Proponent's Environmental Assessment
Klamath River Rural Broadband Initiative

Prepared for
The California Public Utilities Commission, lead state agency
and
The Bureau of Indian Affairs, lead federal agency

Prepared by
The Karuk Tribe

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Acronyms and Abbreviations

ACHP	Advisory Council on Historic Preservation
AP	Access Point for multiple wireless customers
BAA	Biological Assessment Area
BIA	U.S. Department of the Interior, Bureau of Indian Affairs
BLM	U.S. Department of the Interior, Bureau of Land Management
BMP	Best Management Practices
CalTrans	California Department of Transportation
CASF	California Advanced Services Fund
CDF	California Department of Forestry and Fire Protection
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CLEC	Competitive Local Exchange Carrier
CNDDB	California Natural Diversity Database
CPCN	Certificate of Public Convenience and Necessity
CPUC	California Public Utilities Commission
CRPR	California Rare Plant Ranks
CSLC	California State Lands Commission
CSSC	California Species of Special Concern
DIA	Direct Impact Area
EA	Environmental Assessment (NEPA)
EPM	Environmental Protection Measure
ESA	Endangered Species Act (federal)
FONSI	Finding of No Significant Impact (NEPA)
GIS	Geographic Information System
GDR	Green Diamond Resource Company
HCP	Habitat Conservation Plan
IIA	Indirect Impact Area
IS	Initial Statement (CEQA)
JARPA	Joint Aquatic Resources Permit Application
KRRBI	Klamath River Rural Broadband Initiative Project
Last mile	High-speed Internet access provided to business or residence
Meet-me	Point of connection between middle mile and larger network
Middle mile	Fiber optic cable connection between the larger national fiber optic network and Last Mile services
MOA	Memorandum of Agreement
MND	Mitigated Negative Declaration (CEQA)

NAGPRA	Native American Graves Protection and Repatriation Act
NCUAQMD	North Coast Unified Air Quality Management District
NEPA	National Environmental Policy Act
NFS	National Forest System (Lands managed by USFS)
NHPA	National Historic Protection Act
NPS	U.S. Department of the Interior, National Park Service
NRHP	National Register of Historic Places
NSO	Northern Spotted Owl
OCSC	Orleans Community Service Club
PEA	Proponent's Environmental Assessment
PG&E	Pacific Gas and Electric Company, a public utility
Project	Klamath River Rural Broadband Initiative Project
RNP	Redwood National Park, federal portion of the Redwood National and State Parks
RNSP	Redwood National and State Parks
ROW	Right of Way
SF-299	Application for Transportation and Utility Systems and Facilities on Federal Lands
SWPPP	Stormwater Pollution Prevention Plan
TPZ	Timber Protection or Production Zone
Tribe	The Karuk Tribe
Tribes	The Sovereign Nations of the Karuk and Yurok Tribes
UPS	Uninterrupted Power Supply
USACE	U.S. Department of Defense, Army Corps of Engineers
USDI	U.S. Department of the Interior
USFS	U.S. Department of Agriculture, Forest Service
USFWS	U.S. Department of the Interior, Fish and Wildlife Service
WRA	William Rich and Associates (archaeological firm)

Klamath River Rural Broadband Initiative
Proponent's Environmental Assessment

1 Proponent's Environmental Assessment Summary

1.1 Overview

This Proponent's Environmental Assessment (PEA) provides a detailed project description, the environmental setting for the Project, and evaluates the potential impacts of the Karuk Tribe's Klamath River Rural Broadband Initiative Project (KRRBI Project or Project) as part of the joint National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) process. The Karuk Tribe (Tribe), a California utility (Competitive Local Exchange Carrier or CLEC1), is the lead applicant, proponent, and fiscal agent for the KRRBI Project. The KRRBI Project has been granted California Advanced Services Fund (CASF) funding from the California Public Utilities Commission (CPUC) pending an environmental review. The Project will supply middle and last mile fiber optic and non-fiber Project components in Humboldt County, California.

The KRRBI Project will install about 106 miles of "middle mile" fiber optic cable from Orleans to Weitchpec, from Weitchpec to Wautec and Tulley Creek, from Weitchpec to Orick, and from Orick to the "meet-me" with existing Suddenlink fiber north of McKinleyville. It is called "middle mile" because it connects areas without broadband fiber optic cable connections to the larger long-distance fiber optic network.

