfur diesel (ULSD) within California Regulated Waters (CARB 2005). Since these vessels are small and generally only have one fuel tank, it was assumed that they also would use ULSD out to 24 nm.

Uncorrected zero hour emission rates are shown in Table 8. Fuel correction factors for ULSD are shown in Table 9 (these also apply to the work boat described in the next section).

Table 8. Support Vessel Uncorrected Zero Hour Emission Rates (g/hp-hr)

Engine Type	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
Propulsion	0.68	5.10	3.73	0.15	0.15	0.13	486	0.023	0.013
Auxiliary	0.81	5.10	3.73	0.22	0.21	0.13	486	0.023	0.016

Term:
g/hp-hr = grams per horsepower-hour

Table 9. Fuel Correction Factors for the Support Vessel and Work Boat

Engine Type	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
All	0.720	0.948	1.000	0.852	0.852	0.043	1.000	0.948	0.720

Deterioration factors were applied to compensate for engine wear. CARB's Harbor Craft Methodology recommends that a tug or barge at the end of its useful life could have NOx,

[3] Emission factors for crew and supply boats have not changed since the 2013 emissions inventory and therefore are not repeated in subsequent inventories, including the latest 2018 emissions inventory.

PM, ROG and CO emission factors that are 21%, 67%, 44% and 25%, respectively, higher than the zero-hour values. Since the Harbor Craft Methodology was released, CARB has revised its methodology to limit deterioration at 12,000 hours of operation. This is because CARB found, in discussions with stakeholders and the industry, that diesel engines are typically rebuilt after 12,000 hours of use (Dolney pers. comm.). Based on this new guidance, once an engine's cumulative hours equal 12,000 hours, the deteriorated emission factor is assumed to remain constant (CARB 2010b).

Annual hours of operation, useful life, and the deterioration factors for the propulsion and auxiliary engines are shown in Table 10. Final emission factors are shown in Table 11.

Table 10. Hours of Operation, Useful Life and Deterioration Factors for Support Vessel

Engine Type	Annual Hours	Useful Life	Deterioration Factor			
			NOx	PM	ROG	CO
Propulsion	1,796	28	0.21	0.67	0.44	0.25
Auxiliary	2,265	28	0.14	0.44	0.28	0.16

Table 11 Support Vessel Emission Factors (g/hp-hr)

Year	Engine Type	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
2021	Propulsion	0.54	5.05	3.93	0.15	0.14	0.01	486	0.02	0.01
	Auxiliary	0.61	4.96	3.84	0.20	0.20	0.01	486	0.02	0.01
2022+[a]	Propulsion	0.54	5.08	3.95	0.15	0.14	0.01	486	0.02	0.01
	Auxiliary	0.61	4.96	3.84	0.20	0.20	0.01	486	0.02	0.01

Term:
g/hp-hr = grams per horsepower-hour

[a] The support vessel will reach the 12,000-hour deterioration cap in 2022. After this time, it is assumed that the engine will be rebuilt, per CARB guidance. However, this analysis conservatively holds the final deteriorated emission factor constant for all future analysis years.

Work Boat

The work boat is modelled after the *Danny C* vessel, which is a 77-foot utility boat used in dive support, ROV support, anchor support, and equipment transport. The work boat will be used during construction to perform the following activities:

- As a dive platform for divers to support the marine side of the directional bores.
- As a dive platform for divers to support the cable landing where the main cable vessel feeds the marine cable into the landing pipe.
- As a dive platform for divers to jet bury the cable in the shallow water areas.
- As a taxi to take divers to/from the dive platform.

Under CARB Harbor Craft regulations, the *Danny C* is in the category of work boat. It was repowered in 2015 under the CARB Harbor Craft Rule. It currently is powered by two 405-horsepower Cummins QSM11 Tier 3 engines and has two 32-horsepower auxiliary Tier 3 engines.

Load factors,[4] zero hour emission rates, annual hours of operation, useful life assumptions, and deterioration factors were derived using the same methods and sources as described above for the support vessel. Uncorrected zero hour emission rates are shown in Table 12. Annual hours of operation, useful life, and the deterioration factors for the propulsion and auxiliary engines are shown in Table 13. Final emission factors are shown in Table 14. Refer to Table 9 above for the ULSD fuel correction factors.

Table 12. Work Boat Uncorrected Zero Hour Emission Rates (g/hp-hr)

Engine Type	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
Propulsion	0.68	5.10	3.73	0.15	0.15	0.13	486	0.02	0.01
Auxiliary	0.81	5.10	3.73	0.22	0.21	0.13	486	0.02	0.02

Term:
g/hp-hr = grams per horsepower-hour

Table 13. Hours of Operation, Useful Life, and Deterioration Factors for Work Boat

Engine Type	Annual Hours	Useful Life	Deterioration Factor			
			NOx	PM	ROG	CO
Propulsion	675	17	0.21	0.67	0.44	0.25
Auxiliary	750	23	0.06	0.31	0.51	0.41

Table 14. Work Boat Emission Factors (g/hp-hr)

Year	Engine Type	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
2021	Propulsion	0.57	5.19	4.06	0.16	0.15	0.01	486	0.02	0.01
	Auxiliary	1.75	5.12	4.13	0.20	0.20	0.01	486	0.02	0.03
2022	Propulsion	0.58	5.25	4.11	0.16	0.16	0.01	486	0.02	0.01
	Auxiliary	1.78	5.14	4.20	0.21	0.20	0.01	486	0.02	0.03
2023	Propulsion	0.59	5.31	4.17	0.17	0.16	0.01	486	0.01	0.02
	Auxiliary	1.82	5.15	4.26	0.21	0.20	0.01	486	0.03	0.02
2024	Propulsion	0.60	5.37	4.22	0.17	0.17	0.01	486	0.02	0.01
	Auxiliary	1.85	5.16	4.33	0.21	0.20	0.01	486	0.02	0.03

Term:
g/hp-hr = grams per horsepower-hour

[4] Load factors for the work boat were assumed to be 0.45 for the propulsion engines and 0.43 for the auxiliary engines.

Patrol Boat and Tug Boat

The patrol boat would be used to shuttle divers to and from the dive platform or to take observers (inspectors or monitors) to the site during the directional bore activities or during the cable landing. The tug boat may be needed to anchor the main lay vessel. Tug boats rarely are required because the cable ships usually have dynamic thrusters so they can hold station, but tug boats have been added in the emission calculations in the event they are needed.

Under the CARB Harbor Craft Rule, the patrol boat is in the category of a crew and supply boat, and the tug boat is in the category of a tow boat. Both ships are a “ship of opportunity,” meaning that any available crew and supply boat can be used. Average crew boat characteristics were obtained from the Port of Los Angeles 2018 emissions inventory to define the characteristics of the patrol boat, and average towboat characteristics were used to define the tug boats for analysis purposes (Starcrest Consulting Group 2019). The assumptions are listed in Table 15.

Table 15. Patrol Boat and Tug Boat Characteristics

Engine Type	Patrol Boat			Tug Boat		
	Model Year	Engines		Model Year	Engines	
		HP	Number		HP	Number
Propulsion	2009	572	2	2010	777	2
Auxiliary	2008	55	1	2009	64	2

Load factors,[5] zero-hour emission rates, annual hours of operation, useful life assumptions, and deterioration factors were derived using the same methods and sources as described above for the support vessel. Uncorrected zero hour emission rates are shown in Table 16. Annual hours of operation, useful life, and deterioration factors for the propulsion and auxiliary engines are shown in Table 17. Table 18 summarizes the ULSD fuel correction factors, which are applicable to engines older than model year 2011. Final emission factors are shown in Table 19.

[5] Load factors for the patrol boat were assumed to be 0.38 for the propulsion engines and 0.32 for the auxiliary engines. Load factors for the tug boat were assumed to be 0.68 for the propulsion engines and 0.43 for the auxiliary engines.

Table 16. Patrol Boat and Tug Boat Uncorrected Zero-Hour Emission Rates (g/hp-hr)

Engine Type	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
Patrol Boat									
Propulsion	0.68	5.10	3.73	0.15	0.15	0.13	486	0.02	0.01
Auxiliary	1.18	5.32	3.73	0.30	0.29	0.13	486	0.02	0.02
Tug Boat									
Propulsion	0.68	5.53	3.73	0.20	0.19	0.13	486	0.02	0.01
Auxiliary	1.18	5.32	3.73	0.22	0.21	0.13	486	0.02	0.02

Term:
g/hp-hr = grams per horsepower-hour

Table 17. Useful Life and Deterioration Factors for Patrol Boat and Tug Boat

Engine Type	Annual Hours	Useful Life	Deterioration Factor			
			NOx	PM	ROG	CO
Patrol Boat						
Propulsion	1,796	28	0.21	0.67	0.44	0.25
Auxiliary	2,265	28	0.14	0.44	0.28	0.16
Tug Boat						
Propulsion	1,993	26	0.21	0.67	0.44	0.25
Auxiliary	2,965	25	0.14	0.44	0.28	0.16

Table 18. Fuel Correction Factors for the Patrol Boat and Tug Boat

Engine Type	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
All	0.720	0.948	1.000	0.800	0.800	0.043	1.000	0.948	0.720

Table 19. Patrol Boat and Tug Boat Emission Factors (g/hp-hr)

Engine Type	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
Patrol Boat									
Propulsion	0.54	5.08	3.95	0.14	0.14	0.01	486	0.02	0.01
Auxiliary	0.89	5.18	3.84	0.26	0.25	0.01	486	0.02	0.01
Tug Boat									
Propulsion	0.54	5.50	3.95	0.18	0.18	0.01	486	0.02	0.01
Auxiliary	0.89	5.16	3.83	0.19	0.18	0.01	486	0.02	0.02

Term:
g/hp-hr = grams per horsepower-hour

Note:
The patrol and tug boats will reach the 12,000-hour deterioration cap before 2019. After this time, it is assumed that the engines will be rebuilt, per CARB guidance. However, this analysis conservatively holds the final deteriorated emission factor constant for all future analysis years.

B.2 INFORMATIONAL CRITERIA POLLUTANT ANALYSIS

Criteria pollutants generated by construction activities out to 24 nm are presented in Table 20. As previously noted, these emissions are presented for informational purposes only.

Table 20. Informational Criteria Pollutant Emissions Generated by Terrestrial and Marine Activities Out to 24 Nautical Miles

Phase	Source	Tons per Year					
		ROG	NOx	CO	PM10	PM2.5	SO_2
Phase 1	Terrestrial	<1	<1	<1	<1	<1	<1
	Marine (0 to 3 nautical miles [nm])	<1	4	2	<1	<1	<1
	Marine (3 to 24 nm)	<1	7	1	<1	<1	<1
	Total	1	12	3	1	<1	<1
Phase 2	Terrestrial	<1	<1	<1	<1	<1	<1
	Marine (0 to 3 nm)	<1	3	<1	<1	<1	<1
	Marine (3 to 24 nm)	<1	7	1	<1	<1	<1
	Total	1	10	1	<1	<1	1
Phase 3	Terrestrial	<1	<1	<1	<1	<1	<1
	Marine (0 to 3 nm)	<1	3	<1	<1	<1	<1
	Marine (3 to 24 nm)	<1	7	1	<1	<1	<1
	Total	1	10	1	<1	<1	<1
Phase 4	Terrestrial	<1	<1	<1	<1	<1	<1
	Marine (0 to 3 nm)	<1	3	<1	<1	<1	<1
	Marine (3 to 24 nm)	<1	7	1	<1	<1	<1
	Total	1	10	1	<1	<1	<1

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B.3.2 Personal Communications

Brungardt, Chris. RTI Solutions, Inc. San Francisco, CA. July 20, 2020—conversation with Laura Yoon of ICF.

Nicole Dolney. California Air Resource Board. Sacramento, CA. March 25, 2013—conversation with Lou Browning of ICF.

APPENDIX C

Terrestrial and Marine Biological Resource Information

Appendix C1 Resource Agency Coordination
Appendix C2 Marine Biological Resources Report

APPENDIX C1 RESOURCE AGENCY COORDINATION

The ICF terrestrial biological team coordinated with relevant resource agencies to discuss sensitive biological resources expected within the terrestrial biological study area (BSA). A summary of agency communications and site visits is provided below.

California Department of Fish and Wildlife: On July 30, 2020, ICF held a conference call with Greg O'Connell (Environmental Scientist) and Corianna Flannery (Environmental Scientist) to discuss Project design and potential biological concerns regarding the Eureka Subsea Fiber Optic Cables Project (Project). Mr. O'Connell discussed the importance of considering the western bumble bee. Ms. Flannery discussed the importance of the hard ocean floor substrate and asked how the cable would be secured to the ocean floor to reduce or eliminate scour. The western bumble bee has been evaluated in the *Biological Resources* section of the main document, and direct and indirect impacts are avoided. The *Project Description* describes in detail how the cable would be installed on the ocean floor, the importance of the hard bottom substrate, and the need for avoidance.

Consultation Outcomes:

- The Project was designed to avoid hard bottom substrate, and RTI Infrastructure (RTI) conducted surveys of the ocean floor to ensure that proper routing of the cable would occur.
- Ms. Flannery will be copied on all communications with the National Marine Fisheries Service

California Department of Fish and Wildlife: On August 7, 2020, ICF held a conference call with Greg O'Connell to discuss a site assessment and survey approach for the western bumble bee. Because capture of insects was not part of the sampling design, an incidental take permit was not necessary. Mr. O'Connell stressed the importance of nesting and over-wintering habitat but was not concerned with the bee's flight period. Mr. O'Connell described an approach to assess the cable landing site 1 year prior to ground disturbance to determine the presence/absence of western bumble bee.

Consultation Outcomes:

- Mr. O'Connell provided literature for review that was used to develop the survey and assessment approach.
- A survey was designed that involved two separate site visits during the appropriate time and weather conditions to observe and photograph foraging insects.

U.S. Fish and Wildlife Service (USFWS): On August 7, October 9 and 13, 2020, ICF corresponded via email with John Hunter, of the Arcata U.S. Fish and Wildlife Office.

Consultation Outcomes:

- August 7 – Mr. Hunter stated that he would be in contact to discuss the project in more detail.
- October 9 – On behalf of RTI, ICF emailed Mr. Hunter a letter requesting technical assistance for the federally endangered beach layia (*Layia carnosa*) and federally threatened western snowy plover (*Charadrius nivosus nivosus*). ICF requested that USFWS concur with our no effect (NE) determination.
- October 13 – Mr. Hunter responded to the technical assistance letter emailed on October 9. Mr. Hunter asked whether the Project was private or had a federal nexus. If private, he stated that "This might be a no take at this point" and that a technical assistance letter would be issued. However, if there was a federal nexus, the process for a no effect concurrence would be different. ICF's Steve Yonge emailed Mr. Hunter and stated that RTI had yet to contact the U.S. Army Corps of Engineers (USACE) to discuss the Project and whether the terrestrial portion of the Project would be included in the Clean Water Act 404 permit that RTI will apply for. Mr. Hunter stated that the USFWS does not issue technical assistance letters for NE determinations but stated "It would seem to us that your reasoning for a potential NE determination looks sound." Mr. Hunter requested that ICF inform him of the permitting approach the USACE takes and whether a federal nexus is identified.

California Department of Fish and Wildlife: On August 19, 2020, ICF met Greg O'Connell at the cable landing site to discuss the potential for the western bumble bee to occur. We reviewed the area for nesting and over-wintering habitat, and discussed the proposed methods to determine whether western bumble bees were using the site. We explained our sample approach and the photography taken to capture images of foraging insects that would be used for identification to be performed by an entomologist. We discussed potential temporary and permanent impacts, and installation of temporary fencing around the work area during construction. Mr. O'Connell thought impacts on the dune mat community may require restoration; he provided example restoration opportunities and recommended that ICF contact Laurel Goldsmith with USFWS for assistance with dune restoration concepts.

Consultation Outcomes:

- Mr. O'Connell thought it was sufficient to photograph insects and then have the photographs reviewed by an entomologist.
- Permanent impacts at the cable landing site would be minimal and would involve installation of four vault boxes.

National Marine Fisheries Service (NMFS): From August 5 through August 31, 2020, ICF corresponded via email with multiple staff members who support the West Coast and Pacific Islands NMFS regions. ICF clarified the location of the cable landing site and discussed the nexus for consultation that would be initiated by the USACE as part of Nationwide Permit #12.

On October 21, 2020, ICF held a conference call with representatives from both the NMFS West Coast and Pacific Islands Regional offices. We discussed the four phases of the Project, potential effects of the Project to be addressed in the biological assessment (BA) and essential fish habitat (EFH) assessment, and the permitting approach.

Consultation Outcomes:

- Developed a list of NMFS staff to coordinate with and discuss an approach to review and analyze the Project that spans the NMFS West Coast and Pacific Islands regions.
- Agreed to engage the USACE to determine the most appropriate way to permit the Project through the Clean Water Act 404 process.
- ICF on behalf of RTI would begin to prepare the draft BA and EFH assessment that would support formal consultation under Section 7 of the federal Endangered Species Act.

Table C1-1. Special-Status Wildlife and Fish Species and Their Potential to Occur in the Terrestrial Biological Study Area (BSA)

Common Name Scientific Name	Legal Status Federal/ State[a]	General Range and Habitat Description	Potential to Occur in the BSA
Southern torrent salamander *Rhyacotriton variegatus*	–/SSC	Found in coastal drainages from southern Mendocino County north to Oregon; prefers cold shaded streams and seeps, often with rocks and talus, usually on north-facing slopes.	None – No suitable habitat present.
Pacific tailed frog *Ascaphus truei*	–/SSC	Occurs in coastal northern California and inland to Big Bend in Shasta County and north in the Cascade Mountains. Restricted to montane cold, clear, rocky perennial streams in wet forests; tadpoles require water below 15 degrees Celsius.	None – No suitable habitat present
Northern red-legged frog *Rana aurora*	–/SSC	Occurs in coastal northern California; Mendocino County through Oregon and Washington; humid forests, woodlands, and streams with plant cover. Often found in woods adjacent to streams. Breeding habitat is in permanent water sources; lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps.	None – No suitable habitat present
Foothill yellow-legged frog *Rana boylii*	–/SSC	Occurs throughout the North and South Coast Ranges, south to the Transverse Range, across northern California to the west slope of the Cascade Range, and south through the foothills of the Sierra Nevada. Inhabits forest streams and rivers (both perennial and intermittent) with sunny, sandy, and rocky banks, with deep pools, and shallow riffles.	None – No suitable habitat present
Western pond turtle *Emys marmorata*	–/SSC	Occurs throughout California west of the Sierra-Cascade crest; found from sea level to 6,000 feet; occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms.	None – No suitable habitat present

Table C1-1. Continued

Common Name Scientific Name	Legal Status Federal/ State[a]	General Range and Habitat Description	Potential to Occur in the BSA
White-tailed kite *Elanus leucurus*	–/FP	Occur in savanna, open woodlands, marshes, desert grassland, partially cleared lands, and cultivated fields throughout the West; often nest in isolated trees in open-country or forest edges.	Moderate – Suitable nesting and foraging habitat present. Not observed during the July 10, 2020 habitat-based field survey.
Bald eagle *Haliaeetus leucocephalus*	–/SE, FP	Nests in large, old-growth, or emergent live tree with open branchwork. Nests typically located 50 to 200 feet above ground. Forages primarily in large inland fish-bearing waters with adjacent large trees or snags, and occasionally in uplands with abundant rabbits, other small mammals, or carrion. Breeding range includes the Sierra Nevada, Cascade Range, and portions of the Coast Ranges; winter range expands to include most of the State.	None – No suitable nesting or foraging habitat present
Northern harrier *Circus cyaneus*	–/SSC	Widespread throughout North America in wide-open grasslands, marshes, or fields; breed in freshwater and brackish marshes; nest on the ground and usually in a dense clump of vegetation or grass.	Moderate – Suitable nesting and foraging habitat present. Not observed during the July 10, 2020 habitat-based field survey.
Yellow rail *Coturnicops noveboracensis*	–/SSC	Isolated western breeding populations exist in south-central Oregon and, apparently, in adjacent northern California; occurs in shallow marshes, and wet meadows.	None – No suitable habitat present
California Ridgway's rail *Rallus obsoletus*	FE/SE	Found in saltwater marshes, freshwater marshes, and mangrove swamps in California, Arizona, Nevada, and coastal western Mexico; nests in clumps of vegetation or in shrubs just above ground level.	None – No suitable habitat present
Northern spotted owl *Strix occidentalis caurina*	FT/ST	Occurs in coniferous, hardwood, and mixed forests with complex, multi-layered structure, large-diameter trees, and high-canopy closure.	None – No suitable habitat present

Table C1-1. Continued

Common Name Scientific Name	Legal Status Federal/ State[a]	General Range and Habitat Description	Potential to Occur in the BSA
Western snowy plover *Charadrius alexandrinus nivosus*	FT/SSC	Found along the West Coast; breeds above the high tide line on coastal beaches, sand spits, dune-backed beaches, sparsely-vegetated dunes, beaches at creek and river mouths, and salt pans. Known to nest and winter approximately 500 feet west of the CLS.	None – No suitable habitat present.
Mountain plover *Charadrius montanus*	–/SSC	Winter in California; nest across the western Great Plains and Rocky Mountain states; most of California population winters in the San Joaquin and Imperial Valleys in California; prefers dry habitat with short grass, pastures, or bare ground.	None – No suitable habitat present
Marbled murrelet *Brachyramphus marmoratus*	FT/SE	Occurs in coastal western United States., a small seabird that nests in California in stands of old growth redwood and other types of conifer forest. Suitable foraging habitat west of the CLS in the Pacific Ocean.	None – No suitable habitat present.
Yellow-billed cuckoo *Coccyzus americanus occidentalis*	FT/SE	Nests along the upper Sacramento, lower Feather, south fork of the Kern, Amargosa, Santa Ana, and Colorado Rivers. Requires wide, dense riparian forests/woodlands with a thick understory of willows for nesting; sites with a dominant cottonwood overstory are preferred for foraging; may avoid valley-oak riparian habitats where scrub jays are abundant.	None – No suitable nesting or foraging habitat present.
Bank swallow *Riparia riparia*	–/ST	Uncommon breeding season resident in northern and central California; found in valleys and coastal areas where alluvial soils occur; nests colonially in vertical dirt or sand banks, usually along rivers or ponds.	None – No suitable habitat present.

Table C1-1. Continued

Common Name Scientific Name	Legal Status Federal/ State[a]	General Range and Habitat Description	Potential to Occur in the BSA
Townsend's big-eared bat *Corynorhinus townsendii*	–/SSC	Primarily roost in caves and cave-like roosting habitat, such as tunnels and mines. Very sensitive to disturbances and may abandon a roost after one on-site visit. Reported to use buildings in the northern and coastal portions of range. Also reported to use bridges and hollow trees as roost sites. In California, occurs in inland deserts, moist cool redwood forests, oak woodlands of the inner Coast Ranges and Sierra Nevada foothills, and low to mid-elevation mixed conifer forests.	None – No suitable habitat present.
White-footed vole *Arborimus albipes*	–/SSC	Endemic to the coastal coniferous forests of Northern California and Oregon. Rare and poorly known. Thought to inhabit redwood groves.	None – No suitable habitat present.
Sonoma tree vole *Arborimus pomo*	–/SSC	Endemic to California; from Sonoma County, north through Mendocino, Humboldt, and western Trinity counties to the South Fork of the Smith River, Del Norte County; poorly known; occurs in mixed evergreen forests; may prefer wet and mesic old-growth Douglas-fir forest.	None – No suitable habitat present.
Humboldt marten *Martes caurina humboldtensis*	FT/SE	Known from Del Norte and Humboldt Counties, with their range extending into Mendocino and northern Sonoma Counties. Found in coastal old-growth forests.	None – No suitable habitat present
Fisher, West Coast DPS *Pekania pennanti*	FT/SSC	Distributed throughout the northern Coast Ranges, Cascade Range, Klamath Range and southern Sierra Nevada. Inhabits forests with diverse successional stages with mostly mid- and late-successional stages and high percent canopy closure. Requires tree or snag cavities for denning, in large-diameter trees.	None – No suitable habitat present.

Table C1-1. Continued

Common Name Scientific Name	Legal Status Federal/ State[a]	General Range and Habitat Description	Potential to Occur in the BSA
Western bumble bee *Bombus occidentalis*	–/SCE	Populations of central California, Oregon, Washington and southern British Columbia have largely disappeared. Generalist foragers using a variety of flower types. Found in a variety of habitat types and forage/pollinate a wide range of plant species. Construct hives in underground burrows or crevices.	Low – Suitable foraging habitat present, but not observed during August 12 and 19, 2020 habitat assessment and surveys.
Coastal cutthroat trout *Oncorhynchus clarkii*	–/SSC	Found in small, low gradient coastal streams that are cool, shaded, with cover. Also found in estuaries. They are anadromous, but strongly associated with freshwater.	None – No aquatic habitat present
Tidewater goby *Eucyclogobius newberryi*	FE/SSC	Requires fresh or brackish water, and/or mud substrates to burrow into. Does best in tidally muted or seasonally disconnected lagoons, estuaries, or sloughs.	None – No aquatic habitat present

Sources: Jennings and Hayes 1994; Hunter et al. 2005; Moyle 2002; Shuford and Gardali 2008; Thomson et al. 2016; Zeiner et al. 1990a, 1990b; Xerces Society, Defenders of Wildlife, and Center for Food Safety 2018

Terms:

CNDDB = California Natural Diversity Database

DPS = Distinct Population Segment

Notes:

[a] Status explanations:

Federal

FT = Listed as threatened under the federal Endangered Species Act

FE = Listed as endangered under the federal Endangered Species Act

– = No listing

State

SE = Listed as endangered under the California Endangered Species Act

ST = Listed as threatened under the California Endangered Species Act

SCE = Candidate for listing as endangered under the California Endangered Species Act

SSC = Species of special concern in California

FP = Fully Protected under the California Fish and Game Code

– = No listing

Table C1-2. Special-Status Plant Species with Potential to Occur in the Terrestrial Biological Study Area

Scientific Name Common Name	Legal Status[a] Fed/State/ CRPR	Habitat Requirements	Blooming Period	Potential for Occurrence and Rationale
Abronia umbellata var. *breviflora* Pink sand-verbena	–/–/1B.1	Close to the ocean in coastal dunes and coastal strand; 0–10 meters	Jun–Oct	None – Known CNDDB occurrences nearby
Astragalus pycnostachyus var. *pycnostachyus* Coastal marsh milk-vetch	–/–/1B.2	Mesic sites in dunes, along streams, and in coastal salt marshes; 0–30 meters	(Apr) Jun–Oct	None – No suitable habitat present
Cardamine angulate Seaside bittercress	–/–/2B.2	North Coast coniferous forest and lower montane coniferous forest in wet areas and streambanks; 25–915 meters	(Jan) Mar–Jul	None – No suitable habitat present
Carex arcta Northern clustered sedge	–/–/2B.2	Bogs and fens in North Coast coniferous forest; 60–1,405 meters	Jun–Sep	None – No suitable habitat present
Carex leptalea Bristle-stalked sedge	–/–/2B.2	Bogs and fens, mesic meadows and seeps, marshes and swamps; below 700 meters	Mar–Jul	None – No suitable habitat present
Carex lyngbyei Lyngbye's sedge	–/–/2B.2	Brackish or freshwater marshes and swamps; 0–10 meters	Apr–Aug	None – No suitable habitat present
Carex praticola Northern meadow sedge	–/–/2B.2	Moist to wet meadows; 0–3,200 meters	May–Jul	None – No suitable habitat present
Castilleja ambigua var. *humboldtiensis* Humboldt Bay owl's-clover	–/–/1B.2	Coastal saltmarsh with *Spartina, Distichlis, Salicornia, Jaumea*, in marshes and swamps; 0–3 meters	Apr–Aug	None – No suitable habitat present
Castilleja litoralis Oregon Coast paintbrush	–/–/2B.2	Sandy sites in coastal bluff scrub, coastal dunes, coastal scrub; 15–100 meters	Jun–Jul	Low – Not observed in general area since 1918 [Calflora].
Chloropyron maritimum subsp. *palustre* Point Reyes salty bird's-beak	–/–/1B.2	Coastal salt marsh, often with *Salicornia, Distichlis, Jaumea, Spartina* up to 10 meters	Jun–Oct	None – No suitable habitat present

Table C1-2. Continued

Scientific Name Common Name	Legal Status[a] Fed/State/ CRPR	Habitat Requirements	Blooming Period	Potential for Occurrence and Rationale
Collinsia corymbosa Round-headed Chinese-houses	–/–/1B.2	Coastal dunes; 0–20 meters	Apr–Jun	Low – Not observed in general area since 1900 [Calflora].
Erysimum menziesii Menzies' wallflower	E/E/1B.1	Coastal dunes and coastal strand; 1–35 meters	Mar–Sep	Moderate – Known CNDDB occurrences nearby; iNaturalist observations of flowering nearby on March 13, 2020.
Erythronium revolutum Coast fawn lily	–/–/2B.2	Mesic sites and streambanks in bogs and fens, broadleafed upland forest, and North Coast coniferous forest; below 1,600 meters	Mar–Jul (Aug)	None – No suitable habitat present
Gilia capitata subsp. *pacifica* Pacific gilia	–/–/1B.2	Coastal bluff scrub, chaparral, coastal prairie, valley and foothill grassland; 5–1,330 meters	Apr–Aug	Low – Not observed in general area since 1948 [Calflora].
Gilia millefoliata Dark-eyed gilia	–/–/1B.2	Coastal dunes; 1–30 meters	Apr–Jul	High – Known CNDDB occurrences nearby; confirmed presence west of project site.
Hesperevax sparsiflora var. *brevifolia* Short-leaved evax	–/–/1B.2	Coastal bluff scrub, coastal dunes, and coastal prairie on sandy bluffs and flats; 0–215 meters	Mar–Jun	High – Known CNDDB occurrences nearby; confirmed presence 350 feet west of Project site.
Lasthenia californica subsp. *macrantha* Perennial goldfields	–/–/1B.2	Coastal bluff scrub, coastal dunes, and coastal scrub; 5–520 meters	Jan–Nov	Low – Foredune considered low quality habitat. Not observed from Eureka area since 1913 [Calflora].
Lathyrus japonicus Seaside pea	–/–/2B.1	Coastal dunes; 3–30 meters	May–Aug	None – No suitable habitat present

Table C1-2. Continued

Scientific Name Common Name	Legal Status[a] Fed/State/CRPR	Habitat Requirements	Blooming Period	Potential for Occurrence and Rationale
Lathyrus palustris Marsh pea	–/–/2B.2	Moist coastal areas in bogs & fens, lower montane coniferous forest, marshes and swamps, North Coast coniferous forest, coastal prairie, and coastal scrub; 1–100 meters	Mar–Aug	None – No suitable habitat present
Layia carnosa Beach layia	E/E/1B.1	Coastal dunes and coastal scrub, on sparsely vegetated, semi-stabilized dunes, usually behind foredunes; 0–60 meters	Mar–Jul	High – Known CNDDB occurrences nearby; iNaturalist observations of flowers on April 6, 2020; confirmed presence 300 feet west of Project site.
Lilium occidentale Western lily	E/E/1B.2	Well-drained, old beach washes overlain with wind-blown alluvium and organic topsoil; usually near margins of Sitka spruce in coastal scrub, freshwater marsh, bogs and fens, coastal bluff scrub, coastal prairie, North Coast coniferous forest, marshes and swamps; 2–185 meters	Jun–Jul	None – No suitable habitat present
Montia howellii Howell's montia	–/–/2B.2	Vernally wet sites; often on compacted soil, in meadows and seeps, North Coast coniferous forest, and vernal pools; 0–835 meters	(Jan–Feb) Mar–May	None – No suitable habitat present
Oenothera wolfii Wolf's evening-primrose	–/–/1B.1	Sandy substrates, usually in mesic sites, in coastal bluff scrub, coastal dunes, coastal prairie, and lower montane coniferous forest; 3–800 meters	May–Oct	Moderate – Sandy roadside habitats present

Table C1-2. Continued

Scientific Name Common Name	Legal Status[a] Fed/State/ CRPR	Habitat Requirements	Blooming Period	Potential for Occurrence and Rationale
Puccinellia pumila Dwarf alkali grass	/–/2B.2	Coastal salt marshes, known from only two sites in Humboldt and Mendocino Counties; 1–10 meters	July	None – No suitable habitat present
Sidalcea malviflora subsp. *patula* Siskiyou checkerbloom	–/–/1B.2	Open coastal forest and roadcuts, in coastal bluff scrub, coastal prairie, and North Coast coniferous forest; 15–880 meters	Apr (May–Aug)	None – No suitable habitat present
Sidalcea oregana subsp. *eximia* Coast checkerbloom	–/–/1B.2	Near meadows, in gravelly soil, in meadows and seeps, North Coast coniferous forest, and lower montane coniferous forest; 5–1,350 meters	Jun–Aug	None – No suitable habitat present
Silene scouleri subsp. *scouleri* Scouler's catchfly	–/–/2B.2	Coastal bluff scrub, coastal prairie, and valley and foothill grassland; 0–600 meters	(Mar–May) Jun–Aug (Sep)	Low – Not observed in general area since 1937 [Calflora].
Spergularia canadensis var. *occidentalis* Western sand-spurrey	–/–/2B.1	Coastal salt marshes; 0–3 meters	Jun–Aug	None – No suitable habitat present
Viola palustris Alpine marsh violet	–/–/2B.2	Swampy, shrubby places in coastal scrub or coastal bogs; 0–150 meters	Mar–Aug	None – No suitable habitat present
Fissidens pauperculus Minute pocket moss	–/–/1B.2	Damp soil along the coast, In dry streambeds and on streambanks, in North Coast coniferous forest; 10–1,024 meters	N/A	None – No suitable habitat present
Trichodon cylindricus Cylindrical trichodon	–/–/2B.2	Openings on sandy or clay soils on roadsides, stream banks, trails or in fields in broadleafed upland forest, and upper montane coniferous forest; 50–2,002 meters	N/A	None – No suitable habitat present

Table C1-2. Continued

Scientific Name Common Name	Legal Status[a] Fed/State/ CRPR	Habitat Requirements	Blooming Period	Potential for Occurrence and Rationale
Bryoria spiralifera Twisted horsehair lichen	–/–/1B.1	North Coast coniferous forest on the immediate coast, usually on conifers; 0–30 meters	N/A	Low – No suitable habitat present

Sources: Baldwin et al. 2012; CDFW 2018a, 2020a, 2020b; CNPS 2020; USFWS 2020a, 2020b

Notes:

[a] Legal Status explanations:

Federal

E = listed as Endangered under the federal Endangered Species Act

– = no listing under the federal Endangered Species Act

State

E = listed as endangered under the California Endangered Species Act

R = listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.

– = no listing

California Rare Plant Rank (CRPR)

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

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

3 = adequate information not available to determine ranking

.1 = seriously endangered in California

.2 = fairly endangered in California

.3 = not very endangered in California

Table C1-3. Plant Species Observed in the Terrestrial Biological Study Area

Family	Scientific Name	Common Name
Ferns		
Dennstaedtiaceae	*Pteridium aquilinum* var. *pubescens*	Western brackenfern
Equisetaceae	*Equisetum arvense*	Common horsetail
Polypodiaceae	*Polypodium scouleri*	Leather fern
Pteridaceae	*Polystichum munitum*	Sword fern
Gymnosperms		
Cupressaceae	*Hesperocyparis macrocarpa*	Monterey cypress
Pinaceae	*Pinus contorta* subsp. *contorta*	Shore pine
Monocots		
Allicaceae	*Allium triquetrum*	White flowered onion
Cyperaceae	*Carex obnupta*	Slough sedge
Juncaceae	*Juncus bufonius* var. *bufonius*	Toad rush
	Juncus effusus	Common bog rush
	Juncus lescurii	Dune rush
Eudicots		
Aizoaceae	*Carpobrotus aequilaterus*	Sea-fig
	Carpobrotus edulis	Hottentot-fig
Amaranthaceae	*Chenopodium* sp.	Lamb's quarters
Apiaceae	*Foeniculum vulgare*	Sweet fennel
Asteraceae	*Achillea millefolium*	Common yarrow
	Artemisia pycnocephala	Coastal sagewort
	Ambrosia chamissonis	Beach bur
	Anaphalis margaritacea	Pearly everlasting
	Baccharis pilularis subsp. *consanguinea*	Baccharis
	Erigeron glaucus	Seaside daisy
	Hesperevax sparsiflora var. *brevifolia*	Short leaved evax
	Layia carnosa	Beach layia
	Hypochaeris glabra	Smooth cats ear
	Tanacetum bipinnatum	Dune tansy
	Solidago spathulata	Coast goldenrod
Apiaceae	*Daucus pusillus*	Wild carrot
	Conium maculatum	Poison hemlock
Boraginaceae	*Cryptantha leiocarpa*	Coast popcorn flower
	Plagiobothrys reticulatus	Reticulate popcorn flower
Brassicaceae	*Brassica rapa*	Common mustard
	Raphanus raphanistrum	Wild radish
Caprifoliaceae	*Lonicera involucrata*	Twinberry
Caryophyllaceae	*Cakile maritima*	Sea rocket
	Cardionema ramosissima	Sand mat
	Daucus carota	Wild carrot

Table C1-3. Continued

Family	Scientific Name	Common Name
	Silene gallica	Common catchfly
	Spergularia rubra	Ruby sandspurry
Convolvulaceae	*Calystegia soldanella*	Beach morning glory
Dipsacaceae	*Dipsacus sativus*	Teasel
Fabaceae	*Acmispon americanus*	American bird's foot trefoil
	Acmispon micranthus	Hill lotus
	Lupinus arboreus var. *arboreus*	Coastal bush lupine
	Lupinus bicolor	Lupine
	Lupinus littoralis	Seashore lupine
	Medicago polymorpha	Bur clover
	Trifolium dubium	Shamrock
	Trifolium microcephalum	Small head clover
	Trifolium pratense	Red clover
	Trifolium subterraneum	Subterranean clover
	Vicia americana	American vetch
	Vicia hirsuta	Hairy vetch
	Vicia villosa subsp. *villosa*	Hairy vetch
Geraniaceae	*Erodium cicutarium*	Red-stemmed filaree
	Gernaium dissectum	Cut-leaved geranium
Montiacaceae	*Claytonia perfoliata*	Miner's lettuce
Myricaceae	*Myrica californica*	California wax myrtle
Myrsinaceae	*Lysimachia arvensis*	Scarlet pimpernel
Nyctaginaceae	*Abronia latifolia*	Coastal sand-verbena
Onagraceae	*Camissoniopsis cheiranthifolia* subsp. *cheiranthifolia*	Beach evening-primrose
	Camissonia strigulosa	Contorted sun-cups
	Clarkia davyi	Davy's clarkia
Orobanchaceae	*Parentucellia viscosa*	Yellow parentucellia
Papaveraceae	*Platystemon californicus*	Cream cups
Poaceae	*Aira praecox*	Little hair grass
	Alopecurus pratensis	Meadow foxtail
	Ammophila arenaria	European beach grass
	Anthoxanthum odoratum	Sweet vernal grass
	Avena fatua	Wild oat
	Briza maxima	Rattlesnake grass
	Briza minor	Small quaking grass
	Bromus diandrus	Ripgut brome
	Bromus hordeaceus	Soft chess
	Cortaderia selloana subsp. *selloana*	Pampas grass
	Deschampsia caespitosa	Tufted hair grass
	Festuca arundinacea	Reed fescue

Table C1-3. Continued

Family	Scientific Name	Common Name
	Festuca perennis	Perennial rye grass
	Festuca bromoides	Brome fescue
	Holcus lanatus	Velvet grass
Polemoniaceae	*Gilia millefoliata*	Dark-eyed gilia
Plantaginaceae	*Plantago erecta*	California plantain
	Plantago lanceolata	Ribwort
Plumbaginaceae	*Armeria maritima* subsp. *californica*	Sea pink
Polygonaceae	*Eriogonum latifolium*	Coast buckwheat
	Polygonum paronychia	Dune knotweed
	Rumex acetosella subsp. *acetosella*	Sheep sorrel
	Rumex salicifolius var. *crassus*	Willow leaved dock
Rosaceae	*Fragaria chiloensis*	Beach strawberry
	Rubus armeniacus	Himalayan blackberry
	Rubus ursinus	California blackberry
	Spiraea douglasii subsp. *douglasii*	Douglas spiraea
Rubiaceae	*Galium aparine*	Cleavers
Salicaceae	*Salix hookeriana*	Hookers willow
	Salix lasiolepis	Arroyo willow
Scrophulariaceae	*Nuttallanthus canadensis*	Canada toadflax
	Scrophularia californica subsp. *californica*	Bee plant
Valerianaceae	*Plectritis congesta*	Sea blush

Table C1-4. Special-Status Marine Species and Their Potential to Occur in the Marine Biological Study Area (MSA)

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Marine Mammals					
Baird's beaked whale	*Berardius bairdii*	P	Inhabit deep offshore waters in the North Pacific and are common along steep underwater geologic structures (e.g., submarine canyons, seamounts, and continental slopes).	Seasonal- sightings from late spring to early fall in California Very Rare	Not Expected. Sightings occur in deeper waters than the MSA, mainly along continental shelf edges or in deep submarine canyons where they forage. National Marine Fisheries records indicate less than a dozen individuals have been washed up along the west coast of the US.
Blainville's beaked whale	*Mesoplodon densirostris*	P	Found mainly over the continental shelf and into open ocean waters. Occupy tropical to temperate waters worldwide. Groups have been regularly observed off Oahu, Hawaii and in the Bahamas in 500- to 1,000-meter (m) waters.	Rare	Not Expected. Unlikely to be observed in the MSA.
Blue whale	*Balaenoptera musculus*	FE, FD, P	Found worldwide but often occur near the edges of physical features where krill tend to concentrate. These whales begin to migrate south during November.	Seasonal from June through November in California Common	Moderate to High. Relatively common offshore the California coast, in waters 90-370 kilometers (km) from shore.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Bottlenose dolphin	*Tursiops truncatus*	P	Found in temperate and tropical waters around the world. Have both coastal and offshore populations. Common in areas where rivers meet the sea, and can be seen in harbors, bays and estuaries as well as far away from the shore.	Year-round Uncommon	Not Likely. Since 2010, bottlenose dolphins have been reoccurring as far north as San Francisco. It is possible they could occur in the MSA during times when waters are warmer than usual but historically, they do not occur north of central California.
Bryde's whale	*Balaenoptera edeni*	P	Found in highly productive tropical, subtropical, and warm temperate waters worldwide. More commonly found farther from shore.	Rare	Not Expected. Unlikely to be observed in the MSA.
California sea lion	*Zalophus californianus*	P	Reside in the Eastern North Pacific Ocean in coastal waters. Commonly observed along the west coast of North America from southeast Alaska to the central coast of Mexico.	Seasonal Common	High. Commonly observed
Common dolphin – long-beaked	*Delphinus capensis*	P	Found abundantly from Baja California northward to central California. Found in shallow, warmer temperate waters typically within 15 nautical miles (nm) of the coast and on the continental shelf.	Year-round Rare	Not Expected. The maximum northward extent is Point Arena, but numbers drop dramatically northward of central California.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Common dolphin – short-beaked	*Delphinus delphis*	P	A more pelagic species than the long-beaked common dolphin, these dolphins are associated with the California Current and can be found up to 300 nm from shore. They are commonly found near underwater geologic features where upwelling occurs.	Year-round Common	Moderate. Generally found offshore of the MSA.
Cuvier's beaked whale	*Ziphius cavirostris*	P	Found in temperate, tropical, and subtropical waters. Associated in deep pelagic waters (usually greater than 1,000 m deep) of the continental shelf and slope, and near underwater geologic features. Seasonality and migration patterns are unknown.	Sightings in fall and winter in California Rare	Not Expected. Generally, occur in the deeper waters west of the MSA. One washed up on shore near the Mad River in March 1957 (Houck 1958).
Dall's porpoise	*Phocoenoides dalli*	P	Distributed throughout the North Pacific Ocean and along the west coast from the US border with Mexico to the Bering Sea. Mainly found in pelagic waters deeper than 180 m, but can be found both offshore and nearshore.	Sightings In winter and early spring in California Common	Low to moderate. Most frequently observed offshore but have been seen in nearshore oceanic waters.
Dwarf sperm whale	*Kogia simus*	P	Occur over the continental slope and open ocean. Live in tropical and temperate waters worldwide. Found in the Pacific Northwest and California, but more common near Hawaii and the Gulf of Mexico.	Rare	Not Expected. Not likely to be observed within the MSA. Records of dwarf sperm whales are rare and it is unknown whether low numbers are a consequence of their cryptic behavior or if they are not regular inhabitants of offshore California waters.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
False killer whale	*Pseudorca crassidens*	P	Occur over the continental slope and into open ocean waters with depths over 3,000 feet of tropical and warm temperate waters worldwide.	Sightings in summer and early fall in California Rare	Not Expected. Not likely to occur in the MSA because they prefer warmer waters than within the MSA.
Fin whale	*Balaenoptera physalus*	FE, FD, P	Occupy the deep, offshore waters of all major oceans but primarily are in temperature to polar waters.	Seasonal in California Common	Moderate. Relatively common in California waters between March and October, but due to their occurrence farther offshore in deep water, it is not likely they would be seen in the MSA in high numbers.
Ginkgo-toothed whale	*Mesoplodon ginkgodens*	P	Found mainly over the continental shelf and into open ocean warm waters of the Pacific and Indian Oceans.	Rare	Not Expected. No documented sightings in the MSA.
Gray whale (Western North Pacific)	*Eschrichtus robustus*	FE, FD, P	Predominantly occur within the nearshore coastal waters of the North Pacific Ocean, from the Gulf of Alaska to the Baja Peninsula.	Seasonal December through May in California Common	Moderate-High. Occur in coastal waters during late fall-winter southward migration and again late-winter to early-summer during their northward migration. Can be as close as a few hundred yards of shore but more common 3-12 miles offshore.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Guadalupe (Southern) fur seal	*Arctocephalus townsendi*	CT, FT, FD	Reside in tropical waters of Southern California and Mexico. Breed in rocky coastal habitats and caves mainly along the eastern coast of Guadalupe Island, approximately 200 km west of Baja California. There is a small population on San Miguel Island in the Channel Islands.	Very Rare	Not Expected. Unlikely to occur north of Point Conception in Southern California.
Harbor porpoise	*Phocoena phocoena*	P	Continental slope to oceanic waters, mainly in northern temperate, subarctic coastal, and offshore waters. Commonly found in bays, estuaries, harbors, and fjords less than 200 m deep. In California, most common north of Point Conception.	Year-round in California Uncommon	Moderate. Occasionally observed in Humboldt Bay and adjacent waters. Potential to occur in the MSA between 0- and 200-m depth.
Harbor seal	*Phoca vitulina*	P	Found as far north as British Columbia, Canada and as far south as Baja California, Mexico. Most commonly observed pinniped along California coastline. Use the offshore waters for foraging and beaches for resting. Occur on offshore rocks, on sand and mudflats in estuaries and bays, and on some isolated beaches.	Year-round in California Common	High. Common throughout the California coast. Harbor seals favor nearshore coastal waters. Abundant in Humboldt Bay.
Hubb's beaked whale	*Mesoplodon carlhubbsi*	P	Endemic to the North Pacific Ocean. Species is not well known but assumed to occur mainly over the continental shelf and into open ocean waters.	Very Rare	Not Expected. May occur in waters offshore of Central and Northern California, but the species is very rare.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Humpback whale	*Megaptera novaeangeliae*	FE, FD, P	Found in all major oceans. The California population of humpback whales migrates from their winter calving and mating areas off Mexico to their summer and fall feeding areas off coastal California. Humpback whales occur from late April to early December.	Seasonal- May through November in California Common	High. Frequently observed migrating along the California coast between April and November, up to 90 km offshore.
Killer whale	*Orcinus orca*	FE, FD, P	Found throughout all oceans. Most abundant in colder waters but can be somewhat abundant in temperate water. Presence and occurrence can be common but unpredictable in coastal California.	Seasonal in California Uncommon	Low. Most common during April, May, and June as they feed on northbound migrating gray whales. Generally observed in the deeper offshore waters of the MSA.
Long-snouted spinner dolphin	*Stenella longirostris*	FD, P	Found in all tropical and subtropical oceans. Continental shelf to open ocean waters but most commonly in the deep ocean where they track prey.	Sightings in summer and early fall in California Rare	Not expected to occur in the MSA because they inhabit warmer waters than occur in the MSA.
Minke whale	*Balaenoptera acutorostrata*	P	Distributed worldwide and can be in coastal/inshore and over the continental shelf in temperate (preferred), boreal, or polar waters.	Year-round in California Uncommon	Not Expected-Low. Minke whale sightings have occurred throughout the California coast. While rare, they could be observed within the MSA.
North Pacific right whale	*Eubalaena japonica*	FE, FD, P	Found in the North Pacific Ocean. Seasonally migratory; inhabit colder waters for feeding, and then migrate to warmer waters for breeding and calving. Although they may move far out to sea during their feeding seasons, right whales give birth in coastal areas.	Rare	Not Expected. This species is the rarest of all large whale species, and fewer than 50 individuals are believed to occupy US waters.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Northern elephant seal	*Mirounga angustirostris*	P	Found from Alaska to Mexico. They are sighted regularly over shelf, shelf-break, and slope habitats; and they also are present.in deep ocean habitats seaward of the 2,000-m isobaths. Rookeries are located in the Channel Islands, Año Nuevo State Park, near San Simeon in San Luis Obispo County, and in Point Reyes National Park.	Year-round in California Common	Moderate. Northern elephant seals are widely distributed along the west coast of North America but spend about 9 months of the year at sea.
Northern fur seal	*Callorhinus ursinus*	FD, P	Spend 300 or more days per year foraging in the open ocean of the North Pacific. Use rocky beaches for reproduction. Usually come ashore in California only when debilitated; however, a few individuals have been observed on Año Nuevo Island.	Year-round in California Common	Not Expected. Usually 18-28 km from California's shoreline.
Northern right whale dolphin	*Lissodelphis borealis*	P	Endemic to deep, cold temperate waters of the North Pacific Ocean. Also occur over the continental shelf and slope where waters are less than 66°F.	Year-round in California Common	Not Expected. Tend to occupy deep, cold waters near the continental shelf and seaward.
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	P	Occupy temperate waters of the North Pacific. Found from the continental shelf to the deep ocean.	Year-round in California Common	Low. Likely to occur throughout the California coastline but typically do not occur in nearshore waters.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Perrin's beaked whale	*Mesoplodon perrini*	P	Believed to occupy continental shelves and open ocean waters of the Pacific but not well documented.	Very Rare	Not Expected. This whale is known from less than half a dozen strandings between San Diego and Monterey. It is highly unlikely that it will be observed within the MSA, but the species' complete distribution is unknown.
Pygmy sperm whale	*Kogia breviceps*	P	Occur over the continental slope and open ocean. Prefer tropical, subtropical, and temperate waters of the Pacific Ocean. They are mostly found offshore of Peru but also occur in the waters near Hawaii and the Pacific Northwest.	Rare	Not Expected. Unlikely to occur in the nearshore waters of the MSA. Strandings have been documented off Mexico, New Zealand, and Monterey Bay. Overall the species is rare and is expected to only occur south of the MSA.
Risso's dolphin	*Grampus griseus*	P	Distributed throughout all major oceans. Generally found in waters greater than 1,000 m in depth and seaward of the continental shelf and slopes.	Year-round in California Common	Low. They generally occur in the deeper offshore waters of the MSA.
Rough-toothed dolphin	*Steno bredanensis*	P	Found in all tropical and subtropical oceans. Continental shelf to open ocean waters. Prefer the depths of tropical and warmer temperate waters.	Sighting in summer and early fall in California Rare	Not Expected. Unlikely to occur in the relatively cold waters of the MSA.
Sei whale	*Balaenoptera borealis*	FE, FD, P	Wide distribution occurring in subtropical, temperate, and subpolar waters around the world. Usually observed in deeper waters of oceanic areas far from the coastline.	Seasonal- spring and summer in California Common	Not Expected. Sei whales primarily occupy the open ocean, far away from shore.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Short-finned pilot whale	*Globicephala macrorhynchus*	P	Found in warmer tropical and temperate waters. Commonly seen along the coast close to the continental shelf. Forage in areas with high densities of squid.	Year-round in California Very Rare	Not Expected. Generally found in deeper, warmer water than that which occurs in the MSA.
Southern sea otter	*Enhydra lutris nereis*	FT, P, P	A top carnivore in its coastal range and a keystone species of the nearshore coastal zone. Frequent inhabitor in kelp forests.	Year-round in Central and Southern California Common	Not Expected. Southern sea otters occupy the nearshore waters of California from San Mateo County south to Santa Barbara County. They are unlikely to be observed as far north as Eureka in Northern California.
Sperm whale	*Physeter macrocephalus*	FE, FD, P	Occur globally in the open ocean far from land and are uncommon in waters less than 300 m deep. Live at the surface of the ocean but dive deeply to catch giant squid.	Seasonal-late spring and late fall in California Common	Not Expected. Sperm whales are present offshore California year-round. They peak in abundance in late spring and late summer but are rarely seen because they occupy deep offshore water.
Spotted dolphin	*Stenella attenuata*	FD, P	Typically found far away from the coast in tropical and subtropical waters worldwide but also can occupy waters over the continental shelf. Spend majority of day in waters 90-300 m deep and then dive to depth at night to search for prey.	Sightings in summer and early fall in California Rare	Not Expected. The eastern Pacific Ocean population typically is observed far from the coast, and the population has been depleted.
Stejneger's beaked whale	*Mesoplodon stejnegeri*	P	Found in cold, temperate, and subarctic waters of the North Pacific Ocean. Typically occupy deep offshore waters.	Rare	Not Expected. Typically found in deep, offshore waters on or beyond the continental shelf.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Steller (Northern) sea lion	*Eumetopias jubatus*	FE, FD, P	Distributed around the coasts along the North Pacific Ocean rim. Common in coastal waters and onshore for resting. ***Critical Habitat:*** *A zone that extends approximately 1,000 m seaward and landward of any Steller sea lion rookery in Washington, Oregon, and California. Any aquatic foraging habitat within the species geographic range.*	Seasonal in California Common	Moderate. Documented as relatively common along northern California's coast.
Striped dolphin	*Stenella coeruleoalba*	P	Continental shelf to open ocean waters worldwide, often found in areas of upwelling and around convergence zones. Prefer highly productive tropical to warm temperate waters that are oceanic and deep.	Sightings in summer and early fall in California Rare	Not Expected. Unlikely to occur near the MSA. Observations are typically far offshore.
Marine Turtles					
Green sea turtle	*Chelonia mydas*	FE, P	Distributed globally. Primarily use three types of habitat: oceanic beaches (for nesting), convergence zones in the open ocean, and benthic feeding grounds in coastal areas. ***Critical Habitat:*** *waters surrounding Puerto Rico.*	Seasonal in California Rare	Not Expected. In the eastern Pacific, green turtles have been sighted from Baja California to southern Alaska but most commonly occur from San Diego south. Northernmost sighting is offshore Marin County.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Leatherback sea turtle	*Dermochelys coriacea*	FE, P	Distributed globally. Regularly seen off the western coast of the US in the pelagic, with the greatest densities found off central California.	Seasonal in California Occasional	Not Expected. Leatherback sea turtles are most commonly seen between July and October, when the surface water temperature warms to 15-16° C and large jellyfish, the primary prey of the turtles, are abundant offshore. Northernmost sighting is offshore Marin County.
Olive ridley sea turtle	*Lepidochelys olivacea*	FT, P	Mainly a “pelagic” sea turtle in tropical/temperate regions of the Pacific, South Atlantic, and Indian Oceans but has been known to inhabit coastal areas, including bays and estuaries.	Seasonal in California Very Rare	Not Expected. In the Eastern Pacific, the reported range of the Olive ridley turtle extends from southern California to northern Chile. In warmer El Niño years, they may be observed offshore Northern California (as in 2002 in Mendocino and Humboldt Counties).
Loggerhead sea turtle	*Caretta caretta*	FE, P	Distributed throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Occupy three different ecosystems during their lives: the terrestrial zone, the oceanic zone, and the neritic or nearshore coastal area. ***Critical Habitat:*** *The Northwest Atlantic Distinct Population Segment (DPS) critical habitat includes waters throughout the Gulf of Mexico around the Florida panhandle and up the eastern seaboard of the US.*	Seasonal in California Common	Not Expected. In the Eastern Pacific, most recorded sightings are restricted to Southern California. However, sightings are also reported as far north as Oregon and Washington. No. known sightings in Northern California have been reported.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Sharks and Bony Fishes					
Basking shark	*Cetorhinus maximus*	CSC, P	This species movements and migrations are poorly understood. Usually sighted from British Columbia to Baja California in winter and spring; their destination, once they leave coastal areas, is unknown.	Seasonal in California Very Rare	Not Expected. Basking shark populations were severely depleted by commercial fisheries in the 1950s, and they have never fully recovered due to slow growth and low fecundity.
Bluefin tuna	*Thunnus thynnus*	FSC	A highly migratory species, bluefin tuna are distributed throughout the North Pacific. These tunas are pelagic and found in temperate and tropical oceans. They also can be found in coastal regions. They are typically in the upper 200 m.	Year-round in California Common	Moderate-High. Likely to be present offshore of Northern California.
Bocaccio	*Sebastes paucispinis*	FE	A species of coastal rockfish found in the Pacific, from Baja California northward to the Gulf of Alaska. Most are caught in water between 75 and 230 m.	Year-round in California Common	Low-Moderate. Most abundant between Oregon and Baja California, but species is struggling to recover from overfishing.
Canary rockfish	*Sebastes pinniger*	FSC	A coastal rockfish found between Baja California and the Western Gulf of Alaska. Most common off the Oregon central coast. Tend to occupy water depths around 150 m but can be found as deep as 275 m.	Year-round in California Common	Low-Moderate. The species was declared overfished in 2000 and was rebuilt in 2015. Juveniles tend to stay near the water surface, and adults move to deeper benthic habitats.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Chinook salmon (California Coastal Evolutionary Significant Unit)	*Oncorhynchus tshawytscha*	CE, FE, P	Live in freshwater streams up to the first two years of life, then they migrate to estuarine areas as smolts and eventually the ocean to mature and feed. These salmon prefer deeper and larger streams than those used by other Pacific species. ***Critical Habitat:*** *All major rivers and coastal stretches of rivers and creeks in Sonoma, Mendocino, and Humboldt counties in California. Includes all ocean water and substrate to the full extent of the Economic Exclusion Zone.*	Seasonal in California Common.	High. Present in coastal waters and larger streams and rivers throughout northern California.
Chinook salmon – Spring run (Klamath-Trinity Rivers population)	*Oncorhynchus tshawytscha*	FE	Upper Klamath-Trinity Rivers and coastal waters in northern California. ***Critical Habitat:*** *All major rivers and coastal stretches of rivers and creeks in Humboldt, Del Norte, Trinity, and Northern California counties. Includes all ocean water and substrate to the full extent of the Economic Exclusion Zone.*	Seasonal in California Common	High. This population is endemic to the Klamath-Trinity Rivers.
Chum salmon	*Oncorhynchus keta*	CE	Chum salmon are the most widely distributed of all the salmon species found in the Pacific. They inhabit waters throughout the North Pacific Ocean to the coastal regions of North American and Asia.	Common	Low. The status of Chum salmon in California is poorly understood, and it is believed that their numbers are too small to be detected.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Cowcod	*Sebastes levis*	CSC, FCS, P	Found from central Oregon to Baja California, Mexico. Juveniles recruit to fine sediment habitat. They have been observed at depths between 40 and 100 m. Young cowcod move to deeper habitat within their first year.	Seasonal in California Common	Moderate. Documented catch has declined drastically since the mid 1980s. May be present near the seafloor.
Coho salmon (Northern California population)	*Oncorhynchus kisutch*	FE, CE, P	Spawn in small streams with gravel substrates and spend first half of life cycle in streams and small freshwater tributaries. The later-half of life cycle is spent foraging in estuarine and marine waters.	Seasonal in California Common	High. Coho salmon inhabit Big Lagoon, just north of Eureka.
Longfin smelt	*Spirinchus thaleichthys*	CT	Found along the Pacific Coast from Alaska to California. Adults live primarily in bays, estuaries, and nearshore coastal areas, migrating to low salinity or freshwater reaches to spawn. Spawning occurs primarily in January to March.	Seasonal in California Common	Moderate. Humboldt Bay ranks second in longfin smelt abundance after the Sacramento-San Joaquin Delta/San Francisco Bay Estuary. Seasonally absent from marine waters as spawning occurs in freshwater, typically from January to March.
North American green sturgeon (Northern DPS)	*Acipenser medirostris*	CSC, FSC	The Northern DPS of green sturgeon are those that spawn from the Eel River northward to the Klamath and Rogue Rivers. ***Critical Habitat:*** *All ocean water out to 60 fathoms depth from Monterey Bay northward to the border with Canada.*	Common	Low. There are very few data on the presence of green sturgeon in coastal waters. This species may forage in or near the MSA, but its distribution in ocean waters is essentially unknown.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Pacific Ocean perch	*Sebastes alutus*	FSC	Distributed from the Western Aleutian Islands in Alaska to throughout California, although they become increasingly rare moving south through California.	Common	Low-Moderate. Adults and juveniles appear to inhabit water depths ranging between 150 and 420 m.
Pink salmon	*Oncorhynchus gorbuscha*	CE	Distributed on both sides of the North Pacific Ocean and the most abundant of the Pacific salmon. Common from Alaska through Washington but also known to occur in Northern California. Spawn in freshwater streams and rivers but do not spend extended periods of time in fresh water. Instead they migrate out to the ocean to feed and grow.	Common	Low. More common in Washington and Alaska.
Steelhead trout (Northern California DPS)	*Onchorhynchus mykiss irideus*	FT, CSC, P	Can be found along the entire Pacific Coast of Northern California. Anadromous individuals can spend up to 7 years in fresh water prior to smoltification and then spend up to 3 years in saltwater prior to first spawning. Individuals that spend their entire life in freshwater are called rainbow trout. ***Critical Habitat:*** *Essentially all major rivers and coastal stretches of all rivers and creeks throughout California.*	Seasonal in California Common	Moderate. Spawn in streams and rivers throughout Northern California. Adults may occur in coastal waters near streams and rivers.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Steelhead trout (Klamath Mountains)	*Onchorhynchus mykiss irideus*	FSC, P	Same as the Northern California DPS but endemic to the rivers associated with the Klamath Mountains.	Year round Common	Moderate. Spawn in streams and rivers of the Klamath Mountains. Adults may occur in the coast waters associated with these freshwater systems.
Swordfish	*Xiphias gladius*	FSC	Distributed throughout the world's oceans, mostly in tropical and temperate waters, but they have been documented in cold waters of major oceans. They are found along the eastern edge of the North Pacific Ocean.	Common	Low. Swordfish are mostly found in offshore waters and farther south than the MSA.
Tidewater goby	*Eucycloglobius newberryi*	CSC, FE, P	Despite the common name, this goby inhabits lagoons formed by streams running into the sea. Because the lagoons are blocked from the Pacific Ocean by sandbars, admitting salt water only during particular seasons, their water is brackish and cool. The tidewater goby prefers salinities of less than 10 parts per thousand (less than a third of the salinity found in the ocean) and thus is more often found in the upper parts of the lagoons, near their inflow. ***Critical Habitat:*** *The Big Lagoon in Humboldt County is designated as critical habitat for the tidewater goby.*	Seasonal in California Common	Not Expected. Although Big Lagoon is recognized as critical habitat for the tidewater Goby, the species spends its entire life within estuaries and tidal lagoons. Not expected to be present.in the MSA.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
White shark	*Carcharodon carcharias*	CSC, P	Coastal and offshore waters along the continental shelf and islands. In California, important white shark habitat occurs around Monterey Bay and Greater Farallon's National Marine Sanctuaries. White shark populations are affected by purposeful and incidental capture by fisheries, marine pollution, and coastal habitat degradation.	Year-round in California Common	High. Present in coastal waters throughout California.
Widow rockfish	*Sebastes entomelas*	FSC	A coastal rockfish found between the north end of Baja California and the Gulf of Alaska. Most common between British Columbia and Northern California. Most commonly found between approximately 130 and 230 m depth	Year-round in California Common	Low. Not regularly seen in California. Adults of the same size class tend to move seasonally between adjacent areas.
Yelloweye rockfish	*Sebastes ruberrimus*	FSC	Distributed throughout Alaska and the West Coast of the US. Primarily inhabit high-relief rocky habitats in depths ranging between approximately 20 and 375 m.	Year-round in California Common	Low. Rebuilding of their numbers from overfishing requires decades.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
Gastropods					
Black abalone	*Haliotis cracherodii*	FE, P	Found in coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. Range from Point Arena, California to Bahia Tortugas and Isla Guadalupe, Mexico. Very rare in Northern California. ***Critical Habitat:*** *Essentially all of the California coast.*	Year-round in California Very Rare	Not Expected. They are rare north of San Francisco, and Point Arena is considered the northward-most extent of the species.
Green abalone	*Haliotis fulgens*	FSC, P	Coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. Green abalone habitat ranges from Point Conception, California to Bahia Magdalena, Baja California Sur, Mexico.	Year-round in California Very Rare	Not Expected. Green abalone are not likely to occur north of Point Conception, California.
Pink abalone	*Haliotis corrugate*	FSC, P	Coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. Distributed from Point Conception to Bahia de Santa Maria in Baja California, Mexico.	Year-round in California Very Rare	Not Expected. Pink abalone are unlikely to be found north of the Southern California Bight.

Common Name	Scientific Name	Listing Status	Habitat, *Critical Habitat*	Regional Occurrence	Potential to Occur in the MSA
White abalone	*Haliotis sorenseni*	FE, P	Coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. Range from Point Conception, California to Punta Abreojos, Baja California, Mexico.	Year-round in California Very Rare	Not Expected. White abalone are not likely to occur north of Point Conception, California.

Sources: Allen 2014; Allen et al. 2010; AMS 2015; CDFW 2009, 2012, 2018b; Dick et al. 2009; Driscoll 2014; Houck 1958; Kimmey 2015; Love and Yoklavich 2008; Marine Mammal Commission 2018; Miller and Shanks 2004; NOAA 2011, 2014, 2018, 2019a, 2019b, 2019c, 2019d, 2019e, 2020; Prado 2016; Whaleopedia 2019

Terms:

FESA = federal Endangered Species Act

MMPA = Marine Mammal Protection Act

CESA = California Endangered Species Act

Notes:

Status Codes:

Federal: National Oceanographic and Atmospheric Administration (NOAA); MMPA

FD = Depleted Population

P = Federally Protected

Federal: U.S. Fish and Wildlife Service (USFWS), NOAA National Marine Fisheries Service (NMFS); FESA

FDL = Delisted

FE = Listed as “endangered” (in danger of extinction) under FESA

FT = Listed as “threatened” (likely to become Endangered within the foreseeable future) under FESA

FC = Candidate to become a proposed species

FSC = Former “federal species of concern.” The USFWS no longer lists Species of Concern but recommends that species considered to be at potential risk by a number of organizations and agencies be addressed during project environmental review. *NMFS still lists “Species of Concern.”

State: California Department of Fish and Game (CDFG); CESA

CE = Listed as “endangered” under the CESA

CT = Listed as “threatened” under the CESA

CSC = CDFW designated “species of special concern”

Potential for Species Occurrence Rankings

Not Expected – Suitable foraging or spawning habitat is not known to be present or rare, and the species has not been or has been rarely documented to occur.

Low – Suitable foraging or spawning habitat is present, but the species has either not been documented to be present or if present, the presence is uncommon and infrequent.

Moderate – Suitable foraging or spawning habitat is present, and the species is somewhat common or common for part of the year.

High – Suitable foraging or spawning habitat is present, and the species is common throughout the year and/or in substantial numbers.

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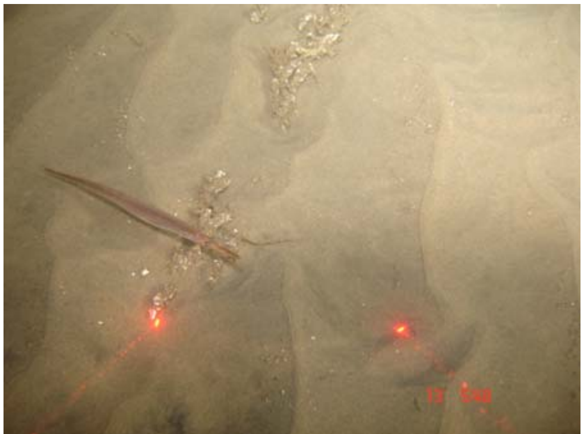
APPENDIX C2 MARINE BIOLOGICAL RESOURCES REPORT




Marine Aquatic Habitats and Biological Resources Offshore Eureka, California

August 2019

Revised: October 2020

Prepared for:

RTI

Prepared by:

APPLIED
marine
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1 Introduction

The purpose of this review is to present a broad scientific overview of the marine habitats and associated biota occurring in the intertidal, subtidal, and pelagic regions present offshore coastal Northern California. This review is based on scientific literature and field studies conducted near the RTI Eureka Subsea Cables Marine Study Area or in nearshore waters of California, where applicable. For the purposes of this review, the analysis of seafloor habitats and associated marine taxa covers the water depth range of 0 – 184 m (0 – 600 ft). For fishes and marine mammals, the analysis extends out to 1,800 meters (m) (5,904 feet [ft]) water depth.

Figure 1 provides an illustration of the Marine Study Area offshore Humboldt Bay and Eureka, California, a graphical presentation of coastal bathymetry and topography, as well as areas of special concern or marine protection.

2 Pertinent Scientific Surveys of Marine Habitats in Northern California and Southern Oregon

Recent scientific investigations of intertidal, subtidal, and pelagic habitats and associated marine biota conducted in Northern California and Southern Oregon that have been used to prepare this document include:

- Areas of special biological significance, California's marine state water quality protection areas (SWRCB 2003);
- Patterns of Benthic Macroinvertebrate Communities and Habitat Associations in Temperate Continental Shelf Waters of the Pacific Northwest (Lee 2012);
- Benthic habitat characterization offshore the Pacific Northwest Volume 1: Evaluation of continental shelf geology (Goldfinger *et al.* 2014);
- Benthic habitat characterization offshore the Pacific Northwest Volume 2: Evaluation of continental shelf benthic ecology (Henkel *et al.* 2014);
- North Central California coast marine protected areas baseline characterization and monitoring of mid-depth rock and soft-bottom ecosystems (20–116 m) (Lindholm *et al.* 2014);
- Baseline monitoring of rocky reef and kelp forest habitat of the North Coast region (Jenkins and Craig 2017);
- Humboldt open ocean disposal site (HOODS) 2008 and 2014 monitoring synthesis report (EPA 2016);
- North coast baseline program final report, mid-depth, and deep subtidal ecosystems (Lauermann *et al.* 2017);

- Baseline characterization of sandy beach ecosystems along the north coast of California (Nielsen *et al.* 2017);
- Invertebrate and fish observation listings from remotely-operated vehicle (ROV) surveys of the Point Arena and 10-mile Marine Protected Areas and near the Noyo River (MARE 2017); and
- Mapping marine habitat suitability and uncertainty of Bayesian networks: A case study using Pacific benthic macrofauna (Havron *et al.* 2017).

In addition to the above-listed surveys conducted specifically in Northern California and Southern Oregon, habitat and marine biota assessments for other cable landings in California provide valuable insights into the ecosystem relationships and distribution of invertebrate and vertebrate taxa. These scientific surveys include:

- MCI/WorldCom fiber optic cable project, Montana del Oro/Morro Bay (SAIC-SLO 1999);
- AT&T US/China fiber optic cable project, Morro Bay and Point Arena (SAIC 1999);
- Pacific crossing and Pan American crossing fiber optic cable landing, Grover Beach (AMS 1999a);
- Tyco Global West fiber optic cable project, San Diego, Manhattan Beach, Santa Barbara, and Morro Bay (SAIC 2000);
- Tycom fiber optic cable project, Hermosa Beach (MBC 2001);
- Monterey Bay Aquarium Research Institute MARS fiber optic cable project, Monterey Bay (MBARI 2004);
- AT&T AAG S-5 fiber optic cable project, Montana del Oro/Morro Bay (AMS 2008); and
- SEA-US 1 fiber optic cable project, Hermosa Beach (AMS 2016a).

Finally, the effects of physical disturbance to subtidal hard substrate habitats and associated marine biota, and the recovery of those marine communities following direct and indirect disturbance, have been extensively studied in conjunction with offshore oil and gas exploration and production operations in the Pacific Outer Continental Shelf and for previously installed coastal fiber optic and electric transmission cables. The results of these scientific investigations have been studied and discussed in:

- Recolonization of deep-water hard substrate communities: potential impacts from oil and gas development (Lissner *et al.* 1991);
- A survey of prominent anchor scars and the level of disturbance to hard-substrate communities in the Point Arguello region (Hardin *et al.* 1993);
- ATOC/Pioneer Seamount cable effects study (Kogan *et al.* 2006);

- MARS fiber optic cable impacts to the marine environment in Monterey Bay National Marine Sanctuary (Kuhnz *et al.* 2015);
- Installation and operational effects of a HDAC submarine cable in Australia (Sherwood *et al.* 2016);
- Submarine cables in Olympic Coast National Marine Sanctuary (Antrim *et al.* 2018); and
- Seabed recovery following protective burial of subsea cables (Kraus and Carter 2018).

3 Pelagic Open Water Habitat and Associated Biological Communities

The pelagic zone supports a number of planktonic organisms (phytoplankton, zooplankton, and ichthyoplankton) that float with the currents, as well as nektonic organisms, such as bony fishes, sharks, and marine mammals that move freely against local and oceanic currents.

3.1 Plankton

Phytoplankton, the primary producers at the base of the marine food web, are consumed by many species of zooplankton. In turn, zooplankton support a variety of species including small schooling fishes (e.g., sardines, herring) and baleen whales (Mysticeti). In the marine environment, phytoplankton tend to be nutrient limited, explaining why they are found at higher densities near coastlines where nutrient inputs from terrestrial point and non-point sources help promote their growth (Fischer 2014). The abundance and composition of phytoplankton along the west coast of California is influenced by the upwelling system and tends to be dominated by diatoms year-round (Du *et al.* 2016). Winds blowing from the north create a current running north to south along the shore that promotes upwelling as well as mixing of plankton over large spatial scales. Relaxation of upwelling and stratification of the water column promotes the growth of phytoplankton. Some phytoplankton taxa, such as dinoflagellates and various species of the *Pseudonitzschia* genus are considered harmful (Du *et al.* 2016).

Organisms that complete their entire life cycle as planktonic forms are called holoplankton and include phytoplankton and zooplankton. Holoplankton have short generation times (hours to weeks), reproduce continually (i.e. are not dependent on a certain season), and are not restricted to specific geographic zones. Plankton that only spend part of their life cycle as planktonic forms, such as eggs and larvae, are called meroplankton. Meroplankton make up a small fraction of the total number of planktonic organisms in seawater. They have shorter spawning seasons, are restricted to a narrow region of the coast, and are at greater risk of mortality from anthropogenic causes, such as subsea construction. As a result, investigations of harmful effects on marine biota in California typically assess effects on meroplanktonic species as proposed by the U.S. EPA (EPA 1977). Important meroplankton include larvae and eggs of commercially important fishes, lobsters, crabs, octopus and squid.

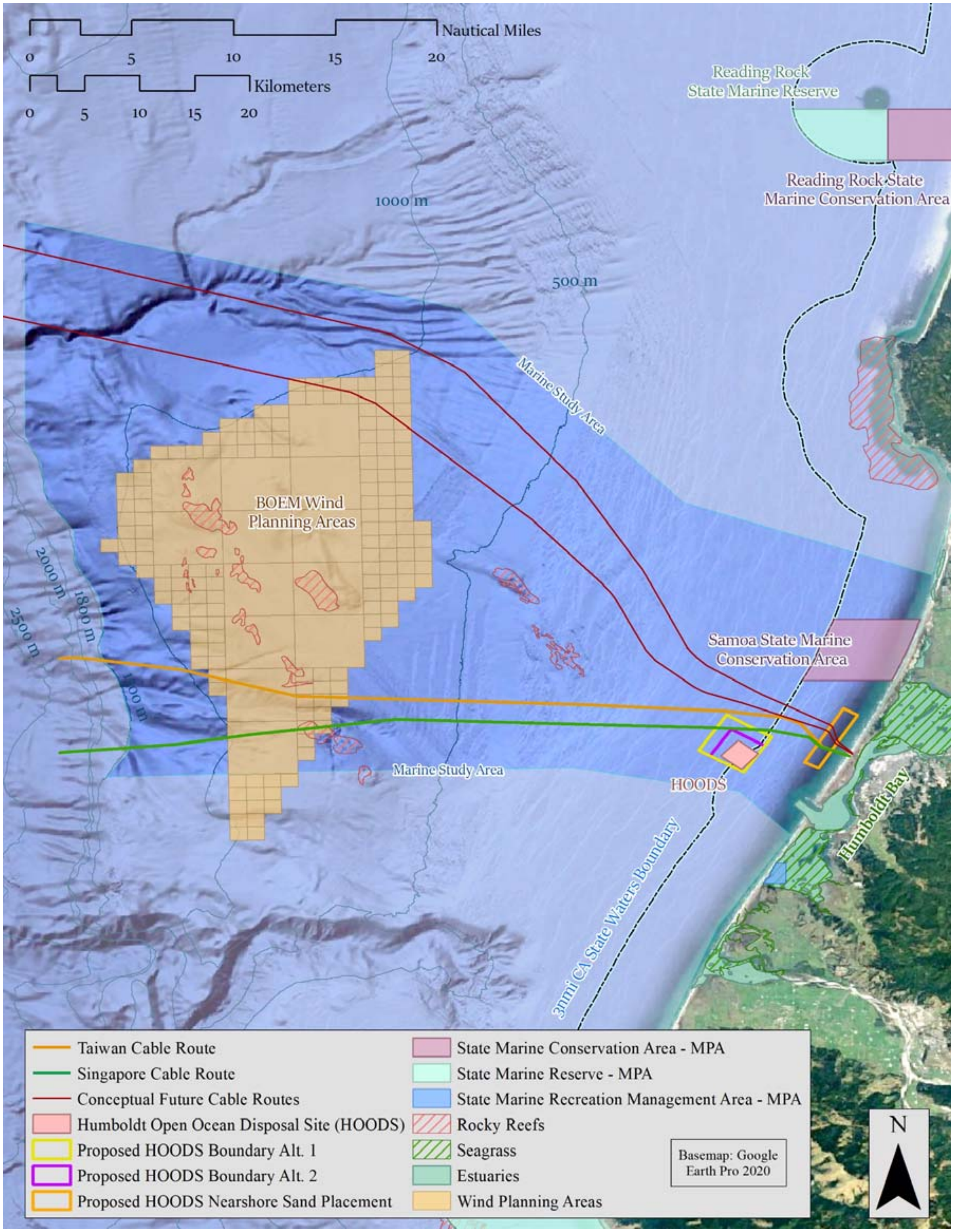

Figure 1: Marine Study Area for the RTI-Eureka Subsea Cables Project

3.2 Marine Mammals and Sea Turtles

3.2.1 Marine Mammals

All marine mammals are protected under the Marine Mammal Protection Act (MMPA), and some species are further protected under the Federal Endangered Species Act (FESA). Marine mammals have the same physiological characteristics as terrestrial mammals but are adapted to live in ocean waters for either all or part of their life. Some marine mammals have evolved a thick layer of fat that allows them to maintain their body temperature. All marine mammals must come to the surface to breathe, but some species can hold their breath and remain underwater for extended periods of time. This is achieved by slowing the heart rate during a dive to conserve oxygen. Marine mammals include whales, dolphins, porpoises, seals, sea lions, walruses, sea otters, manatees, dugongs, and the polar bear.

The entire California coast is home to an abundance of marine mammals. Several species are regular or periodic inhabitants of the waters offshore Eureka and Northern California, and many are commonly observed in nearshore in less than 200 meters of water. The California sea lion (*Zalophus californianus*), harbor seal (*Phoca vitulina*), and humpback whale (*megaptera novaeangeliae*) are highly likely to be observed in the waters of the Marine Study Area. Other marine mammals that are moderately likely to be observed within the Marine Study Area include blue whales (*Balaenoptera musculus*), common dolphins (*Delphinus delphis*), fin whales (*Balaenoptera physalus*), gray whales (*Eschrichtus robustus*), harbor porpoises (*Phocoena phocoena*), northern elephant seals (*Mirounga angustirostris*), and steller sea lions (*Eumetopias jubatus*). In addition, there is a low probability that Dall's porpoises (*Phocoenoides dalli*), killer whales (*Orcinus orca*), minke whales (*Balaenoptera acutorostrata*), Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), and Risso's dolphins (*Grampus griseus*) may be observed. See Table 7.1 for details on these special status marine species and for those taxa that are highly unlikely or not expected to occur in the Marine Study Area.

3.2.2 Sea Turtles

Physical and oceanographic forces drive patterns of primary and secondary productivity in the coastal waters off California (Wingfeld *et al.* 2011). Five species of marine sea turtles are known to inhabit these waters or seasonally migrate to the area to forage during times of high productivity. These include loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), Pacific hawksbill (*Eretmochelys imbricata*), and olive ridley (*Lepidochelys olivacea*) sea turtles (California Herps 2019).

Of these five species, only the olive ridley sea turtle has been reported to occur in the nearshore waters of Northern California, with sightings at Noyo in Mendocino County and near Table Bluff in Humboldt County (California Herps 2019). The loggerhead and Pacific hawksbill sea turtles are known to occur only in Southern California south of Point Conception. Green and leatherback sea turtles also are more commonly observed in the warmer waters off Mexico and Southern California. They have been occasionally observed as far north as Marin County in north Central California, with far rarer observations as far north as Canada's Vancouver Island (California Herps 2019).

The leatherback, green, and Pacific hawksbill sea turtles are federally listed as endangered throughout their ranges, and the olive rridley and loggerhead sea turtles are federally listed as threatened. Critical habitat for the leatherback sea turtle has been established from Point Arena in north Central California south to Point Arguello, in Southern California (NOAA 2018b).

4 Intertidal and Nearshore Habitats

4.1 Sandy Beach

Sandy beach ecosystems account for approximately 70% of the shoreline of the entire California coastline and comprise 152.4 miles of the Northern California coast[1] (Horizon 2012; Dugan *et al* 2015; Nielsen *et al.* 2017). Sandy beach ecosystems can be separated into long beaches (> 1 kilometer [km] in length) and pocket beaches (<1 km in length). The beaches occurring in the Marine Study Area are identified as long beaches.

Sandy beaches provide critical habitat for shorebirds, marine mammals, and fishes; but they are often used by humans for recreation, and they help to support coastal economies. Numerous species of shorebirds, such as sanderlings, marbled godwits, and willets, feed along the water's edge on sandy beaches. Western snowy plovers and California least terns also are known to use sandy beaches and coastal dunes for nesting sites. Additionally, pinnipeds haul out on isolated beaches and sands spits, including gravel and fine- to medium-grained beaches (Horizon 2012).

Generally, beaches are highly dynamic environments exposed to air and sun during low tides; they are subject to intense wave-related energy and constant reworking, as well as large-scale seasonal substrate variations (Thompson *et al.* 1993). Organisms that live in the sand are mobile and frequently shift their distribution in response to daily fluctuations in temperature, salinity, and moisture content (Straughan and Hadley1978).

A variety of invertebrates live in the sand or in wracks of decaying seaweed and other detritus associated with the beach surface. The beaches of North Central and Northern California support a diverse invertebrate community with over 70 species reported in a recent scientific assessment (Nielsen *et al.* 2017). Sand crabs (*Emerita analoga*) and beach hoppers (*Megalorchesis* spp.) are typically the dominant invertebrate taxa present, accounting for up to 78% of total intertidal biomass. Other common taxa include polychaete worms and clams. Kelp wrack and other washed-up organic debris are the predominant energy and food sources for beach ecosystems (Nielsen *et al.* 2017).

4.2 Rocky Intertidal

There is no rocky intertidal habitat along the proposed RTI Eureka subsea cable routes. The closest rocky intertidal habitat is located along the man-made rock jetties lining the entrance to Humboldt Bay (Figure 1). Organisms inhabiting this type of rocky intertidal habitat typically include assorted barnacles (*Balanus and Chthamalus* spp.), mussels (*Mytilus californianus*),

[1] The north coast of California is defined as the coastline between Alder Creek in Mendocino County to the California-Oregon border.

limpets, chitons, small crabs, assorted sea stars, bryozoans, encrusting sponges, brown algae, snails, and hermit crabs (*Paguridae*) (RCEA 2018).

5 Subtidal Habitats and Associated Macrobenthic Biological Communities

Subtidal habitats typically are characterized as either soft sediment or hard substrate. Depending on water depth, currents, wave energy, and other physical conditions, the soft substrate can range from coarse sands (typically observed in high-energy, shallow-water environments) to fine muds (observed in low-energy, deeper water environments). Hard substrate can be divided into natural (rocky outcrop) or artificial (e.g., concrete, pilings, steel) substrate and further characterized by elevation or rise above the seafloor. While some reports characterize elevation rise as “mixed,” “low,” or “high” (Lee 2012; Henkel *et al.* 2014), more common descriptors used for categorizing elevation of hard substrate above the seafloor are:

- Mixed bottom – a combination of coarse sand, gravel, cobble, and small boulders;
- Low relief – exposed bedrock and rocky outcropping rising approximately < 0.3 m (<1 ft) from the seafloor;
- Moderate relief – exposed rocky outcroppings that typically rise approximately 0.3–1.0 m (1–3 ft) from the seafloor;
- High relief – exposed rocky outcropping that typically rise >1.0 m (>3 ft) from the seafloor.

Many of the deep-water, hard substrate biological assessments featured in this report have documented an increase in species diversity and abundance with increasing elevation above the seafloor. Moderate-relief rocky features tend to be isolated features surrounded by soft-bottom habitat, whereas high-relief features tend to be found in rocky areas surrounded by mixed-, low-, and moderate-relief habitat (SAIC 1999; SAIC 2000; AMS 2008; AMS 2016a). These studies also have identified that water depth, current speed, rate of sedimentation, and elevation off the seafloor are key factors in determining the composition of biota inhabiting a specific hard substrate habitat (Lissner and Shoakes 1986; Battelle Ocean Sciences 1991; Hardin *et al.* 1993; Lee 2012; Henkel *et al.* 2014).

Additionally, with increasing water depth and a reduction of wave energy above the seafloor, the sediment composition shifts from coarse sands with low organic content near the beach to fine muds with increasing organic content as one transits farther offshore into deeper waters. This shift in sediment composition and energy also results in changes to the marine biota inhabiting the soft substrate habitat.

5.1 Habitats and Associated Biota Observed in the 0–30 m (0–100 ft) Water Depth Range

Most fiber optic cables begin their offshore routing at the point at which the cable exits an existing pipeline/outfall or horizontal bore hole. Thtypically is occurs in 12–25 m (39–82 ft) water depth and preferably in soft substrate such as sand or silt. Although hard substrate does occur at these shallower depths subject to higher wave energy, cable routes routinely are selected to avoid them. As a result, most of the fiber optic cable route reconnaissance surveys reviewed for this report begin at water depths greater than 25 m (82 ft). Investigations of shallow-water rocky reefs in Southern, Central, and Northern California have been conducted by Occidental College (2008), Chambers (1998), AMS (1999a), and Jenkins and Craig (2017); these studies can be used to inform our understanding of species present at water depths < 30 m (100 ft). Because scientists conducted these surveys using SCUBA equipment, the taxonomic lists generated from them typically are more extensive than lists generated from ROV-based surveys. The following discussion of biota in water < 30 m (100 ft) depth is based on the aforementioned studies and assessments using SCUBA, whereas discussions of biota in water > 30 m (100 ft) depth focuses primarily on observations and data originating from fiber optic cable route surveys and surveys of California's Marine Protected Areas (MPAs) in Central and Northern California.

5.1.1 Soft Substrate

Soft substrate habitat is composed of both infaunal[2] and epifaunal[3] taxa. Sediment composition commonly observed between 0 and 30 m (0 and 100 ft) depth include coarse sands in the surf zone shifting to finer sands and muds (silts and clays) at the deeper water depths of this zone (Figures 2 and 3). The infaunal community inhabiting this zone primarily consists of arthropods, mollusks, and polychaetes. The U.S. Environmental Protection Agency (EPA) reported (2016) that the infaunal community along stations ranging between 25 m (82 ft) and 92 m (302 ft) depth at the Humboldt Open Ocean Disposal Site (HOODS), located immediately offshore of the entrance to Humboldt Bay (Figure 1), exhibited a fairly distinct trend toward increasing organism density, as well as increasing taxon richness, with increasing depth. This depth-trend in infaunal organism density and richness reflected differences in both substrate type and energy, with shallower stations being subject to a higher-energy environment and sandy sediments compared with a lower-energy environment and finer grained, more carbon-rich substrate at the deeper water stations. The nearshore, coarser sand sediments were dominated by arthropods and mollusks, whereas the siltier seafloor sediments located farther offshore were dominated by polychaete worms (EPA 2016).