For convenience of permitting and consideration of alternatives, the middle mile portion of the Project is divided into five segments, as shown on Figure 1.1-1, a map of the Project location. Segment 1 runs from the existing fiber optic connection with Siskiyou Telephone in Orleans to Weitchpec. Segment 2 connects Weitchpec and Wautec along Highway 169, while Segment 3 connects Segment 2 to Segment 4 along Bald Hills Road. Segment 4 runs from Elk Camp Fire Station and the intersection of Johnsons Road, where Segment 3 terminates, to the town of Orick and terminates at the new Orick tower. Segment 5 connects the first four segments to the existing Suddenlink network, running from the Orick tower to the "meet-me" point. There will be "last mile" connections along all five Segments. It is called "last mile" because it connects individual customers (commercial, institutional, and domestic) to the broadband fiber optic network directly.

The Project will supply last mile high-speed broadband to anchor institutions, businesses, and residences in the communities of Orleans, Weitchpec, Wautec, Johnsons, and Orick, and other possible customers . The last mile will largely be supplied wirelessly, utilizing existing towers to broadcast the signal in Orleans and along the Klamath River in the Yurok Reservation. It will also utilize a new tower to be built in Orick as part of this Project. Some anchor institutions will receive a direct fiber connection.

[1] A service provider that competes with the incumbent company to provide local service.

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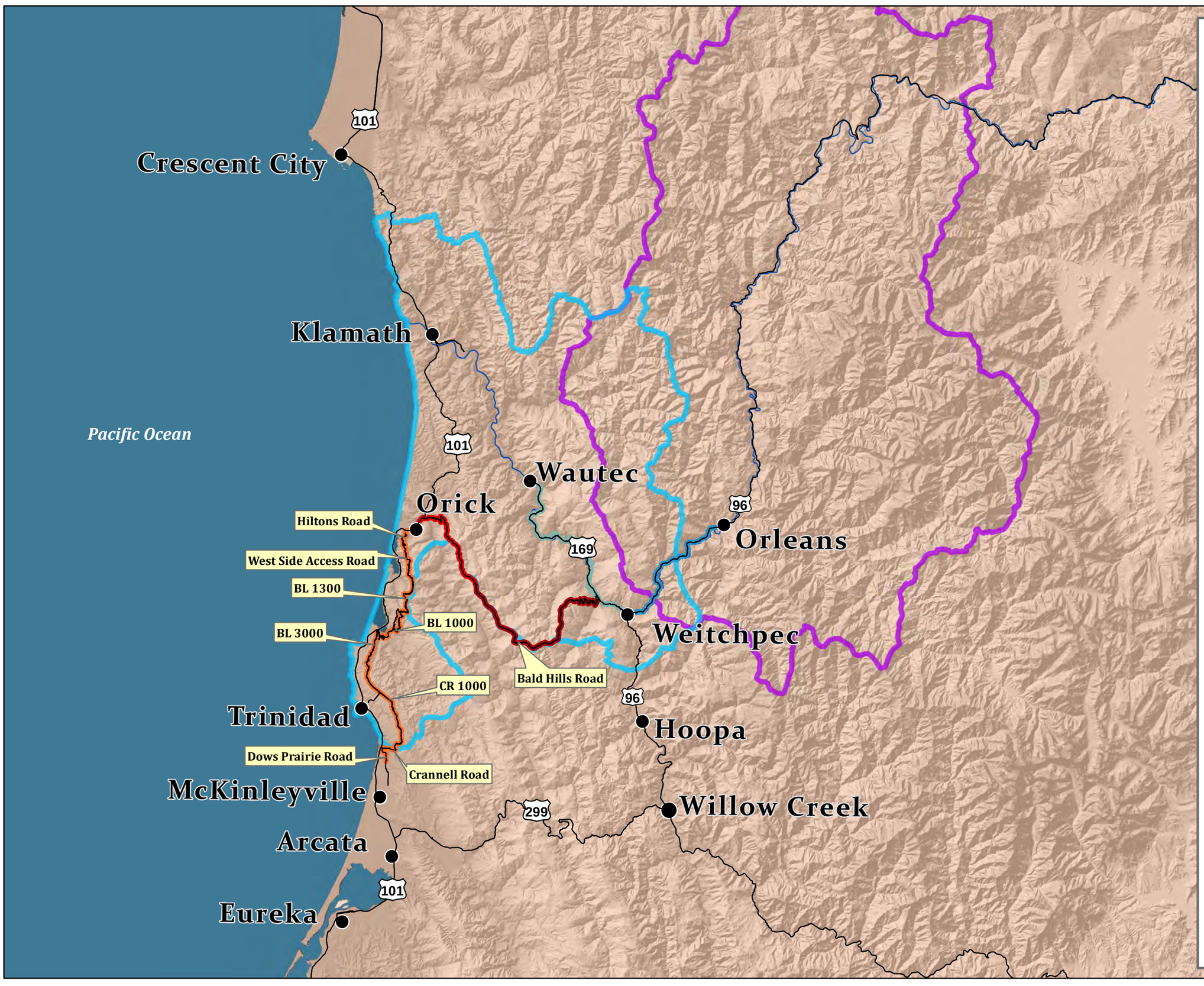
Klamath River Rural Broadband Project