The most common epifaunal invertebrate taxa observed between 0 and 30 m (0 and 100 ft) include the ornate tube worm (*Diopatra ornata*), cancer crabs *(Cancer* sp.), slender crabs *(Cancer gracilis),* masking crab *(Loxorhynchus crispatus),* octopus *(Octopus rubescens* and *O. bimaculatus/bimaculoides)*), white sea pens (*Stylatula elongata*), sea cucumbers (*Parastichopus californicus*), sunflower stars (*Pycnopodia helianthoides*), occasional polychaete tube worms, Pachycerianthus anemones, spiny sand stars (*Astropecten armatus*), short-spined seastars (*Pisaster brevispinus*), sand stars (*Luidia foliolata*), sea pansy (*Renilla kollikeri*), swimming crabs (*Portunus xantusii*), hermit crabs, Kellet's whelk (*Kelletia kellettii*), and sand

[2] Infaunal – benthic organisms that live within the substrate or sediments of the seafloor.

[3] Epifaunal- benthic organisms that live on the seafloor surface of the substrate or sediment.

dollars (*Dendraster excentricus*) (SAIC 1999; MBARI 2004; AMS 2008; Lauerman *et al*. 2017; MARE 2017).

Additionally, the bat star (*Asterina miniata*) and red sea star (*Mediaster aequalis*) occasionally are observed present in soft substrate when the soft substrate habitat is close to exposed hard substrate. In coarser sand habitats, the invertebrate community typically is dominated by ornate tubeworms (*D. ornata*) and sand dollars (*D. excentricus*) when they are present in colonies occupying fairly narrow bands. In deeper waters, where the sediments shift to finer muds, brittle stars (*Ophiura* spp.) start to occur in larger numbers.

When hard substrate is in proximity to the surveyed location, various species of drift algae also are commonly observed along the seafloor in soft-bottom habitat. Observed species include bull kelp (*Nereocystis luetkeana*), feather boa kelp (*Egregia meanzinii*), acid kelp (*Desmarestia ligulata*), and surf grass (*Phyllospadix* spp*.)*. Populations of small red and brown algae also have been reported to occur attached to worm tubes (MBC 2001; AMS 2016a).

5.1.2 Hard Substrate

Hard substrate habitat types typically observed between 0 and 30 m (0 and 100 ft) water depths include mixed bottom with a combination of coarse sand and cobble and low-relief rocks (< 0.3 m [1 ft]) above the seafloor (Figure 4). No known or reported hard substrate occurs within this depth range offshore Eureka except along the rock jetties flanking the entrance to Humboldt Bay (RCEA 2018) and possible artificial hard substrate provided by sunken wrecks (Figure 1). However, if mixed- or low-relief rocky substrate were to occur along the proposed cable route between 0 and 30 m (0 and 100 ft) depth, the associated biological communities likely would be dominated by a dense mat of turf species including a mixture of small hydroids, bryozoans, tunicates, sponges, crustose and erect coraline algae, barnacles, and multiple species of red and brown algae according to surveys of North Coast MPAs (Jenkins and Craig 2017). For example, in their assessment of the Trinidad Head MPA, Jenkins and Craig (2017) reported that the dominant algae occurring in water depths less than 20 m (66 ft) included woody stem kelp (*Pterygophera californica*), brown algae (*Laminaria* spp.), brown kelp (*Cystosiera* spp.), and bull kelp (*Nereocystis luetkeana*).

Other invertebrate taxa that may be present at some locations where low- or mixed- relief rock outcroppings occur include surf grass (Phyllospadix *sp.)* in the very shallow water depths of this zone, sea anemones (*Actinaria unident.*), swimming anemones (*Stomphia coccinea*), squid (*Loligo* sp.), crab (*Cancer* spp.), masking crab (*L. crispatus*), bat stars (*Asterina miniata*), red sea stars (*M. aequalis)*, giant-spined sea stars (*Pisaster giganteus*), other *Pisaster* sea stars, brittle stars (*Ophiura* spp.) and occasionally sea hares (*Aplysia californica*) (AMS 2008; SAIC-SLO 1999; MBARI 2004).

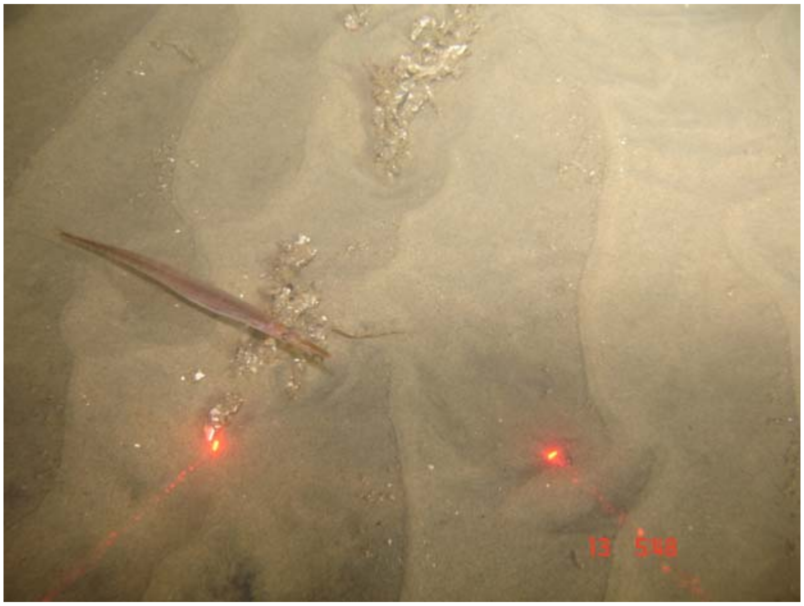

Figure 2: Coarse sand substrate in < 30 m of water depth offshore Central California. Ornate tube worms (*D. ornata*) and a tubesnout (*Aulorhynchus flavidus*) along the AAG-S5 cable route.

Figure 3: Coarse sand substrate in < 30 m water depth offshore Southern California. Drift kelp and ornate tube worms (*D. ornata*) along the SEA-US cable route.

Figure 4: Mixed-bottom, low-relief, hard substrate habitat in < 30 m of water depth offshore Central California along the SEA-US cable route.

5.2 Habitats and Associated Biota Observed in the 30–100 m (100-328 ft) Water Depth Range

5.2.1 Soft Substrate

Soft substrate habitats in the 30–100 m (100–328 ft) depth range, where bottom currents or wave energy continue to wash the seafloor in the shallower depths of the zone, include scattered mixed-bottom, coarse sand, silty sands, and fine silt-clay mud sediments. The coarser sand substrate normally is seen only at the shallower water depths of this segment of the nearshore environment. The finer mud substrate is frequently pockmarked with burrow holes (Figures 5 and 6).

Infaunal taxa inhabiting the soft sediments in this depth range are dominated by polychaete worms, crustaceans, and mollusks (EPA 1995, 2016). Dominant polychaete infaunal taxa, which accounted for up to 70% of individuals present, include *Siophanes bombyx*, *Decamastus gracilis*, *Glycera oxcephala*, *Heteromastus filobranchus*, *Lumbineris luti*, *Mediomastus californiensis*, *Scoloplos armiger*, *Spiphanes bombyx,* and *Tharyx* spp. (EPA 1995, 2016). Dominant infaunal crustacean taxa include the cumacean *Diastylopsis dawsonii*; the amphipods *Ampelisca careyi*, *Anisogammarus pugettensis*, *Atylus tridens*, *Monoculodes spinipes*, *Protomedia prudens*, *Photos* spp., *Diasylis* spp., *Cheirmedeia* spp., *and Isaeidae* spp.; and the isopod *Synidotea bicuspida*. Dominant molluscan infaunal taxa include the gastropods *Olivella pycna* and *Mitrella* spp.; bivalves *Axinopsida sericata*, *Macoma* spp., and S*iliqua patula*; and unidentified brittle stars (*Ophiuroids*) (EPA 1995, 2016).

Soft substrate epifauna reported occurring in these water depths include multiple species of decapod crustacean, such as bay shrimp (*Crangon* spp.) and coon-stripe shrimp (*Pandalus danae*), dungeness crab (*Metacarcinus magister*), sand dollars (*D. excentricus*) and several species of sea stars (EPA 2016, 1995). Sand dollars have been reported to occur in large, dense beds in the coarser sand sediments offshore Humboldt Bay (EPA 1995; Fenstermacher *et al.* 2001).

Based on seafloor surveys conducted by ROV, several species of sea pens (*Ptilosarcus gurneyi*, *Stylatula elongata*, *Acanthoptilum* spp., *Subselliflorae* spp., *Virgularia* spp.), sea slugs (*Pleurobranchea californica*), sand stars (*L. foliolata*), multi-armed sea stars (*Rathbunaster californica* and *Pycnopodia helianthoides*), Cerianthidae anemones, California sea cucumbers (*Apostichopus californicus* [formerly known as *Parastichopus californica]*), and swimming anemones (*Stomphia coccinea*) also occur at these water depths (Lauermann *et al.* 2017; SAIC 2000; Lee 2012; MARE 2017). In coarser sediments, brittle stars and the sunflower star (*Pycnopodia helianthoides*) predominate, and decapod crustacean taxa generally decline with depth offshore (EPA 2016).

5.2.2 Hard Substrate

Hard substrate habitat types typically observed in the 30–100 m (100–328 ft) depth range in the nearshore waters of California can include mixed-bottom, low-, moderate-, and high-relief rock. Although no hard substrate habitat is known to be present within these water depths offshore Eureka, it is possible that isolated small patches of mixed- or low-relief habitat is found along any of the proposed fiber optic cable routes. It is also possible that sunken shipwrecks located in these water depths offshore Eureka (Figure 1) would provide artificial hard substrate for sessile[4] marine taxa. Data from scientific assessments of nearby Central and North Coast MPAs, as well as other studies of hard substrate habitats and associated biological communities occurring within these depths can be used to characterize any hard substrate taxa that may be present. An assessment of multiple hard substrate habitats in the Pacific Northwest concluded that water temperature and latitude were interchangeable when characterizing the presence of individual taxa (Lee 2012).

The hard substrate community inhabiting rocky features between 30 and 100 m (100 and 328 ft) depth appears to be dominated by turf, encrusting and foliose bryozoans, assorted encrusting sponges, snails, and the white-plumed anemone *M. farcimen* (=*giganteum*) (Figure 6). Also occasionally occurring are brown cup corals (*P. stearnsii*), assorted crabs (*Cancer* spp.), shrimps, red sea stars (*M. aequalis*), sea cucumbers (*Parastichopus* spp.), the sunflower star (*Pycnopodia* sp.), the fish eating star (*Stylasterias forreri*), pink urchins (*Allocentrotus fragilis*), swimming anemones (*S. coccinea*), and brittle stars (*Ophiuroids*). Additionally, soft gorgonian corals including *Lophogorgia chiliensis* and *Eugorgia rubens* occasionally are observed as single or small multi-stalked specimens (SAIC 2000; Lee 2012; AMS 2008; Lauermann *et al.* 2017; MARE 2017).

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[4] Sessile – marine taxa that are attached to hard substrate and not motile.

5.3 Habitats and Associated Biota Observed in the 91–200 m (300–656 ft) Water Depth Range

5.3.1 Soft Substrate

The soft seafloor substrate typically observed in the 91–200 m (300–656 ft) depth range and below is exclusively comprised of silts and clays, with minor amounts of fine sand (Figures 7 and 8). The macrobenthic community in this depth range is similar to that observed in the deeper depths of the 30–100 m (100–328 ft) range discussed above. It is dominated by sea pens (*S. elongata, Virgularia* spp.), sand stars (*L. foliolata*), assorted crabs including *Cancer* spp., *Paralithoides* spp., and *Metacarcinus magister*), and assorted shrimp. Other commonly or frequently occurring taxa include several species of sea anemones (e.g., *Urticina* spp.), the multi-armed sea star (*R. californica*), the red sea star (*M. aequalis*), brittle stars (*Amphiodia* sp. and Ophiuroidea), pink sea urchin (*Allocentrotus fragilis*), free-living polychaetes (*Chloeia pinnata*), sea cucumbers (*Parastichopus* spp.), several species of octopus (Octopoda) and sea slugs (*P. californica*) (SAIC 2000; AMS 2007; Lee 2012; Lauermann *et al.* 2017; MARE 2017; Henkel 2014).

5.3.2 Hard Substrate

Hard substrate habitat types observed in the 91–200 m (328–656 ft) depth range are the same as those present in the 30–100 m (100–328 ft) depth range. As illustrated in Figure 1, hard substrate features occur offshore Eureka, California between 200 and 500 m (656 and 1,640 ft) and again between 500 and 1,000 m (1,640 and 3,281 ft). This farther offshore grouping of rocky features occurs within the planned federal wind energy lease area. All of this hard substrate habitat is identified by the National Fisheries Management Service (NMFS) as Habitat Areas of Particular Concern (HAPCs) under the Magnuson-Stevens Fishery Management and Conservation Act. As noted in Figure 1, it is the intent of the RTI Eureka Subsea Cables Project to avoid any moderate- to high-relief hard substrate areas that might occur along any of the proposed cable routes.

The macrobenthic taxa inhabiting water depths between 91 and 200 m (328 and 656 ft) are similar to those encountered in the 30–100 m (100–328 ft) depth range with turf, cup corals, bryozoans, sponges, tunicates, and the white-plumed anemone being the most often observed. Also commonly observed are giant basket stars (*Gorgonocephalus eucnemis*), brittle stars (Ophiuroidea), various species of crabs and red sea stars (*M. aequalis*). At some locations, where moderate- to high-relief rock outcrops may be present, crinoids (e.g., *F. serratissima*), soft gorgonian corals, the California hydrocoral *Stylaster californicus* (= *Allopora californica)* become more frequent (Lauerman *et al.* 2017; SAIC 2000; Lee 2012; MARE 2017).

It is within these water depths that deep-water branching corals have been reported occurring along fiber optic cable routes (SAIC 2000). Based on whether current speeds, sedimentation rates, and the occurrence of high-relief features are favorable, branching hard and soft corals have been reported, including the branching white coral *Lophelia* sp. (NOAA 2014a).

Figure 5: Soft substrate habitat in 30–100 m water depth offshore Southern California along the SEA-US Cable Route. Left Photo-shell hash and drift algae. Right photo-*Acanthoptilum* spp. sea pens.

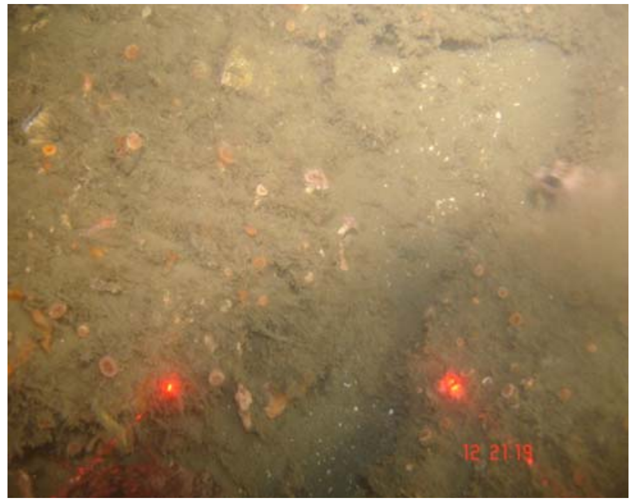

Figure 6: Natural and artificial hard substrate habitat in 30–100 m water depth offshore Southern (left photo) and Central California (right photo). Left photo-debris with attached turf species, *Metridium farcmens* anemone, crab, and rockfish along the SEA-US Cable Route. Right photo- low shelf with turf, cup corals (*Balanophyllia elegans*), sponges, and bryozoans along the AAG-S5 Cable Route.

Figure 7: Fine silt and clay soft substrate in100–185 m water depth offshore Southern California. Pink urchins (*Strongylocentrotus fragilis*) along the SEA-US

Figure 8: Fine silt and clay soft substrate in 100–183 m water depth offshore Central California. Spiny sand star (*Astropecten* sp.) and brittle stars along the AAG-S5 cable

6 Fish Assemblages

The distribution of fish species offshore California is influenced by various combinations of water depth, substrate type, temperature, and ocean currents (Love and Yoklavich 2006). Fish assemblages along the Central California coast have not been extensively researched, and most data are based on commercial and recreational landing data. These data, combined with data from ROV reconnaissance surveys along fiber optic cable routes, are the primary basis for describing fish assemblages in this paper. Although many marine resources, including fishes, typically are distributed by water depth and habitat type, the following description of fish assemblages is divided by substrate type.

6.1 Pelagic (Open Water)

Pelagic fish assemblages tend to be similar throughout the coastal waters of Northern California, characterized by small schooling species such as Pacific sardine (*Sardinops sagax*), Northern anchovy (*Engraulis mordax*), and smelt (Osmeridae); schooling predators such as bluefin tuna (*Thunnus thynnus*), albacore tuna (*Thunnus alalonga*), and thresher shark (*Alopias vulpinus*); and large solitary predators such as mako shark (*Isurus oxyrinchu*), leopard shark (*Triakis semifasciata*), and great white shark (*Carcharodon carcharias*), (CDFW 2018). Other common fish species that inhabit the open water environment include assorted salmon (*Oncorhynchus* spp.*)*, steelhead (*Onchorhynchus mykiss irideus*), market squid (*Doryteuthis opalescens*), jack and Pacific mackerel (*Trachurus symmetricus* and *T. symmetricus*), opah (*Lampris* spp.), juvenile and adult rockfishes, and assorted perches *(*Embiotocidae*).*

6.2 Subtidal Soft Substrate

Soft bottom habitat is the most widespread benthic habitat on the California shelf (Allen 2006; Allen *et al.* 2011; Dugan *et al*. 2015). Demersal fishes occupying this habitat are relatively sedentary compared to pelagic fish species and respond more readily to changes in the benthic environment. Fishes found in soft-bottom habitats in Northern California are typified by flatfishes such as sanddabs, including speckled (*Citharichthys stigmaeus*) and Pacific (*C. sordidus*), Dover sole (*Microstomus pacificus*), English sole (*Pleuronectes vetulas*), assorted soles (Pleuronectidae), California halibut (*Paralichthys californicus*), poachers (Agonidae), tubesnout (*Aulorhynchus flavidus*), spotted cuskeels (*Chilara taylori*), longspine combfish (*Zaniolepsis latispinnus*), black eyed goby (*C. nicholsi*), Pacific hagfish (*Eptatretus stouti*), spotted ratfish (*Hydrolagus colliei*), California tonguefish (*Symphurus atricauda*), Pacific electric ray (*Torpedo californica*), banded guitarfish (*Zapteryx exasperate*), and eelpouts (*Lycodes* spp.) (AMS 2008; AMS 1999a; Chambers 1998; SAIC-SLO 1999; SAIC 1999; SAIC 2000; Lee 2012; MARE 2017). Larger predators include the big skate (*Raja binoculata*), longnose skate (*R. shina*), Pacific angel shark (*Squatina californica*), swell shark (*Cephaloscyllium ventriosum*), and great white shark (*Carcharodon carcharias).* As discussed above for fish species associated with hard substrate habitat, water depths <200 m (656 ft) do not appear to be a deterrent for soft substrate-associating fish.

6.3 Subtidal Hard Substrate

Similar to macroinvertebrate communities discussed above, fish assemblages in Northern California also are highly variable depending on both abiotic and biotic parameters, including the presence of reef structure (Pondella *et al.* 2011). Common fish species observed inhabiting or associating with hard substrate habitat, including both mixed bottom, low relief, and high relief, include sculpins (Cottidae) such as bull sculpin (*Enophrys taurine*) and coraline sculpin (*Artedius corallines*), black eyed goby (*Coryphopterus nicholsi*), giant kelpfish (*Heterostichus rostratus*), rainbow seaperch (*Hypsurus caryi*), white seaperch (*Platchthys stellatus*), pile perch (*Rhacochilus vacca*), pink surfperch (*Zalembius rosaceus*), kelp bass *(Paralabrax clathratus),* painted greenling *(Oxylebius pictus),* lingcod *(Ophiodon elongates),* and señorita (*Oxyjulis california*) (Chambers 1998; AMS 1999a; SAIC-SLO 1999; SAIC 1999; SAIC 2000; AMS 2008; Henkel 2014; MARE 2017).

The most common fish assemblages observed occurring on deeper water hard substrate outcroppings are assorted juvenile and adult rockfishes, including the brown rockfish (*Sebastes auriculatus*), gopher rockfish (*S. carnatus*), copper rockfish (*S. caurinus*), green striped rockfish (*S. elongates),* quillback rockfish (*S. maliger),* rosy rockfish (*S. rosaceus),* half banded rockfish (S. *semicinctus*), olive rockfish (*S. serrinoides),* and tree fish (*S. serriceps)* (AMS 1999a; Chambers 1998; SAIC-SLO 1999; SAIC 1999; SAIC 2000; AMS 2008; Henkel 2014; MARE 2017). Fish species typically observed associated with hard substrate do not appear to be as restricted by water depth as soft substrate taxa, at least to 200 m (656 ft). If any water depth delineation occurs in nearshore California waters. it appears to occur between water depths < 30 m (100 ft) and > 30 m (100 ft).

Other schooling fish species that have been observed or collected close to hard-bottom substrate areas include poachers (Agonidae), blue rockfish (*S. mystinus*), schooling baitfish (Atherindae), and speckled sanddabs (*Citharichthys stigmaeus*) (Chambers 1998; AMS 1999a; SAIC-SLO 1999; SAIC 1999; SAIC 2000; AMS 2008; Henkel 2014; MARE 2017). These same species are expected to occur in the vicinity of hard-bottom features along the RTI Eureka Subsea Cables Project offshore cable routes.

6.4 Magnuson-Stevens Act Managed Fish Species

In accordance with the 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act, essential fish habitat (EFH) is defined as “those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity.” Central California coincides with areas designated as EFH in all four fishery management plans (FMPs): the Pacific Coast Groundfish FMP (PFMC 2016b), the Coastal Pelagic Species FMP (PFMC 2018a), Pacific Coast Salmon FMP (PFMC 2016a), and Highly Migratory Species FMP (PFMC 2018b).

Most of the 85 groundfish species managed under the Pacific Groundfish FMP are found at various stages in their life histories in diverse habitats throughout Northern California. Some species are broadly dispersed during specific life stages, especially those with pelagic eggs and larvae, while other species may have limited distributions (i.e., adult rockfishes in nearshore habitats) with strong affinities to a particular location or substrate type. Estuaries, sea grass beds, canopy kelp, rocky reefs, and other "areas of interest" such as seamounts, offshore banks, canyons are designated as HAPCs for groundfish managed species. Figure 1 illustrates the locations of NMFS-designated HAPCs along the Northern California coast and specifically those occurring along the proposed RTI Eureka Subsea Cables Project cable routes.

Coastal pelagic fish species live in the water column, not near the sea floor, and usually are found from the surface to > 1,000 m (3,281 ft) water depth (PFMC 2018a). Six stocks of coastal pelagic fish species are managed under the Coastal Pelagic Species FMP, including jack mackerel (*Traxchurus symmetricus*), Pacific chub mackerel (*Scomber japonicas*), Pacific sardine (*Sardinops sagax*), market squid (*Doryteuthis opalescens*), northern anchovy (*E. mordax)* and krill or euphausiids (*Euphausia* spp., *Thysanoessa* spp., *Nyctiphanes simplex*, and *Nematocelis difficilis*). In addition, jacksmelt (*Atherinopsis californiensis*) and Pacific herring (*Clupea pallasii*) are considered ecosystem components of the fishery and are monitored. All of these species are observed in the coastal waters offshore Humboldt Bay (Tables 6.2 and 6.3 below).

The Pacific Coast Salmon FMP (2016) outlines spatially explicit EFH for Chinook salmon (*Oncorhynchus tshawytscha*), Coho salmon (*Oncorhynchus kisutch*), and Puget Sound pink salmon (*Oncorhynchus* gorbuscha). While inland spawning habitat is considered the most essential to these species (all areas designated as HAPC for salmon are inland), all three are still present in marine coastal waters. The marine EFH for all three species extends from the inland extreme high tide line out to the 200-mile Exclusive Economic Zone offshore of the states of Washington, Oregon, and California north of Point Conception. Humboldt Bay is therefore located within the boundary of this EFH. Chinook salmon are more commonly found off the coast of California, but Coho and Puget Sound pink salmon, while uncommon, also can be present.

EFH for Highly Migratory Species includes all marine waters from the shoreline to 200 nautical miles (370 km) offshore. Three species of shark are managed under the Highly Migratory Species FMP: the blue shark (*Prionace glauca*), common thresher shark (*Alopias vulpinus*), and shortfin mako shark (*Isurus oxyrinchus*). Additionally, five species of tuna are managed under this plan, including bigeye tuna (*T. obesus*), North Pacific albacore (*Thunnus alalunga*), Pacific bluefin tuna (*T. orientalis*), yellowfin tuna (*T. albacares*), and skipjack tuna (*Katsuwonus pelamis*) (Table 6.1). Striped marlin (*Kajikia audax*) is the only species of billfish managed under the Highly Migratory Species FMP. Broadbill swordfish (*Xiphias gladius*) is the only species of swordfish and Dorado/mahi-mahi (*Coryphaena hippurus*) is the only species of dolphinfish managed under this FMP. All of the highly migratory species occur in offshore waters adjacent to Humboldt Bay (Tables 6.2 and 6.3 below).

TABLE 6.1
MAGNUSON-STEVENS ACT MANAGED FISH AND INVERTEBRATE SPECIES

Fisheries Management Plan	Species, Common Name	Species, Scientific Name	Life Stage	Occurrence in Proximity to Eureka Site*
Coastal Pelagic	Jack mackerel	*Trachurus symmetricus*	E, L, J, A	Present[1]
	Jacksmelt	*Atherinopsis californiensis*	E, L, J, A	Present[1,2]
	Krill or Euphausiids	*Euphausia pacifica, Thysanoessa spinifera,* *Nyctiphanes simplex, Nematocelis difficilis,* *T. gregaria, E. recurva,* *E. gibboides, E. eximia*	E, F, J, A	Present[3]
	Market squid	*Doryteuthis opalescens*	E, L, J, A	Present [1,2]
	Northern anchovy	*Engraulis mordax*	E, L, J, A	Present[1]
	Pacific herring	*Clupea pallasii pallasii*	E, L, J, A	Present[1]
	Pacific (chub) mackerel	*Scomber japonicus*	E, L, J, A	Present[1,2,4]
	Pacific sardine	*Sardinops sagax*	E, L, J, A	Present[1]
Pacific Groundfish (dashed lines separate elasmobranchs, roundfishes, rockfishes, and flatfishes, respectively)	Cabezon	*Scorpaenichthys marmoratus*	E, L, J, A	Present[1,2,4]
	Kelp greenling	*Hexagrammos decagrammus*	E, L, J, A	Present[1,2,,4]
	Lingcod	*Ophiodon elongatus*	E, L, J, A	Present[1,2,4]
	Pacific cod	*Gadus macrocephalus*	E, L, J, A	Present[1,2]
	Pacific whiting (hake)	*Merluccius productus*	E, L, J, A	Present[1,2]
	Sablefish	*Anoplopoma fimbria*	E, L, J, A	Present[1,2]
	Aurora rockfish	*Sebastes aurora*	E, L, J, A	Absent[1]
	Bank rockfish	*Sebastes rufus*	E, L, J, A	Present[1]
	Black rockfish	*Sebastes melanops*	E, L, J, A	Present [2,4]
	Black-and-yellow rockfish	*Sebastes chrysomelas*	E, L, J, A	Present[2,4]
	Blackgill rockfish	*Sebastes melanostomus*	E, L, J, A	Present [2]
	Blue rockfish	*Sebastes melanostomus*	E, L, J, A	Present [2,4]
	Bocaccio rockfish	*Sebastes paucispinis*	E, L, J, A	Present [2,4]
	Bronzespotted rockfish	*Sebastes gilli*	E, L, J, A	Absent[1]

TABLE 6.1 (CONTINUED)
MAGNUSON-STEVENS ACT MANAGED FISH AND INVERTEBRATE SPECIES

Fisheries Management Plan	Species, Common Name	Species, Scientific Name	Life Stage	Occurrence in Proximity to Eureka Site*
	Brown rockfish	*Sebastes auriculatus*	E, L, J, A	Present [2,4]
	Calico rockfish	*Sebastes dalli*	E, L, J, A	Absent[1]
	California scorpionfish	*Scorpaena guttata*	E, L, J, A	Absent[1]
	Canary rockfish	*Sebastes pinniger*	E, I, J, A	Present [2,4]
	Chameleon rockfish	*Sebastes phillipsi*	E, L, J, A	Absent[1]
	Chillipepper rockfish	*Sebastes goodei*	E, L, J, A	Present [2]
	China rockfish	*Sebastes nebulosus*	E, L, J, A	Present [2,4]
	Copper rockfish	*Sebastes caurinus*	E, L, J, A	Present [2,4]
	Cowcod	*Sebastes levis*	E, L, J, A	Present [2]
	Darkblotched rockfish	*Sebastes crameri*	E, L, J, A	Present [2]
	Deacon rockfish	*Sebastes diaconus*	E, L, J, A	Present[1]
	Dusky rockfish	*Sebastes ciliatus*	E, L, J, A	Absent[1]
	Dwarf-red rockfish	*Sebastes rufinanus*	E, L, J, A	Absent[1]
	Flag rockfish	*Sebastes rubrivinctus*	E, L, J, A	Absent[1]
	Freckled rockfish	*Sebastes lentiginosus*	E, L, J, A	Absent[1]
	Gopher rockfish	*Sebastes carnatus*	E, L, J, A	Present [2,4]
	Grass rockfish	*Sebastes rastrelliger*	E, L, J, A	Present [2,4]
	Greenblotched rockfish	*Sebastes rosenblatti*	E, L, J, A	Absent[1]
	Greenspotted rockfish	*Sebastes chlorostictus*	E, L, J, A	Present [2]
	Greenstriped rockfish	*Sebastes elongatus*	E, L, J, A	Present [2]
	Harlequin rockfish	*Sebastes variegatus*	E, L, J, A	Absent[1]
	Halfbanded rockfish	*Sebastes semicinctus*	E, L, J, A	Absent[1]
	Honeycomb rockfish	*Sebastes umbrosus*	E, L, J, A	Absent[1]
	Kelp rockfish	*Sebastes atrovirens*	E, L, J, A	Absent[1]

TABLE 6.1 (CONTINUED)
MAGNUSON-STEVENS ACT MANAGED FISH AND INVERTEBRATE SPECIES

Fisheries Management Plan	Species, Common Name	Species, Scientific Name	Life Stage	Occurrence in Proximity to Eureka Site*
	Longspine thornyhead	*Sebastolobus altivelis*	E, L, J, A	Present [2]
	Mexican rockfish	*Sebastes macdonaldi*	E, L, J, A	Absent[1]
	Olive rockfish	*Sebastes serranoides*	E, L, J, A	Present [2,4]
	Pacific Ocean perch	*Sebastes alutus*	E, L, J, A	Present [2]
	Pink rockfish	*Sebastes eos*	E, L, J, A	Absent[1]
	Pinkrose rockfish	*Sebastes simulator*	E, L, J, A	Absent[1]
	Quillback rockfish	*Sebastes maliger*	E, L, J, A	Present [2,4]
	Redbanded rockfish	*Sebastes babcocki*	E, L, J, A	Present [2]
	Redstripe rockfish	*Sebastes proriger*	E, L, J, A	Present [1]
	Rosethorn rockfish	*Sebastes helvomaculatus*	E, L, J, A	Present [2]
	Rosy rockfish	*Sebastes rosaceus*	E, L, J, A	Present [2,4]
	Rougheye rockfish	*Sebastes aleutianus*	E, L, J, A	Present[1]
	Sharpchin rockfish	*Sebastes zacentrus*	E, L, J, A	Present[1]
	Shortbelly rockfish	*Sebastes jordani*	E, L, J, A	Present[1]
	Shortraker rockfish	*Sebastes borealis*	E, L, J, A	Present [2]
	Shortspine thornyhead	*Sebastolobus alascanus*	E, L, J, A	Present [2]
	Silvergray rockfish	*Sebastes brevispinis*	E, L, J, A	Present[1]
	Speckled rockfish	*Sebastes ovalis*	E, L, J, A	Present[1]
	Splitnose rockfish	*Sebastes diploproa*	E, L, J, A	Present[1]
	Squarespot rockfish	*Sebastes hopkinsi*	E, L, J, A	Absent[1]
	Sunset rockfish	*Sebastes crocotulus*	E, L, J, A	Present[1]
	Starry rockfish	*Sebastes constellatus*	E, L, J, A	Present [2]
	Stripetail rockfish	*Sebastes saxicola*	E, L, J, A	Present [2]
	Swordspine rockfish	*Sebastes ensifer*	E, L, J, A	Absent[1]
	Tiger rockfish	*Sebastes nigrocinctus*	E, L, J, A	Present [4]

TABLE 6.1 (CONTINUED)
MAGNUSON-STEVENS ACT MANAGED FISH AND INVERTEBRATE SPECIES

Fisheries Management Plan	Species, Common Name	Species, Scientific Name	Life Stage	Occurrence in Proximity to Eureka Site*
	Treefish rockfish	*Sebastes serriceps*	E, L, J, A	Absent[1]
	Vermillion rockfish	*Sebastes miniatus*	E, L, J, A	Present[2,4]
	Widow rockfish	*Sebastes entomelas*	E, L, J, A	Present[2,4]
	Yelloweye rockfish	*Sebastes ruberrimus*	E, L, J, A	Present[2,4]
	Yellowmouth rockfish	*Sebastes reedi*	E, L, J, A	Absent[1]
	Yellowtail rockfish	*Sebastes flavidus*	E, L, J, A	Present[2,4]
	Big skate	*Raja binoculata*	E, L, J, A	Present[2]
	Leopard shark	*Triakis semifasciata*	E, L, J, A	Present[2,4]
	Longnose skate	*Raja rhina*	E, L, J, A	Present[2]
	Spiny dogfish	*Squalus suckleyi*	E, L, J, A	Present[2,4]
	Arrowtooth flounder (turbot)	*Atheresthes stomias*	E, L, J, A	Present[2,4]
	Butter sole	*Isopsetta isolepis*	E, L, J, A	Present[2]
	Curlfin sole	*Pleuronichthys decurrens*	E, L, J, A	Present[2]
	Dover sole	*Microstomus pacificus*	E, L, J, A	Present[2,4]
	English sole	*Parophrys vetulus*	E, L, J, A	Present[2]
	Flathead sole	*Hippoglossoides elassodon*	E, L, J, A	Present[1]
	Pacific sanddab	*Citharichthys sordidus*	E, L, J, A	Present[2,4]
	Petrale sole	*Eopsetta jordani*	E, L, J, A	Present[2,4]
	Rex sole	*Glyptocephalus zachirus*	E, L, J, A	Present[2]
	Rock sole	*Lepidopsetta bilineata*	E, L, J, A	Present[2]
	Sand sole	*Psettichthys melanostictus*	E, L, J, A	Present[2,4]
	Starry flounder	*Platichthys stellatus*	E, L, J, A	Present[2,4]

TABLE 6.1 (CONTINUED)
MAGNUSON-STEVENS ACT MANAGED FISH AND INVERTEBRATE SPECIES

Fisheries Management Plan	Species, Common Name	Species, Scientific Name	Life Stage	Occurrence in Proximity to Eureka Site*
Salmon	Chinook salmon	*Oncorhynchus tshawytscha*	A	Present[1]
	Coho salmon	*Oncorhynchus kisutch*	A	Present[1]
	Pink salmon	*Oncorhynchus gorbuscha*	A	Present[1]
Highly Migratory	Bigeye tuna	*Thunnus obesus*	A	Present[1]
	Blue shark	*Prionace glauca*	A	Present[1]
	Common thresher shark	*Alopias vulpinus*	A	Present[1]
	Dorado (Mahi-mahi, Dolphinfish)	*Coryphaena hippurus*	A	Present[1]
	North Pacific albacore	*Thunnus alalunga*	A	Present[1]
	Pacific bluefin tuna	*Thunnis orientalis*	A	Present[1]
	Shortfin mako (Bonito) shark	*Isurus oxyrinchus*	A	Present[1]
	Skipjack tuna	*Katsuwonus pelamis*	A	Present[1]
	Swordfish	*Xiphias gladius*	A	Present[1]
	Striped marlin	*Tetrapturus audax*	A	Present[1]
	Yellowfin tuna	*Thunnus albacares*	A	Present[1]
All Fishery Management Plans	Mesopelagic fishes	Families*: Myctophidae, Bathyalgidae, Paralepididae,* and *Gonostomatidae*		Absent[1]
	Pacific sand lance	*Ammodytes hexapterus*	E, L, J, A	Present[1]
	Pacific saury	*Cololabis saira*	E, L, J, A	Present[1]
	Pelagic squids	Families*: Cranchiidae, Gonatidae, Histioteuthidae, Octopoteuhidae, Ommastrephidae* except Humboldt squid *(Dosidicus gigas), Onychoteuthidae,* and *Thysanoteuthidae*	E, L, J, A	Present[5]
	Round herring	*Etrumeus teres*		Absent[1]

TABLE 6.1 (CONTINUED)
MAGNUSON-STEVENS ACT MANAGED FISH AND INVERTEBRATE SPECIES

Fisheries Management Plan	Species, Common Name	Species, Scientific Name	Life Stage	Occurrence in Proximity to Eureka Site*
	Silversides	*Atherinopsidae*		Absent[1]
	Smelts	*Osmeridae*	E, L, J, A	Present[1]
	Thread herring	*Opisthonema libertate, Opisthonema medirastre*		Absent[1]

NOTES:

E = Egg, **L** = Larvae, **J** = Juvenile, **A** = Adult

OCCURRENCE:

Present = Species found within the marine study area based on sources listed below

Absent = Not found within marine study area based on sources listed below

SOURCES:

Froese, R. and D. Pauly. Editors. 2019. FishBase. World Wide Web electronic publication. www.fishbase.org, version (04/2019)[1]; CDFW Final California Commercial Landings Table 9, 2013 – 2017[2]; Euphausiids of the World Ocean E. Brinton, M.D. Ohman, A.W. Townsend, M.D. Knight and A.L. Bridgeman[3]; PSMFC RecFIN Recreational Landings for Humboldt County, 2013 – 2018[4] Palomares, M.L.D. and D. Pauly. Editors. 2019. SeaLifeBase.World Wide Web electronic publication.www.sealifebase.org.

6.5 Commercial and Recreational Fishing

The coastal waters of Northern California are used extensively for both commercial and recreational fishing. Although more than 90 fish species or groups were commercially landed at Eureka between 2013 and 2018, only 12 of them accounted for 91% of the landings based on tonnage (Table 6.2). Those taxa that account individually for more than 0.7% of the total landings between 2013 and 2018 include Dungeness crab (*Metacarcinus magister),* ocean pink shrimp (*Pandalus jordani*), Dover sole (*M. pacificus),* market squid (*Doryteuthis opalescens),* sablefish (*Anoplopoma fimbria)*, Petrale sole (*E. jordani)*, hagfish (Myxini), longnose skate (*Raja rhina*), longspine thornyhead *(S. altivelis),* night smelt (*Spirinchus starksi*), shortspine thornyhead (*Sebastolobus alascanus),* and albacore tuna (*Thunnus alalonga*). Commercial fishing methods include trolling, trawling, and trapping.

TABLE 6.2
EUREKA, CALIFORNIA ANNUAL COMMERCIAL LANDINGS IN THOUSAND POUNDS: CDFW 2013 – 2018

Species		Commercial Landings (thousand pounds)							
Common Name	**Genus Species**	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**	**Mean**	**Percent Total Catch**
Crab, Dungeness	Metacarcinus magister	13,474	0.96	9,828	509	4,616	20,062	8,082	34.4
Shrimp, ocean pink	Pandalus jordani	4913	3,275	2,011	7,647	8,466	8,502	5,802	24.7
Sole, Dover	Microstomus pacificus	3166	3,114	3,128	2,783	2,508	2,852	2,925	12.5
Squid, market	Doryteuthis opalescens	0.00	0.00	0.00	0.00	4,795	0.00	799	3.4
Sablefish	Anoplopoma fimbria	630	845	927	822	696	652	762	3.2
Sole, Petrale	Eopsetta jordani	892	844	668	599	591	499	682	2.9
Hagfish	Myxini	560	651	438	604	593	557	567	2.4
Skate, longnose	Raja rhina	21	278	264	2,239	175	16	499	2.1
Thornyhead, longspine	Sebastolobus altivelis	217	383	47	510	610	569	389	1.7
Smelt, night	Spirinchus starksi	281	288	275	387	303	312	308	1.3
Thornyhead, shortspine	Sebastolobus alascanus	202	189	237	274	292	295	248	1.1
Tuna, albacore	Thunnus alalunga	219	194	102	31	521	209	213	0.9
Lingcod	Ophiodon elongatus	350	245	82	83	70	40	145	0.6
Flounder, arrowtooth	Atheresthes stomias	52	85	116	17	126	172	95	0.4
Sole, rex	Glyptocephalus zachirus	127	165	128	77	81	75	109	0.5
Rockfish, black	Sebastes melanops	95	120	134	217	0	66	105	0.4
Sole, English	Parophrys vetulus	110	209	123	97	55	37	105	0.4
Rockfish, widow	Sebastes entomelas	518	108	0.28	1	0.32	0.18	105	0.4
Salmon, Chinook	Oncorhynchus tshawytscha	87	4	12	69	157	279	101	0.4
Rockfish, canary	Sebastes pinniger	305	165	1	9	2	1	81	0.3
Smelt, surf	Hypomesus pretiosus	2	1	6	104	223	57	66	0.3
Shrimp, coonstripe	Pandalus danae	82	56	54	37	82	81	65	0.3
Rockfish, group shelf	Sebastes	215	58	5	6	7	1	49	0.2

TABLE 6.2 (CONTINUED)
EUREKA, CALIFORNIA ANNUAL COMMERCIAL LANDINGS IN THOUSAND POUNDS: CDFW 2013 – 2018

SOURCES:

California Department of Fish and Wildlife Final California Commercial Landings, Table 14MB: 2013 – 2017. Species shown account for 99% of mean annual commercial landings in pounds in the Eureka area. Fished species and families comprising the remaining 1% from greatest to least include big skate (*Beringraja binoculata*), rockfish group slope (*Sebastes*), sanddab (Citharichthys), darkblotched rockfish (*Sebastes crameri*), Pacific hagfish (*Eptatretus stoutii*), grenadier (Macrouridae), redtail surfperch (*Amphistichus rhodoterus*), yellowtail rockfish (*Sebastes flavidus*), Bocaccio (*Sebastes paucispinis*), blue rockfish (*Sebastes mystinus*), chilipepper rockfish (*Sebastes goodei*), Pacific sanddab (*Citharichthys sordidus*), starry flounder (*Platichthys stellatus*), California halibut (*Paralichthys californicus*), vermillion rockfish (*Sebastes miniatus*), Cabezon (*Scorpaenichthys marmoratus*), copper rockfish (*Sebastes caurinus*), purple sea urchin (*Strongylocentrotus purpuratus*), quillback rockfish (*Sebastes maliger*), curlfin turbot (*Pleuronichthys decurrens*), Pacific halibut (*Hippoglossus stenolepis*), Pacific whiting (*Merluccius productus*), thresher shark (*Alopias vulpinus*), shortfin mako shark (*Isurus oxyrinchus*), swordfish (*Xiphias gladius*), kelp greenling (*Hexagrammos decagrammus*), red sea urchin (*Mesocentrotus franciscanus*), spiny dogfish shark (*Squalus acanthias*), China rockfish (*Sebastes nebulosus*), redbanded rockfish (*Sebastes babcocki*), rougheye rockfish (*Sebastes aleutianus*), grass rockfish (*Sebastes rastrelliger*), sand sole (*Psettichthys melanostictus*), blackgill rockfish (*Sebastes melanostomus*), curlfin sole (*Pleuronichthys decurrens*), brown rockfish (*Sebastes auriculatus*), Pacific Ocean perch rockfish (*Sebastes alutus*), bluefin tuna (*Thunnus thynnus*), olive rockfish (*Sebastes serranoides*), Pacific cod (*Gadus macrocephalus*), black and yellow rockfish (*Sebastes chrysomelas*), California moray eel (*Gymnothorax mordax*), shortraker rockfish (*Sebastes borealis*), striped surfperch (*Embiotoca lateralis*), calico surfperch (*Amphistichus koelzi*), jacksmelt (*Atherinopsis californiensis*), red rock crab (cancer *productus*), rosy rockfish (*Sebastes rosaceus*), skipjack tuna (*Katsuwonus pelamis*), gopher rockfish (*Sebastes carnatus*), rock sole (*Lepidopsetta bilineata*), Louvar (*Luvarus imperialis*), striped seaperch (*Embiotoca lateralis*), aurora rockfish (*Sebastes aurora*), greenstriped rockfish (*Sebastes elongatus*), Cowcod rockfish (*Sebastes elongatus*), barred surfperch (*Amphistichus argenteus*), white seabass (*Atractoscion nobilis*), Pacific mackerel (*Trachurus symmetricus*), walleye surfperch (*Hyperprosopon argenteum*), spotted ratfish (*Hydrolagus colliei*), greenspotted rockfish (*Sebastes chlorostictus*), yellowtail (*Seriola quinqueradiata*), leopard shark (*Triakis semifasciata*), flag rockfish (*Sebastes rubrivinctus*), bat ray (*Myliobatis californica*), rosethorn rockfish (*Sebastes helvomaculatus*), starry rockfish (*Sebastes constellatus*), brown smoothhound shark (*Mustelus henlei*), butter sole (*Plueronectes isolepis*), slender sole (*Lyopsetta exilis*), and pile surfperch (*Rhacochilus vacca*).