Figure 1.1-1
Project Area



Legend

- Yurok Ancestral Territory
- Karuk Ancestral Territory

Fiber Install Route Segment

- 1
- 2
- 3
- 4
- 5

0 5 10 20 Miles

N W E S

Yurok Tribe GIS Program
March 15, 2016

1.2 Scope of the PEA

The PEA, prepared for the Karuk Tribe by its contractor, EnerTribe, provides a detailed Project Description in Section 2, then describes the affected environment and Project-related environmental effects of the construction, operation, and maintenance of the KRRBI Project for the following resource areas in Section 3:

- Aesthetics
- Agriculture and Forestry
- Air Quality and Greenhouse Gasses
- Biological Resources
- Cultural Resources and Tribal Cultural Resources
- Geology, Soils, and Minerals
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use, Recreation, and Planning
- Noise
- Population and Housing
- Public Services/Utilities
- Transportation and Traffic

Alternatives considered are presented in Section 4, while Section 5 presents initial environmental protection measures (EPMs) proposed as an integral part of the Project.

The PEA presents the regulatory setting, the environmental setting for the Project, and the residual environmental impacts of the Project after all reasonable design and construction elements have been incorporated into the Project description to avoid, minimize, or mitigate for adverse effects of the Project. The Project description includes a strong commitment from the Karuk and Yurok Tribes to reduce the Project impacts as much as feasible given the Project purpose and need and the timeline for being in service to these remote rural communities. This commitment to reducing Project impacts is further discussed in Section 5, Applicant Proposed Measures.

The PEA is intended to provide the Bureau of Indian Affairs (BIA), the lead federal agency for NEPA, and the CPUC, the lead state agency for CEQA, with the information needed to complete a NEPA/CEQA joint analysis and document. The Karuk Tribe anticipates that the resultant NEPA environmental Assessment (EA) and CEQA Initial Study (IS) will be sufficient for the NEPA Finding of No Significant Impact (FONSI) and the CEQA issuance of a Mitigated Negative Declaration (MND).

1.3 Coordination with Permitting Agencies

The Karuk Tribe has held two multi-agency meetings to present this Project and solicit input regarding the Project design. One was held October 14, 2014, in Eureka, CA, and the other was held on August 25-26, 2015. The latter meeting started in Orick at the U.S. Department of the Interior, National Park Service (NPS) Southern Operations Center and went on to be a two-day field review. During and after these meetings, the Karuk Tribe received important information that helped refine the Project. The NPS staff have been particularly responsive and helpful, providing Geographic Information System (GIS) files to help with the analysis and providing a

formal letter with concerns (dated November 24, 2015) regarding possible impacts on Redwood National Park (RNP) lands[2].

In addition to initial filings with NPS and U.S. Department of Agriculture, Forest Service (USFS), the Karuk Tribe has recently filed several new or amended permit applications, including:

- Revised SF-299, Application for Transportation and Utility Systems and Facilities on Federal Lands, requesting a Special Use Authorization, to the USFS to include the Yurok Signal connection, submitted June 2, 2016, to occupy a portion of National Forest System lands in the Six Rivers National Forest. On June 22, 2016, USFS staff contacted EnerTribe staff for additional information and stated that a meeting in Orleans would be scheduled in the next few weeks to go over the Project. As of the date of this publication, no meeting has occurred.
- New SF-299 requesting a ROW grant across Public Lands managed by the U.S. Department of the Interior, Bureau of Land Management (BLM)'s Arcata Field Office, submitted June 13, 2016. EnerTribe staff met with BLM staff in the field and reviewed the Project on the ground in Segment 1 just northeast of the Reservation boundary on June 10, 2016. BLM staff said they would respond positively to the BIA's letter requesting cooperating agency status and did not see any problems with the application.
- New Encroachment Permit application to the State of California Department of Transportation (CalTrans) for use of the road shoulders of Highways 96, 169, and 101 for the Project, submitted June 7, 2016. On June 24, 2016, CalTrans staff responded by phone message. EnerTribe staff has followed up with CalTrans staff.
- New Encroachment Permit application to Humboldt County Public Works for the use of road shoulders of several county roads, submitted June 10, 2016. That same day, Humboldt County Public Works staff told the Tribe that they were working on the encroachment permit and the memorandum of understanding that serves in place of a franchise to allow occupancy of Humboldt County infrastructure in parallel. Humboldt County approved the Memorandum of Understanding on October 26, 2016.
- Application to California Department of Forestry and Fire Protection (CDF) for permission to cross their parcel at Elk Camp Fire Station on Bald Hills Road, submitted July 20, 2017.