Recreational fishing, conducted from rocky shores, sandy beaches, docks, private boats, and commercial party boats, landed approximately 100 fish taxa between 2013 and 2018 (Table 6.3). However, only 19 of these taxa accounted for more than 91% of the landings in tonnage or in individual numbers of fish landed. The dominant fish taxa caught by recreational fisherman include lingcod (*O. elongates*); assorted species of rockfishes including blue, vermillion, yellowtail, gopher, copper, brown, black, olive, Boccacio, kelp, and Canary (*S. mystinus, S. miniatus, S. flavidus, S. caratus, S. caurinus, S. auriculatus, S. malanops, S. serranoides, S. paucispinis, S. astrovirens,* and *S. pinniger*, respectively); Cabezon (*Scorpaenichthys marmoratus*); barred surfperch (*Amphistichus argenteus*); Dungeness crab (*M. magister*); California halibut (*P. californicus)*; jacksmelt (*A. californiensis*); Pacific chub mackerel (*Trachurus symmetricus*); and Pacific sanddab (*C. sordidus*), (Table 6.3).

TABLE 6.3
PRIMARY FISH AND INVERTEBRATE TAXA RECREATIONALLY CAUGHT IN THE NEARSHORE WATERS OFF OF HUMBOLDT COUNTY (EXCEPT SHELTER COVE AND DEL NORTE): RECFIN 2013 – 2018

Fish Species		**Recreational Landings (metric tons)**							
Common Name	**Genus Species**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**Mean**	**% Total Catch**
Rockfish, black and yellow	*Sebastes chrysomelas*	102.17	174.79	120.69	79.43	54.82	31.43	93.89	40.52
Lingcod	*Ophiodon elongatus*	51.18	78.80	109.34	66.68	62.11	28.50	66.10	28.53
Surfperch, redtail	*Amphistichus rhodoterus*	13.70	16.73	28.22	41.09	70.55	0.12	28.40	12.26
Crab, Dungeness	*Metacarcinus magister*	44.86	NR	NR	NR	NR	NR	44.86	3.23
Cabezon	*Scorpaenichthys marmoratus*	6.07	6.95	9.82	8.07	6.56	3.86	6.89	2.97
Rockfish, vermilion	*Sebastes miniatus*	2.65	3.45	4.98	4.50	6.46	3.66	4.28	1.85
Halibut, California	*Paralichthys californicus*	0.00	NR	NR	3.31	12.42	8.50	6.06	1.74
Herring, Pacific	*Clupea pallasii*	8.05	3.39	0.68	0.34	4.51	4.59	3.59	1.55
Rockfish, copper	*Sebastes nebulosus*	2.34	1.71	2.45	3.60	6.22	3.60	3.32	1.43
Rockfish, blue	*Sebastes mystinus*	2.26	1.41	3.76	2.76	5.35	1.27	2.80	1.21
Rockfish, quillback	*Sebastes maliger*	1.92	1.64	2.61	2.42	4.22	2.14	2.49	1.08
Greenling, kelp	*Hexagrammos decagrammus*	2.19	1.58	2.77	1.21	1.42	0.93	1.68	0.73
Rockfish, canary	*Sebastes pinniger*	0.10	0.15	0.19	0.07	3.83	3.29	1.27	0.55
Seaperch, striped	*Embiotoca lateralis*	0.39	0.08	2.19	0.71	2.23	0.34	0.99	0.43
Rockfish, China	*Sebastes goodei*	1.22	0.73	0.78	0.79	0.87	0.52	0.82	0.35
Sole, Petrale	*Eopsetta jordani*	0.81	0.47	0.54	0.77	1.50	0.46	0.76	0.33
Rockfish, brown	*Sebastes auriculatus*	0.93	0.84	0.97	0.40	0.44	0.20	0.63	0.27
Sanddab, Pacific	*Citharichthys sordidus*	0.83	0.63	0.48	0.24	0.60	0.22	0.50	0.22
Rockfish, yellowtail	*Sebastes flavidus*	0.60	0.35	0.56	0.14	0.49	0.41	0.42	0.18
Topsmelt	*Atherinops affinis*	NR	NR	2.24	0.11	0.00	0.00	0.59	0.17
Jacksmelt	*Atherinopsis californiensis*	0.03	0.01	0.33	1.06	0.75	0.01	0.36	0.16

TABLE 6.3 (CONTINUED)
PRIMARY FISH AND INVERTEBRATE TAXA RECREATIONALLY CAUGHT IN THE NEARSHORE WATERS OFF OF HUMBOLDT COUNTY (EXCEPT SHELTER COVE AND DEL NORTE): RECFIN 2013 – 2018

Fish Species		Recreational Landings (metric tons)							
Common Name	Genus Species	2013	2014	2015	2016	2017	2018	Mean	% Total Catch
Rockfish genus	*Sebastes*	1.34	0.36	0.11	0.00	0.00	0.00	0.30	0.13
Rockfish, olive	*Acanthoclinus fuscus*	0.05	0.19	0.35	0.29	0.52	0.31	0.28	0.12

SOURCES:

Pacific Fishery Management Council RecFin, Humboldt County 2013 – 2018. Species shown account for 99% of mean annual recreational landings in metric tons in the Eureka area. Fished species comprising the remaining 1% include walleye surfperch *(Hyperprosopon argenteum),* tiger rockfish *(Sebastes nigrocinctus),* grass rockfish *(Sebastes rastrelliger),* leopard shark *(Triakis semifasciata),* spiny dogfish shark *(Triakis semifasciata),* red rock crab *(Cancer productus),* Pacific sardine *(Sardinops sagax),* yellow rockfish *(Sebastes ruberrimus),* silver surfperch *(Hyperprosopon ellipticum),* calico surfperch *(Amphistichus koelzi),* northern anchovy *(Engraulis mordax),* monkeyface prickleback *(Cebidichthys violaceus),* rock greenling *(Hexagrammos lagocephalus),* gopher rockfish *(Sebastes caurinus),* cancer genus *(Cancer),* flatfish order (Pleuronectiformes), shiner perch *(Cymatogaster* aggregate*),* Pacific mackerel *(Scomber japonicus),* Pacific hake *(Merluccius productus),* red Irish lord *(Hemilepidotus hemilepidotus),* widow rockfish *(Sebastes entomelas),* surf smelt *(Hypomesus pretiosus),* black rockfish *(Sebastes melanops),* Bocaccio *(Sebastes paucispinis),* surfperch family (Embiotocidae), starry flounder *(Platichthys stellatus),* Pacific staghorn sculpin *(Leptocottus armatus),* big skate *(Beringraja binoculata),* jack mackerel *(Trachurus symmetricus),* soupfin shark *(Galeorhinus galeus),* arrowtooth flounder *(Atheresthes stomias),* pile perch *(Rhacochilus vacca),* yellowtail *(Merluccius productus),* lefteye flounder family (Bothidae), bat ray *(Myliobatis californica),* rosy rockfish *(Sebastes rosaceus),* wolf eel *(Anarrhichthys ocellatus),* sand sole *(Psettichthys melanostictus),* sculpin family (Cottidae), buffalo sculpin *(Enophrys bison),* brown smooth-hound shark *(Mustelus henlei),* Dover sole *(Microstomus pacificus),* and sablefish *(Anoplopoma fimbria).*

7 Species of Special Concern

Inhabiting Northern California's coastal subtidal region are several species of special concern, which include species protected under FESA, the California Endangered Species Act (CESA), the Marine Mammal Protection Act (MMPA), the California Fish and Game Code, the National Oceanic and Atmospheric Administration (NOAA) species of concern list, the U.S. Fish and Wildlife Service, the California Department of Fish and Wildlife (CDFW), and state or federal agencies such as the California Coastal Commission (CCC) that designate species as having a scientific, recreational, ecological, or commercial importance. Table 7.1 (at the end of the section) provides a listing of all species of special concern that may be present offshore Eureka, California. Under FESA, CESA, and the MMPA, all of the marine mammals and sea turtles discussed in Section 3.3 (*Marine Mammals and Sea Turtles*) are considered species of special concern. There are FESA/CESA protected and MSA managed fish species that are considered species of special concern and are similarly discussed in Section 6 (*Fish Assemblages*) above. Finally, marine birds that are FESA, CESA, or protected under the Federal Migratory Bird Act are not part of this study, which focuses only on marine aquatic resources.

The sub-sections below discuss specific species of concern (including marine invertebrates and algae) that inhabit subtidal soft and hard substrate habitats out to approximately 1,800 m (5,906 ft) water depth offshore Eureka that may be at greater risk to fiber optic cable installations than other marine biota.

7.1 FESA/CESA Protected Invertebrate Species

7.1.1 Soft Substrate Species

Sand dollars (*D. excentricus*), as a micro-habitat forming core species, are considered by some California agencies as a species of special concern. They form dense beds in the shallow subtidal zone of open sandy beaches in water depths between 4 and 12 m (13 and 39 ft), typically just offshore of the wave zone (Merrill and Hobson 1970). As would be expected, they move locations frequently and are easily subject to physical disturbance. Most cable landings go beneath the seafloor at water depths ranging between 10 and 25 m (33 and 82 ft), connecting with the horizontal bore hole or pipeline of the onshore segment of the cable. As such, it is unlikely that sand dollar beds would be affected by fiber optic cable installations. Dense beds of sand dollars are known to occur offshore of Eureka's Samoa Beach and the entrance to Humboldt Bay (Fenstermacher *et al.* 2001). The beds offshore Samoa Beach were reported to occupy a narrow band between 8 and 15 m (25 and 50 ft) water depth, and are known to shift and move over time. The beds located offshore of the entrance to Humboldt Bay are reported to occur in slightly deeper water, between 16 and 24 m (53 and 80 ft) (Fenstermacher *et al.* 2001).

7.1.2 Hard Substrate (Sessile) Invertebrate Species

In general, hard substrate habitat occurrence offshore California, when compared to the extent of soft substrate habitat, is relatively limited. As indicated in the discussion above, the occurrence of high-relief hard substrate typically results in the presence of species that may be considered more susceptible to impacts from mechanical disturbances, such as from cable installations. The most susceptible species to these types of impacts are usually large (i.e.., more than 0.3 m [1 ft] in height), slow growing (a few to several centimeters per year), and relatively delicate/brittle or soft/friable in body form (e.g. branching corals and erect sponges), respectively. (Lissner *et al*. 1991; Hardin *et al*. 1994; Henkel *et al.* 2014; Lee 2012). For example, large erect sponges (*Demospongiae*) in a variety of colors are slow growing and, similar to the California hydrocoral (*Stylaster californica*), require several years to achieve sizes of 30 centimeters (11.8 inches) or more (e.g., Lissner *et al.* 1991; Hardin *et al.* 1994; SAIC-SLO 1999; Henkel *et al.* 2014; Lee 2012). These species are of special concern due to their natural history characteristics. Following natural or human-related disturbance, recolonization and recovery can take years due to their limited dispersal abilities and slow growth.

7.1.3 Species of Abalone, Including White Abalone (*Haliotis sorenseni*), Black Abalone (*Haliotis cracherodii*), Pink Abalone (*Haliotis corrugate*), and Green Abalone (*Haliotis fulgens*)

Abalones are large marine herbivorous gastropods that live in rocky ocean waters. White abalone is listed as endangered under FESA and occurs only in coastal waters south of Point Conception at depths of 24–30 m (80–100 ft) in low- and high-relief rock or boulder habitats interspersed with sand channels (NOAA 2015a). Black abalone also is listed as endangered under FESA; it ranges from Point Arena, California to Bahia Tortugas and Isla Guadalupe, Mexico (NOAA 2015b). Black abalone are found inhabiting rocky intertidal and very shallow subtidal habitats, typically wedged between rocks. Green abalone is listed as a species of concern (NOAA 2017a, 2017b). This species resides in shallow water on open, exposed coastal areas in the low intertidal to at least 9 m (30 ft) water depth and in some locations as deep as 18 m (60 ft). Like the white abalone, green abalone only occur south of Point Conception. The pink abalone also is listed as a species of concern. This species occupies sheltered waters at depths between 6 and 36 m (20 and 118 ft). Pink abalone also only occur south of Point Conception.

7.1.4 Red Abalone (*Haliotis rufescens*)

Most commonly found in North Central and the southern portion of Northern California, red abalone (*Haliotis rufescens*) inhabit intertidal and shallow subtidal rocky substrate between Bahia Tortugas and Baja California to Coos Bay, Oregon. While red abalone predominantly inhabit rocky hard substrate, they are known to move across sand or gravel regions between isolated rocky substrate features. Red abalone inhabit water depths ranging between the intertidal zone to approximately 180 m (590 ft), but are most common between 6 and 40 m (20 and 131 ft) water depth (CDFG 2001).

Red abalone is a broadcast spawner that aggregates in clusters for reproduction. Young abalone, including post larva and juveniles, forage on bacteria, diatoms, and other single-celled algae (phytoplankton). Adult abalone forage on brown algae, and when food is scarce, feed on benthic diatom films.

Mortality of red abalone typically is due to predators, anthropogenic impacts, environmental conditions, and disease (CDFG 2005). Although not currently protected under federal or state endangered species regulations, red abalone support a major recreational fishery in Northern California. Recent declines in abundance and the recent closure of the fishery elevated the red abalone to a Species of Special Concern by the State of California.

All species of abalone were part of a commercial and recreational fishery offshore California until 1997, when CDFW closed the commercial fishery due to declining populations. CDFW closed the red abalone recreational fishery at the end of 2017. CDFW cited low stock abundances, starving abalone, and high mortality as reasons for the closure and is developing the Red Abalone FMP that will identify what conditions must be met in order to reopen the fishery (CDFW 2018).

7.2 Deep-Sea Corals

Deep-sea or cold-water corals are a diverse group of organisms with more than 3,000 species characterized to date across diverse environments worldwide (Smithsonian 2019). Many of these corals provide habitats for a myriad of marine species. Deep-sea corals occur primarily on hard-bottom substrate on the continental shelf and slope, in offshore canyons, and on oceanic island slopes and seamounts. Deep-sea corals are HAPCs for groundfish and other managed fish species under the Magnuson-Stevens Act.

Deep-sea coral ecosystems typically are long lived, slow growing, and fragile, which make them especially vulnerable to physical disturbances and damage. Along the west coast of North America, 101 species of corals have been identified, consisting of 18 species of stony corals, 7 species of black corals, 36 species of gorgonian or soft corals, 8 species of true soft corals, 27 species of sea pens, and 5 species of stylastid corals (Lumsden *et al.* 2007). Many of these taxa are designated as "structure-forming," meaning they are known to provide vertical structure above the seafloor that can be used by other invertebrates or fishes (NOAA 2010; Whitmire and Clarke 2007).

The most common stony corals observed offshore California are the solitary cup corals (e.g., *Balanophyllia elegans*, *Paracyathus stearsii*) and branching corals (e.g., *Lophelia pertusa, Oculina profunda*, *Madrepora oculata*, *Dendrophyllia oldroydae*, *Astrangia haimei, Labyrinthocyathus quaylei*, and *Coenocyathus bowersi*). Black corals, which are represented by only seven species, are considered very abundant along the Pacific coast—with *Antipathes* sp. and *Bathypathes* sp. exhibiting coast-wide distributions, while the other five species appear to be limited to seamounts (Whitmire and Clarke 2007). Gorgonians are the most populous group of corals off the Pacific coast. Purple gorgonians (*Eugorgia rubens*) and orange gorgonians (*Adelogorgia phyllostera*) are commonly observed in the nearshore coastal waters; bubblegum corals (*Paragorgia arborea*), although found in high abundance region-wide, inhabit water depths greater than 200 m. Gorgonians and black corals have branching tree-like forms and may occur as single colonies or form thickets. These three-dimensional features and vertical structures provide habitat for numerous fish and invertebrate species, and enhance the biological diversity of many deep-sea ecosystems.

Included with deep-sea corals are sea pens (order Pennatulacea), which occur over soft-bottom substrates and are the most abundant coral taxon in the region. Some sea pens are quite motile and can move from one location to another. *Stylatula* sp., *Anthoptilum grandiflorum*, and *Umbellula* sp. are the most common taxa—all of which are found coast wide. Although groves of pennatulaceans have been shown to support higher densities of some fish species over adjacent areas, they are not considered to be structure forming (Brodeur 2001).

Lace corals or stylasterid corals have been observed colonizing moderate to high-relief rocky habitats from the intertidal zone down to shelf water depths. Only five species from three genera are known to occur along the Pacific west coast, with *A. californica* being the only species known to occur in California.

A. californicus has a calcareous skeleton and forms upright pink to dark blue branching colonies. This species is characterized by very slow growth (i.e., 5 to 10 years to reach sexual maturity and possibly more than 20 years to grow to a height of 30 centimeters) (Thompson *et al*. 1993; Gotshall 1994). *Allopora* has no planktonic larval stage, and fertilization between adult colonies more than 10 m apart is rare.

In recent years, NOAA has developed an increased interest in these ecosystems and especially the potential for impacts from bottom contact fishing activities (NOAA 2014a). Deep-sea corals are being evaluated for designation as EFH within the Pacific Coast Groundfish FMP and likely will be designated once the 5-year review is complete.

Unfortunately, there is limited information concerning known occurrences of deep-sea corals offshore California. This is in part due to the difficulty and expense of locating and surveying deep-sea hard substrate habitat. Much of what the scientific community knows about their presence is a direct result of manned submersible and ROV surveys of fiber optic cable routes or oil and gas exploration sites. The extensive hard substrate rocky reefs identified occurring offshore Eureka in 500–1,000 m (1,640–3,280 ft) can be expected to support some solitary and branching corals.

Christmas tree coral (*Antipathes dendrochristos*), a species of black coral that occurs in the Southern California Bight, has been documented around Piggy Bank and on Hidden Reef north of Santa Catalina Island; there also are a few documented occurrences around San Nicolas Island (Huff *et al.* 2013). Huff *et al.* (2013) mapped ocean currents, primary productivity (chlorophyll), and temperature against known locations of Christmas tree coral to develop a predictive model for the Southern California Bight. These environmental correlates predicted bands of low occurrence interspersed with isolated pockets of high occurrence in the Marine Study Area. Specific locations of coral within these bands and pockets depended on the availability of hard-bottom substrate. Guinotte and Davies (2014) developed a habitat suitability model for multiple species of deep-sea coral for the U.S. West Coast. They reported bands of suitable habitat associated with specific bathymetric features in the Marine Study Area. Both studies show suitable deep-sea coral habitat in places that would be crossed by the proposed cable routes. In the following specific locations, the proposed cable routes may encounter deep-sea coral:

- Bottom slopes south of the Channel Islands and around Piggy Bank;
- High-relief bottom between Santa Barbara Island and the Channel Islands; and
- High-relief bottom between San Nicolas Island and the Channel Islands.

7.3 Kelp and Sea Grasses (Submerged Aquatic Vegetation)

The giant brown kelp (*Macrocystis pyrifera*) is distributed along the eastern Pacific coast from Alaska to Mexico and again from Peru to Argentina—as well as in Australia, New Zealand, South Africa, and most sub-Antarctic islands north of 60°S (Abbot and Hollenberg 1976). They form large dense forests in the nearshore waters of Southern California and in some locations in Central California, as well as throughout the Channel Islands where clear water allows them to grow deeper than 30 m (100 ft). No known giant kelp beds occur north of Santa Cruz in nearshore waters of California.

The more dominant “forest-” forming algae in Northern California is bull kelp (*Nereocystis luetkeana*). Bull kelp is an annual that releases spores in spring that grow throughout the year and then die (Springer *et al.* 2007). Kelp forests are home to many marine animals, and act as spawning and nursery grounds for many invertebrates and fish. *Macrocystis* and *Nereocystis* anchor themselves to the seafloor by attaching their holdfasts to small boulder-sized rocks or rocky outcroppings. No known *Nereocystis* beds occur offshore Humboldt Bay or Eureka, California.

Surfgrass (*Phylospadix*) is a flowering marine plant in the family *Zosteraceae* that can be found throughout coastal California where suitable habitat occurs. It is most commonly observed attached to rocks in middle to low intertidal zones, but where conditions are favorable, it can occur to depths of 15 m. No known surfgrass beds occur in the nearshore waters adjacent to Humboldt Bay. Isolated patches of surfgrass may be present along the rock jetties flanking the entrance to Humboldt Bay.

TABLE 7.1
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL TO OCCUR WITHIN THE MARINE STUDY AREA

Common Name	**Scientific Name**	**Listing Status**	**Habitat, Critical Habitat**	**Regional Occurrence**	Potential to Occur in Study Area
Marine Mammals					
Baird's beaked whale	*Berardius bairdii*	P	Inhabit deep offshore waters in the North Pacific and are common along steep underwater geologic structures, like submarine canyons, seamounts, and continental slopes.	Seasonal- sightings from late spring to early fall in California Very Rare	Not Expected. Sightings occur in deeper waters than the study area, mainly along continental shelf edges or in deep submarine canyons where they forage. National Marine Fisheries records indicate less than a dozen individuals have been washed up along the west coast of the US.
Blainville's beaked whale	*Mesoplodon densirostris*	P	Found mainly over the continental shelf and into open ocean waters. Occupy tropical to temperate waters worldwide. Groups have been regularly observed off Oahu, Hawaii and in the Bahamas in 500-1000m waters.	Rare	Not Expected. Unlikely to be observed in the study area.
Blue whale	*Balaenoptera musculus*	FE, FD, P	Blue whales are found worldwide but often occur near the edges of physical features where krill tend to concentrate. These whales begin to migrate south during November.	Seasonal from June through November in California Common	Moderate to High. Relatively common offshore the CA coast, in waters 90- 370 km from shore.
Bottlenose dolphin	*Tursiops truncatus*	P	Found in temperate and tropical waters around the world. Have both coastal and offshore populations. Common in areas where rivers meet the sea, and can be seen in harbors, bays, and estuaries as well as far away from the shore.	Year-round Uncommon	Not Likely. Since 2010 bottlenose dolphins have been reoccurring as far north as San Francisco. It is possible they could occur in the study area during times when waters are warmer than usual but historically, they do not occur north of central CA.
Bryde's whale	*Balaenoptera edeni*	P	Found in highly productive tropical, subtropical, and warm temperate waters worldwide. More commonly found further from shore.	Rare	Not Expected. Unlikely to be observed in the study area.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL TO OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Marine Mammals (continued)					
California sea lion	*Zalophus californianus*	P	Reside in the Eastern North Pacific Ocean in coastal waters. Commonly observed along the west coast of North America from southeast Alaska to the central coast of Mexico	Seasonal Common	High. Commonly observed
Common dolphin – long-beaked	*Delphinus capensis*	P	Found abundantly from Baja California northward to central California. Found in shallow, warmer temperate waters typically within 15 nautical miles of the coast and on the continental shelf.	Year-round Rare	Not Expected. The maximum northward extent is Point Arena, but numbers drop dramatically northward of central California.
Common dolphin – short-beaked	*Delphinus delphis*	P	A more pelagic species than the long-beaked common dolphin, these dolphins are associated with the California Current and can be found up to 300 nm from shore. They are commonly found near underwater geologic features where upwelling occurs.	Year-round Common	Moderate. Generally found offshore of the study area.
Cuvier's beaked whale	*Ziphius cavirostris*	P	Found in temperate, tropical, and subtropical waters. Associated in deep pelagic waters (usually greater than 1,000m deep) of the continental shelf and slope, and near underwater geologic features. Seasonality and migration patterns are unknown.	Sightings in fall and winter in California Rare	Not Expected. Generally, occur in the deeper waters west of the study area. One washed up on shore near the Mad River in March, 1957 (Houck 1958).
Dall's porpoise	*Phocoenoides dalli*	P	Distributed throughout the North Pacific Ocean and along the west coast from the US border with Mexico to the Bering Sea. Mainly found in pelagic waters deeper than 180m, but can be found both offshore and nearshore.	Sightings In winter and early spring in California Common	Low to moderate. Most frequently observed offshore, but have been seen in nearshore oceanic waters.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL TO OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Marine Mammals (continued)					
Dwarf sperm whale	*Kogia simus*	P	Occur over the continental slope and open ocean. Dwarf sperm whales live in tropical and temperate waters worldwide. Found in the Pacific Northwest and California, but more common near Hawaii and the Gulf of Mexico.	Rare	Not Expected. Not likely to be observed within the study area. Records of dwarf sperm whales are rare and it is unknown whether low numbers are a consequence of their cryptic behavior or if they are not regular inhabitants of offshore California waters.
False killer whale	*Pseudorca crassidens*	P	Occur over the continental slope and into open ocean waters with depths over 3,000ft of tropical and warm temperate waters worldwide.	Sightings in summer and early fall in California Rare	Not Expected. Not likely to occur in the study area because they prefer warmer waters than within the study area.
Fin whale	*Balaenoptera physalus*	FE, FD, P	Fin whales occupy the deep, offshore waters of all major oceans, but are primarily in temperature to polar waters.	Seasonal in California	Moderate. Relatively common in California waters between March and October, but due to their occurrence farther offshore in deep water, it is not likely they would be seen in the study area in high numbers.
Ginkgo-toothed whale	*Mesoplodon ginkgodens*	P	Found mainly over the continental shelf and into open ocean warm waters of the Pacific and Indian Oceans.	Rare	Not Expected. No documented sightings in the study area.
Gray whale (Western North Pacific)	*Eschrichtus robustus*	FE, FD, P	Predominantly occur within the nearshore coastal waters of the North Pacific Ocean, from Gulf of Alaska to Baja Peninsula.	Seasonal December through May in California Common	Moderate-High. Occur in coastal waters during late fall-winter southward migration and again late winter to early summer during their northward migration. Can be as close as a few hundred yards of shore, but more common 3-12 miles offshore.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL TO OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Marine mammals (continued)					
Guadalupe (Southern) fur seal	*Arctocephalus townsendi*	CT, FT, FD	Reside in tropical waters of Southern California and Mexico. Breed in rocky coastal habitats and caves mainly along the eastern coast of Guadalupe Island, approximately 200 Kilometers west of Baja California. There is a small population on San Miguel Island in the Channel Islands	Very Rare	Not Expected. Unlikely to occur north of Point Conception in Southern California.
Harbor porpoise	*Phocoena phocoena*	P	Continental slope to oceanic waters, mainly in northern temperate, subarctic coastal, and offshore waters. Commonly found in bays, estuaries, harbors, and fjords less than 200m deep. In California, most common north of Point Conception	Year-round in California Uncommon	Moderate. Occasionally observed in Humboldt Bay and adjacent waters. Potential to occur in the study area between 0-200 m depth.
Harbor seal	*Phoca vitulina*	P	Found as far north as British Columbia, Canada and as far south as Baja California, Mexico. Most commonly observed pinniped along California coastline. Use the offshore waters for foraging and beaches for resting. Occur on offshore rocks, on sand and mudflats in estuaries and bays, and on some isolated beaches.	Year-round in California Common	High. Common throughout the California coast. Harbor seals favor near shore coastal waters. Abundant in Humboldt Bay.
Hubb's beaked whale	*Mesoplodon carlhubbsi*	P	Endemic to the North Pacific Ocean. Species is not well known but assumed to occur mainly over the continental shelf and into open ocean waters.	Very Rare	Not Expected. May occur in waters offshore of Central and Northern California but the species is very rare.
Humpback whale	*Megaptera novaeangeliae*	FE, FD, P	Found in all major oceans. The California population of humpback whales migrates from their winter calving and mating areas off Mexico to their summer and fall feeding areas off coastal California. Humpback whales occur from late April to early December.	Seasonal – May through November in California Common	High. Frequently observed migrating along the California coast between April and November, up to 90 km offshore.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL TO OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Marine Mammals (continued)					
Killer whale	*Orcinus orca*	FE, FD, P	Found throughout all oceans. Most abundant in colder waters but can be somewhat abundant in temperate water. Presence and occurrence can be common but unpredictable in coastal California.	Seasonal in California Uncommon	Low. Most common during April, May, and June as they feed on northbound migrating gray whales. Generally observed in the deeper offshore waters of the study area.
Long-snouted spinner dolphin	*Stenella longirostris*	FD, P	Found in all tropical and subtropical oceans. Continental shelf to open ocean waters, but most commonly in the deep ocean where they track prey.	Sightings in summer and early fall in California Rare	Not expected to occur in the study area because they inhabit warmer waters than occur in the study area.
Minke whale	*Balaenoptera acutorostrata*	P	Distributed worldwide and can be in coastal/inshore and over the continental shelf in temperature (preferred), boreal, or polar waters.	Year-round in California Uncommon	Not Expected-Low. Minke whale sightings have occurred throughout the California coast. While rare, they could be observed within the study area.
North Pacific right whale	*Eubalaena japonica*	FE, FD, P	Found in the North Pacific Ocean. Seasonally migratory; inhabit colder waters for feeding, and then migrate to warmer waters for breeding and calving. Although they may move far out to sea during their feeding seasons, right whales give birth in coastal areas.	Rare	Not Expected. This species is the rarest of all large whale species, and fewer than 50 individuals are believed to occupy US waters.
Northern elephant seal	*Mirounga angustirostris*	P	Found from Alaska to Mexico. They are sighted regularly over shelf, shelf-break, and slope habitats and they also are present in deep ocean habitats seaward of the 2000 m isobaths. Rookeries are located in the Channel Islands, Año Nuevo State Park, near San Simeon in San Luis Obispo County, and in Point Reyes National Park.	Year-round in California Common	Moderate. Northern elephant seals are widely distributed along the west coast of North America but spend about 9 months of the year at sea.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL TO OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Marine Mammals (continued)					
Northern fur seal	*Callorhinus ursinus*	FD, P	Spend 300 or more days per year foraging in the open ocean of the North Pacific. Use rocky beaches for reproduction. Usually come ashore in California only when debilitated, however, a few individuals have been observed on Año Nuevo Island.	Year-round in California Common	Not Expected. Usually 18-28 km from California's shoreline.
Northern right whale dolphin	*Lissodelphis borealis*	P	Endemic to deep, cold temperate waters of the North Pacific Ocean. Also occur over the continental shelf and slope where waters are less than 66°F.	Year-round in California Common	Not Expected. Tend to occupy deep, cold waters near the continental shelf and seaward.
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	P	Occupy temperate waters of the North Pacific. Found from the continental shelf to the deep ocean.	Year-round in California Common	Low. Likely to occur throughout the California coastline but typically do not occur in nearshore waters.
Perrin's beaked whale	*Mesoplodon perrini*	P	Believed to occupy continental shelves and open ocean waters of the Pacific, but not well documented.	Very Rare	Not Expected. This whale is known from less than half a dozen strandings between San Diego and Monterey. It is highly unlikely that it will be observed within the study area, but the species' complete distribution is unknown.
Pygmy sperm whale	*Kogia breviceps*	P	Occur over the continental slope and open ocean. Prefer tropical, subtropical, and temperate waters of the Pacific Ocean. They are mostly found offshore of Peru but also occur in the waters near Hawaii and the Pacific Northwest.	Rare	Not Expected. Unlikely to occur in the nearshore waters of the study area. Strandings have been documented off Mexico, New Zealand, and Monterey Bay. Overall the species is rare and is expected to only occur south of the study area.
Risso's dolphin	*Grampus griseus*	P	Distributed throughout all major oceans. Generally found in waters greater than 1,000 m in depth and seaward of the continental shelf and slopes.	Year-round in California Common	Low. They generally occur in the deeper offshore waters of the study area.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL TO OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Marine mammals (continued)					
Rough-toothed dolphin	*Steno bredanensis*	P	Found in all tropical and subtropical oceans. Continental shelf to open ocean waters. Prefer the depths of tropical and warmer temperate waters.	Sighting in summer and early fall in California Rare	Not Expected. Unlikely to occur in the relatively cold waters of the study area.
Sei whale	*Balaenoptera borealis*	FE, FD, P	Wide distribution occurring in subtropical, temperature, and subpolar waters around the world. Usually observed in deeper waters of oceanic areas far from the coastline.	Seasonal – spring and summer in California Common	Not Expected. Sei whales primarily occupy the open ocean, far away from shore.
Short-finned pilot whale	*Globicephala macrorhynchus*	P	Found in warmer tropical and temperate waters. Commonly seen along the coast close to the continental shelf. Forage in areas with high densities of squid.	Year-round in California Very Rare	Not Expected. Generally found in deeper, warmer water than that which ccurs in the study area.
Southern sea otter	*Enhydra lutris nereis*	FT, P, P	A top carnivore in its coastal range and a keystone species of the nearshore coastal zone. Frequent inhabitor in kelp forests.	Year-round in Central and Southern California Common	Not Expected. Southern sea otters occupy the nearshore waters of California from San Mateo County south to Santa Barbara County. They are unlikely to be observed as far north as Eureka in Northern California.
Sperm whale	*Physeter macrocephalus*	FE, FD, P	Occur globally in the open ocean far from land and are uncommon in waters less than 300 m deep. Live at the surface of the ocean but dive deeply to catch giant squid.	Seasonal – late spring and late fall in California Common	Not Expected. Sperm whales are present offshore California year- round, peak in abundance late spring and late summer, but are rarely seen because they occupy deep offshore water.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL TO OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Marine mammals (continued)					
Spotted dolphin	*Stenella attenuata*	FD, P	Typically found far away from the coast in tropical and subtropical waters worldwide but can also occupy waters over the continental shelf. Spend majority of day in waters 90-300 m deep then dive to depth at night to search for prey.	Sightings in summer and early fall in California Rare	Not Expected. The eastern Pacific Ocean population typically is observed far from the coast and the population has been depleted.
Stejneger's beaked whale	*Mesoplodon stejnegeri*	P	Found in cold temperate and subarctic waters of the North Pacific Ocean. Typically occupy deep, offshore waters.	Rare	Not Expected. Typically found in deep, offshore waters on or beyond the continental shelf.
Steller (Northern) sea lion	*Eumetopias jubatus*	FE, FD, P	Distributed around the coasts along the North Pacific Ocean rim. Common in coastal waters and onshore for resting. Critical Habitat; A zone that extends approximately 1000m seaward and landward of any Steller sea lion rookery in Washington, Oregon, and California. Any aquatic foraging habitat within the species geographic range.	Seasonal in California Common	Moderate. Documented as relatively common along northern California's coast.
Striped dolphin	*Stenella coeruleoalba*	P	Continental shelf to open ocean waters worldwide, often found in areas of upwelling and around convergence zones. Prefer highly productive tropical to warm temperate waters that are oceanic and deep.	Sightings in summer and early fall in California Rare	Not Expected. Unlikely to occur near the study area. Observations are typically far offshore.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL TO OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Marine Turtles					
Green sea turtle	*Chelonia mydas*	FE, P	Distributed globally. Primarily use three types of habitat: oceanic beaches (for nesting), convergence zones in the open ocean, and benthic feeding grounds in coastal areas. Critical Habitat; waters surrounding Puerto Rico.	Seasonal in California Rare	Not Expected. In the eastern Pacific, green turtles have been sighted from Baja California to southern Alaska but most commonly occur from San Diego south. Northernmost sighting is offshore Marin County
Leatherback sea turtle	*Dermochelys coriacea*	FE, P	Distributed globally. Regularly seen off the western coast of the US in the pelagic with the greatest densities found off central California.	Seasonal in California Occasional	Not Expected. Leatherback sea turtles are most commonly seen between July and October, when the surface water temperature warms to 15-16° C and large jellyfish, the primary prey of the turtles, are abundant offshore. Northernmost sighting is offshore Marine County.
Olive ridley sea turtle	*Lepidochelys olivacea*	FT, P	Mainly a "pelagic" sea turtle in tropical/temperate regions of the Pacific, South Atlantic, and Indian Oceans but has been known to inhabit coastal areas, including bays and estuaries.	Seasonal in California Very Rare	Not Expected. In the eastern Pacific, the reported range of the Olive Ridley turtle extends from southern California to northern Chile. In warmer El Niño years they can be observed offshore Northern California as in 2002 in Mendocino and Humboldt Counties.
Loggerhead sea turtle	*Caretta caretta*	FE, P	Distributed throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Occupy three different ecosystems during their lives: the terrestrial zone, the oceanic zone, and the neritic or nearshore coastal area. Critical Habitat; The Northwest Atlantic DPS critical habitat includes waters throughout the Gulf of Mexico around the Florida panhandle and up the eastern seaboard of the US.	Seasonal in California Common	Not Expected. In the Eastern Pacific, most recorded sightings are restricted to Southern California. However, sightings also are reported as far north as Oregon and Washington. No. known sightings in Northern California have been reported.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL TO OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Sharks and Bony Fishes					
Basking shark	*Cetorhinus maximus*	CSC, P	This species movements and migrations are poorly understood. Usually sighted from British Columbia to Baja California in the winter and spring; where they go, once they leave coastal areas, is unknown.	Seasonal in California Very Rare	Not Expected. Basking shark populations were severely depleted by commercial fisheries in the 1950s, and they have never fully recovered due to slow growth and low fecundity.
Bluefin tuna	*Thunnus thynnus*	FSC	A highly migratory species, Bluefin Tuna are distributed throughout the North Pacific. These tunas are pelagic and found in temperate and tropical oceans. They can also be found in coastal regions. They are typically in the upper 200m.	Year-round in California Common	Moderate-High. Likely to be present offshore of northern California.
Bocaccio	*Sebastes paucispinis*	FE	Bocaccio is a species of coastal rockfish found in the Pacific, from Baja California northward to the Gulf of Alaska. Most are caught in water between 75 and 230 m.	Year-round in California Common	Low-Moderate. Most abundant between Oregon and Baja California, but species is struggling to recover from overfishing.
Canary rockfish	*Sebastes pinniger*	FSC	A coastal rockfish found between Baja California and the Western Gulf of Alaska. Most common off the Oregon central coast. Tend to occupy water depths around 150m, but can be found as deep as 275m.	Year-round in California Common	Low-Moderate. The species was declared overfished in 2000, and rebuilt in 2015. Juveniles tend to stay near the water surface and adults move to deeper benthic habitats.
Chinook salmon (California coastal evolutionary significant unit)	*Oncorhynchus tshawytscha*	CE, FE, P	Live in freshwater streams up to the first two years of life, then they migrate to estuarine areas as smolts and eventually the ocean to mature and feed. These salmon prefer deeper and larger streams than those used by other Pacific species. Critical Habitat; all major rivers and coastal stretches of rivers and creeks in Sonoma, Mendocino, and Humboldt counties in California. Includes all ocean water and substrate to the full extent of the Economic Exclusion Zone.	Seasonal in California Common.	High. Present in coastal waters and larger streams and rivers throughout northern California.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Sharks and Bony Fishes (continued)					
Chinook salmon – spring run (Klamath-Trinity Rivers population)	*Oncorhynchus tshawytscha*	FE	Upper Klamath-Trinity Rivers and coastal waters in northern California. Critical Habitat; all major rivers and coastal stretches of rivers and creeks in Humboldt, Del Norte, Trinity, and northern California counties. Includes all ocean water and substrate to the full extent of the Economic Exclusion Zone.	Seasonal in California Common	High. This population is endemic to the Klamath-Trinity Rivers.
Chum salmon	*Oncorhynchus keta*	CE	Chum salmon are the most widely distributed of all the salmon species found in the Pacific. They inhabit waters throughout the North Pacific Ocean to the coastal regions of North American and Asia.	Common	Low. The status of Chum salmon in California is poorly understood, and it is believed that their numbers are too small to be detected.
Cowcod	*Sebastes levis*	CSC, FCS, P	Found from central Oregon to Baja California, Mexico. Juveniles recruit to fine sediment habitat. They have been observed at depths between 40 and 100 m. Young cowcod move to deeper habitat within their first year.	Seasonal in California Common	Moderate. Documented catch has declined drastically since the mid 1980s. May be present near seafloor.
Coho salmon (Northern California population)	*Oncorhynchus kisutch*	FE, CE, P	Spawn in small streams with gravel substrates, and spend first half of life cycle in streams and small freshwater tributaries. The later-half of life cycle is spent foraging in estuarine and marine waters.	Seasonal in California Common	High. Coho salmon inhabit the Big Lagoon, just north of Eureka.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Sharks and Bony Fishes (continued)					
Longfin smelt	*Spirinchus thaleichthys*	CT	Found along the Pacific coast from Alaska to California. Adults live primarily in bays, estuaries, and nearshore coastal areas, migrating to low salinity or freshwater reaches to spawn. Spawning occurs primarily in January to March.	Seasonal in California Common	Moderate. Humboldt Bay ranks second in Longfin smelt abundance after the Sacramento-San Joaquin Delta/San Francisco Bay Estuary. Seasonally absent from marine waters as spawning occurs in freshwater, typically January - March
North American green sturgeon (northern distinct population segment)	*Acipenser medirostris*	CSC, FSC	The northern distinct population segment of green sturgeon are those that spawn from the Eel River northward to the Klamath and Rogue Rivers. Critical Habitat; All ocean water out to 60 fathoms depth from Monterey Bay northward to the border with Canada.	Common	Low. There a very few data on green sturgeon presence in coastal waters. This species may forage in or near the marine study area but its distribution in ocean waters is essentially unknown.
Pacific Ocean perch	*Sebastes alutus*	FSC	Distributed from the Western Aleutian Islands in Alaska to throughout California, although they become increasing rare moving south through California.	Common	Low-Moderate. Adults and juveniles appear to inhabit water depths ranging between 150 420 meters.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Sharks and Bony Fishes (continued)					
Pink salmon	*Oncorhynchus gorbuscha*	CE	Pink salmon are distributed on both sides of the North Pacific Ocean. They are the most abundant of the Pacific salmon and are common from Alaska through Washington, but also are known to occur in Northern California. Pink salmon spawn in freshwater streams and rivers but do not spend extended periods of time in freshwater. Instead they migrate out to the ocean to feed and grow.	Common	Low. More common in Washington and Alaska.
Steelhead trout (Northern California distinct population segment)	*Onchorhynchus mykiss irideus*	FT, CSC, P	Can be found along the entire Pacific Coast of northern California. Anadromous individuals can spend up to 7 years in fresh water prior to smoltification, and then spend up to 3 years in salt water prior to first spawning. Individuals that spend their entire life in fresh water are called rainbow trout. Critical Habitat; Essentially all major rivers and coastal stretches of all rivers and creeks throughout California,	Seasonal in California Common	Moderate. Spawn in streams and rivers throughout northern California. Adults may occur in coastal waters near streams and rivers.
Steelhead trout (Klamath Mountains)	Onchorhynchus mykiss irideus	FSC, P	Same as the Northern California DPS, but endemic to the rivers associated with the Klamath Mountains.	Year-round in California Common	Moderate. Spawn in streams and rivers of the Klamath Mountains. Adults may occur in the coast waters associated with these freshwater systems.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Sharks and Bony Fishes (continued)					
Swordfish	Xiphias gladius	FSC	Distributed throughout the world's oceans, mostly in tropical and temperate waters, but they also have been documented in cold waters of major oceans. They are found along the eastern edge of the North Pacific Ocean.	Common	Low. Swordfish are mostly found in offshore waters and farther to the south than the Study Area.
Tidewater goby	Eucycloglobius newberryi	CSC, FE, P	Despite the common name, this goby inhabits lagoons formed by streams running into the sea. The lagoons are blocked from the Pacific Ocean by sandbars, admitting salt water only during particular seasons, and so their water is brackish and cool. The tidewater goby prefers salinities of less than 10 parts per thousand (ppt) (less than a third of the salinity found in the ocean) and is thus more often found in the upper parts of the lagoons, near their inflow. Critical Habitat: The Big Lagoon in Humboldt County is designated as critical habitat for the tidewater goby.	Seasonal in California Common	Not Expected. Although Big Lagoon is recognized as critical habitat for the Tidewater Goby, the species spends its entire life within estuaries and tidal lagoons. Not expected to be present in the Study Area.
White sharks	*Carcharodon carcharias*	CSC, P	Coastal and offshore waters along the continental shelf and islands. In California, important white shark habitat occurs around Monterey Bay and Greater Farallon's national marine sanctuaries. White shark populations are impacted by purposeful and incidental capture by fisheries, marine pollution, and coastal habitat degradation	Year-round in California Common	High. Present in coastal waters throughout the State.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Sharks and Bony Fishes (continued)					
Widow rockfish	*Sebastes entomelas*	FSC	A coastal rockfish found between the north end of Baja California and the Gulf of Alaska. Most common between British Columbia and northern California. Most commonly found between approximately 130-230m depth	Year-round in California Common	Low. Not regularly seen in California. Adults of the same size class tend to move seasonally between adjacent areas.
Yelloweye rockfish	*Sebastes ruberrimus*	FSC	Distributed throughout Alaska and the West Coast of the U.S. Primarily inhabit high-relief rocky habitats in depths ranging between approximately 20-375m.	Year-round in California Common	Low. The rebuilding of their numbers from overfishing requires decades.
Gastropods					
Black abalone	*Haliotis cracherodii*	FE, P	Coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. Range from Point Arena, California to Bahia Tortugas and Isla Guadalupe, Mexico. Very Rare in northern California Critical Habitat; essentially all of the California coast.	Year-round in California Very Rare	Not Expected. They are rare north of San Francisco and Point Arena is considered the northward most extent of the species.
Green abalone	*Haliotis fulgens*	FSC, P	Coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. Green abalone habitat ranges from Point Conception, California to Bahia Magdalena, Baja California Sur, Mexico.	Year-round in California Very Rare	Not Expected. Green abalone are not likely to occur north of Point Conception, California.

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL OCCUR IN THE MARINE STUDY AREA

Common Name	Scientific Name	Listing Status	Habitat, Critical Habitat	Regional Occurrence	Potential to Occur in Study Area
Gastropods (continued)					
Pink abalone	*Haliotis corrugate*	FSC, P	Coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. Distributed from Point Conception to Bahia de Santa Maria in Baja California, Mexico.	Year-round in California Very Rare	Not Expected. Pink abalone are unlikely to be found north of the Southern California Bight.
White abalone	*Haliotis sorenseni*	FE, P	Coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. Range from Point Conception, California to Punta Abreojos, Baja California, Mexico.	Year-round in California Very Rare	Not Expected. White abalone are not likely to occur north of Point Conception, California.

NOTES:

FESA = federal Endangered Species Act

MMPA = Marine Mammal Protection Act

CESA = California Endangered Species Act

POTENTIAL FOR SPECIES OCCURRENCE RANKINGS:

Not Expected – Suitable foraging or spawning habitat is not known to be present or rare, and the species has not been or is rarely documented to occur

Low – Suitable foraging or spawning habitat is present, but the species has either not been documented to be present or if present, the presence is uncommon and infrequent

Moderate – Suitable foraging or spawning habitat is present, and the species is somewhat common or common for part of the year

High – Suitable foraging or spawning habitat is present, and the species is common throughout the year and/or in substantial numbers

TABLE 7.1 (CONTINUED)
SPECIAL-STATUS MARINE SPECIES AND THEIR POTENTIAL OCCUR IN THE MARINE STUDY AREA

STATUS CODES:

Federal: National Oceanographic and Atmospheric Administration (NOAA); MMPA

FD = Depleted Population

P = Federally Protected

Federal: U.S. Fish and Wildlife Service (USFWS), NOAA National Marine Fisheries Service (NMFS); FESA

FDL = Delisted

FE = Listed as “endangered” (in danger of extinction) under FESA

FT = Listed as “threatened” (likely to become endangered within the foreseeable future) under FESA

FC = Candidate to become a proposed species

FSC = Former “federal species of concern”. The USFWS no longer lists Species of Concern but recommends that species considered to be at potential risk by a number of organizations and agencies be addressed during project environmental review. *NMFS still lists “Species of Concern”.

State: California Department of Fish and Game (CDFG); CESA

CE = Listed as “endangered” under CESA

CT = Listed as “threatened” under CESA

CSC = CDFW designated “species of special concern”

SOURCES:

Allen 2014; Allen et al. 2010; AMS 2015; CDFW 2009, 2012, 2018,b; Dick et al. 2009; Driscoll 2014; Houck 1958; Love and Yoklavich 2008; Marine Mammal Commission Marine Mammal Species of Special Concern 2018; Miller and Shanks 2004; NOAA 2011, 2014b, 2018a, 2019a, 2019b, 2019c, 2019d, 2019e, 2020; Prado 2016; Kimmey 2015; Whaleopedia 2019.

8 Potential Effects of Fiber Optic Cable Installation and Operation on Intertidal and Subtidal Marine Communities

The installation, maintenance, and ultimate abandonment/removal of a subsea fiber optic cable located in the coastal waters of California can be expected to result in disturbances to the communities that the cable traverses. These impacts likely would vary, not only with respect to the route and substrate type but also according to installation methods that will depend on water depth and substrate type. In shallow water soft-sediment areas, divers or ROVs typically bury the cable using a water jet to create a channel into which the cable is laid. Typically, the cable channel is allowed to self-bury. In deeper soft-bottom areas, a cable installation plow is used to dig a 1-m (3.3-ft) deep trench in the seafloor, place the cable into the trench, and then refill the trench with the excavated sediment.

In the event that a proposed cable route contains hard substrate features, the final routing of the cable will avoid, to the maximum extent feasible, moderate- and high-relief outcrops, especially in high-energy environments in water depths less than 33 m (100 ft). If placement along mixed-bottom or low- to moderate-relief habitat is unavoidable, the cable typically is laid onto the seafloor; and an ROV or divers are used to properly position the cable around isolated exposed outcrops or high-relief features, and to locate the cable so that minimum contact with more sensitive hard-bottom habitat occurs.

In addition to direct physical disturbance of marine habitats by cable placement or burial during installation, other potential effects include:

- Short-term and isolated increased water turbidity during cable burial in soft seafloor sediments with a cable plow or by ROV or diver trenching activities;
- Potential release of drilling fluids during the boring of the fiber optic cable landfall conduits;
- Underwater noise from marine construction work vessels and cable-laying activities; and
- Accidental release of hydrocarbon-containing fuel oils and lubricants by work vessels engaged in cable installation and landfall conduit horizontal directional drilling (HDD) activities.

Numerous fiber optic cables have been installed in the coastal waters of California, Oregon, and Washington over the past several decades (SAIC-SLO 1999; SAIC 1999; SAIC 2000; MBC 2001; MBARI 2004; AMS 2008, 2016a, 1999b). Within California, landfalls have occurred in Southern California (San Diego, Hermosa Beach, Manhattan Beach, Los Angeles, and Santa Barbara), Central California (Montana del Oro, Grover Beach, Estero Bay, and Moss Landing), and Northern California (Manchester Beach). CEQA and NEPA documents prepared for these projects discuss in detail the potential impacts on marine biota from installation, operation and removal/abandonment of fiber optic cables. Mitigation measures outlined in these documents can be assessed for their efficacy in preventing or minimizing the potential effects on marine resources. Additionally, pre- and post-cable lay ROV surveys have been performed that provide information on the longevity and severity of potential effects on marine habitats and biota. Finally, the effects of cable installation and operation on marine soft and hard substrate habitats and associated biological communities have been assessed in a number of diverse locations, including the Olympic Coast National Marine Sanctuary, Washington (NOAA 2018b); Monterey Bay, California (Kogan *et al.* 2006, Kunz *et al.* 2015); coastal waters in Australia (Sherwood *et al.* 2016); and multiple other locations worldwide (Kraus and Carter 2018).

Potential effects undoubtedly will vary between each project depending on project specifics, route, location along the coast, and technical approach for installation. The following discussion provides a brief synopsis of potential marine effects on marine biological resources from fiber optic cable installation and operation, and outlines operational actions that can be implemented to prevent significant impacts on marine ecosystems.

8.1 Soft-Bottom Habitat and Associated Biota

Impacts on soft-sediment biota during cable installation, operation, or abandonment can be expected to be short term and therefore temporary (Kraus and Carter 2018; Antrim *et al*. 2018; Kunhz *et al.* 2015; Kogan *et al.* 2006). The use of a cable plow to create a furrow along the seafloor into which the fiber optic cable is placed and buried can be expected to result in a temporary disturbance of benthic infauna (animals living in the sediments of the seafloor) and epifauna (animals living on the surface of the seafloor). It is estimated that the actual area of disturbance is less than 8 m (26 ft) wide, with the most severe effects being limited to the 1-m- (3.3-ft-) wide trench made by the plow (Kraus and Carter 2018). Many motile epifaunal invertebrates and fishes can be expected to avoid the plow and return to the area shortly after the plow has left and the trench has been refilled. Any benthic infauna inhabiting the upper sediment layers disturbed by the plow are assumed to be smothered and killed. This loss, however, will occur in a small area of the seafloor relative to the surrounding area. The infaunal community inhabiting the adjacent, undisturbed sediments are expected to rapidly start recolonizing the affected area. Recolonization will occur both by migration from adjoining, undisturbed seafloor areas and by natural recruitment (Kunhz *et al.* 2015; Kraus and Carter 2018; Antrim 2018; Kogan *et al.* 2006).

Studies of the ATOC/Pioneer seamount cable (Kogan *et al.* 2006), the PAC fiber optic cable in the Olympic Coast National Marine Sanctuary (Antrim *et al.* 2018), the MARS fiber optic cable in the Monterey Bay National Marine Sanctuary (Kunhz *et al.*. 2015), and other submarine cables worldwide (Kraus and Carter 2018) found that recolonization of soft sediment communities was fairly rapid, beginning within weeks of the disturbance; but full recovery of the community could take up to a couple of years. Key factors in the recovery of seafloor sediments were water depth, sediment composition, level of energy present, and whether the location was depositional or erosional. Studies that specifically investigated benthic infaunal and epifaunal communities along the cable routes found no significant differences in community composition between studied sites adjacent to the installed cables and comparison sites several hundred meters distant from the cables (Kogan *et al.* 2006; Kunhz *et al.* 2015; Antrim *et al.* 2018). A similar study on a high-voltage direct current power cable installation offshore Australia concluded that the ecological effects of the cable installation on soft substrate epibiota were transient and minor (Sherwood *et al.* 2016).

These findings are similar to findings from studies of offshore sand mining operations in the Gulf of Mexico and in the Atlantic Ocean, where large areas of sand are removed for shoreline restoration. These studies have shown that recovery of the benthic infaunal and epifaunal community to comparable pre-disturbance conditions typically occurs within a couple of years following the disturbance (Hammer *et al.* 1993; Van Dolah *et al*. 1992). The key factors influencing the speed of recovery in these studies were (1) when the impact occurred relative to seasonal periods of spawning and recruitment; and (2) the proximity of undisturbed sediment to the disturbed/affected area.

Because the disturbance to benthic infauna during the proposed cable installation offshore Eureka, California does not involve permanent sediment removal, and the distance between disturbed and undisturbed sediment typically will be less than 0.5 m, recovery to pre-disturbance conditions is expected to be relatively rapid, requiring a couple of years or less for full recovery.

Disturbances resulting from laying cable in shallow water areas with coarse sand can be similar to disturbances in deeper areas covered with fine sediments, despite the existence of different types of sediments. Similar levels of disturbance also may result even if different methods of cable burial are used, such as ROVs or cable plows. In the very nearshore areas, in water depths less than 30.5 m (100 ft), the seafloor and associated biota experience frequent and regular disturbances from wave action. As a result of this high-energy, constantly changing environment, the associated biological community has adapted to frequent exposure and burial. The infaunal community typically is limited in species diversity and consists primarily of filter feeders (e.g., tube worms, sand dollars, sand anemones) and detrital feeders (e.g., shrimp and crabs). These taxa also tend to be highly mobile; consequently, any effects on the habitat and associated biota can be expected to be undetectable within a few days or months of cable installation.

During cable plowing and trenching activities, temporary spikes in near-seafloor turbidity may occur. Increased turbidity typically is restricted to the water immediately above and adjacent to the seafloor where the plowing or trenching occurs. Depending on water depth and natural wave and current energy, turbidity plumes (i.e., resuspended sediments) generated from the trenching can be expected to resettle to the seafloor quickly. During ROV surveys of cable routes, seafloor sediments frequently are disturbed by the ROV thrusters and generate turbidity plumes similar to those generated by cable plows (AMS 2008, 2016a). These turbidity plumes also quickly dissipate within minutes following the disturbance.

Similar to increases in turbidity from cable trenching and plowing activities, HDD boring of conduits can result in turbidity increases through the accidental release of bentonite drilling fluid to the seafloor and nearshore subtidal habitats. Bentonite is a marine clay that is used for lubricating the borehead cutting tool and transporting borehole cuttings back to shore. The HDD boring process typically terminates the landfall conduit installation at water depths between 12 and 17 m (40 and 55 ft). In general, the offshore termination point along the cable route is selected to occur in soft sediment habitat. Throughout most of California, the seafloor sediments occurring at these water depths are composed of sand with some minor silt and clay components. Coastal seafloor sediments at these water depths also typically are exposed to wind and wave surge, as well as regular resuspension of seafloor sediments, resulting in naturally occurring increased turbidity near the seafloor.

The accidental release of small volumes of bentonite drilling fluid into this environment is not expected to result in any detectable effects on marine biota above that which may be naturally occurring in the area of release, or to result in any permanent changes to soft substrate habitat. Any released bentonite clay would be expected to be quickly resuspended by wind- and wave-generated surge present at these shallow water depths and to be transported with similar sized sediment particles to natural depositional areas along the coast. Any potential increased turbidity resulting from the accidental release of bentonite drilling fluid would be expected to be either non-detectable against existing background turbidity conditions at the release site or to be quickly dissipated similar to any increased turbidity caused by cable trenching or plowing.

The greatest potential for substantive effects on marine habitats and associated marine biota from the accidental release of bentonite drilling fluids during HDD boring activities is release of a large volume of fluid. Such a large release could result in short-term smothering and burial of benthic epifauna and infauna, as well as clogging of fish gills (Robertson-Bryan 2006). It also could cause longer term increased turbidity in the area of the release. Early detection of any accidental release of bentonite drilling fluid, and the immediate cessation of HDD drilling activities until operational steps can be taken to stop the release of drilling fluid, are key to limiting the potential effects on marine habitats and biological resources. Preparation and implementation of an HDD monitoring plan that details procedures for preventing the accidental release of drilling fluid during HDD work, as well as operational and release response procedures in case of a drilling fluid release, can prevent the inadvertent discharge of large volumes of bentonite drilling fluid to the marine environment.

A key and critical component of an HDD monitoring plan is inclusion of rhodamine dye into the drilling fluid, paired with on-site monitoring, to detect its presence in the ocean waters along and adjacent to the HDD borehole route during active boring activities. Since 2000, bentonite drilling fluid has been detected infrequently among a total of 32 coastal fiber optic cable landing projects using HDD boring technology (AMS 2001, 2002a, 2002b, 2003, 2016b, 2018). In only a few cases was drilling fluid documented being discharged to the marine environment. In each of these occurrences, the boreholes were suspected of being drilled through naturally fractured and faulted geologic layers, such as the Monterey formation, where the drilling fluid could travel through existing fractures in buried substrates to the seafloor surface (AMS 2002a). In some cases, the observation of discharged drilling fluids to the seafloor was just prior to the borehole exiting the seafloor, and immediate substitution of water for the drilling fluid curtailed any further discharge of drilling fluid (AMS 2002a). Placement of rhodamine dye into the drilling fluid for these cable landing projects permitted early detection of the potential for or the occurrence of discharged drilling fluid to the marine environment. This early detection of rhodamine dye enabled immediate cessation of HDD boring activities and implementation of alternative boring procedures that either stopped the release of drilling materials to the marine environment or minimized the potential effect of discharged materials to the marine environment (AMS 2001, 2002a, 2002b, 2003, 2016b, 2018).

Use and operation of marine construction equipment and vessels always poses some risk of an accidental release of hydrocarbon-based products such as fuel oil, diesel fuel, lubricants, and hydraulic fluids. Depending on the quantity released, the accidental release of these products into the marine environment has the potential to affect marine habitats and taxa. These impacts could come from oiling; destruction or degradation of habitat, food sources, or nursery grounds; or chronic toxicity.

Vessels operate under strict state and federal regulatory requirements that include measures to prevent and respond to an unforeseen accidental release of hydrocarbon-based products. These vessel-specific spill prevention and response plans include procedures to prevent, contain, report, recover, and remove any accidentally released hydrocarbon materials onboard the vessel or from the vessel into the ocean. Additionally, project-specific spill prevention and response plans include specific requirements that prevent hydrocarbon products present at work sites and onboard work vessels from reaching coastal waters. Such spill plans typically will prevent stockpiling of hydrocarbon-based products onboard, include onsite recovery and clean-up procedures for equipment and materials, and include training requirements for project personnel. These types of requirements routinely prevent the occurrence of accidental releases as well as minimize the potential exposure to marine ecosystems.

8.2 Hard Substrate Habitat

Impacts from cable installation potentially can be most severe in hard substrate habitat that occurs within the cable route. The biota associated with hard substrate habitat is predominantly sessile, slow growing, and susceptible to crushing, dislodgement, and other physical disturbances. High-relief hard substrate areas (> 1 m [3.3 ft]) generally are considered to be more sensitive to impacts than low-relief hard-bottom habitat (< 1 m [3.3 ft])(Lissner *et al*. 1991). This is because of their higher species diversity, species abundances, and the potential presence of organisms that are sensitive to physical disturbances such as erect turf species, hard and soft hydrocorals, and branching and erect sponges (Lissner *et al*. 1991). Mixed-bottom and low-relief hard-bottom habitats generally have lower species diversity and abundances due to frequent cycles of burial by sand and higher turbidity near the seafloor. These harsher physical conditions typically result in a more ephemeral biological community that is often dominated by organisms that are more tolerant of high turbidity and sand scouring, or are able to grow fast enough to avoid complete burial. Typical taxa observed in recent ROV habitat and macrobenthic taxa surveys for fiber optic cable routes in California include cup corals, gorgonian corals, brittle stars, sea stars, puffball and other similar encrusting sponges, and some species of anemones such as *Stomphia* and *Urticina*.

The predominant species inhabiting moderate- to high-relief hard substrate in water depths <200 m (650 ft) include turf communities (mixtures of small hydroids, bryozoans, tunicates, and sponges), cup corals (*Paracyathus* and *Balanophyllia*), sea stars (*Asterina* and *Henricia*), brittle stars (*Amphipholis*), red algae (at depths to about 30 m), rockfishes (*Sebastes* spp.*)*, lingcod (*O. elongatus*), and painted greenling (*O. pictus*). Additionally, on hard-bottom moderate- to high-relief features in water depths >100 meters (300 ft), the feather star or crinoid (*Florometra serratissima*) and the large plumose anemone *Metridium* frequently are observed. All of these taxa are capable of withstanding periodic physical impacts. Other species, such as California hydrocoral (*S. californica*), branching coral (*Lophelia*), colonial anemone (*C. californica*), and large erect sponges, typically are more sensitive to physical impact/burial and may require longer periods to recover. *Metridium* and *Corynactis* are common species on moderate- and high-relief substrate, whereas observations of *Stylaster and Lophelia* are reported infrequently in past cable route surveys.

The potential for post-lay disturbance effects is highly dependent on where the cable is located within a hard substrate area, the type of hard substrate present (i.e., mixed, low, moderate or high relief), and how securely the cable is installed on the seafloor. Suspensions often result in continued movement of the cable in response to currents and wave action in shallow depths (< 30.5 m [100 ft]), causing abrasion of hard substrate (Kogan *et al.* 2006; Kuhnz *et al.* 2015). Based on observations made during past cable route and post-lay surveys in California coastal waters, the impacts on associated biota from post-lay movement appear to be minimal with careful placement of the cable. During a survey of the AT&T Asia-America Gateway (AAG) S-5 cable near Morro Bay, California, AMS (2008) reported that they could not detect any noticeable impacts associated with previously laid cables in the area. Several studies have reported the presence of large erect sponges, *M. farcimen* anemones, and other sessile organisms growing on or over exposed cables (SAIC 1999; Kogan *et al.* 2006; Kuhnz *et al.* 2015). An ROV survey of the MCI-ATT fiber optic cable route offshore Montaña del Oro reported small, localized movements of a previously installed trans-pacific telephone cable (up to 10 centimeters [4 inches] in width) occurring when the cable was laid over hard substrate habitat in a high wave energy, shallow-water location (SAIC-SLO 1999). Similarly, sections of the surface-installed ATOC/Pioneer Seamount cable running through soft silt/sandstone offshore Pigeon Point, California reported deep groves cut into exposed rock from cable strumming in very high-energy, shallow-water depth (<11 m [35 ft]) (Kogan *et al.* 2006). The installation of a power transmission cable through a glass reef located offshore British Columbia resulted in 100% mortality of glass sponges immediately under the cable and up to 15% within 1.5 m (4.5 ft) of the cable, because of the method of installation (Dunham *et al.* 2015). No evidence of cable movement was observed, however, once the cable was installed.

Recovery of disturbed hard substrate areas by immigration, asexual propagation, or larval recruitment should begin occurring within months of the disturbance. However, some areas take longer to recover fully than others. A study performed in the Pt. Arguello area suggested that the small areas of hard-bottom habitat that might be disturbed by cable-laying operations could take years to recover fully to pre-disturbance conditions (Hardin *et al.* 1993). These authors reported estimated mean time for recovery to background densities of 23 years for *Paracyathus stearnsi* and 19 years for *Lophogorgia chilensis* in areas disturbed by dragging anchors during pipe-laying operations. In his assessment of the ecological effects of a power cable installation offshore Australia, Sherwood *et al.* (2016) reported that the armored cable running over hard substrate provided a colonizable surface for reef species comparable to species found in surrounding coral reefs within 3.5 years of installation. Dunham *et al.* (2015), reported that the glass sponge reef offshore British Columbia had recovered to approximately 85% natural reef growth and cover when compared to control sites within 2-years of the cable's installation. Finally, during the assessment of the ATOC/Pioneer cable, the surface-laid cable through soft sediment areas of the cable route was noted to provide artificial hard substrate habitat that was quickly colonized by *M. farcimen* and *Urticina* spp. anemones, occasional sponges, and other low-relief colonizing taxa (Kogan *et al.* 2006). In this latter case, species diversity and abundance associated with the cable actually were higher than that of adjacent sediment habitats (Kogan *et al.* 2006). These authors further noted that the presence of the attached epifaunal community established a microcosm that attracted fish and crab taxa (Kogan *et al.* 2006).

Increased turbidity from cable trenching or plowing activities, or the accidental release of bentonite drilling fluid, can be expected to pose a greater negative effect on hard-bottom habitats compared to soft-bottom habitats. As discussed above, marine taxa, such as colonial and branching corals, large erect sponges, anemones, hydrocorals—and in shallower waters, brown, red, and green algae—generally are more sensitive to increased turbidity and sediment deposition than solitary cup corals and turf species. Project-induced turbidity, sedimentation, and bentonite drilling fluid releases can result in increased burial of low-, moderate-, and high-relief hard substrate and attached taxa, clogging of fish gills and feeding surfaces, and temporary loss of foraging habitat. These impacts can be expected to be greater for moderate- to high-relief habitat and associated biota because of their greater sensitivity to sedimentation and the longer time it takes to recover from impacts (Hardin *et al.* 1993). Terminating cable trenching and HDD borehole cable conduits in areas of soft sediment that are away from hard-bottom habitat and associated biota, as well as development and implementation of an HDD monitoring plan, can be expected to prevent and minimize potential exposure of hard substrate habitat and biota to accidental bentonite drilling fluid releases and increased turbidity from cable trenching and burial.

Potential exposure of hard substrate habitat and associated marine communities, including fishes, marine mammals, and sea turtles, to hydrocarbon materials typically is worse than that posed for soft substrate communities because of the time it takes these communities to establish themselves. As for soft substrate communities, implementation of spill prevention, training, and response procedures can be expected to prevent the occurrence of accidental hydrocarbon releases or limit the volume of released material.

8.3 Fishes

Most of the environmental assessments prepared for underwater fiber optic cables (e.g., CSLC 2000a, 2000b, 2005, 2019) indicate that temporary displacement of some fishes from the immediate vicinity (e.g., tens of feet) of the cable route would occur during passage of cable installation equipment. The impacts described in these assessments are considered temporary (i.e., on the order of hours) and localized (occurring over a limited area), and therefore less than significant. Extensive alteration or destruction of habitat or communities lasting more than 1 year is unlikely due to the small size of the cable, the localized corridor represented by the route, and burial of the cable along most of the inshore route to a depth of 100 fathoms (185 m [600 ft]) of the route. Bottom communities disturbed by cable installations are expected to return to pre-installation conditions in a relatively short amount of time (less than 1 year), which typically is documented by a post-installation survey.

Fishes could be exposed to temporary and isolated increased underwater noise from cable-laying activities and from work vessels involved in HDD boring and cable installation activities. Exposure to elevated sound levels can lead to short-term hearing loss in fishes, known as a temporary threshold shift (TTS), or irreversible injury, referred to as a permanent threshold shift (PTS) (CalTrans 2015; McCauley *et al.* 2003). Loud noises also can cause other physiological damage such as swim bladder rupture or even death (CalTrans 2001, 2015; Hastings and Popper 2005). Many factors, such as the duration of the sound, proximity to the source, and life history characteristics, can determine the extent of the damage (Hastings and Popper 2005).

Studies in the North Sea assessing cable trenching and plowing projects for offshore wind farms reported peak underwater noise levels of 178 dB re 1 μPa at a distance of 1 m (3.3 ft) (Nedwell *et al.* 2003). Similarly, peak underwater noise levels, defined as the maximum variation in the pressure wave from positive to negative for cable-laying ships, have been reported to range between 170-180 dB re 1 μPa at a distance of 1 m (3.3 feet) (Hale 2018) and 160-180 dB at a distance of 1 m for small work boats (Bailey *et al.* 2010; CalTrans 2015). Peak nearshore background underwater noise levels have been reported averaging between 128 and 138 dB re 1 μPa at a distance of 1 m (3.3 feet) (Fabre and Wilson 1997). Therefore, generation of underwater noise by fiber optic cable installation most likely is below established acute impact levels of 183 dB and 187 dB for fishes less than and greater than 2 grams in mass, respectively, and only slightly higher than the 150-dB level established for behavioral disturbance (CalTrans 2015). Additionally, it is anticipated that project-generated underwater noise levels will drop below behavioral sound criteria for fish in approximately 32-64 m (95-210 ft), and be below background underwater noise levels in 128-160 m (420-840 ft) from the source, based on an assumed drop of 5-6 dB per doubling of distance from the noise source (McKenna *et al*. 2012). Given the low magnitude of underwater noise generated by most cable-laying activities relative to established thresholds for acute effects on fish, and the short duration over which cable-laying activities will exceed background noise conditions, no substantive effects on fish are anticipated.

As discussed above for invertebrate taxa, the accidental release of hydrocarbon-based products has the potential to affect any fishes that happen to be present in the area affected by the release. Preparation and implementation of a spill prevention, training, and response procedures plan can be expected to prevent the occurrence of accidental hydrocarbon releases from cable installation and maintenance activities, as well as limit the volume of any released material and therein the potential effects on fish taxa, should it occur.

8.4 Marine Mammals and Sea Turtles

No significant effects on marine mammals are anticipated from cable installation at the landing sites or along the offshore route. Many of the potential impacts such as disruption of migration routes or increased noise during installation are considered temporary, lasting only hours (along the sea route installation) to a few days (at the cable landfall location) in any one location, and are not expected to cause disruptions substantially different from normal ship traffic (e.g., noise) through the area (SAIC 2000).

Ship strikes of whales have become of growing concern for several species, with ship strikes to the highly endangered North Atlantic right whale receiving the most attention off the U.S. east coast (Calambokidis 2011). In 2007, four blue whales off the coast of California were found dead with direct or indirect indications of having been struck by ships. These four were all found in the vicinity of the Santa Barbara Channel and the Los Angeles-Long Beach Harbors. Ship strikes during cable installation are highly unlikely because the speed of the ship during cable-laying activities is slower (~0.5 to 1.5 knots while plowing) than migrating whales or fast-swimming sea lions. The potential for ship strikes to sea turtles is greater than for marine mammals, especially when they surface to breathe. Although some avoidance of a cable lay ship can be anticipated as a result of general disturbance in the area, some potential for collision with marine animals remains. Active avoidance remains the best approach for preventing potential collisions between cable lay vessels and marine mammals and sea turtles. This can be accomplished through preparation and implementation of a marine mammal monitoring and avoidance plan during all cable-laying operations. These plans typically require that marine mammal observers be present on the cable installation ship, in addition to procedures for ceasing all operations if a marine mammal or sea turtle comes within a prescribed “safety zone” distance of the vessel, in order to minimize the risk of a collision.

The long-term presence of a fiber optic cable along the seafloor likely would not impede whale migrations because the cable would (1) be buried along most of the nearshore route; and (2) represent a very low profile (e.g., 1 to several inches) in hard-bottom areas as a result of careful installation and post-lay inspection/adjustment. Also, as discussed in CSLC (2000a), cable slack would be stabilized at a level within the range of 2 to 3% in areas where the cable cannot be buried to ensure that the cable conforms to the slopes and peaks of the seabed and is not suspended substantially (e.g., more than 1 foot) above the bottom. This would prevent creation of any spans that could potentially entangle marine mammals such as whales. Of the approximately two dozen known commercial fiber optic cable landings in coastal California waters installed since 2000, no known or reported entanglements between whales and fiber optic cables have occurred.

As discussed above for fishes, exposure to underwater noise from cable installation activities and work vessels also may pose some potential for acute and sublethal effects on marine mammals and sea turtles. Underwater operations can generate peak underwater noise levels ranging between 160 and 180 dB. This includes 178 dB (re 1 µPa at 1 meter) peak underwater noise levels for cable-trenching activities (Nedwell *et al.* 2003) and between 160 and 180 dB at a distance of 1 m (Caltrans 2015) for cable-laying ships and small work vessels, depending on their size and design. Small vessels tend to generate higher underwater noise levels than large ships.

NOAA (2018) established updated thresholds for the onset of PTS and TTS for impulsive and non-impulsive noise sources based on marine species hearing groups. Impulsive sources include sudden onset sounds such as explosions or pile driving, while non-impulsive sources include continuous sounds such as sonar, vibratory pile driving, and vessel movement. The NOAA established thresholds (dB re 1 µPa) identify the levels at which a marine mammal is predicted to experience changes in hearing sensitivity, whether temporary or permanent, from acute exposure to loud underwater anthropogenic sound sources. The updated impulsive noise thresholds are dual metric, meaning whichever results in the largest isopleth for calculating PTS or TTS onset should be used. The impulsive noise thresholds contain only cumulative metrics. NOAA recommends that, when the peak sound pressure level (SPL) threshold for non-impulsive noise exceeds the peak SPL noise threshold associated with impulsive sounds, the impulsive noise peak thresholds should be used. It can be assumed that the reported peak non-impulsive sound levels are more like cumulative values since non-impulsive sounds do not have the sharp initial sound wave that quickly drops lower. The cumulative PTS and TTS non-impulsive peak sound levels are presented in Table 8.1.

TABLE 8.1. CUMULATIVE SOUND EXPOSURE LEVELS FOR MARINE MAMMALS

Marine Mammal Group	Onset of Permanent Threshold Shifts (cumulative sound exposure level)	Onset of Temporary Threshold Shifts (cumulative sound exposure level)
Baleen whales	199 decibels (dB)	179 dB
Dolphin and toothed whales	198 dB	178 dB
Porpoises	173 dB	153 dB
True seals	201 dB	181 dB
Sea lions, fur seals, and sea otters[5]	219 dB	199 dB

SOURCE: NOAA 2018.

With the possible exception of the sound exposure limits for porpoises, all other underwater thresholds are greater than the underwater noise generated by cable installation equipment and vessels. For porpoises, the anticipated cumulative underwater

[5] Sea otters are managed by USFWS, and these PTS and TTS thresholds are considered advisory.

noise threshold potentially generated by cable installation vessels is at or just slightly higher than the established PTS and TTS threshold levels of 173 and 153 dB, respectively, indicating that the porpoise would need to be located very close to the noise source to potentially be affected, which is unlikely to occur. Assuming the aforementioned 5- to 6-dB drop per doubling of distance from the sound source (McKenna *et.al* 2012), potential project-generated underwater noise generated by cable lay vessels can be expected to drop to 170 dB within 13 feet of the vessel and 150 dB within 106 feet of the vessel.

As presented in Table 7.1, two species of porpoise have some potential to occur in the coastal waters offshore Eureka: Dall's porpoise and the harbor porpoise. If present during cable installation activities, the porpoises would need to be swimming within 13-100 feet of the stern of the lay ship to be affected. There are currently no known RMS values for cable installation activities, so it is not possible to estimate at what distance from the underwater sound source the NOAA-established PTS AND TTS threshold level would occur.

Little scientific information is known about the effects of anthropogenic underwater noise on marine turtles, or at what potential threshold levels acute or behavioral responses may occur (Williams *et al.* 2015). Sea turtles appear to be sensitive to low-frequency sounds with a functional hearing range of approximately 100 Hz to 1.1 kHz (Grebner and Kim 2015). Scientific information on direct measurements of underwater noise sources on marine turtles concerns impulsive sound sources (not generated from project-related activities), such as airguns and dynamite explosions (not part of the proposed project-related activities). These studies indicated that marine turtles may be somewhat resistant to successive dynamite blasts (Erbe 2012) and can detect and exhibit avoidance behavior to in response to 175 dB RMS-generating impulsive airgun sounds (Weilgart 2012) when several kilometers away from the source. Additionally, the Acoustical Society of America-developed guidelines for sound exposure criteria for fish and turtles suggested that (1) sea turtle hearing probably was more similar to that of fishes than to marine mammals; and (2) when assessing potential underwater noise effects on marine turtles, that the peak SPL acute threshold level for fish of 206 dB might be an appropriate measure (Grebner and Kim 2015). As indicated above, potential project related underwater peak SPL noise levels are expected to be in the 160-180 dB range, which is well below the 206-dB level for acute impacts. Based on the behavioral responses to impulsive-based sound sources, it is anticipated that any marine turtles approaching project-related cable installation activities would project work vessels. However, no sea turtle species are anticipated in the project area.

Although they can be expected to avoid the immediate area where the underwater noise is generated during cable lay activities, implementation of a marine mammal and sea turtle monitoring program and the presence of an observer onboard the cable installation vessel can be expected to prevent any exposure of porpoises and other marine mammals and sea turtles to underwater noise levels of sufficient magnitude to result in any deleterious effects.

As discussed above for fishes and invertebrate taxa, accidental release of any hydrocarbon-based product has the potential to affect marine mammals and sea turtles that are present in the area affected by the accidental release. Preparation and implementation of a spill prevention, training, and response procedures plan can be expected to prevent the occurrence of accidental hydrocarbon releases from cable installation and maintenance activities, as well as to limit the volume of any released material and therein the potential effects on marine taxa, should it occur.

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APPENDIX D

Marine Cultural Resources Report

MARINE CULTURAL RESOURCES TECHNICAL REPORT FOR RTI INFRASTRUCTURE, INC.

EUREKA SUBSEA CABLES PROJECT

PREPARED FOR:

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July 2020

2020. *Marine Cultural Resources Technical Report for RTI Infrastructure, Inc's Eureka Subsea Cables Project*. July. Prepared for RTI Infrastructure, Inc., San Francisco, California.

Contents

Tables and Figures

Table

Table Notes:

Shipwrecks reported include several vessel types and designs identified as follows:

Barque (also Bark). A barque is a sailing vessel with three or more masts, fore and aft rigged on after mast, square rigged on all others.

Brig. A brig is a vessel with two masts and square rigged on both of them.

Barques and brigs are not to be confused with a barquentine/barkentine or brigantine, which are rigged differently.

Packet. A packet is a mail vessel that also may carry passengers and cargo.

Schooner. A schooner is a fore and aft rigged vessel with two or more masts.

Scow. A scow is a flat-bottomed, square-ended craft used for transport of cargo.

Ship. A ship is technically a sailing vessel with three or more masts and yards crossed on all of them.

Sloop. A sloop is a one-masted sailing vessel with a fore and aft rig, bowsprit, and jib stay—or any vessel with a single-head sail (Layton 1987 in MMS 1990:IV–25.

Figure **Page**

Acronyms and Abbreviations

AWOIS	Automated Wreck and Obstructions Information System
BOEM	Bureau of Ocean Energy Management
B.P.	Before Present
cable	fiber optic cable
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CHIRP	compressed high-intensity radar pulse
CRHR	California Register of Historical Resources
CSLC	California State Lands Commission
km	kilometer(s)
LGM	Last Glacial Maximum
m	meter(s)
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
OCS	outer continental shelf
OGB	ocean ground bed
PRC	Public Resources Code
Project	Eureka Subsea Cables Project
ROV	remotely operated vehicle
RTI	RTI Infrastructure, Inc.
TCP	traditional cultural property
USACE	U.S. Army Corps of Engineers

INTRODUCTION

The RTI Infrastructure, Inc. (RTI, the Applicant) proposed Eureka Subsea Cables Project (Project) is located in Samoa (Figures 1, 2, and 3). Samoa is a census-designated place in Humboldt County, California. It is 1.5 miles northwest of Eureka, at an elevation of 23 feet. Samoa is in the northern peninsula of Humboldt Bay. Historically, the northern peninsula is identified as the "northern sand spit of the Humboldt Bay bar."

The proposed Project would install four subsea fiber optic cables (cables) carrying telecommunication data to connect the United States with Singapore, Taiwan, Asia, and Australia. The Project entails four phases (Figure 4). Phase 1 would build the infrastructure to receive four cables and bring the first cable from Singapore to California in 2021.

Project-related work would take place in both terrestrial (land) and marine (ocean) areas onshore and offshore of a privately owned parcel of land. The study area for this Project includes those offshore areas extending from the mean high water (MHW) tide line out to the edge of the continental shelf break at a water depth of 5,904 feet (1,800 meters [m] [984 fathoms]). This area includes waters within the 3-nautical-mile (nm) State waters limit, as well as deeper waters of the U.S. Territorial Sea and U.S. Contiguous Zone. The prehistoric and historic maritime activities in northern California provide the context for review and analysis of the Project. A separate cultural resources report has been prepared under separate cover for terrestrial components.

The analysis in this technical report finds that RTI's proposed Project has the potential to disturb or destroy previously unknown or inaccurately recorded submerged prehistoric and historic maritime cultural resources. This impact would be significant under the California Environmental Quality Act (CEQA). Mitigation measures are recommended in the Impacts and Mitigation Measures section of this report to reduce the impact to a less-than-significant level. These mitigation measures would require identification of resources and avoidance of potentially significant resources by rerouting the cable.

Marine Cultural Resources Categories

Three broad categories of marine cultural resources are considered in this study, all of which are currently submerged and may be encountered during the marine installation of the Project: (1) historic period shipwrecks, including downed aircraft and unidentified debris; (2) prehistoric period watercraft; and (3) prehistoric archaeological resources, both as in situ site deposits and isolated artifacts.

Historic Period Shipwrecks

Historic period shipwrecks consist of the remains of watercraft that were used as early as the 16th century to cross the waters of the study area. These historic period watercraft include vessels that came to rest on the ocean floor due to foundering, stranding, collision between vessels, or burning; or that were abandoned at sea not due to age. Their remains currently may be partially or wholly obscured by sediments of the ocean floor.

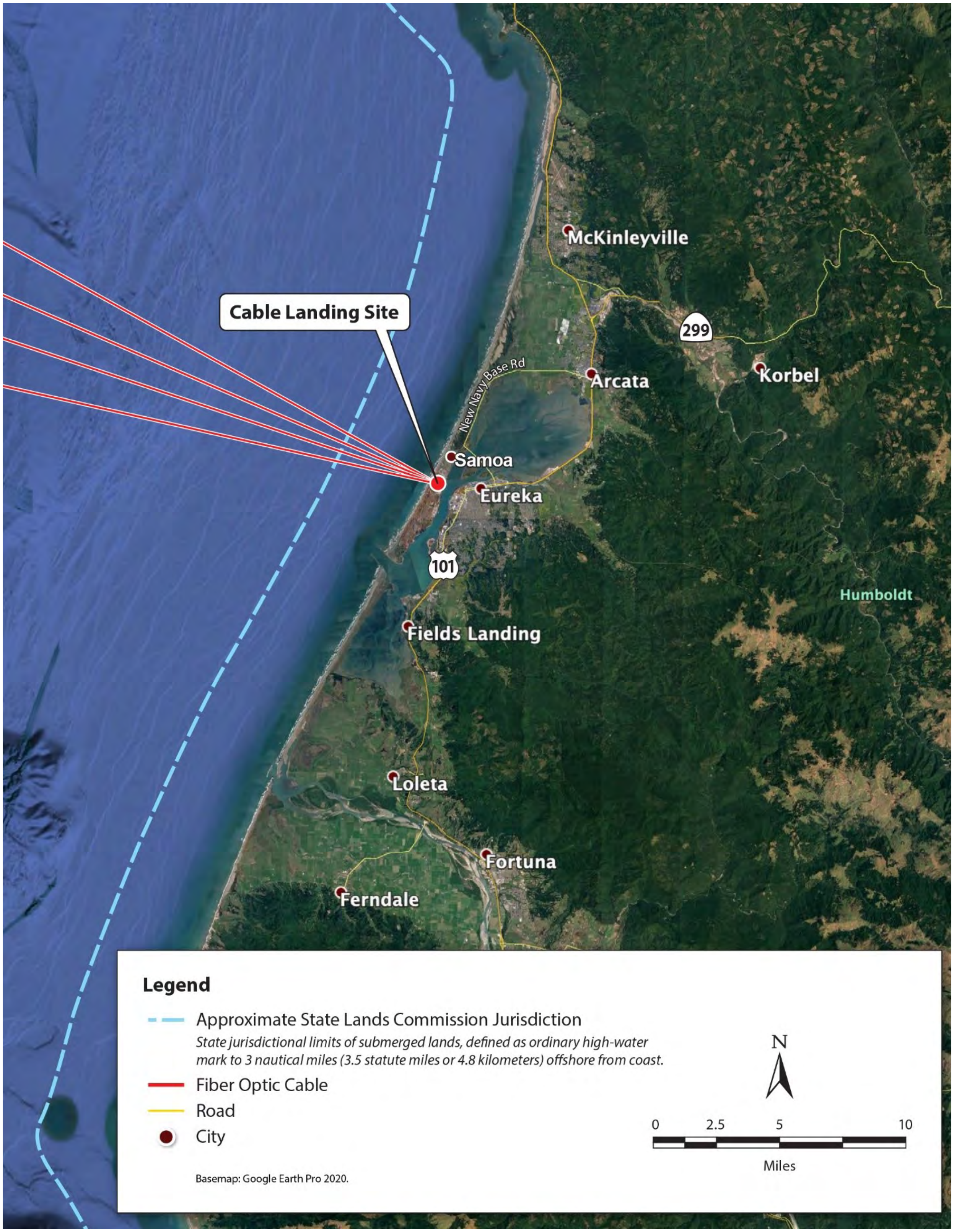
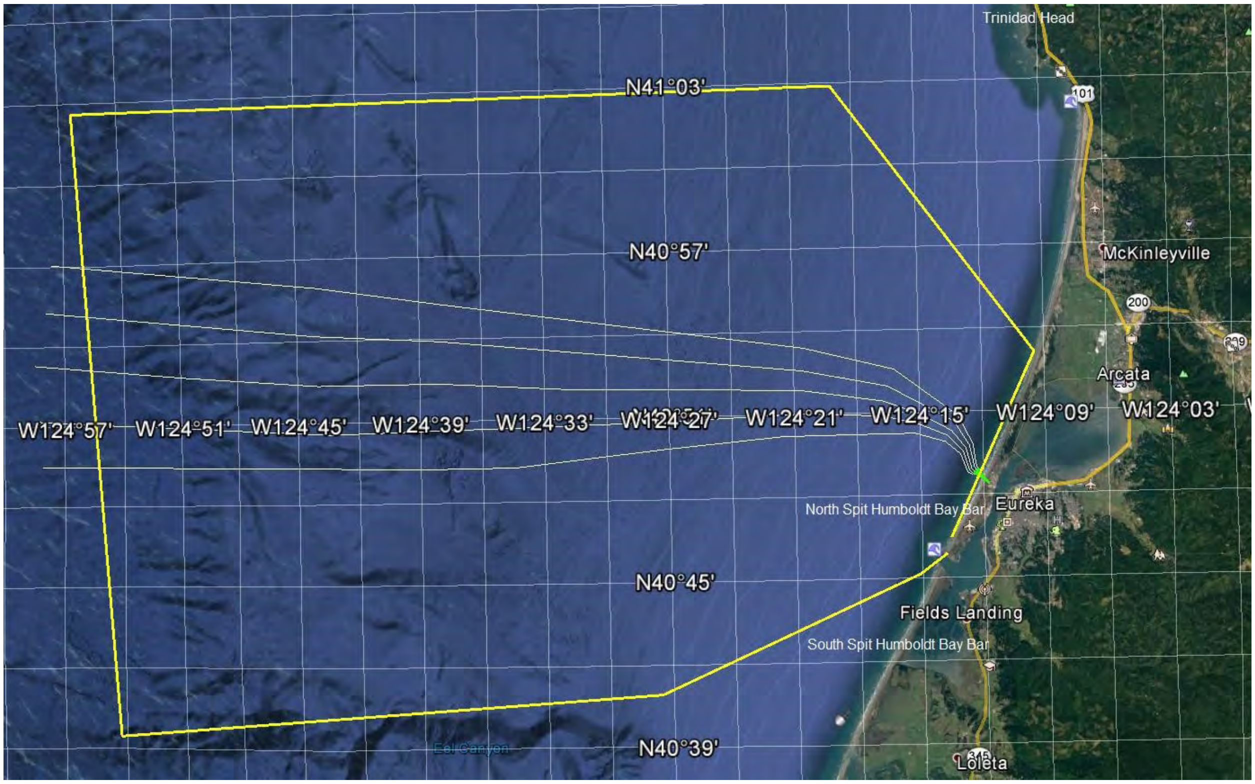


Figure 1. Project Location



Project (Image Landsat/Copernicus, Data SIO, NOAA, US Navy NGA GEBCO©Google)

Figure 2. Marine Project Area

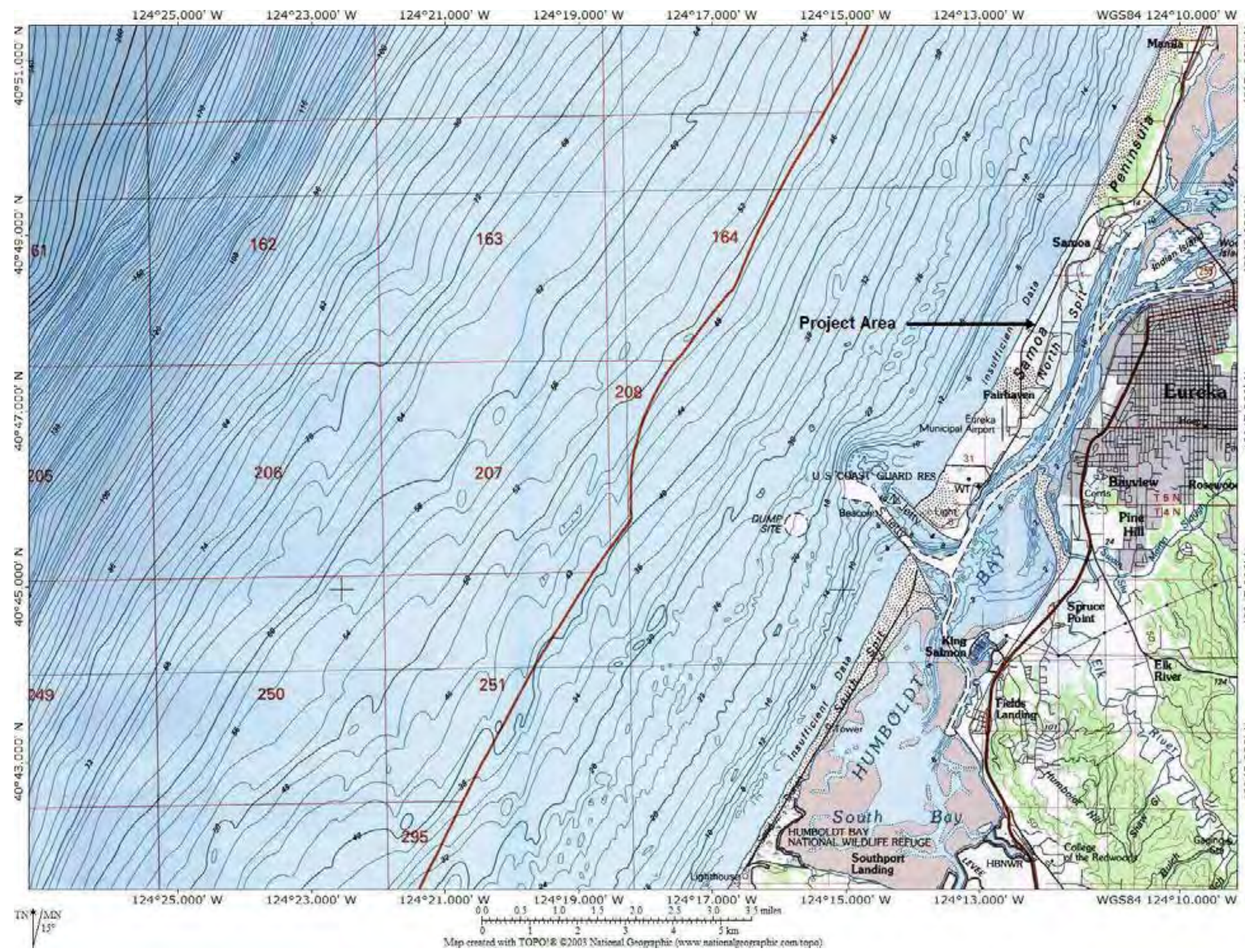


Figure 3. Topographic Map of the Project Area

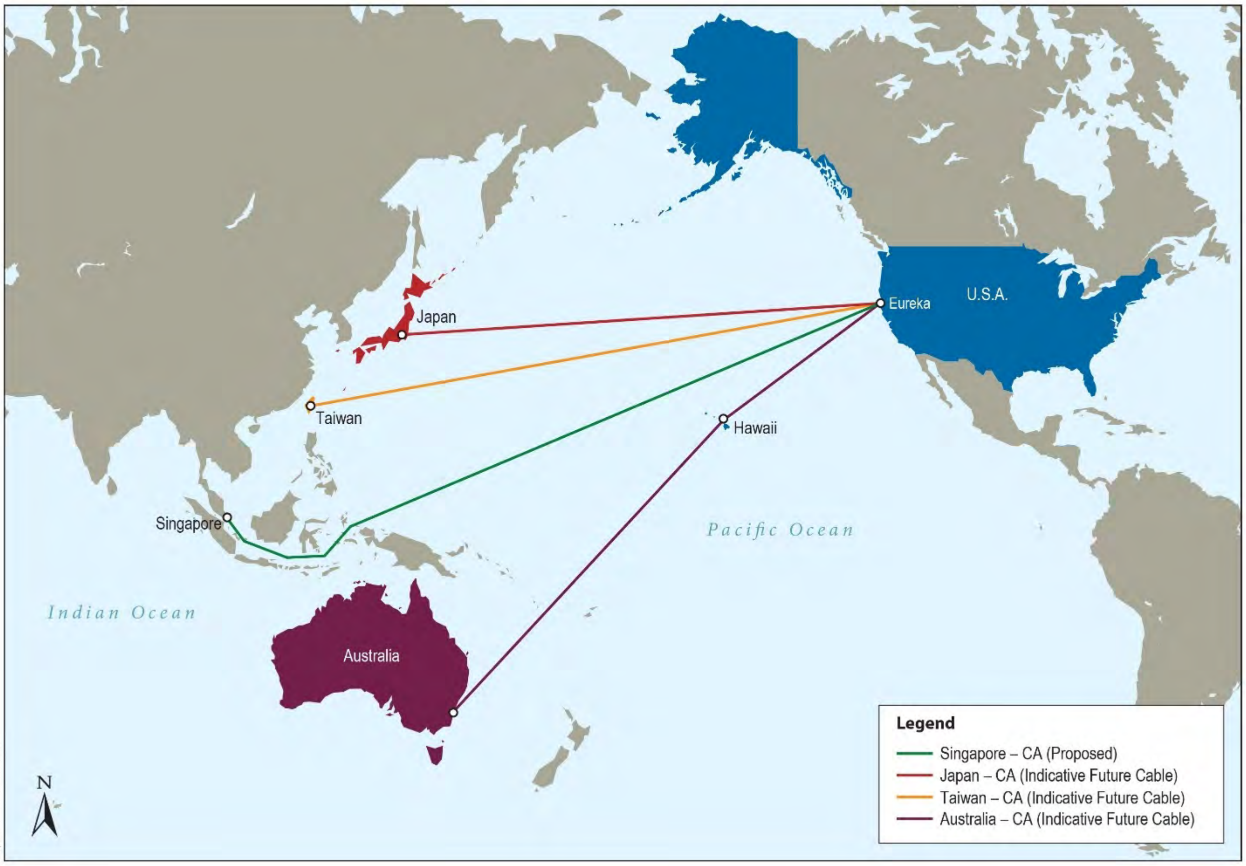


Figure 4. Proposed Project Phases

Prehistoric Period Watercraft

Native Americans used watercraft for transportation and fishing in salmon streams and lakes, and for hunting offshore and in seal and sea lion rookeries for seal and sea lions. During the approximately 13,000 years of Native American navigation through the study area, some native vessels may have been inundated, stranded, or capsized. Preservation of such vessels in the nearshore environment is considered to be rare or unlikely.

Prehistoric Archaeological Resources

Prehistoric archaeological resources include places where Native Americans lived, performed activities, altered the environment, and created art before they sustained contact with Europeans. Prehistoric resources contain features left behind by these activities as well as artifacts and subsistence remains. Additionally, they may contain human remains in the form of burials, cairns, or cremations. Although originally deposited on a non-marine landscape, changes in sea level have resulted in such resources currently being submerged. Such sites may date from the terminus of the Pleistocene through Holocene periods.

The proposed Project involves terrestrial and marine components. Because this report addresses only the marine environment, terrestrial Project components are summarized below. A more detailed discussion of the marine Project components follows.

Terrestrial Project Components

The following terrestrial Project components would be needed to install four cables (coming from Asia or Australia) and their related structures on land above the ordinary high-water mark (OHWM) (outside of the California State Lands Commission [CSLC] jurisdiction), as seen in Figure 5.

- **Cable Landing Site**. The four cables would land in an unoccupied area of the Humboldt Bay Harbor, Recreation, & Conservation District. An approximately 150-foot by 100-foot area would be used for the following key Project components.
  - Staging Area. The cable landing site would be used to park vehicles and store construction-related equipment for both terrestrial and marine work.
  - Cable Landing Vaults (LVs). Four LVs (approximately 8 feet wide by 12 feet long by 9 feet deep) would be buried with a cast-iron vault cover (36 inches in diameter) at grade level, meaning flush with the ground. A separate landing pipe (described below) would be installed from each of the LVs and would exit offshore into the Pacific Ocean. Once the landing pipes are installed, each individual cable (from different Project phases) would be pulled from the Pacific Ocean through its own designated landing pipe into an LV. After completion of the Project, the cables ultimately would be connected with soon to be built terrestrial cable infrastructure that is not part of the proposed Project. The LVs also would provide access to the landing pipes for maintenance activities related to the existing terrestrial cable infrastructure.
  - Landing Pipes. Four independent landing pipes[1] (approximately 5 to 6 inches in diameter) for four cables would be installed from each of the LVs. Each landing pipe would be approximately 4,600 feet long, starting from the LV and ending offshore. The terrestrial portion of the landing pipes would be installed at least 35 feet under the cable landing site and the beach using the horizontal directional drilling (HDD) construction method (Figure 6).
  - Ocean Ground Beds (OGBs). A grounding device known as an OGB would be installed underground onshore or offshore for each cable to ground it (Figure 7). An OGB is needed for cathodic protection to control corrosion and to provide a ground for the electricity travelling through the cable to power the marine cable amplifiers.

[1] Each landing pipe would be approximately 4,600 feet long; approximately 3,600 feet of this would be offshore. The total length for all four landing pipes would be about 18,400 feet.

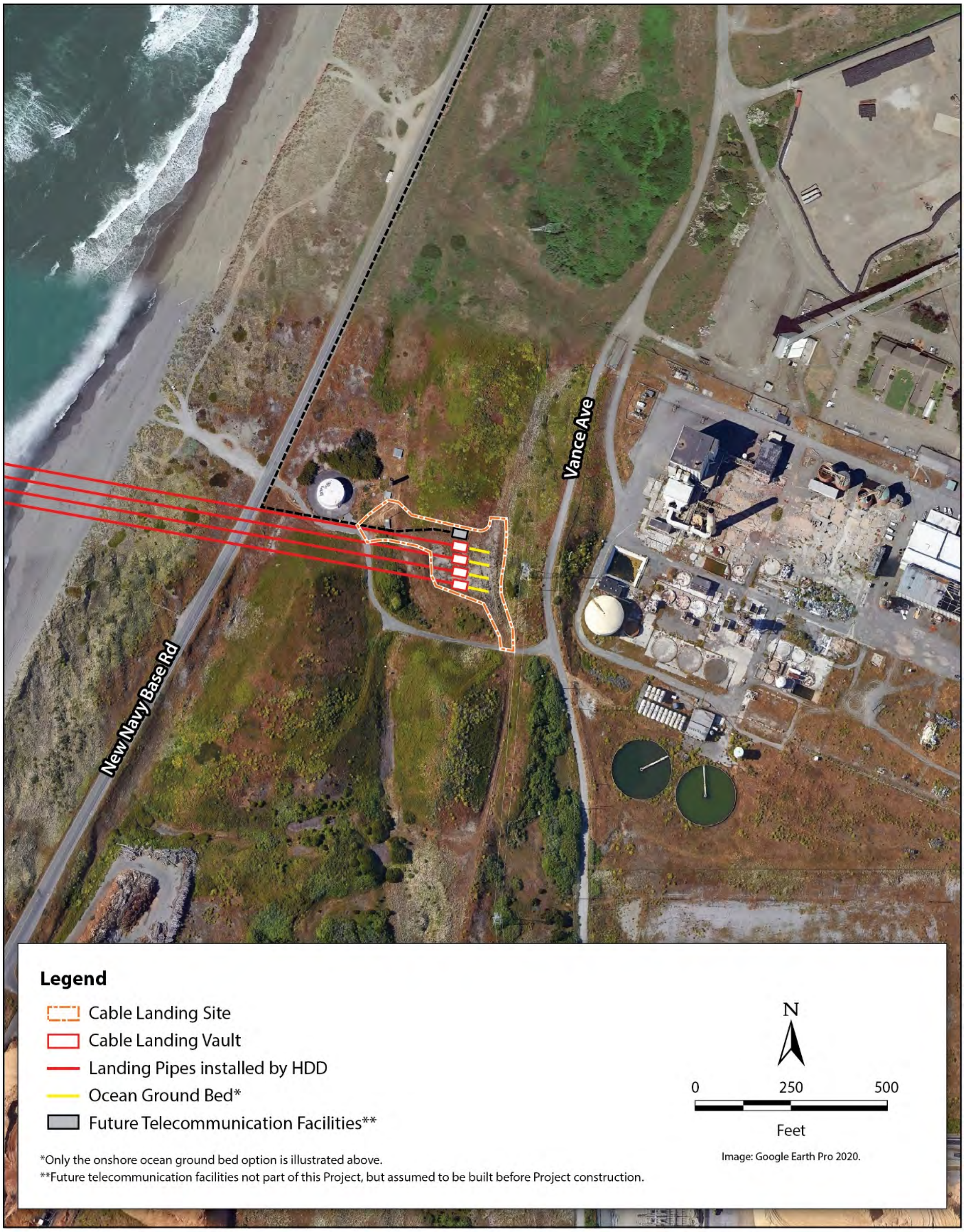


Figure 5. Terrestrial Project Components

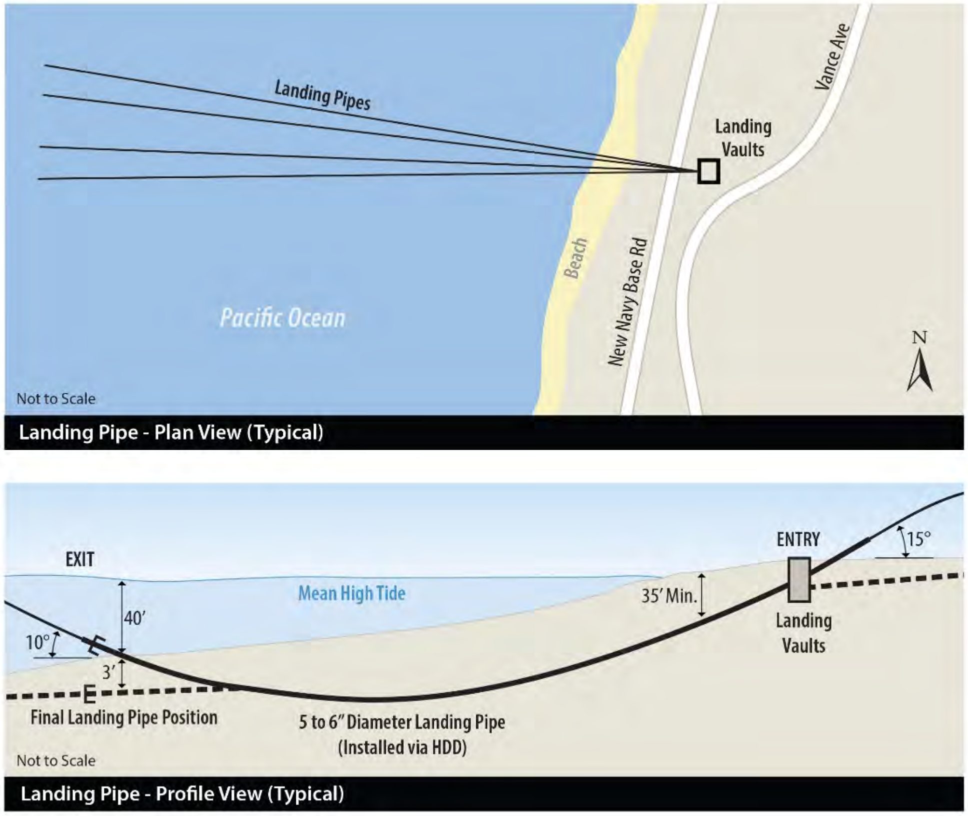
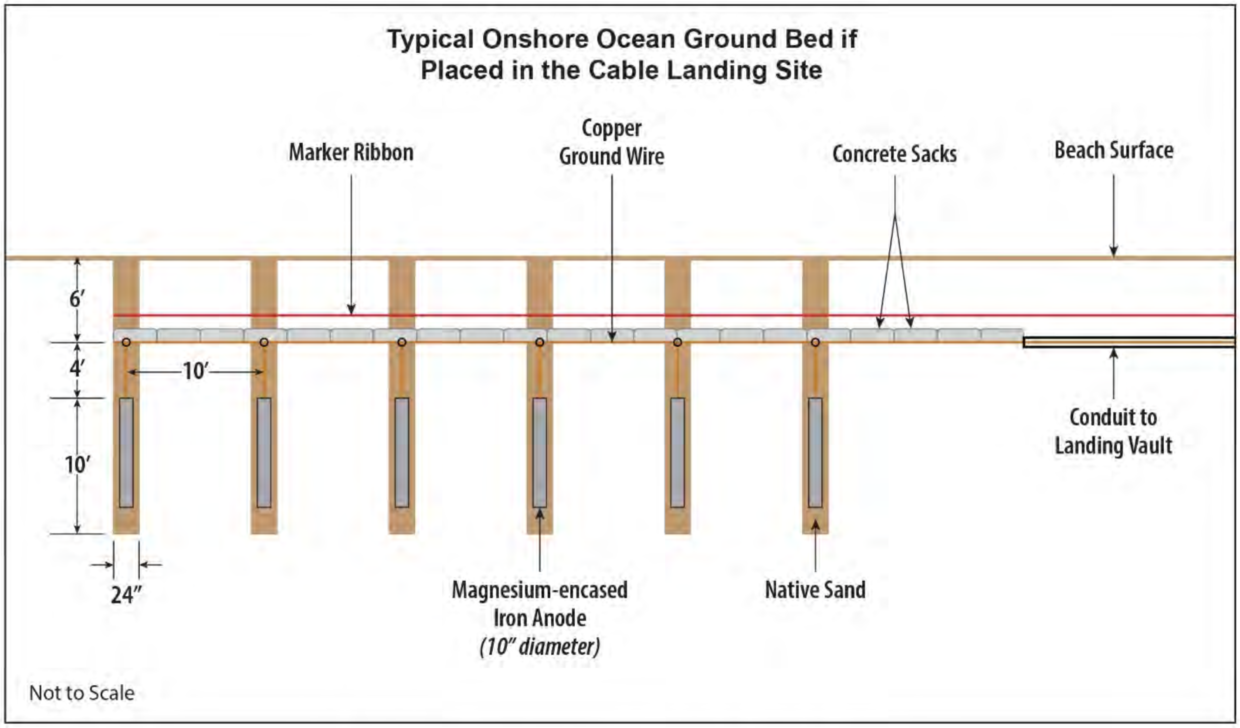


Figure 6. Marine Project Components



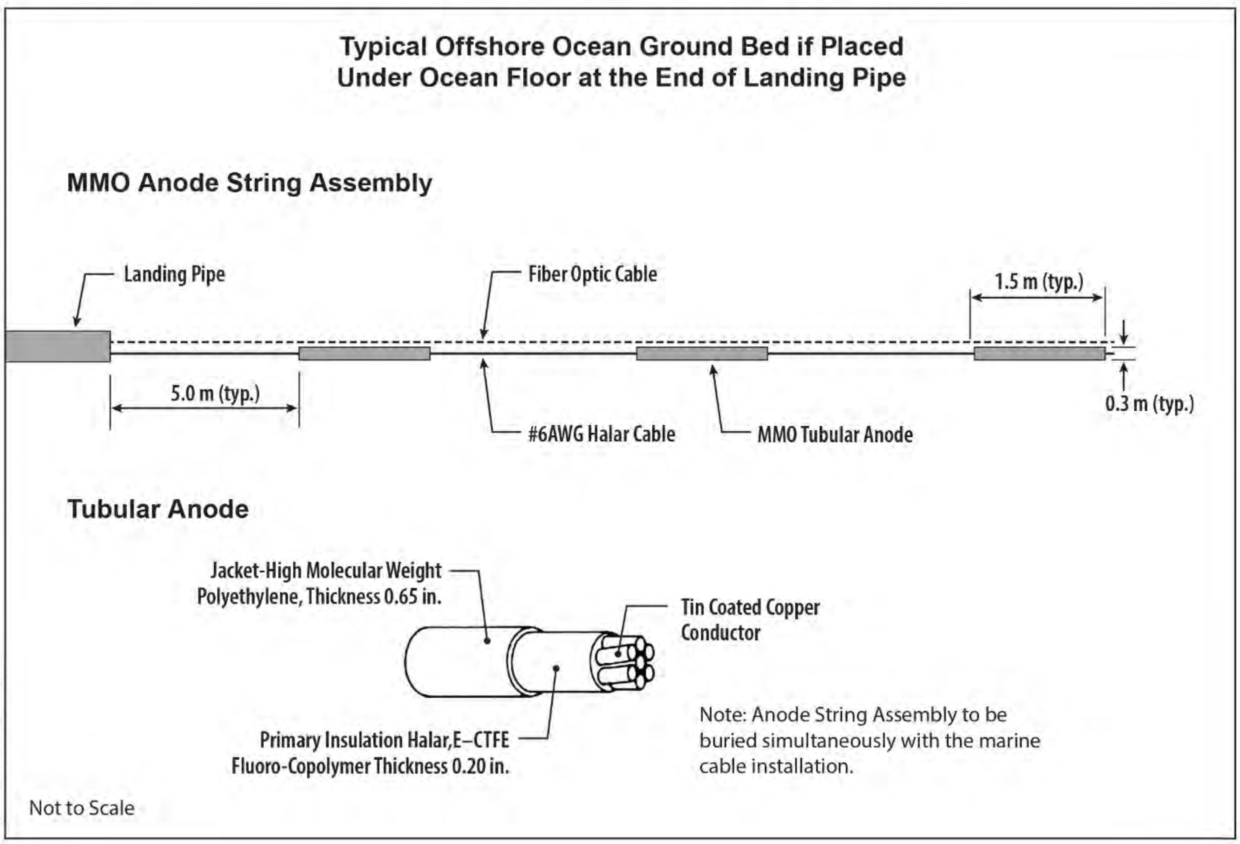


Figure 7. Cross Section of Ocean Ground Bed (Onshore or Offshore)

Terrestrial Connection to Vault and Cable Landing Station. From the cable landing site, each cable would be connected to a single vault (to be provided by the local telecommunications company) along New Navy Base Road (Figure 5). The connection would be provided using a type of HDD (bore) from the LV to the vault along the road. The vault would provide access to an existing conduit system along New Navy Base Road. The conduit would provide a connection to an existing cable landing station in the area. The terrestrial connection to the vault and cable landing station is not part of the Project.

Marine Project Components

Summary of Marine Components

The following marine Project components would be needed to install four cables (coming from Asia or Australia) and their related structures. As mentioned, landing pipes would be installed from the cable landing station and would extend offshore about 3,600 feet (0.6 mile or 0.5 nm), at which point the ocean is a sufficient depth to bury the cables directly on the ocean floor (approximately 40 feet). After that, the cables would continue either under or on the surface of the ocean floor until they reach their intended international destination. The scope of this Project ends 3 nm offshore to correspond with the boundaries of the CSLC jurisdiction. (After 3 nm, the United States assumes jurisdiction over the Pacific Ocean). As such, the marine components of this Project would be activities that occur starting at mean high water of the Pacific Ocean and ending 3 nm from the shoreline.

Landing Pipes. As noted above, four landing pipes (approximately 5 to 6 inches in diameter) would be installed. Each landing pipe would be approximately 4,600 feet long, starting from the LV and ending offshore. The landing pipes would be installed at least 35 feet under the cable landing site and the beach (using the HDD construction method) and exiting at about 3,600 feet (0.5 nm or 0.6 mile) offshore at a water depth of approximately 40 feet. Four cables would be pulled through these landing pipes and brought into their respective LV to ultimately connect with a soon to be built cable from a telecommunications provider to a vault associated with an existing conduit system along New Navy Base Road.

Fiber Optic Cables. The cable lay ship (with the help of a dive support vessel and divers) would bring the cable to the end of the landing pipe at about 3,600 feet offshore or 4,600 feet from the LVs (where the ocean water depth is approximately 40 feet deep). Each cable then would be pulled through its own individual landing pipe (constructed in Phase 1) to its respective LV.

Before reaching the landing pipe, the cable would be installed as follows. In ocean water that is between 40 and 98 feet deep, the cable would be installed by diver-assisted post-lay burial. In water between 98 and 5,904 feet deep, the cable would be buried under the ocean floor by plowing or the post-lay burial method, depending on ocean floor characteristics. The cables would lay directly on the ocean floor in water deeper than 5,904 feet (approximately 32 miles offshore from the LVs at the OCS). [2]

Ocean Ground Beds. An OGB would be installed onshore or offshore (to be determined after the electronic components of the cable system are designed and manufactured) for each cable to ground

[2] U.S. federal jurisdiction extends to the edge of the OCS under the Outer Continental Shelf Lands Act.

the cable. An OGB is crucial for cathodic protection to control corrosion and to provide a ground for the electricity that would travel through the cable to power the marine cable amplifiers.

Detailed Marine Project Components

The marine Project components are segments between the mean high water line and the outer limit of the OCS, at approximately 5,904 feet of seawater depth. The CSLC has jurisdiction from the mean high water line to 3 nautical miles (nm) offshore; the federal jurisdiction is past 3 nm to the OCS. In the CSLC's jurisdiction, the cable would be installed in both soft and hard bottom substrates. The soft bottom substrate predominates, consisting of sand, silt, and clay—with silt and clay components increasing with greater water depth. Some low- to high-relief hard substrates could be present, but they would be avoided, where feasible, using data from the ocean bottom surveys being conducted by the Applicant prior to construction.

Landing Pipes. As noted above, four landing pipes (approximately 5 to 6 inches in diameter) would be installed. Each landing pipe would be approximately 4,600 feet long, starting from the LV and ending offshore. The landing pipes would be installed at least 35 feet under the cable landing site and the beach (using the HDD construction method) and would exit at about 3,600 feet (0.5 nm or 0.6 mile) offshore at a water depth of approximately 40 feet. Four cables would be pulled through these landing pipes and brought into their respective LV to ultimately connect with a soon to be built cable from a telecommunications provider to a vault associated with an existing conduit system along New Navy Base Road.

Marine Fiber Optic Cables. The following two marine fiber optic cable armoring designs (double armor and single armor, illustrated in Figure 8) would be used to provide an appropriate degree of protection from geologic and sedimentary conditions encountered during installation and from potential interactions with fishing gear.

- **Double-Armored Cable.** This design (less than 2 inches in diameter) offers the greatest degree of protection and is recommended to be used in rocky or coarse substrate areas where protection from fishing gear may be warranted. There are two surrounding layers of galvanized wires that are coated with tar to reduce corrosion, two layers of polypropylene sheathing, and an outer layer of tar-soaked nylon yarn.
- **Single-Armored Cable.** This design (less than 2 inches in diameter) is like double-armored cable but with only a single layer of polypropylene sheathing and a single ring of galvanized wires. This cable would be used where there is reduced risk of damage caused by substrate conditions or fishing by burying the cables in soft bottom sediments using a sea plow or ROV.

The marine cable would contain a copper conductor to transmit telecommunication data signals (light pulses). The maximum distance a signal can travel without a regenerator is approximately 35 miles. Therefore, signal regenerators would be required at appropriate intervals in the cables to help transmit the signals from the United States to Asia or Australia.

Signal Regenerators in the Marine Cables

The regenerator equipment would operate from 48 volts of direct current (DC) electricity using DC power feed equipment housed at an existing cable landing station. The marine fiber optic cable would transmit this signal (DC electrical power) to the regenerators. The DC power equipment system is not part of the proposed Project because the closest one to California would be more than

3 nm offshore. The completed system would include protective equipment to detect a sharp decrease or sharp increase in electrical current flow in the cables. If an abnormal current flow is detected in the cable, the DC power system would shut down. The DC power would generate a magnetic field on the order of 5 milligauss at 3.28 feet from the cable. The magnetic field would diminish with distance from the cable (such that, at 33 feet, it would be approximately 0.5 milligauss).[3]

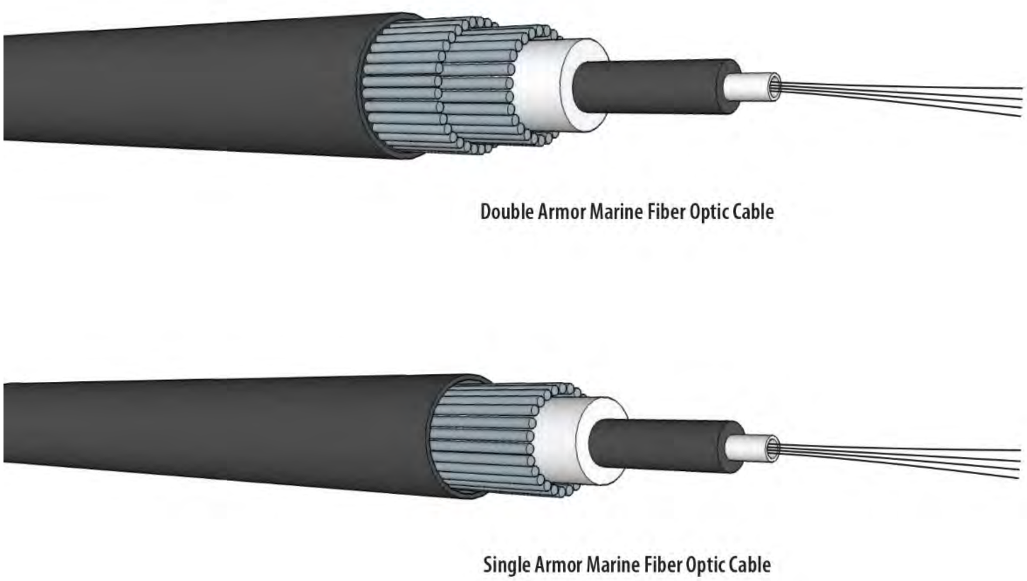


Figure 8. Marine Fiber Optic Cable Designs

Marine Project Construction Methods

Marine Project construction would take place during all Project phases. Overall, marine construction would involve a dive support vessel (primary work vessel), a smaller secondary work vessel, and a cable lay ship (Figure 9). The following text explains the different marine construction methods that typically would be used at different water depths.

[3] The magnetic field strength would not adversely affect marine life. The field strength level at 3.3 feet (5 milligauss) is far below the most protective field strength for human health (833 milligauss from the International Commission on Non-Ionizing Radiation Protect [ICNIRP]) and is the equivalent to the field strength from a personal computer at 3.3 feet.

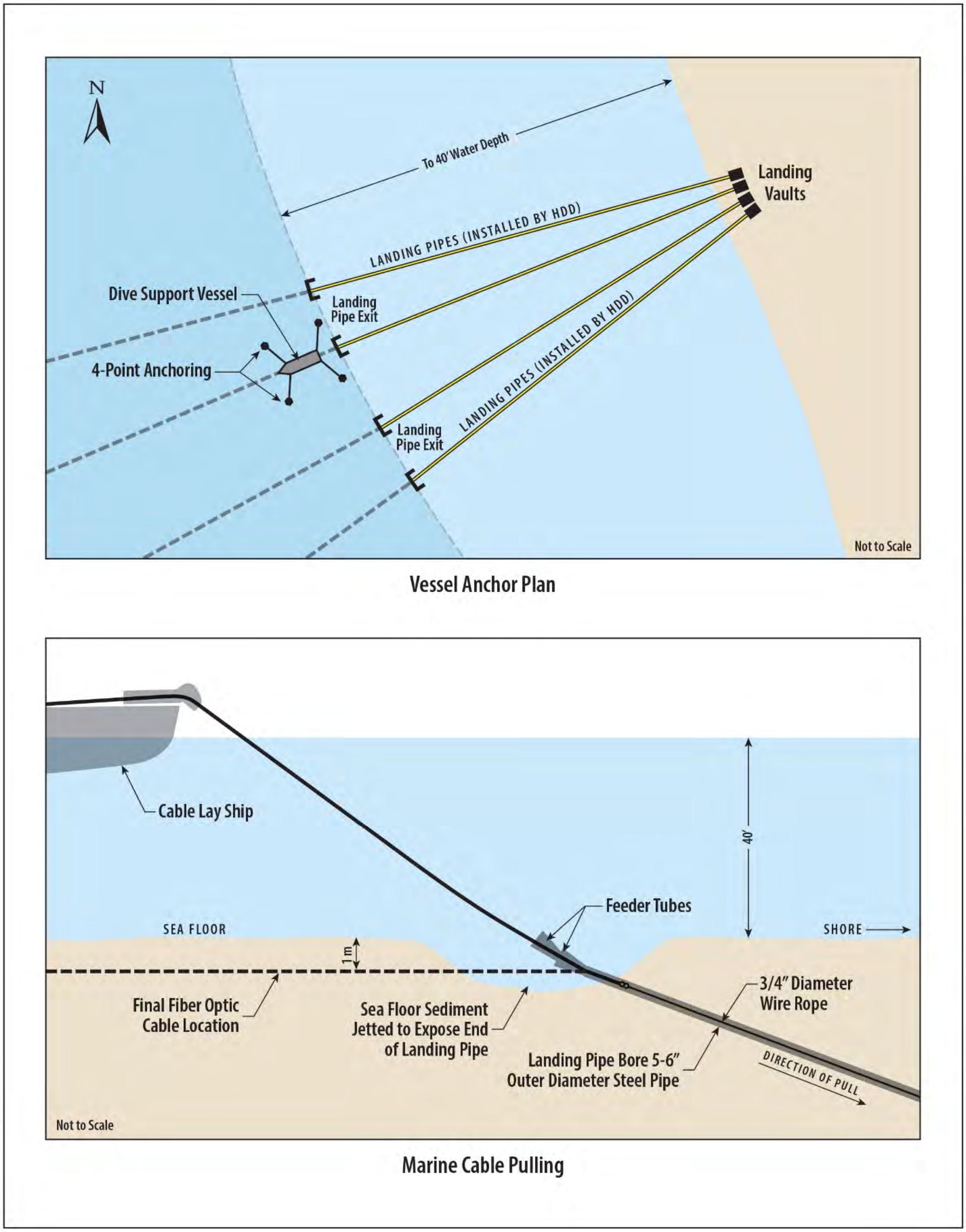


Figure 9. Marine Cable Pulling from Offshore to Onshore

Horizontal Direction Drilling to Install Landing Pipes (LV to approximately 40-foot water depth, up to approximately 0.66 mile offshore)

The first marine Project component would be to install four landing pipes using the HDD method. Once all four landing pipes are installed, the cable lay ship would arrive offshore from Asia or Australia as it lays fiber optic cable in the deep ocean.

Exposing Landing Pipe Exit. At approximately 3,600 feet offshore (where the landing pipes exit) (Figure 9), divers would jet approximately 10 to 15 cubic yards of ocean floor sediment to expose the end of the landing pipe. The divers would remove the drill head from the landing pipe and install a flapper valve on the end of the landing pipe to keep seawater from entering until the cable is installed into the landing pipe.

Dive Support Vessel (Primary Work Vessel). A 100- to 200-foot-long dive support vessel (Figure 9) would arrive and set up on station within about 50 feet of the landing pipe exit point (about 3,600 feet offshore), using a four-point mooring with an anchor spread of 328 feet. A smaller secondary work vessel would be used with the dive support vessel to set and retrieve anchors, and to shuttle crew between the diver support vessel and the shore. All anchors would be set and retrieved vertically to avoid dragging them across the ocean floor. All anchoring would be conducted as described in a Marine Anchor Plan, and the anchor drop zones would avoid hard bottom and existing utilities.

Cable Lay Ship. Once the cable lay ship arrives offshore, it would position itself several hundred feet oceanward of the end of the landing pipe (3,600 feet offshore). The divers would connect the end of the incoming cable to an existing wire rope in the landing pipe,[4] install cable chutes (also known as *feeder tubes* as seen in Figure 9) into the end of the landing pipe, and attach floats to the cable so it can be pulled through the landing pipe and brought onshore in the LV. The cable would be pulled onshore into the LV by a hydraulic winch and anchored behind the LV. Once the cable is secured in the LV, the cable lay ship would move away from that location. Divers would manage and monitor the pulling process from the dive support vessel.

Pre-Lay Grapnel Run (water depths of 40 to 5,904 feet, between approximately 0.66 and 68.4 miles offshore)

Information from the ocean-bottom surveys would be used to assist in this “run.” The purpose of an engineered pre-lay grapnel run is to clear debris on the bottom of the ocean floor (e.g., discarded fishing gear) along the routes where the fiber optic cables would be buried. A grapnel, typically of the flat fish type, would be dragged along the cable route before cable installation to clear out the path for burying cables (Figure 10). The grapnel would be attached to a length of chain to ensure that it touches the bottom of the ocean floor. The cable lay ship or a dive support vessel would tow the grapnel at approximately 1.2 miles per hour (approximately 1 knot per hour). The arms of the grapnel are designed to hook debris lying on the ocean floor or shallowly buried to approximately 1.3 feet. If debris is hooked and towing tension increases, towing would stop, and the grapnel would

[4] A 0.75-inch wire rope or *pull cable* in the landing pipe would be attached to a hydraulic winch in the LV when the landing pipe is installed.

be retrieved by winch. Any debris recovered during the operation would be stowed on the vessel for subsequent disposal in port.

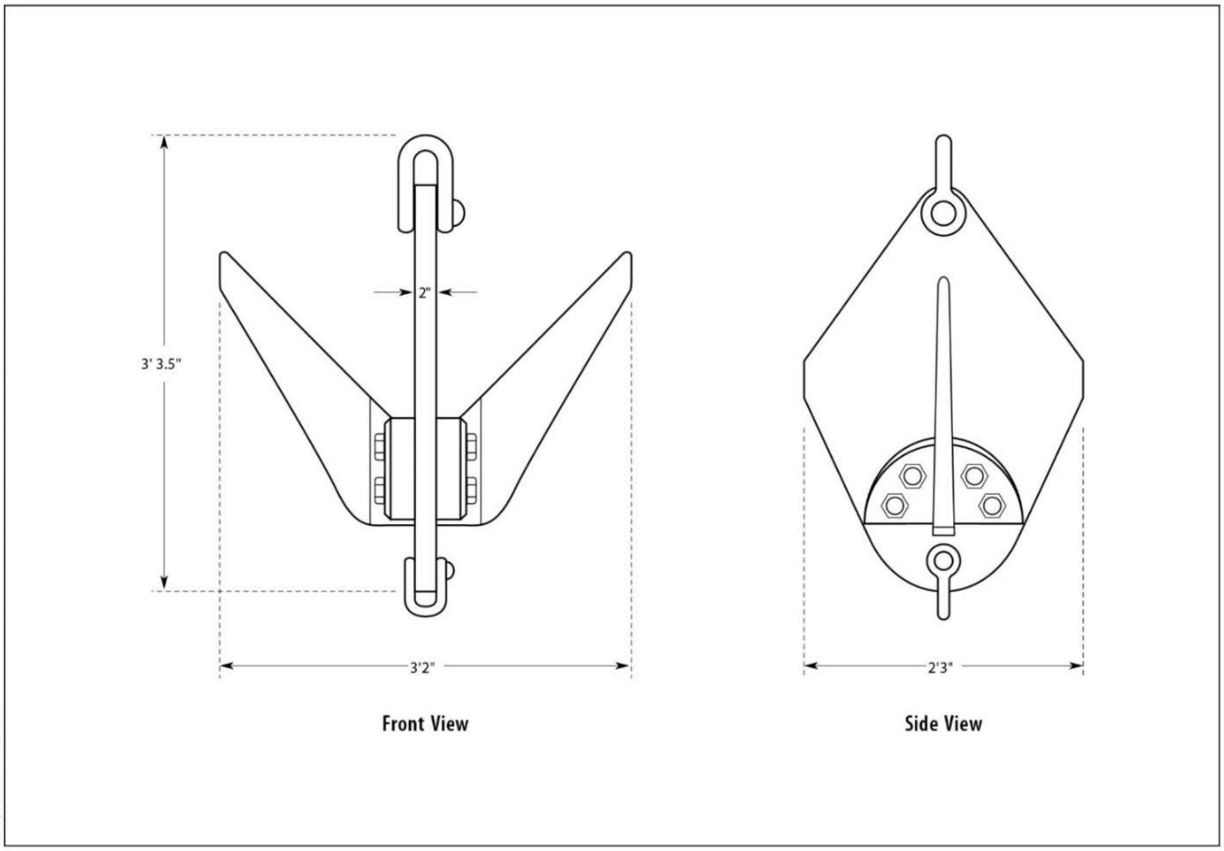


Figure 10. Flat Fish Grapnel to Clear Ocean Bottom Debris

Diver-Assisted Post-Lay Burial (water depths of 40 to 98 feet, between approximately 0.66 and 1.3 miles offshore)

Once the cable has been connected to the LV, the cable lay ship would begin to move west (farther offshore) along the predetermined course, rolling out (paying out) the cable as it goes traveling at approximately 2.3 miles per hour (2 knots per hour). The cable would be temporarily laid directly on the ocean floor and later the divers would bury it, starting from the landing pipes exit point at about 0.66 mile (40 feet water depth) to 1.3 miles (98 feet water depth) offshore. Post-lay burial of the cable by ROV would take place between 1 day and 3 weeks after the cable is first laid on the ocean floor.

Divers would use hand jets to open a narrow furrow beneath the cable, allowing the heavy cable to drop into the furrow. The disturbed sediments then would settle back over the cable, filling the furrow and restoring the surface to original grade. Depending on bottom conditions, the cable would be buried to a depth of approximately 3.3 feet.

Cable Plow or ROV-Assisted Post-Lay Burial (approximate water depths of 98 to 5,904 feet; between approximately 1.3 and 68.4 miles offshore)

Sea plow burial would be used beyond water depths of 98 feet to a depth of 5,904 feet. In some locations where plow burial is not possible, the cable would be buried using post-lay burial methods (ROV-assisted post-lay burial) as explained below.

Cable Plow Post-Lay Burial. The cables can be plowed at water depths of approximately 98 to 5,904 feet, from approximately 1.3 to 68.4 miles offshore. A sea plow is a sled-like burial tool that would be deployed by the cable lay ship after the shore-end landing operations are complete (Figure 11). Once the sea plow, supported by two sled outriggers to a total width of approximately 20 feet, was deployed to the bottom, divers would assist with loading the cable into the sea plow's burial shank. The mechanical movements would be controlled by an operator watching the divers through a video camera mounted on the plow. The cable would be buried at the same time as it would continue to feed through the sea plow shank and into the bottom of the furrow, all in a single operation. The 3.3-foot-wide sea plow furrow would naturally close under the weight of the sediments and the plow sled outriggers. The plow would be expected to operate at the rate of approximately 0.6 mile per hour (approximately 0.5 knot per hour).

Remotely Operated Vehicle Cable Post-Lay Burial. At water depths of approximately 98[5] to 328 feet, from 1.3 to 8 miles offshore, or where the sea plow cannot be deployed because of bottom conditions, an ROV (a robotic device operated from the cable lay ship) or a similar vessel would be used to bury the cable (Figure 9). The ROV would move under its own power and would be tethered to and guided from the cable lay ship. ROV jets would loosen the ocean floor sediments beneath the cable, allowing it to settle to the desired depth of 3 to 4 feet. The disturbed sediments would settle back over the area to their original grade, leaving the cable buried. The ROV would operate at a nominal speed of 0.35 mile per hour (0.3 knot per hour) when jetting. However, the overall rate of forward progress would depend on the number of passes needed to attain target burial depths, a variable that is in turn a function of sediment stiffness. The post-lay burial of cable by ROV would disturb about 15 feet of the ocean floor (not the water column).

[5] There is overlap between the ROV and the plow post-lay burial methods (both start at 98 feet). This is because some plows and vessels can deploy at water depths of 98 feet, while others need more depth.

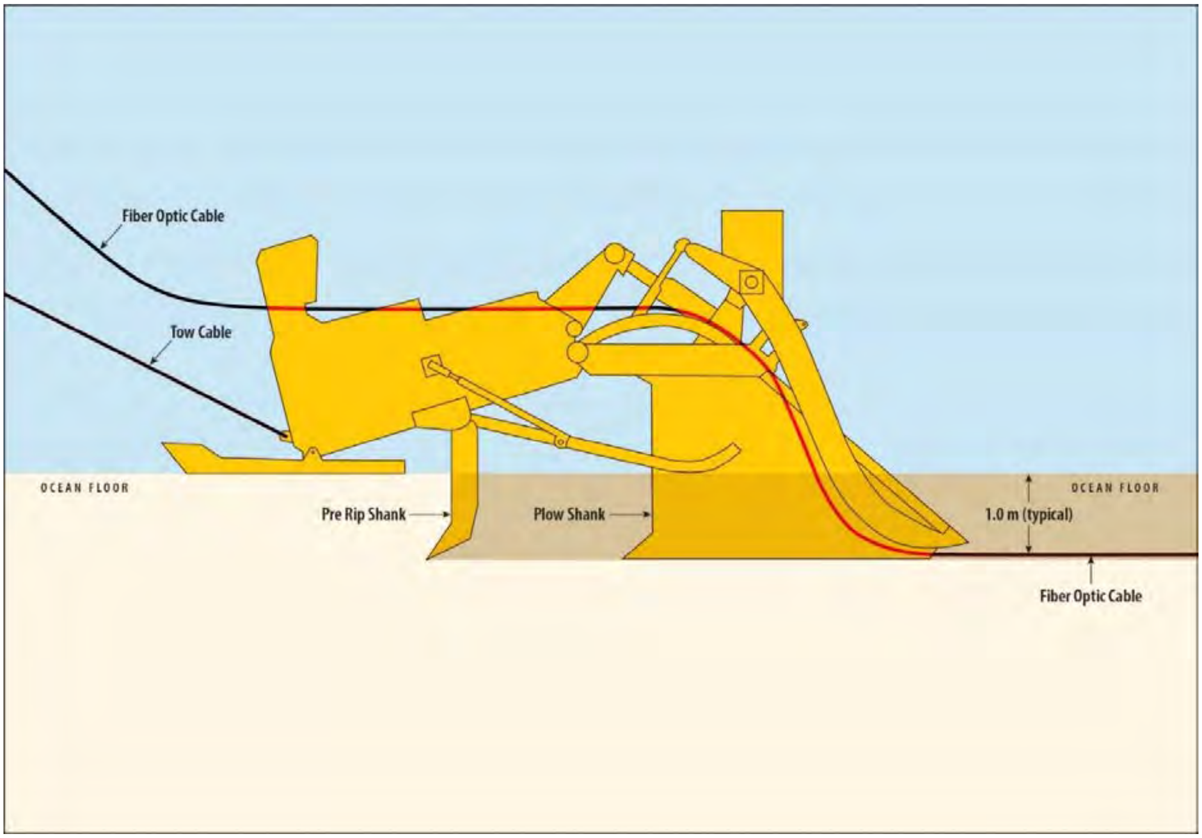


Figure 11. Sea Plow for Burying Marine Fiber Optic Cables on Ocean Floor

Direct-Surface Lay (water depths of more than 5,904 feet; 68.4 miles offshore)

At this depth, the cable lay ship would lay the cable directly on the ocean floor without burial, while maintaining slack control to ensure a straight lay of the cable and ensuring contact with the ocean floor to avoid suspensions.

Federal Regulations

Federal protections for scientifically significant cultural resources primarily derive from the **National Historic Preservation Act (NHPA) of 1966 as amended.** If a project involves a federal property, federal permit, or federal funding, it may be considered a federal undertaking and is required to comply with Section 106 of the NHPA (36 Code of Federal Regulations Part 800). This regulation sets forth the responsibilities that federal agencies must meet in regard to cultural resources. Federal agencies must conduct the necessary studies and consultations to identify cultural resources that may be affected by an undertaking, evaluate those cultural resources to determine whether they are eligible for the listing in the National Register of Historic Places (NRHP), assess the potential of the undertaking to affect NRHP-eligible resources, and take action to resolve any adverse effects that may result from the undertaking. The NRHP eligibility criteria are very similar to those for the California Register of Historical Resources (CRHR) (see below).

The **Outer Continental Shelf Lands Act of 1953** provides that the subsoil and seabed of the OCS are subject to U.S. jurisdiction and triggers other laws, including the NHPA. The **Antiquities Act of 1906**, enacted to protect cultural resources on lands owned or controlled by the federal government, is used to protect important cultural resources on the OCS in national marine monuments and other federal marine protected areas, but the act has not yet been applied on the OCS outside of such areas (BOEM 2013:31–32).

The **Native American Graves Protection and Repatriation Act (NAGPRA) of 1990** was enacted for the protection and repatriation of the remains of Native Americans and associated grave objects. The act applies on tribal and federal lands, defining federal lands as any land other than tribal lands are that controlled or owned by the U.S. government. Although no case has yet been recorded of the application of NAGPRA in the marine context in the study area, it appears reasonable that NAGPRA would apply to the remains of Native Americans and associated objects on the OCS when discovered during intentional excavation and as a result of inadvertent discoveries (BOEM 2013:47–48). It is the opinion of the authors that NAGPRA would provide the authority to protect Native American remains and associated grave objects on the OCS (BOEM 2013:49).

Submerged cultural resources within the waters of the State of California and federal waters from the 3 nm limit to the continental shelf margin are within the jurisdiction of the U.S. Army Corps of Engineers (USACE), Los Angeles District (Section 404, Clean Water Act,) and BOEM. It is the policy of the USACE and BOEM to consult with the appropriate State Historic Preservation Officer regarding all federally permitted offshore activities.

State of California Regulations

California Environmental Quality Act (Public Resources Code § 21000 et seq.). Historical, archaeological, and paleontological resources are afforded consideration and protection by CEQA (Public Resources Code [PRC] Section 21083.2). The State CEQA Guidelines define significant cultural resources under two regulatory designations: historical resources and unique archaeological resources (14 California Code of Regulations [CCR] Section 15064.5).

A historical resource is defined as a "resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources"; or "a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code"; or "any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record" (14 CCR Section 15064.5[a][1]-[3]). Although traditional cultural properties (TCPs) and cultural landscapes are not directly called out in the state definitions of historical resources, TCPs are places and cultural landscapes are areas, and places and areas are included as types of historical resources. Historical resources that are automatically listed in the CRHR include California historical resources listed in or formally determined eligible for listing in the NRHP and California Registered Historical Landmarks from No. 770 onward (PRC Section 5024.1[d]). Locally listed resources are entitled to a presumption of significance unless a preponderance of evidence in the record indicates otherwise.

Under CEQA, a resource generally is considered historically significant if it meets the criteria for listing in the CRHR. A resource must meet at least one of the following four criteria (PRC Section 5024.1; 14 CCR Section 15064.5[a][3]) for eligibility:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.
2. It is associated with the lives of persons important to local, California, or national history.
3. It embodies the distinctive characteristics of type, period, region, or method of construction, or represents the work of a master or possesses high artistic values.
4. It has yielded or has the potential to yield information important to the prehistory or history of the local area, California, or nation.

Historical resources also must possess integrity of location, design, setting, materials, workmanship, feeling, and association (14 CCR 4852[c]).

An archaeological artifact, object, or site can meet CEQA's definition of a unique archaeological resource, even if it does not qualify as a historical resource (14 CCR 15064.5[c] [3]). An archaeological artifact, object, or site is considered a unique archaeological resource if "it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria (PRC Section 21083.2[g]):

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Under California law, cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and/or scientific importance. All resources nominated for listing in the CRHR must have integrity; the authenticity of a historical resource's physical identity is evidenced by the survival of characteristics that existed during the resource's period of significance. Therefore, resources must retain enough of their historical character or appearance to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association. It also must be judged with reference to the particular criteria under which a resource is proposed for nomination (PRC Section 5024.1).

CEQA Guidelines, California Code of Regulations Title 14, Section 15064.5. When an initial study identifies the existence of, or the probable likelihood of, Native American human remains within a project area, a lead agency is directed to work with the appropriate Native Americans as identified by the Native American Heritage Commission (NAHC). The applicant may develop an agreement for treating or disposing of, with appropriate dignity, the human remains and any items associated with Native American burials with the appropriate Native Americans identified as the Most Likely Descendant by NAHC.

Public Resources Code Section 5097.5. This code states that no person shall willingly or knowingly excavate, remove, or otherwise destroy a vertebrate paleontological site or paleontological feature without the express permission of the overseeing public land agency. PRC Section 30244 further states that any development that would adversely affect paleontological resources shall require reasonable mitigation. These regulations apply to projects located on land owned by or under the jurisdiction of the state or a city, county, district, or other public agency.

Public Resources Code Section 5097.9 et seq. (1982). This code establishes that both public agencies and private entities using, occupying, or operating on state property under public permit shall not interfere with the free expression or exercise of Native American religion and shall not cause severe or irreparable damage to Native American sacred sites. This section also creates the NAHC, charged with identifying and cataloging places of special religious or social significance to Native Americans, identifying and cataloging known graves and cemeteries on private lands, and performing other duties regarding the preservation and accessibility of sacred sites and burials.

California Coastal Act of 1976. This act establishes policies pertaining to cultural resources investigations conducted for impact analysis pursuant to CEQA, the National Environmental Policy Act, and NHPA Sections 106 and 110. The act provides that "[w]here development would adversely impact archeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required" (PRC Section 30244). Anyone who proposes any development in the coastal zone must secure a Coastal Development Permit from the California Coastal Commission.

The **Abandoned Shipwreck Act** enacted by Congress in 1987 transferred ownership of submerged historic shipwrecks embedded in the bottomlands of a state's waters to the state. Under this law, submerged historic shipwrecks occurring within 3 nm of a state's shoreline are owned by that state. The act provides authority for states to protect and manage submerged, abandoned shipwrecks through state law (BOEM, 2014:42).

The CSLC administers the **California Shipwreck and Historic Maritime Resources Program** under PRC Sections 6309, 6313, and 6314. The CSLC maintains a list of known shipwrecks in State waters and seeks and provides information about historic shipwrecks and sunken aircraft. Any shipwreck sunk for more than 50 years is presumed to be of archaeological or historical significance and is protected under State law.

Local Regulations

Humboldt County. Along with the unincorporated towns of Samoa and Fairhaven, the North Spit of Humboldt Bay is under the jurisdiction of the County of Humboldt and is not within the direct jurisdiction of the City of Eureka. The following documents include local regulations applicable to the proposed Project:

- The County of Humboldt, General Plan, Chapter 6 Cultural Resources (6-1 through 6-7) cites relevant federal and state Policies regarding cultural resources; and the County Framework Plan establishes policies for identification, protection, and mitigation of cultural resources, consistent with federal and state regulative framework.
- Humboldt Bay Management Plan, Section II-Chapter 2.0 Humboldt Harbor Setting May 2007
- The General Plan Update contains policies CU-P1 through P5, which establish that the County will scrutinize development projects to identify and protect cultural resources, as well as cooperate with Native American groups where potential Native American resources could be affected by development proposals
- (https://humboldtgov.org/DocumentCenter/View/58843/Section-314-Cultural-Resources-Revised-DEIR-PDF.)

City of Eureka. The City of Eureka 1997 General Plan includes goals and policies regarding Historic Preservation and the protection of Archaeological Resources. These policies and goals have been incorporated into the Historic Preservation Option Element to the General Plan. In addition, the following documents and regulations are relevant to the proposed Project:

- Chapter 9 City of Eureka Historic Preservation Element (Heald et al. 2003.)
- Under California Government Code Section 37361, the City of Eureka is provided broad local authority to impose conditions to protect and enhance cultural resources. The Historic Preservation Ordinance established a Local Register of Historic Places; identified criteria for inclusion on the Local Register of Historic Places; and created an administrative body, the Historic Preservation Commission, to review projects subject to the ordinance.
- Humboldt Bay Management Plan 14–11 HBHRCD Draft Environmental Impact Report RKA 05 03 (April 2006).

Town of Samoa. The Samoa Master Plan area is located within the coastal zone (pursuant to the California Coastal Act of 1970), and is subject to the regulations of the Coastal Act, under the jurisdiction of the California Coastal Commission (Samoa Town Master Plan – Samoa, California, Recommendations for Sustainable Site Analysis, Final March 2, 2009.)

ENVIRONMENTAL SETTING

The study area is located within and offshore of Samoa, California (Figures 1, 2, and 3). Samoa is a census-designated place in Humboldt County, California. It is 1.5 miles northwest of Eureka, at an elevation of 23 feet. Samoa is in the northern peninsula of Humboldt Bay. Samoa Beach is the long strand of beach on the ocean side of the Samoa peninsula historically known as the northern spit of the Humboldt Bay bar. The study area includes offshore waters extending from MHW out to the edge of the OCS at a water depth of approximately 5,904 feet (1,800 m [984 fathoms]). This area includes the 3-nm State waters and waters of the U.S. Territorial Sea and U.S. Contiguous Zone. The prehistoric and historic maritime activities in northern California provide the context for review and analysis of this Project.

Geology and Oceanography

Northern California Coast

The offshore study area for this Project is located within the waters of the Eel River Basin and situated between two large submarine canyons: Trinity or Trinidad Canyon to the north and the Eel River Canyon to the south. The offshore Eel River basin extends northward from near Cape Mendocino to Cape Sebastian, Oregon, and from the coastline seaward to the upper continental slope, an average distance of about 38 nm (70 kilometers [km]) (Field et al. 1980:3–4).

The northern California coastline has a physiographic appearance closely similar to Oregon's coastline, with the occasional addition of low-relief coastal plains (e.g., at the mouth of the Mad and Eel Rivers). Southward of Humboldt Bay, narrow beaches backed by steep headlands dominate the coastline (BOEM 2013:13).

The OCS off northern California is relatively flat and featureless, and is the southern extension of the Eel River Basin. The Eel River Basin trends north to northwest and extends north from south of Eureka, California to the southern Oregon OCS. The OCS extends seaward from the coast 10 to 30 km (5.4 to 16.2 nm) as a smooth plain (MMS 1990:II-48). The shelf break generally occurs at 180 m. The OCS off northern California is narrower than the worldwide average (Griggs and Hein 1980 in MMS 1990:II-48). The OCS off northern California south of Heceta Head, Oregon and north of Cape Mendocino has an average width of less than 25 km (13.5 nm).

Two large submarine canyons are located west of the northern California coast (MMS 1990:II-48). Trinity Canyon heads below the shelf break on the continental slope at approximately 750 m (410 fathoms) depth. Eel Canyon is steep, narrow, and meandering; it has incised the OCS and heads at nearly 150 m (82 fathoms) depth. Trinity Canyon is described as broad and bowl-shaped, and has developed a tributary network (Filed et al. 1980). It is also identified as Trinidad Canyon.

The modern coast varies considerably in topography; it is relatively straight and unprotected. South of Trinidad Head, California, the coastal terrace is less rugged; and a low-relief, extensive coastal plain has developed at the mouth of the Eel and Mad Rivers (MMS 1990, EE-45). The coastal plain of the Eel and Mad Rivers is dissected by meandering rivers and streams. Humboldt Bay is the only major estuary in this region (Figure 3).

Humboldt Bay

Humboldt Bay is located along the coastal margin of the northern Coastal Ranges geomorphic province of California. Sediment in the Entrance Channel, North Bay Channel, and Samoa Channel is predominantly sand. Jacoby and Freshwater Creeks discharge into Arcata Bay on the north; and Elk River and Salmon Creek discharge into the central portion of Humboldt Bay and into South Bay, respectively. These streams and sloughs are tidal from 1 to 2 miles inland of their mouths. The floodplains are grasslands, marshlands, and mudflats.

The climate of the Humboldt Bay area consists of cool summers, with fog occurring from July through September; and severe storms, winds, and squalls occurring frequently along the coast. The Humboldt Bay area temperatures are moderated by the ocean. The average annual mean temperature is 52 degrees (Fahrenheit), with a variance of only 10 degrees from summer to winter along the coast.

Humboldt Bay is a natural embayment and a multi-basin, bar-built coastal lagoon located on the coast of Humboldt County, in the Redwood Empire Region of California. The largest city adjoining the bay is Eureka, the regional center and county seat of Humboldt County, followed by the northern town of Arcata.

Humboldt Bay consists of two large bays connected by a long thalweg.[6] The estuary is separated from the Pacific Ocean by two long sand spits varying in width from 1/8 to1 mile. The present entrance to Humboldt Bay is formed by two rubble mound-type jetties about 2,000 feet (366 m) apart. From the entrance, the Bay extends north and south for a distance of about 26 km (14 miles), varying in width from 0.5 to 4 miles and covering an area of over 17,000 acres. The tidal range between mean lower low water and mean higher high water is about 5.4 feet (1.7 m) at the south jetty and 6.7 feet (2.1 m) at Eureka. The entrance channel is exposed to high waves, at times exceeding 30 feet (9 m) in height during winter months. The Bay is part of a coastal terrace, at the foot of the surrounding steep mountains and narrow valleys. The landscape is typical of the northern California coast. Much of the surrounding lands is covered by dense forests of California redwoods and Douglas fir. Humboldt Bay is the only harbor with deep draft channels between San Francisco 225 nm (259 statute miles [417 km]) to the south and Coos Bay Oregon 156 nm (180 statute miles [289 km]) to the north.

The 10-mile long North Spit of the Humboldt Bay bar separates Humboldt and Arcata Bays from the ocean. Dunes extend the length of the spit. The Nature Conservancy Lanphere-Christensen Dun Preserve protects 213 acres of undisturbed dunes, some as tall as 80 feet (24.4 m) and 123 acres of salt marsh (CCC 1987:103). Portions of the spit have been industrialized for over 100 years.

The Humboldt Bay Bar and Entrance Channels are dredged to a depth of 48 feet (14.6 m) at mean lower low water. The Bay has four channels: North Bay Channel, Samoa Channel and Turning Basin, Eureka Channel, and Fields Landing Channel. The permanently designated Humboldt Open Ocean Disposal Site is used for placement of dredged materials offshore.

A gradual diminution in the size of the Bay has occurred in recent geologic history as various estuaries have filled with sediment and extended the east Bay margin westward. The majority of shoaling in the navigation channels results from material carried to the Bay entrance by longshore

[6] Thalweg means "valley course." In geography and fluvial geomorphology, a thalweg or talweg is the line of lowest elevation within a valley or watercourse (Richards 2005; Wikipedia https//en.wikipedia.org/wiki/Thalweg).

drift along the Pacific Coast. The primary sources of sediment are the Eel River, about 10 miles (16 km) south of the inlet to the Bay and the Mad and Little Rivers, about 14 and 20 miles (22.5 and 32 km). respectively, north of the inlet.

The local seismic history is event active.

A discussion of the history of Humboldt Bay is provided in the terrestrial cultural setting. The following is a discussion of the cultural setting and maritime history organized by three historic time periods, the Maritime Exploration period (1579 to 1775); the Spanish/Mexican period (1769 to 1846); and the American period, which includes development of the coastline (1846 to the present). It was known that Japanese vessels had drifted across the northern Pacific and washed ashore on the northwest coast (MMS 1990:IV 44). A minority of authors have argued for Chinese and Japanese pre-Columbian transpacific voyages prior to 1542 (Brooks 1875; Davis 2000) to account for a similarity of certain physical characteristics of North American Indians and those of Asian populations (BOEM 2013:187).

Paleogeography

Marine deposition, coastal sedimentation, and the resulting landforms on the northern California coast have been dominated by the combined effects of climatic and tectonic patterns. The coastal margin off northern California is an active depositional regime (Field et al. 1980 in MMS:II-51). Pleistocene sediments off the northern California coast are described as sand and silt inter-bedded with gravels (Snavely and Macleod 1977 in MMS 1990: II-54). While the early and middle Pleistocene were times of folding and major tectonic activity in California, the late Pleistocene was dominated by erosional and depositional events related to sea level fluctuations responding to glacial and interglacial stages. During the Pleistocene period of lower sea stands, a westerly-flowing fluvial system likely incised the exposed continental margin, depositing sediments in floodplain, deltaic, and shallow-water environments. Sediments then were reworked into beach and shallow marine deposits, which were reworked again during subsequent transgressions. Wave cut platforms or abrasion platforms developed along the coast as the result of wave abrasion during ancient still stands (MMS 1990:II-54). With a change in sea level, platforms may be submerged or raised. These subsequently raised Pleistocene marine terraces occur discontinuously along the coast at elevations up to 400 m (1,312 feet). The late Pleistocene/Wisconsin sediments (30,000–18,000 before present [B.P.]) probably are preserved on the present-day continental slopes only below 120 m (394 feet [66 fathoms]) or as early fill in some of the submarine canyons, slope gullies, or deep shelf river channels (MMS 1987:38).

The study area is located within waters of the Eel River Basin and situated between two large submarine canyons: Trinidad Canyon to the north and Eel River Canyon to the south of the study area. The area is located within the accretionary complex[7] associated with the Cascadia Subduction Zone. The offshore Eel River Basin extends northward from near Cape Mendocino to Cape Sebastian, Oregon; and from the coastline seaward to the upper continental slope, an average distance of about 70 km (Field et al. 1980:3–4). The continental margin off northern California has developed in response to late Tertiary and Quaternary tectonic plate motion. North of Cape Mendocino, the margin is composed of the OCS (0 to 200 m), plateau slopes (200 to 500 m), marginal plateaus (50 to

[7] In geology, an *accretionary complex* is a former accretionary wedge typically made up of a mix of turbidites of terrestrial material, basalts from the ocean floor, and pelagic and hemipelagic sediments.

1,000 m), and continental slope (1,000 to 3,000 m). The Eel River Basin extends from 50 km inland in the lower Eel River and Humboldt-Arcata Bay area, offshore across the shelf, plateau slope, and the Eel and Klamath Plateaus. The plateau and plateau slope are incised by two large submarine canyons, Eel and Trinity or Trinidad Canyons.

Late Quaternary faulting affecting northern coastal California near Humboldt Bay is described as the southernmost extensive of the forearc contraction with the Cascadia Subduction Zone (Kelsey and Caver 1988 in MMS 1990:II-47). Movement of the Cascadia Subduction Zone seafloor spreading along the Gorda Ridge causes the Gorda Plat to move beneath the Northern American Plat to its southern limit at Cape Mendocino. Neotectonic stresses cause relatively rapid uplift (ca. 4 millimeters [mm]/year) in the immediate vicinity of the Mendocino Fault—caused by frictional loading where the southern edge of the Gorda Plate moves westward past the eastward-travelling Pacific Plat along the Mendocino Fracture Zone. Elsewhere in California, uplift is less than 1 mm/year.

Holocene sediments deposited on the OCS vary in thickness and, like Pleistocene sediments cited above, consist mostly of unconsolidated sand, silt, clay, and gravels (Wagner et al. 1972 in MMS 1990:II-54). The majority of the northern California OCS is covered by at least 10 m (33 feet) of sediment. Two isolated depocenters[8] occur off Humboldt Bay and southwest of Crescent City, California to the north. Field et al. (1980 in MMS 1990:II-57) reports the sediment off Humboldt Bay to be greater than 50 m (164 feet) thick. Areas devoid of Holocene sediment include areas offshore of rocky headlands, some submarine canyons, the innermost shelf, and some structural highs.

The most recent regression affecting the study area began during the onset of the Wisconsin glaciations, approximately 30,000 to 35,000 Before Present (B.P.). Sea level dropped from a level near or slightly below present sea level about 30,000 B.P., between 21,000 and 18,000 B.P., to a level about 120 to 130 m (394 to 427 feet [66 to 72 fathoms]) below the present level, exposing Late Pleistocene deposits (Curray 1965; Bloom 1977; Bloom et al. 1974 in MMS 1990:II-69). Holocene stratigraphy of the OCS in the study area represents deposits resulting from the eustatic sea level rise, known as the Flandrian Transgression, which began about 18,000 years B.P. in response to climate change. From the onset of the Holocene transgression to about 10,000 to 7,500 years B.P., a rapid inundation of the OCS occurred. The rate of sea level rise has since slowed and has been stable or fluctuating slightly during the past 3,000 years (Kulm et al. 1968 in MMS 1990:II-54). The maximum late Pleistocene lowstand is found at a depth of about 120 m (394 feet [66 fathoms]).

Paleoshoreline in the study area parallels the modern coast. The 7,500 B.P. shoreline is plotted within 5 to 7 km (2.7 to 3.7 nm) of the present shoreline. The shelf break at Eel River Canyon marks the southern end of the Eel River Basin. In the study area, this paleochannel system is coincident to the most likely locations of ancient bays and estuaries.

As the Flandrian Transgression pushed the shore easterly, valleys incised during the glacial lowstand began to back-fill with fluvial sediments, which in turn were covered with marine post-Wisconsin deposits as sea level was reaching its present level.

Distribution of surficial sediments on the northern California shelf can be described as a relatively thick accumulation that thins seaward and cite maximum sediment thickness if greater than 33 m. Holocene sediments generally can be divided into a nearshore sand and mid- to outer-shelf silt and

[8] In geology, a *depocenter* is an area or site of maximum deposition, or the geographic location of the thickest part of any geographic unit in a depositional basin.

mud in depths of 60 to 80 m (197 to 263 feet [33 to 44 fathoms]). Sources of overlying sediments in the study area can be attributed to river outflows of suspended sediments. The OCS in the study area has been controlled by four major cycles of shoreline advance and retreat. During glacial periods, the shoreline retreated to near the edge of the modern OCS. During interglacial periods, the shoreline advanced to near-modern levels. These changes in sea level occurred rapidly relative to geologic time and resulted in the formation of the broad, gently sloping, sediment-veneered, wave-cut platform that makes up the modern OCS.

This area of the Pacific OCS has a moderately narrow coastal landscape marked by steeply sloping surface gradients and characterized by paleoshoreline contours that primarily parallel the modern coastal shoreline during Last Glacial Maximum (LGM) time. South of Eureka, California, the Pacific OCS paleolandscape narrows considerably, lying just within and a short distance beyond the State water limit. Eel River Basin sediments above the Holocene unconformity consist of approximately 492 feet (150 m) of non-marine clay, silt, sand, and gravel (Field et al. 1980:3-4, Figures 3 and 4)

Prehistoric Setting

Prehistoric Occupation of the Marine Study Area

At the height of the Wisconsin glaciation at approximately 18,000 to 24,000 years B.P., the sea level was as much as 120 to 130 m (394 to 427 feet [66 to 72 fathoms]) below its present altitude (Milliman & Emory 1968). At that time, the California shoreline was near the edge of the OCS, approximately 6 nm offshore from the present shoreline (uncorrected for local offshore deposition or uplift rates) within the study area.

Recent GIS studies summarized in Bureau of Ocean Energy Management (BOEM) (2013:21) indicate that the sea level rose an average of 6.3 mm per year (or 6.3 m every 1,000 years) over the 19,000-year period since the LGM. This rate was not constant but varied over time. Sea level continues to rise incrementally along the California coast.

Human populations have occupied the California coast for at least the past 13,000 years and have enjoyed the products of the littoral zone for much of that time. The littoral zone includes the nearshore intertidal area where many edible resources, including shellfish, can be harvested. Sea level at 11,000 years B.P. was approximately 46 m (151 feet [25 fathoms]) below present level. It is reasonable to assume that prehistoric occupation sites, where debris from villages and campsite accumulated as far out as what is now the OCS, were abandoned as they were inundated by the rising sea level during the Holocene transgression (Nardin et al. 1981; Richards 1971; Bloom 1977). As sea levels rose after the LGM, prehistoric people moved their sites farther inland to stay above shifting shorelines and to access shifting resource areas (BOEM 2013:21).

If the preference for site locations remained the same over time, even as the sea level rose, we would expect to find inundated prehistoric period archaeological sites offshore in places where former streams once came together to flow into larger stream and rivers, and where they entered the ocean as they crossed bluffs and beaches (Stright 1987). Former estuaries, bay mouth bars, tombolos (a bar of sand or shingle joining an island to the mainland), and backshore beaches as well as nearby bluffs also would be sensitive locations for offshore prehistoric archaeological sites.

Prehistoric archaeological sites are formed from the accumulation of layers of soil and debris from daily activities that have been deposited over time. Typically, the longer the period of occupation and the larger the group of people, the greater the accumulation of debris. Archaeological sites at or near the shoreline most often are characterized by concentrations of whole and fragmentary seashells, while archaeological sites that are more distant from the shoreline most often lack such concentrations of shell and include the debris from the exploitation of inland habitats. Such debris may include stone tools and the remains of animals that were hunted, butchered, and cooked, as well as tools for grinding nuts and seeds. Archaeological sites on the OCS may be composed of a series of deposits that document the sea level rise and resulting change in the relative distance of the site from the sea. As the sea level rose, sites that once were used for exploitation of terrestrial resources may have become bases for exploitation of intertidal resources before being abandoned as the sites became inundated. As stated in BOEM (2013:23), the order of site occupations recorded in such layered archaeological sites can reveal the sequences of environmental changes associated with rising sea levels and the resulting changes in human behavior and resource preferences.

Not all prehistoric sites would have been well preserved. Prehistoric sites on the paleolandscape of the Pacific OCS would have been subjected to the erosive effects of water as rising sea levels advanced the shoreline of the Pacific Ocean to the east. Inman (1983) suggests that erosion would be widespread and sites may not have been preserved except in exceptional circumstances—where conditions on the landscape, such as clusters of plants and trees, or rocky overhangs, would have protected such deposits from erosion. Such conditions might be expected in the ecological and geomorphic contexts associated with lagoons and terraces. Snethkamp et al. (1990:111–102; Bickel 1978,1988) suggest that the same classes of physiographic locations with a high potential for site preservation on land may have offered the highest potential for preservation during and following the process of inundation. More recently, Gusick and Faught (in Bicho et al. 2011:27) noted that in areas such as the Northwest Coast isostatic rebound outpaced sea level rise, leaving Pleistocene coastal landscapes inland from the current shoreline.

Site preservation depended on at least three factors: degree of protection of site deposits by overlying sedimentation prior to inundation, duration of exposure to increased forces of erosion associated with time spent in the intertidal zone during the transgression, and intensity of wave energy. As is true of sites on dry land, rapid burial of sites prior to inundation would have created the best conditions for preservation during inundation. An example of rapid burial on dry land occurs when a river overflows its banks and leaves behind a thick layer of sediment and debris on the surrounding landscape. The burial of sites on the OCS is most likely to have occurred in river floodplains and terraces. Prehistoric sites that were not rapidly buried but that remained on or near the surface of the Pacific OCS most likely were washed away (BOEM 2013:25). The erosive effects of the Pacific's wave actions on buried archaeological sites would have been reduced through time, as the sea level continued to rise and the depth of the water increased.

The subtidal zone includes all of the seafloor below the normal reach of high wave energy; it offers a more stable environment conducive to preservation of inundated sites, especially if they had been buried beneath sediments prior to inundation (Snethkamp et al. 1990:111–105 in MMS 1990; BOEM 2013:26). All of the OCS within the study area is located within the subtidal zone and, as sea level rose, the intertidal zone migrated landward leaving behind a layer of sand in the subtidal zone.

BOEM (2013:54, Figure 16) depicts shoreline contours in the study area that were present on the exposed Pacific OCS coastal landscape during the time since the LGM. Contours depicted include 12,000 B.P., 13,000 B.P., 14,000 B.P., 16,000 B.P. and 18,000 B.P. shorelines west of the study area. It is also possible that inundated prehistoric sites on the Pacific OCS that may have been preserved along the margins of paleochannels or intervening buried landforms were buried under a substantial layer of sediment and are deep enough to remain unaffected by the proposed Project. However, the depth of such protective sedimentation compared with the depth of anticipated Project-related ground disturbance has not yet been analyzed.

In summary, the study area has the potential for as yet undiscovered prehistoric archaeological deposits. Zones within the study area of moderate to high potential for such deposits are highly localized; identification of these localities would require a sophisticated analysis of the pre-submergence landscape within the study area, and modeling of subsequent conditions of submergence and rate of deposition throughout the marine transgression.

Native American Settlement and Occupation

An analytic framework for interpretation of Humboldt County prehistory is provided by Frederickson (1973), who divided human history in California into three broad periods: the Paleoindian period, the Archaic period, and the Emergent period. This scheme uses sociopolitical complexity, trade networks, population, and the introduction and variations of artifact types to differentiate between cultural units; the scheme, with minor revisions (Frederickson 1984), remains the dominant framework for the prehistoric archaeological research in this region.

The Paleoindian period (12,000 to 8,000 B.P.) was characterized by small, highly mobile groups occupying broad geographic areas. No evidence of Paleoindian occupation has yet been recovered from Humboldt County. Frederickson's Paleoindian occupation falls within BOEM's (2013:83) Terminal Pleistocene/Early Holocene (14,000 to 8,000 B.P.), the earliest sites of which are represented largely on the northern Channel Islands, as very few sites of this period have been identified in northern California (BOEM 2013:84).

During the Archaic period (Lower Archaic period c. 8,000 to 5,000 B.P., Middle Archaic period c. 5,000 to 2500 B.P., and Upper Archaic period c. 2500 B.P. to 1,000 A.D.) is characterized by geographic mobility and establishment of long-term base camps in localities from which a more diverse range of resources could be exploited. The addition of milling tools, obsidian and chert concave-base points, and the occurrence of sites in a wider range of environments suggest that the economic base was more diverse (Koenig 2006:5). By the Upper Archaic, mobility was being replaced by a more sedentary adaptation in the development of numerous small villages, and the beginnings of a more complex society and economy began to emerge. Frederickson's Lower, Middle, and Upper Archaic periods roughly correspond to BOEM's (2013) Middle Holocene (8,000 to 3,000 B.P.) and a portion of the Late Holocene.

During the Emergent period (1,000 A.D. to 1,800 A.D.), social complexity developed toward the ethnographic pattern of large, central villages where political leaders resided, with associated hamlets and specialized activity sites. Artifacts associated with the period include the bow and arrow, small corner-notched points, mortars and pestles, and a diversity of beads and ornaments (Frederickson 1994). The Emergent period whole falls within BOEM's (2013:86) Late Holocene (3,000 B.P. to contact). By the Late Holocene there is evidence for fully developed fishing and marine mammal hunting along south, central, and northern California coasts (Moratto 1984).

MMS 1990:III-31 indicates that archaeological research has been particularly sparse on the coast of northern California, but that substantial investigations concentrated mainly in the Humboldt area and King Range.

Peoples that settled north of the Eel complex watersheds are grouped together as northwest California cultures that include the Hokan- and Algonquian-speaking tribes, as well as the Hoopa, Chilula, and Whilkut. Villages clustered around lagoons, sloughs, and river mouths along the coast. Native Americans in the Humboldt Bay region were from the Yurok, Kanuk, Wiyot, Chilula, Whilkut, and Hupa tribes who settled on the Pacific coast and along the banks of the Trinity and Klamath Rivers.

Humboldt Bay is located within a region that was occupied, at the time of contact, by a population defined by Kroeber (1925, 1970 Ed.:112) as the Wiyot. Kroeber describes the Wiyot as a small body of shore-dwelling people that with the Yurok constitutes the Algonquins of California. The Wiyot are the farthest southwest people whose language has Algonquian roots. Wiyot (meaning "where you site and rest") coastal territory ranged from the lower Mad River through Humboldt Bay and south along the lower basin of the Eel River. Their territory fell into three natural divisions: lower Mad River, Humboldt Bay, and lower Eel River—known as Batawat, Wiki, and Wiyot, respectively. Wiyot, however, is used for the entire stock by most of the neighboring groups.

Wiyot villages occurred along Humboldt streams, along the Bay shore, or in tidewater networks and waterways. Village sites may have been located around the wetland areas that are now Cooper and McFarlan Gulches, as well as Martin Slough and Elk River, Ryan's Slough, and Freshwater Creek. Many of the resources of their homeland were destroyed before much was understood about Wiyot culture, or were disturbed by commercial, industrial and residential development from the settlement period through the present day.

Systematic anthropological and archaeologist investigation was initiated by L.L. Loud of the University of San Francisco in 1918. Loud (1918) recorded 172 sites in the lower reach of the Mad and Eel Rivers. Loud identified 14 village sites located on Humboldt Bay and conducted excavation on Gunther Island at CA-Hum-167, the Wiyot village of Tolowot. H.H. Stuart's additional excavations at CA-HUM-167 were examined later by Heizer and Elsasser (1964).

Archaeologically, the settlement of the region by Wiyot and Yurok is marked by the emergence and development of the "Gunther Pattern" as seen at CA-Hum-67 on Gunther Island in Humboldt Bay. This pattern consisted of assemblages of harpoon points, woodworking tools, Dentalium shells, and other distinctive artifacts—such as ceremonial red and black obsidian bifaces and well-made ground-stone zoomorphs of these coastal and riverine cultures (Moratto 1984:484). A second Wiyot village is cited by Kroeber (1925, 1970 Ed.:115) as Tabayat or Witki situated on the North Spit of Humboldt Bay north of the study area.

Whistler (1979a in Moratto 1984:483) dates the Wiyot entry into their neighboring Karok and later arriving Yurok territory during the Frederickson's Emergent period (500 to 1,850 AD) at about 900 A.D.

A more complete discussion of the Wiyot may be found in the terrestrial cultural resources portion of the CEQA document.

Historic Setting

Historic Exploration, Settlement, and Commerce

Juan Rodriguez Cabrillo, a Portuguese pilot and navigator, commanded an expedition to explore the California coast north of Cedros Island in Baja California. With the hope of locating the fabled northwest passage, the "Strait of Annan," and determining whether Asia could be reached by following the Pacific Coast north, he departed Navidad near Acapulco in June 1542, in the San Salvador and the Victoria (Bancroft 1886:1). Cabrillo's was the first European expedition to explore along the California coast. Cabrillo died during the voyage, and his remains are believed to be buried on one of the Channel Islands, possibly San Miguel Island (Moriarty and Keistman 1973). When Cabrillo died, Bartolome Ferrer assumed command of the expedition and led it as far north as the southern Oregon border.

Other explorers followed the Cabrillo expedition, including Pedro de Unameno, who opened the Acapulco-Manila trade route between the Philippines and Mexico in 1565, allowing Spain to realize Columbus' dream of a new trade route with the Indies. The Manila galleon trade lasted until 1815 (Shurz 1939; Gearhart et al. 1990: IV, 5). Another expedition led by Sebastian Vizcaino in 1602 produced fairly accurate charts of the coast and harbors of southern and central California.

During circumnavigation of the world by sea in 1579, Sir Francis Drake is believed to have landed on the west coast of North America. Drakes Bay near Point Reyes is considered as the likely landing spot.

The development by Spain of the Manila galleons in 1565, which transported Chinese porcelain, silk, ivory, spices, and other exotic goods from Asia to Spanish settlements in Mexico, resulted in the inclusion of the West Coast into global trade (BOEM 2013:188).

The Manila galleons sailed annually from the Philippines bound for Acapulco. The sailing masters steered the galleons as near to 30 degrees north latitude as possible, often having to travel farther north to find favorable winds. After the long trip across the Pacific, the ships turned south upon seeing the first indications of land and thus avoiding the uncharted hazards of the California coast (MMS 1987). If all went well, the first land seen by the sailors would be the tip of the Baja peninsula. The ship then sailed to Acapulco. Many galleons never made it to safe harbor in Acapulco. Some of these included the Capitana (unknown location, circa 1600); Nuestro de Senora Aguda (Catalina Island, circa 1641); and the Francisco Xavier (Columbia River, Oregon, circa 1707). Galleons also fell prey to pirates such as Sir Francis Drake and Thomas Cavendish (Santa Ana, off the tip of Baja, 1587), and George Compton (San Sebastian, aground on Catalina Island, 1754) (Schurz 1939; Bancroft 1886; Meighan and Heizer 1952). The Manila galleon trade lasted until 1815 (Shurz 1939; Gearhart et al. 1990: IV, 5).

The European and Euro-American presence in the Pacific Northwest remained sparse along the coastline in the 19th century. When Spain finally colonized California, all Spanish ships sailing along the California coast, including the Manila galleons, were required to stop at Monterey. Schurz (1939) states that more than 30 Manila galleons were lost over the 250 years of trade. A few were wrecked on the westward passage and others shortly after leaving Manila. At least a dozen remain unaccounted for.

Spanish (1769–1818) and Mexican Colonial Period (1818–1848)

The years of the Spanish-Mexican hegemony in California saw increasing numbers of vessels arriving on the California coast. These engaged in the sea otter fur trade, smuggling, and the legal trade of China's goods in exchange for California's abundant hides and tallow from the vast herds of cattle kept at various private ranchos (Ogden 1923, 1941).

Although explorers Juan Rodriquez Cabrillo and Sir Francis Drake had sailed the Humboldt County coastline, it was not until 1775 that a Spanish vessel captained by Juan Francisco de Bodega landed at Patricks Point in Trinidad and claimed the land for the King of Spain. Trinidad Bay located north of the Project area served as a port for fur trading and Chinese trade expeditions.

The first significant contacts by Europeans with the Indians of northwestern California by Juan Francisco de la Bodega y Quadra in 1775 and George Vancouver in 1793 was with the Yurok Indians, the northern coastal neighbors of the Wiyot. Not until 1806 was Humboldt Bay, the approximate center of Wiyot territory, entered by White explorers. It was not until 1851 that deliberate observations and written reports on the Wiyot were made by Redick McKee and George Gibbs, both representing the U.S. government. Several archaeological village sites are situated along east-facing beaches of the North Spit of Humboldt Bay. Wiyot territory extended from north of Bear River to south of Little River.

During the following period of Spanish rule, George Vancouver, an Englishman, explored much of the Pacific coast between 1791 and 1795; this was the last documented exploration of coastal California by ship.

The Russian-American Fur Company was established near Fort Ross in 1812 (MMS 1990:98). The sea otter trade began in 1784 and continued roughly from 1874 to 1848, although declining markedly after 1830; and the hide and tallow trade of the 1830s and 1840s were the major international commercial activities that brought ships to California until the Gold Rush of 1849. Although certain Spanish and later Mexican citizens were authorized to conduct business on behalf of the government, most commerce consisted largely of smuggling by Yankee ships from East Coast ports. Spanish and later Mexican authorities made trading except through specified ports either outright illegal or imposed exceedingly high tariffs to protect their economic interests.

To the inhabitants of colonial locations like California, participating in these smuggling ventures was the only way to acquire some common conveniences and luxury goods. Smugglers in the otter trade would buy as many skins as possible in California and then sail to China and trade them for goods that brought high prices in New England or Europe. Otter furs initially were supplied by Native Americans working for the missions. Later, Aleut Islanders from Alaska working for the Russians competed for this lucrative trade.

The hide and tallow trade consisted of buying cattle hides from the vast ranchos in California and shipping them to New England's expanding industrial base for the production of leather goods for domestic use and export. Most of the hide and tallow trade took place in southern California. The Mexican-American War of 1846 and the Gold Rush of 1849 permanently changed the character of California shipping (MMS 1987:82). Clipper ships and side-wheel steamers soon eclipsed the outdated sailing brigs. What had in Hispanic times been a sparsely populated coast with a livestock-raising economic base supplemented by some fur trading was transformed into a thriving, densely populated, American state with a diverse economy.

American Period (after 1848)

Due to the combination of geographic features and weather conditions that concealed the narrow bay entrance from view and despite the documented 1806 sighting by Russian explorers, Humboldt Bay was not known by Europeans until an 1849 overland exploration provided a reliable account of its exact location (Davidson 1891:16). The first American ship to land on the Humboldt coast was the Lelia Byrd. Humboldt Bay was found in 1806 by an exploration party from the O'Cain, a vessel jointly commissioned by the Winship brothers from Boston and the Russian-American Fur Company; but the Bay itself was not mapped (Humboldt Bay Harbor, Recreation & Conservation District 2019).

With the discovery of gold in California in 1848, the primacy of San Francisco as the principal port on the West Coast was confirmed, as thousands of vessels made their way to San Francisco as part of the Gold Rush. Dr Josiah Gregg, a supply company merchant in search of gold, and his party traveled west on foot from the Trinity Mines and found Humboldt Bay in 1849, approximately 43 years after the first American ship entered Humboldt Bay. By 1850, a dozen expeditions sailed from San Francisco to search for the port at Humboldt Bay. The Laura Virginia captained by Douglas Ottinger found the entrance to the Bay in 1850. A small boat was launched and sailed into the natural harbor by the ships First Mate H.H. Buhne. The Bay was christened "Humboldt" after the popular naturalist and author Baron Alexander von Humboldt. Warnersville, Humboldt County's first town was established on Trinidad Bay 4 days later, and Humboldt City and the towns of Union (now Arcata) and Eureka soon followed.

After 4 years of its founding, seven of nine mills processing timber to marketable lumber on Humboldt Bay were located at Eureka. A year later, 140 lumber schooners operated in and out of Humboldt Bay moving lumber from mills to Pacific Coast cities.

The paddle-wheel steamer Santa Clara arrived from San Francisco in 1852. The Santa Clara was beached at Eureka on the later site of the town foundry, and the paddles were removed and connected by belt to a small sawmill constructed adjacent to the vessel. The large marine steam engines provided enough power to run the entire mill.

By the 1880s, railroads brought production of hundreds of mills in the region to Eureka for shipment through its port. Humboldt Bay shipyards include the historic H.D. Bendixsen and Rolph Shipbuilding.

Salmon fisheries along the Eel River were established as early as 1851, with processing plants on Eureka's wharf in 1858. The first of many ships built in Eureka was launched, establishing Eureka's shipbuilding industry. Eureka also became the West Coast's largest oyster farming operation in the 19th century.

In 1872, Danish Immigrant Hans Bendixsen built a shipyard on the eastern side of the Spit that was in use through 1920. Lumber processing facilities were built in 1892, leading to the construction of shipping docks and establishment of the towns of Manila, Samoa, and Fairhaven (CCC 1987:103). Samoa was formerly a lumberjack town where families lived in company housing and worked in the mills or lumberjacking. In 1892, Vance Lumber Company purchased the Humboldt Bay frontage from the Samoa Land and Improvement Company. The Eureka and Klamath River Railroad was chartered in 1893 to connect the Samoa sawmill and associated worker housing facilities to the city of Arcata and timberlands near the Mad River. The Samoa sawmill was purchased by Andrew B. Hammond in 1900. Hammond Lumber Company built an emergency shipyard during World War I, and seven wooden steamships were built at Samoa between 1917 and 1919. Samoa was formerly known as Brownsville until formation of the Samoa Land and Improvement Company in 1889.

Closer to the Project area, the US Navy Cruiser, Milwaukee—a 9,700-ton and 426-foot long vessel with large boilers and propelled by steam, went aground on the North Spit of the entrance at Humboldt Bay. Salvage operations were carried out by the local Mercer-Fraser Company under contract to the Navy. Salvage required construction of a railroad trestle for moving the heavier objects from the vessel to a newly constructed "Camp Milwaukee" located adjacent to the site and near the Hammond Lumber Company cookhouse (Hillman 1944 in Simpson 2001).

Although local Native American relations were at first friendly with Dr. Gregg, they later became increasingly hostile as settlers overwhelmed the Wiyot and cut off access to ancestral sources of food by theft of land. Increased hostilities led to the building and equipping of Fort Humboldt in 1853. Of all the native groups of northwestern California, the Wiyot have suffered most in terms of dispossession and displacement during the past 100 years (Elasser in Heizer 1978:161). The 1860 Wiyot Massacre took place on Gunther "Indian" Island when a local group identified as primarily Eureka businessmen massacred the Wiyot. Several famous generals of the Civil War, including Ulysses S. Grant, served at the Fort. In addition to miners and soldiers, commercial trades of farming, shipping, shipbuilding, fishing, and brewing of steam beer were developed at this time. Eureka's charter was granted in 1856.

The Pacific depended on ships bringing raw and manufactured goods, immigrants, and capital until completion of the transcontinental railroad in 1869 offered an alternative method of transportation for commerce (Delgado 1990:8). California waters were soon alive with clipper ships and side-wheel steamers. Lumber, bricks, food, machinery, and labor were provided by vessels because San Francisco and the rest of California had only scarce agricultural and industrial output. Soon, however, reciprocal trade burgeoned with the establishment of lumber mills, farms, factories, and ranches.

Schooners were developed as vessels used for short hauls that could maneuver in the close quarters required at smaller landings. Generally having two masts, schooners were faster, easier to handle, needed smaller crews, could be made of wood, and were less expensive to operate than other sailing ships (Lindstrom 2013). The schooners were shorter and wider, their hull depths (draft) shallower, and they generally weighed less than 200 tons. Lindstrom (2013) indicates that from 1860 to 1884 about 70% of vessels built were sail powered only, and after 1884 most vessels had steam engines or were converted to steam power. Steam allowed the boats to move even without wind and allowed vessels to move up rivers. In addition, steam schooners still had sails in case the engine or boiler failed. As can be attested to by the number of shipwrecks reported in the study area, loss of vessels through stranding, grounding, or other damage was common. Steam schooners became prevalent by 1897. Far fewer losses of steam-powered schooners are listed than the earlier schooners.

Coastal trade in California continued to grow with the expansion of mining, agriculture, fishing, and manufacturing. California's burgeoning economy, coupled with the natural physical barrier of the mountains of the Sierra Nevada to terrestrial commerce, resulted in coastal growth at an unparalleled rate (Caughey 1970 in MMS 1987:82). Rapid industrial growth and the advent of rapid technological development in the shipping industry in the latter half of the 19th century resulted in larger and larger wood, iron, and steel ships. Southbound side-wheel steamers carried gold shipments from the gold fields.

Spanish ships bringing grain from Chile were common during the last half of the 19th century. In the last quarter of the 19th century, lumber schooners were bringing lumber and railroad ties from the north, while huge British iron barks were bringing rails and heavy machinery round the horn (Caughey 1970).

With the development of agriculture in California, barks could carry grain out instead of sailing "in ballast" (without any cargo). Steamships and schooners were being built on this coast, and steel-hulled ships were being built on the East Coast and elsewhere. The increasing need for coal brought in British ships from Newcastle, which later were used along with San Francisco ferryboats as fishing barges up and down the coast. Others were converted into cargo barges for use in the coastal trade. A large percentage of these ships sank along the California coast and constitute a significant element of the cultural resources that may be found in the study area.

From the latter quarter of the 19th century, the Japanese dominated the California fishing industry with vessels of traditional Japanese design. During the first quarter of the 20th century, the Japanese fishing communities gradually were supplanted by Portuguese and Italian fishermen; finally they were displaced altogether when World War II brought about Japanese-American relocation (BLM 1979:IV-115).

Coastal growth resulted in ships of all kinds from all over the world bringing in a variety of goods and distributing California products to ports worldwide (MMS 1987:82). The latter half of the 19th century saw rapid industrial growth and the advent of rapid technological development within the shipping industry. Larger and larger wood, iron, and steel ships appeared. By the end of the 19th century, steamships were replacing sailing vessels as the primary mode of transportation, and the Pacific Coast became prominent in shipbuilding. By World War I, the diesel engine and the oil-burning steam turbine had replaced sail for all but bulk cargoes. As steam replaced sail, the internal combustion engine became popular. California became the American gateway to the Pacific world; and virtually every type of ship, large and small, was seen in California waters.

Historic Sea Routes and Shipwreck Distribution

Coastal and overseas routes in use north of Point Conception originally followed the southbound longshore California current, the North Pacific current (sometimes called the North Pacific Drift, a slow warm water current that flows west to east between 30 and 50 degrees of latitude), and the Japanese west- to east-flowing Kuroshio or Japanese current. While traversing coastal waters without stops, motorized ship traffic travels within the established shipping lanes. Sailing vessels, however, must constantly tack and jibe in order to make headway up the coast because of the prevailing northwesterly wind pattern. Sailing ships running down the coast usually will not tack or jibe because they are running before the wind. These routes are compiled from descriptions in the historic record and idealized depictions taken from route charts published by various shipping lines (MMS 1987:85).

Branching of shipping lanes to reach local ports varies with the point of origin, destination, and direction and force of the wind, which changes with the seasons. Ships often take shortcuts to reduce running time outside of the shipping lanes. Historic shipping lanes can be plotted, but they are not always adhered to; and vessel losses may occur both within the lanes or shoreward. The density of losses increases with the occurrence of natural hazards such as rocky shoals, headlands, and reefs, in addition to inclement weather in the vicinity of ports of call. Ports of call continue to be accessed from the coastal shipping lane. This configuration has little changed since the first Spanish explorations and the Philippine Manila galleon trade.

Numerous vessels have been reported lost in the study region. A large number of vessels whose coordinates remain unknown were lost enroute along the California coast. BOEM generally has confined archaeological search to the areas considered most sensitive (i.e., waters less than or equal to 120 m deep ([394 feet, 66 fathoms]) and areas of potentially high shipwreck density as determined by historical data. The planned cable routes cross through these documented areas that are sensitive for the occurrence of shipwrecks and known historic shipping lanes. Although most shipwrecks in the study area may be anticipated to be located near shore, any of these vessels may be located within or near the deeper water portion of the study area. Although the distribution of shipwrecks is influenced by environmental factors (e.g., wind; current; weather; and nearshore hazards such as sandbars, rocks, and reef areas), it is influenced even more by vessel traffic patterns.

Because of the vagaries of wind and weather, these sea routes could include a “sea lane” (an established sea route). Coastal and overseas routes in the Santa Maria and Eel River Basins were established by the Spanish (MMS 1987:84). As noted earlier, while motorized vessels can readily maintain travel within these shipping lanes, sailing vessels must constantly tack and jibe in order to make headway of the coast due to prevailing northwesterly wind patterns. Sailing ships running down coast usually do not have to tack and jibe because they are running before the wind (MMS 1987:84). The sea lanes established historically are still in use today and appear on modern navigational charts. Transit to local ports branch off from the established sea lanes, which increases traffic and collisions as does seasonal fog of varying densities.

The nine Manila galleons reported lost offshore of California could be located anywhere in the Pacific; however, given the southerly destination of Mexican ports and probable use of the North Pacific current, there is a potential that they may be encountered within the proposed cable routes in the study area.

Marine Cultural Resources Categories

Three broad categories of marine cultural resources are considered in this study, all of which are currently submerged and may be encountered during the marine installation of the Project: (1) historic period shipwrecks (including downed aircraft and unidentified debris); 2) prehistoric period watercraft, and (3) prehistoric archaeological resources, both in situ site deposits and isolated artifacts. The historic and prehistoric period watercraft came to rest after they were abandoned during travel across bodies of water, and they currently may be partially or wholly obscured by sediments of the ocean floor. No downed aircraft have been reported in the study area. The prehistoric period archaeological sites and isolated artifacts were deposited during occupation of what is now ocean floor, but what was dry land at the time of their deposition. These sites and isolated artifacts may be buried at varying depths depending on their age and the depositional history of the location in which each is found.

Historic Period Shipwrecks

For purposes of this study, historic period shipwrecks consist of the remains of watercraft that were used as early as the 16th century to cross the waters of the study area, remains of downed aircraft, and unidentified debris. Many of the shipwrecks offshore the northern California coast may occur near shore rocks, coves, historic landings, anchorages, wharves, and lighthouses; but in Humboldt County, most occur near Humboldt and Trinidad Bays. They also may occur in lesser numbers in deeper waters offshore. These historic period watercraft came to rest on the ocean floor due to marine casualties such as foundering (casualties due to leaking or capsizing of vessels, vessels lost at sea not due to collision or burning, and vessels not reported after sailing), stranding (casualties due to vessels running aground or striking rocks, reefs, or bars), colliding (collision between vessels), or burning (casualties due to fire and explosion) and were abandoned (abandonment at sea not due to age) during travel on the Pacific Ocean. Currently, their remains may be partially or wholly obscured by sediments and in rocky strata along the ocean floor. Not all marine casualties result in shipwreck sites as they also may represent the location where vessels wrecked but later were returned to service or removed for salvage, leaving behind jettisoned or lost cargo, ballast, or rigging.

Debris may include flotsam (debris scattered due to the process of wrecking), jetsam (items such as cargo or other ships equipment purposely jettisoned or accidentally lost from traveling vessels), and items deposited on the seafloor through salvage of vessels or their cargoes and past economic activities such as fishing or marine exploration. Cargo or ballast jettisoned offshore or lost comprises a class of historic archaeological sites that need not entail the wrecking of a vessel.

Prehistoric Period Watercraft

Native Americans used watercraft for transportation and fishing in salmon streams and lakes, and for hunting offshore and in seal and sea lion rookeries. The Humboldt Bay area was home to the Wiyot, an Algonquian-speaking group thought to have entered from the Columbia Plateau circa 900 A.D. according to carbon-14 dating (Elsasser in Heizer 1978:255). The local Wiyot of the Humboldt Bay area were littoral or "tidewater" peoples; and their subsistence practices reflected this habitat, which included fishing, mollusk collecting, and sea mammal hunting. Much of Wiyot technology reflected these practices as well, including redwood dugout canoes, weirs, platforms, traps, nets, spears, and harpoons.

The Wiyot practiced both surf and other saltwater fishing, with a heavy emphasis on anadromous[9] salmon, the main source of animal protein for the Wiyot (Elsasser in Heizer 1978:158). The Wiyot made their dugout canoes from redwood logs. It has been noted that only peoples who lived in an area of redwood forests that grew close to the water made these canoes. The redwood log was dug out using fire and tools made of stone and mussel shell. The front and back of the boat generally were blunt (shovel-shaped) and square. The canoes, which sometimes were as long as 18 feet, were used both in the ocean and in the rivers and bays.

During the approximately 13,000 years of Native American navigation through the study area, some native vessels may have been inundated, stranded, or capsized. When the wood—specifically redwood and Douglas fir—that was used in construction of their vessels is submerged in a saltwater environment, it will decay through time. While submersion in saltwater initially allows wood to absorb considerable quantities of salt, rendering the wood resistant to microbial colonization and decay, the wood remains susceptible to leaching through time that will degrade its resistance to decay (Schneider et al. 1996). Given the fragile nature of these craft, in terms of construction methods and perishable materials, it would be rare or unlikely that evidence of such vessels would be preserved in the nearshore environment.

[9] *Anadromous* refers to fish born in fresh water that spend most of their life in the sea and return to fresh water to spawn. Salmon, smelt, shad, striped bass, and sturgeon are common examples.

Prehistoric Archaeological Resources

Prehistoric archaeological resources include places where Native Americans lived, performed activities, altered the environment, and created art before they sustained contact with Europeans. Prehistoric resources contain features left behind by these activities as well as artifacts and subsistence remains. Additionally, they may contain human remains in the form of burials, cairns, or cremations. Although originally deposited on a non-marine landscape (dry land), changes in sea level have resulted in such resources currently being submerged. Such sites may date from the terminus of the Pleistocene through Holocene periods. These sites and isolated artifacts may be buried at varying depths, depending on their age and the depositional history of the location in which each is found.

Marine Cultural Resources Study Area

The study area for marine cultural resources consists of the four proposed cable routes and a 10-nm buffer around each route, beginning at the mean high tide line of the North Spit of the Humboldt Bay Bar situated between Fairhaven and Samoa and westward to the continental shelf break. The broad-scale buffer zone allows for inaccuracies inherent in the reported locations of historic shipwrecks. There is some overlap in the buffers around each route. The study area for this report includes marine areas within the CSLC jurisdiction that extend 3 nm miles (4.8 km) from the mean high tide line, as well as marine areas under federal jurisdiction that extend beyond the 3-nm State jurisdiction on the OCS where the submarine cables would be buried to the extent feasible.

Remote sensing survey data indicate that the study area has a flat topography devoid of old freshwater courses or terraces that were suitable for human habitation. It is likely, however, that sediments would have covered the original ground surfaces, and the probability of finding preserved archaeological sites remains problematic.

A previous archaeological survey using magnetometer and side scan sonar that was completed by Land and Sea Surveys in 1990 under contract to the USACE (Macfarlane 1991) reports numerous magnetic and sonar anomalies identified in the Humboldt Open Ocean Disposal Site area offshore Humboldt Bay. Three of the identified seafloor features were interpreted as potential shipwreck locations, and avoidance was recommended during disposal of dredge materials for maintenance dredging projects. Additionally, one magnetic anomaly of consequence was interpreted as the location of a potential shipwreck remaining near the western end of the Bar and Entrance Channel (Humboldt Bay Harbor Recreation and Conservation District and USACE, San Francisco District 1994). Additional investigation was recommended at that time but does not appear to have been conducted.

Shipwrecks are submerged maritime resources with the potential to provide information not available in the written record on historic ship construction, trade, commerce, industry, military history, and maritime lifeways.

The impact analysis for marine cultural resources discusses methodology and significance thresholds, and identifies impacts and mitigation measures. Potential impacts on extant cultural resources were based on marine Project construction methods.

Methodology

Marine Cultural Resources Records Search

Research methods were limited to an archival and records search to inventory marine cultural resources. All marine cultural resources cited consisted of shipwrecks. No downed aircraft or prehistoric archaeological sites and isolated artifacts were listed. The inventory completed for the study area covers the four potential routes plus a 10-nm buffer. No remote sensing survey of the ocean floor for shipwrecks and other debris or predictive modeling for prehistoric archaeological resources has yet been completed for the marine portion of the study area. Sources consulted included cultural resource inventories (shipwreck and downed aircraft listings) provided by the CSLC, BOEM Pacific OCS Region (BOEM 2013; former Bureau of Land Management Pacific OCS Region [Stickel & Marshack] 1979), the Minerals Management Service (MMS 1990 [Gearhart et al.]), and the National Oceanic and Atmospheric Administration (NOAA) Automated Wreck and Obstructions Information System (AWOIS) database (1988). The NRHP, California Historical Landmarks, California Inventory of Historical Resources, and local archives also were consulted.

Other sources consulted include the USACE, Los Angeles and San Francisco Districts; National Maritime Museum in San Francisco; Los Angeles Maritime Museum; Commerce Department files at the National Archives in Washington D.C. and San Bruno; Regional Records Centers at Laguna Nigel and San Bruno; The Huntington Library in San Marino; the published volumes of Lloyds of London Ships Registry1850–1980 and 1885–1950; the U.S. Department of Commerce Merchant Vessels of the United States 1867–1933; and the U.S. Coast Guard Merchant Vessels of the United States 1933–1982 and Supplements 1982–1988 at the University of California Library, University of California at Santa Barbara and Long Beach Library, and the State Library and State Archives and Records Office. More recent sources included Jackson (1969) and White (2014), shipwreck locations documented on NOAA Navigation Charts 18620 and 18622, and literature on file at the Humboldt Bay Maritime Museum in Eureka and Humboldt Bay Museum in Samoa, California.

Submerged Prehistoric Resources (Offshore)

The records search yielded no maritime finds of prehistoric origin within the study area. All known underwater prehistoric resources on file appear to be located in Oregon and southern California waters. It should be noted, however, that there is a recognized potential for the remains of prehistoric and historic sites, artifacts, and Native American water craft to be present offshore—although there is a lower potential for their preservation in-situ. Preservation of sites and artifacts in-situ may occur in undersea environments protected from wave action during inundation (e.g., in the lee of reefs, sand bars or other landforms) or buried beneath significant sediment cover.

Submerged Historic Resources (Offshore)

Historic submerged cultural resources include historic period shipwrecks. No evidence of downed aircraft in the study area was found in the archival search.

Locations of Shipwrecks

The reported locations of historic period shipwrecks are characterized by inaccuracies. Many, if not most, vessels reported as lost in the study area have not been accurately located or assessed for eligibility for listing in the CRHR. Therefore, the potential for the Project to affect these shipwrecks cannot be accurately assessed. However, given the large number of shipwrecks reported within or near the study area prior to 1950, it is likely that one or more may be found by site-specific remote sensing surveys conducted for each of the four subsea cable corridors.

A 10-nm buffer was included in the study area records search due to the general lack of specific coordinates for the majority of shipwrecks reported. This buffer reflects the most conservative interpretation of the potential accuracy of the shipwreck locations reported. Databases of the CSLC, BOEM, NOAA AWOIS, and in-house shipwreck databases were checked for listings within the study area. Published sources (White 2014; Jackson 1969) provided additional information on extant resources, in addition to the state and federal databases.

Although the majority of shipwrecks of known approximate location (i.e., accurate from within 0.91 nm [1.7 km] to within 10 nm [18.5 km]) are close to shore, numerous shipwrecks are reported that may fall within or near the cable routes as they pass through offshore waters to the 3-nm state waters limit and beyond to the OCS and slope. To further verify locations of the vessels reported lost within the study area, original sources were reviewed; and information such as “at,” “near,” and “off” a land reference that had been removed from CSLC and BOEM shipwreck listings were added back into the data.

Shipwrecks tend to concentrate along approaches to historic harbors and landings. Shipwrecks also are concentrated along the shoreline, especially along treacherous points of land because of dense fog or other sea conditions. These data indicate that the highest density of shipwrecks generally are expected to occur close to shore. The most treacherous location in the study area is the Humboldt Bay Entrance Channel itself, which often is obscured by dense fog and heavy seas that drive vessels onto the adjacent sand bars north and south of the narrow channel. While the majority of shipwrecks in the study area appear to cluster around the Entrance Channel and adjacent sand bars, shipwrecks may occur anywhere within state and federal waters. Collecting additional side-scan sonar and magnetometer data from Project routes within this area should be given high priority.

Fewer shipwrecks are expected to occur in extremely deep waters outside of the normal lanes of traffic. Shipwrecks in deep water generally are thought to be the result of marine casualty or purposeful sinking.

One or more shipwrecks may be documented by site-specific remote sensing surveys using both side-scan sonar and magnetometer. The presence or absence of the older more fragile shipwreck localities can be determined only by magnetometer survey. Without magnetometer survey, such resources may be undetected and may be disturbed, damaged, or destroyed during the pre-lay grapnel run or during cable installation and burial. In the case of historic wooden shipwrecks, disturbance of any portion of the shipwreck or overlying substrate would facilitate a more rapid decomposition through physical, chemical, and biological processes, with a consequent loss of information on a site or sites significant in the history of California.

As part of this analysis, shipwrecks were mapped in relation to the alternate cable routes based on their reported coordinates or other relevant information. Centered on the North Spit of Humboldt Bay cable origin, the study area extends 10 nm (18.5 km) north to include waters offshore of Camel Rock south of Trinidad Head, excluding the immediate inshore area of that location and southward to the Eel River.

Documented Historic Period Shipwrecks

In summary, a total of 146 documented shipwrecks, unknown wreckage, and debris locations are reported within the study area. The majority of these vessels were built between 1838 and 1899. No record could be found in the historic literature of any historic landings along the North or South Spits of the Humboldt Bay Bar where vessels offshore would have anchored and lightered in their cargoes. The references consulted as part of the records search for submerged historic period cultural resources provided information on shipwrecks, unknown wreckage, and debris locations. As previously referenced, these historic period watercraft came to rest on the ocean floor due to marine casualties such as foundering (casualties due to leaking or capsizing of vessels, vessels lost at sea not due to collision or burning, and vessels not reported after sailing), stranding (casualties due to vessels running aground on a sandbar or reef, striking rocks, or becalming),[10] colliding (collision between vessels), burning (casualties due to fire and explosion), or that were abandoned (abandonment at sea not due to age) during travel on the ocean. Vessels that foundered are those that took on water and sank below the surface of the water.

Vessels reported as lost ranged in size from 6 to 9,700 tons, except for one wood tugboat that was lengthened and converted to a cruiser. There was no information on conversion of older vessels to barges or pleasure vessels prior to their loss. Table 1 lists the shipwrecks that, based on accuracy of location and other criteria, are likely to occur within or near the four proposed cable corridors with landing sites at Samoa.

The accuracy of the coordinates provided for the shipwrecks varies. Neither the accuracy of location nor the significance of the vessels listed by the CSLC and MMS 1990 or BOEM 2013 has been evaluated. All resources that could be placed to within 10 nm of each of the proposed routes have been included for consideration and are listed in Table 1. Many of the resources listed contain information that, regardless of the documented coordinates, places the vessels near or west of the Samoa landing. This information can neither be verified nor denied based on the information available. Considerably more research will need to be conducted as part of the remote sensing surveys to validate the locations cited.

The Humboldt Bay Entrance Channel is exposed to high waves produced by local coastal storms accompanied by high winds and is exposed to high waves and swells generated by distant Pacific storms. The shifting sandbar across the Entrance Channel historically has seriously impaired the movement of ships in and out of the Bay. The entrance to the Bay is 0.25 mile wide. The reason for the numerous shipwrecks is the horrific ocean currents that constantly flow past the entrance of the

[10] *Stranding* is often misused by mariners to indicate running out of fuel, engine trouble, or trouble with the ship's machinery rather than the vessel itself.

bay running north and south. They forced the ships trying to enter the bay onto the ocean beaches north and south of the entrance, wrecking them. Ships wrecked included sailing ships from the 1800s, several Navy ships including destroyers and submarines, and coast guard ships, passenger vessels, cruise ships, freighters, fishing vessels etc.

Most wrecks have occurred as ships try to cross the sandbar and enter the Bay.

During World War II, the USACE built two long jetties out into the ocean from both sides of the mouth of the Bay, using huge quarried rocks brought in by trucks to facilitate allowing ships to enter the Bay between the jetties, despite the heavy currents rushing past. The jetties are about 0.25 mile in length. The sea wall and South Spit jetty are considered historic resources as their construction by the USACE began in 1889. Both Humboldt Harbor jetties are registered as California Historic Civil Engineering Landmarks, and the Humboldt Harbor Historical District is listed as California Historic Landmark Number 882. The jetties are two of the oldest man-made structures on the Pacific Coast subject to extreme wave action (BLM 2002).

There have been fewer shipwrecks in the recent past. The U.S. Coast Guard maintains a Life-Saving Station beside the Bay just north of the entrance on Samoa Road. The NRHP lists the Humboldt Bay Life-Saving Station (October 30, 1979 #79000477) and includes the 1875/1936 Coast Guard Building.

For the purposes of this analysis, shipwrecks are divided by the physical description of reported casualty location. Except where there is an agreement between cited locations and coordinates, coordinate locations largely are ignored as the majority of locations cite the coordinates for the harbor mouth and are clearly at odds with the physical descriptions of the wrecking situations or locations.

Eleven of these shipwrecks are reported to be within Humboldt Bay, and two specifically are associated with the Eureka Harbor Dock and Mooring Basin. All 11 of these shipwrecks can be eliminated from the analysis.

Seven shipwrecks are reported to have occurred at the entrance to Humboldt Bay, and 23 are reported as having occurred south of the South Jetty and the South Spit of the Humboldt Bay Bar or near the Eel River. These 30 shipwrecks therefore are considered less likely to occur within the four planned cable routes as none of the proposed routes extend in a southerly direction. The most well known of these shipwrecks are the USS H-3, a submarine formerly named Garfish, that ran aground on the Humboldt Bay bar while trying to enter Humboldt Bay; and the USS Milwaukee that grounded while attempting to salvage the H-3 and broke up in the pounding surf. The USS H-3 was removed, decommissioned, and scrapped the following year.

Twelve shipwrecks are reported to have occurred on the North Spit of the Humboldt Bay Bar, with three specifically located at Samoa Beach. These shipwrecks include two potentially significant shipwrecks. The Brooklyn, a 333-ton single-ender steamer was stranded after striking the Humboldt Bay bar at Samoa Beach in heavy seas in 1930; and the Commodore Prebel, a 282-ton sidewheel (aka paddlewheel) steamer built in 1844 was stranded on the North Spit in 1851. All 12 shipwrecks are considered to be potentially located in nearshore waters along the North Spit in the vicinity of the cable landing.

An additional 43 shipwrecks are reported to have occurred at, on, or off the Humboldt Bay Bar with no specific reference to the North or South Spit. Without additional information, all of these shipwrecks are considered to be potentially located within the vicinity of the cable landing.

Twenty-six shipwrecks are reported to have occurred at or off Eureka/Humboldt Bay. Lacking additional information, all 28 shipwrecks are considered to be potentially located in the study area.

Seventeen of the shipwrecks listed are reported as having been removed or refloated. Their coordinates remain in the shipwreck tables because cargo or associated machinery may still exist at the loss location.

The remaining 15 shipwrecks are reported to have occurred within the deeper waters of the offshore study area directly west of Humboldt Bay. Remains of these shipwrecks may occur within or near the four cable routes.

None of the 146 shipwrecks have been previously evaluated for their significance or importance in California history. No degree of accuracy of location has been evaluated previously for any of the shipwrecks reported in the study area. Table 2 lists these shipwrecks by their type (rig and service) and their range of built and loss dates.

An additional 31 shipwrecks (Table 3) are reported by vessel name as off the coast of northern California. Lacking a specific location, these are not considered in the analysis but may be used to identify a specific shipwreck site if one should be found in the individual remote sensing surveys of the four cable routes. Table 4 lists these shipwrecks by their type (rig and service) and their range of built and loss dates.

Additional research for subsequent remote sensing surveys may provide additional information on the accuracy of the coordinates recorded. The following describes the shipwrecks anticipated to occur within the maximum 10-nm radius of the proposed routes. The MMS (1987, 1990) databases discuss eligibility for listing in the CRHR only in terms of historical significance. Unfortunately, these three levels of significance, insignificant (not eligible for listing in the NRHP), moderate (potentially eligible for listing in the NRHP), and significant (eligible for listing in the NRHP), were not assigned to listings available for the study area.

With additional information, several more shipwrecks could be eliminated or added from the numbers cited above; however, without confirmation of the accuracy of the coordinates cited, they cannot be completely eliminated. Digital newspaper repositories are a likely source for additional information on study area shipwrecks. The California Digital Newspaper Collection has digitized numerous historical newspapers from California. These collections can be accessed at the University of California Davis and the University of California Riverside Libraries, along with the Sonoma County Library and the San Francisco Public Library Historical Digital Newspaper Collections. BOEM (2013:229) also cites other digital newspaper archives, including Ancestry.com, Newspaper Archive, com, and the Library of Congress' Chronicling America website.

Eligibility for Listing in the NRHP and CRHR

For the purposes of this study, any property listed in the NRHP also is eligible for listing in the CRHR. None of the shipwrecks listed in the CSLC or BOEM databases and in the study area have been evaluated for their eligibility for listing in the NRHP.

With reference to their potential eligibility for listing in the NRHP and, by extension, the CRHR, the MMS 1990 reference uses the terms "significant," "probably significant," and "not significant." Alternative terminology, used by the BOEM 2013 reference, includes "probably eligible," "may be eligible," and "not eligible" for inclusion in the NRHP. Unless the resource has been evaluated according to the criteria established for inclusion in the NRHP, these statements of significance and eligibility remain informal suggestions. Based on previous evaluations, all those shipwrecks with loss of life generally are evaluated as significant. Significance also may be accrued based on the importance of the ship's designer or builder, materials, type of engine or other equipment, association with an early build date, or date of loss.

Of the shipwrecks documented within the study area, 12 potentially may be eligible for listing in the NRHP based on age of construction and lives lost. As noted, any resource eligible for listing in the NRHP also is eligible for listing in the CRHR. The eligibility of the remaining 134 shipwrecks reported in the study area remains undetermined. Of the 12 vessels only 2, the Albert & Edward and the Brooklyn, have been previously evaluated as moderately significant.

Shipwrecks that are tentatively evaluated as potentially significant based on the present research include the Albert & Edward, Brooklyn, Chilcot, Corinthian, Fidelity, Lili of Elsffeith, Laura Pike, Maxim, Mexican, Weott, Willimantic, and an unknown brig:

- Albert & Edward was a 96-ton two-masted schooner built in 1875 that capsized on the Humboldt Bar in 1876 with five lives lost.
- Brooklyn was a 333-ton single-ender steamer built in 1901 that stranded when striking a sand bar at Samoa Beach in heavy seas in 1930, with 17 lives lost.
- Chilcat was a 215-ton ship that sank on Humboldt Bar in 1899 with 10 lives lost.
- Corinthian was a 94-ton two-masted gas screw schooner built in 1892 that stranded on Humboldt Bar in 1906 with 12 lives lost.
- Fidelity was a three-masted schooner that capsized in 1889 at Humboldt Bar in 1889, with eight lives lost.
- Laura Pike, a vessel of unknown type and service, wrecked on the Humboldt Bar in 1878 with seven lives lost.
- Lili of Elsffeith, a 1,609-ton barque, grounded on the rocks off Eureka in 1878 enroute to San Francisco, with seven lives lost.
- Maxim was a two-masted 117-ton schooner built in 1876 that foundered in 1901 on Humboldt Bar, with six lives lost.
- Mexican was a vessel of undocumented rig or service that wrecked in 1853 on the Humboldt Bar with four lives lost.
- Weott was a 557-ton steamship of unknown construction that sank off the Humboldt Bar while carrying general cargo in 1899, with two lives lost.
- Willimantic, a 176-ton brig built in 1848, wrecked at Humboldt Bar in 1875 with eight lives lost. Remains later washed ashore on Gold Beach north of the study area.
- An unknown brig was reported to a Captain Terry as sinking in 1852 at Humboldt Bay with five lives lost.

The majority of recent (post-1950s) shipwrecks in the BOEM (2013) database are included as a means of eliminating them from consideration should they appear in the results of sonar, magnetometer, autonomous underwater vehicle, or multibeam surveys. Fifty of the vessels represented are of this more recent vintage.

It is pertinent to the historic lumber, freight, and fishing industry in the study area that as many as 60 of the dated vessels were lost between 1838 and 1899, and 34 between 1900 and 1950. A total of 54 vessels were recent losses dating between 1951 and 1980. Dated vessels built prior to 1950 should be evaluated for significance to the extent possible, but that effort is not within the range of the present scope of work. Vessels lost after 1950 with an early building date, a specific or unusual design, are associated with significant loss of life, or with other historic association also may be evaluated as potentially significant (MMS 1990) and "probably eligible for listing in the NRHP" (BOEM 2013). These vessels may include workboats used after 1950 that were built as part of the World War II effort and converted to pleasure craft, passenger transport, fishing boat, or other workboat. However, none of the vessels in the study area are believed to be associated with World War II.

For the most part, vessels built after 1950 have been recommended as not eligible for listing in the NRHP (MMS 1987). The majority of these vessels are diesel-, gas-, or sail-powered vessels of wood, fiberglass, and steel construction. These vessels were included in the updated BOEM 2013 shipwreck database so that they could be eliminated as potential historic cultural resources during the interpretation of side scan sonar, magnetometer, autonomous underwater vehicle, and multibeam records. Vessels reported lost in the study area that were built between 1940 and 1945 may be associated with the World War II effort and may bear battlestars or have other historic associations that have not yet been evaluated. In addition, vessels built prior to 1953 for the Korean War effort may bear battlestars or have other historic associations that have not yet been evaluated.

Significance Thresholds

Under CEQA, lead agencies are to protect and preserve resources with cultural, historic, scientific, or educational value. State CEQA Guidelines Section 15064.5 provides significance criteria for determining a substantial adverse change to the significance of a cultural resource. In addition, Appendix G of the State CEQA Guidelines provides additional guidance in determining a project's impact on cultural resources. The information provided in the State CEQA Guidelines has been used to develop the significance criteria for cultural resources for the proposed Project. State CEQA Guidelines also require reasonable mitigation measures for impacts on archaeological resources that result from development on public lands.

A Project activity would result in a significant impact on a cultural resource if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5 and PRC Section 21083.2.
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5 and PRC Section 21083.2.

Until identified cultural resources can be evaluated for their eligibility for nomination to the NRHP and CRHR, they all must be considered potentially significant until otherwise eliminated by additional research, avoidance, or a program of data recovery.

Impacts and Mitigation Measures

RTI proposes to install four transpacific subsea cables to land at Samoa, located on the North Spit of Humboldt Bay Bar. The Project would be implemented in four phases—one phase for each of the cable systems. The marine segments of the cable systems refer to those segments between the mean high water line and the outer limit of the OCS, where seawater depth is approximately 5,904 feet (1,800 m). They consist of the marine conduit, cables, splice boxes, and cable regenerators. Cables consist of a double-armored design, used in rocky areas or coarse substrates and where protection from fishing gear may be warranted; and a light-weight armored cable, similar to the doubled-armored cable that is used where the risk of damage due to substrate conditions or fishing is reduced by burial of the cable in soft-bottom sediments using a seaplow or remotely operated vehicle (ROV). Both cables are less than 2 inches (5 centimeters in diameter).

Impact: Project-related ground-disturbing activities have the potential to disturb or destroy previously unknown or inaccurately recorded submerged prehistoric archaeological resources or historic shipwrecks.

Impacts associated with the onshore portion of the installation are discussed in the terrestrial archaeological survey report submitted under separate cover. The following marine Project activities, as described above under Detailed Marine Project Components, have the potential to affect submarine archaeological resources by disturbing or degrading the seafloor or seafloor sediments:

- Marine directional bores
- Anchoring activities
- Pre-lay grapnel run
- Diver-assisted post-lay burial
- Cable plow-assisted post-lay burial
- ROV-assisted post-lay burial
- Cable plow post-lay burial
- ROV cable post-lay burial
- Direct surface lay

Emergency cable repair, retirement, abandonment, or removal of the cable systems are likely to result in impacts similar to those of installation. If significant impacts are identified, the types of measures proposed to mitigate installation impacts also could mitigate removal impacts to a less-than-significant level.

As identified in the above discussion of construction techniques, marine construction activities have the potential to disturb, disrupt, or degrade extant cultural resources such as prehistoric watercraft and historic shipwrecks on the seafloor or within seafloor sediments from the mean high water line to the outer limit of the OCS. Prehistoric archaeological sites associated with buried late Pleistocene and Holocene paleolandforms in the study area are unlikely to be disturbed during construction, operation, or repair of the four RTI cables proposed. Such resources, should they be present, would have a significant covering of marine sediments up to 30 m thick. Subsurface disturbance of a potentially significant or a significant shipwreck may result from anchoring activities associated with directional boring through nearshore sediments from the LV to water depths of 30 feet (9.2 m); from diver-assisted burial at water depths between 40 and 98 feet (12 to 30 m); from cable plow, or diver or ROV-assisted post-lay burial in water depths of 98 to 5,904 feet (30 to 1,800 m), and from direct surface lay in water depths greater than 5,904 feet (1,800 m).

Additionally, although cable-laying and support vessels would be dynamically positioned rather than requiring anchoring or anchor mooring systems at locations along the proposed cable routes, anchoring may be anticipated to occur for reasons such as bad weather, repair, or other problems. These unanticipated anchoring activities also have the potential to disturb, disrupt, or degrade extant cultural resources.

Mitigation Measures MM-1 through MM-3 are recommended to reduce potential impacts to a less-than-significant level. Implementation of these measures would require identification of resources and avoidance of any potentially significant resources by rerouting the cable.

Mitigation Measures

MM-1: Conduct a Pre-Construction Offshore Archaeological Resources Survey

Use the results of an acoustic survey (e.g., a CHIRP system survey) for evidence of erosion/incision of natural channels; the nature of internal channel-fill reflectors; and overall geometry of the seabed, paleochannels, and the surrounding areas for their potential to contain intact remains of the past landscape with the potential to contain prehistoric archaeological deposits (e.g., Schmidt et al. 2014 in BOEM 2015:09). *CHIRP* is an acronym for compressed high-intensity radar pulse. CHIRP sub-bottom profilers achieve very high-resolution imaging of the upper regions of the sub-surface but do not penetrate as deeply into the sub-bottom strata as Boomer or Sparker type systems. The analysis will include core sampling in various areas, including but not limited to, paleochannels to verify the seismic data analysis. Based on the CHIRP and coring data, a Marine Archaeological Resources Assessment Report shall be produced by a qualified maritime archaeologist and reviewed by the California Coastal Commission or the State Historic Preservation Officer to document effects on potentially historic properties.

MM-2: Conduct a Pre-Construction Offshore Historic Shipwreck Survey

A qualified maritime archaeologist, in consultation with the lead agency, shall conduct an archaeological survey of the proposed cable routes. The archaeological survey and analysis shall be conducted following current CSLC, BOEM, and USACE (San Francisco and Sacramento Districts) standard specifications for underwater/marine remote sensing archaeological surveys (Guidelines for Providing Geological and Geophysical, Hazards, and Archaeological Information Pursuant to 30 Code of Federal Regulations Part 585).

The archaeological analysis shall identify and analyze all magnetic and side scan sonar anomalies that occur in each cable corridor, defined by a lateral distance of 0.5 km on each side of the proposed cable route. This analysis shall not be limited to side scan and magnetometer data, and may include shallow acoustic (sub-bottom) data as well as autonomous underwater vehicle and multibeam data that may have a bearing on identification of anomalies representative of potential historic properties. The analysis shall include evaluation to the extent possible of the potential significance of each anomaly that cannot be avoided within the cable corridor. If sufficient data are not available to identify the anomaly and make a recommendation of potential significance, the resource(s) shall be considered as potentially eligible for listing in the NRHP and CRHR, and shall be treated as a historic property. If any cultural resources are discovered as the result of the marine remote sensing archaeological survey, the proposed cable route or installation procedures shall be modified to avoid the potentially historic property. BOEM administratively treats identified submerged potentially historic properties as eligible for inclusion in the NRHP under Criterion D and requires project proponents to avoid them unless the proponent chooses to conduct additional investigations to confirm or refute their qualifying characteristics. BOEM typically determines a buffer (e.g., 50 m) from the center point of any given find beyond which the project must be moved, in order to ensure that adverse effects on the potential historic property will be avoided during construction.

MM-3: Prepare and Implement an Avoidance Plan

Pursuant to Section 30106 and 30115 of the Coastal Act of 1976, "where developments would adversely impact archaeological…resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required" (PRC Section 30244). An Avoidance Plan, therefore, shall be developed and implemented to avoid all documented resources from the Marine Archaeological Resources Assessment Report and the Offshore Historic Shipwreck Survey Report, addressing discoveries of as yet unidentified resources encountered during planned marine survey and construction, and providing mitigation monitoring if deemed necessary during construction to ensure compliance.

Cumulative Effects

Introduction

Cumulative impacts on cultural resources take into account the impacts of a project in combination with those of other past, present, and reasonably foreseeable projects. The geographic extent of cumulative analysis for cultural resources encompasses a large region due to the interrelated nature of the region's prehistoric, historic, and ethnographic resources. The geographic area for the analysis of cumulative impacts for submerged cultural resources includes the offshore submerged lands beneath the Arena Basin. For purposes of this cumulative analysis, impacts on cultural resources could result at any time throughout the life of the Project, but are most likely during ground-disturbing activities associated with construction.

This report provides a historical background for the study area and describes the inventory of known cultural resources in the area. The types of resources that are found within the study area are similar to those found within the broader geographic region considered for the cumulative analysis.

The condition of these cultural resources varies considerably, and depends on the types and extent of human and natural factors that may have affected the integrity of individual resources or group of resources. Construction activities offshore can destabilize sediments, thereby increasing erosion at archaeological sites. Many shipwrecks in the offshore environment are buried or partially buried in sediments. The portions of the vessel under sediments are protected from sediment shifting, active biological predation, and chemical processes that degrade exposed portions of the shipwreck.

Exposure of even a small portion of a shipwreck to aerobic seafloor conditions can very quickly degrade wood-hulled shipwrecks such as those prevalent in the study area.

Project Contribution to Cumulative Impacts

Direct impacts on marine cultural resources may be avoided through adequate site identification and mandated avoidance as the preferred mitigation. Similar to construction of the proposed Project, should resources be discovered during the construction of current and future projects, they would be subject to legal requirements designed to protect them, thereby reducing the effect of encountering unknown cultural resources. Because of the planning of the marine cable routes to avoid cultural resources that may exist on the sea floor, as well as implementation of recommended Mitigation Measures MM-1 through MM-3, the Project would be unlikely to make a substantial contribution to cumulative impacts on marine cultural resources.

The isolated prehistoric artifacts that have been recovered from the seabed north of the study area by divers and current archaeological research support the assessment that there is the potential to encounter prehistoric archaeological sites during construction of the submerged portion of the cables. The same is true for historic shipwrecks. A number of shipwrecks have been reported within the study area; however, the level of accuracy of these reports is not adequate to determine with certainty that any of the cables will encounter a shipwreck.

Mitigation measures require identification of areas with high potential for specific submerged cultural resources, which would reduce any impact to a less-than-significant level. No past projects have reported encountering submerged historic shipwrecks or prehistoric archaeological resources in the study area, and currently no proposed projects have the potential to disturb or destroy such resources. Therefore, the Project's contribution to cumulative impacts on marine cultural resources would not be significant.

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