The Tribe plans to continue to work closely with these and other regulatory agencies to develop a Project description that reflects the issues, concerns, and policies of each agency and, to the

[2] Redwood National and State Parks (RNSP) include Redwood National Park (established 1968) and California's Del Norte Coast, Jedediah Smith, and Prairie Creek Redwoods State Parks (dating from the 1920s). The combined parks contain 133,000 acres. KRRBI crosses only the National Park portion and reference will be made to Redwood National Park, or RNP, in this document.

extent possible, incorporates needed measures to make the Project permissible under each agency's policies.

Section 2.3, below, further elaborates on the roles and responsibilities of participating agencies.

1.4 Public Outreach

Public outreach efforts, including outreach to federal, state, and local agencies, are summarized in Table 1.4-1, below:

Table 1.4-1. Public Outreach Record

Date	Location	Outreach Event
5/22/17	Washington, DC	Presentation of KRRBI at America's Rural Opportunity: Infrastructure Fueling Economic Development, Fourth Event,
2/1/17	Tuolumne, CA	Presentation of KRRBI during the FCC Tribal Broadband, Telecom, and Broadcast Training and Consultation Workshop
9/25/16	KRRBI project	CPUC commissioner Sandoval and telecommunications advisor William Johnston toured the KRRBI project in Yurok territory
8/26/16	Orick, CA	Agency and public meeting for KRRBI project
11/2/15	Austin, TX	Annual TribalNet conference (11/2-5/2015) – EnerTribe staff, Earthprint Staff and Karuk/Yurok tribal staff attended the conference. EnerTribe did a presentation on the KRRBI project to help raise awareness with neighboring tribes
10/30/15	Cal OES offices, Mather, CA	Presentation of Orleans Community Perspective on Broadband, Water/Energy Nexus meeting
10/19/15	news article	Article run in multiple news sources: http://anewscafe.com/2015/10/19/indian-country-gets-wired-karuk-tribe-brings-broadband-to-the-boondocks/
10/16/15	Orleans Karuk Council Chambers	Ribbon Cutting Ceremony for Áan Chúuphan. This event was publically broadcasted and attended by members of the public, tribal members, agencies, and tribal leadership
8/25/15	Orick, CA	Environmental project walk for CPUC and permitting agencies for KRRBI, on site and at National Park offices (8/25-26/2015).
7/8/15	Yurok Tribal Offices, Weitchpec, CA	Public Hearing with CPUC, Verizon, community leaders, agencies, tribal leaders etc. to address broadband concerns and how KRRBI will solve some of them
4/9/15	Orleans Karuk Council Chambers	Broadband Meeting with tribal leadership, communications consultants, contractors and concerned community members
3/13/15	news article	Article in the Eureka Times-Standard "Broadband coming to Orleans": http://www.timesstandard.com/article/NJ/20150313/NEWS/150319905
3/4/15	news article	Article in Indian Country Today to raise awareness: http://indiancountrytodaymedianetwork.com/2015/03/04/karuk-yurok-tribes-bringing-broadband-remote-homes-california-159467
11/12/14	Las Vegas, NV	TribalNet Conference, panel discussion on Broadband in Indian Country and the KRRBI project success. This helped raise awareness with neighboring tribes and Indian Country as a whole
10/14/14	Tribal Offices, Smith River, CA	Tribal meetings with Commissioner Catherine Sandoval and her Telecommunications Adviser William Johnston. Tolowa tribal representatives and the team discussed the Broadband projects in Indian Country and the "Water/Energy Nexus".

Table 1.4-1. Public Outreach Record

Date	Location	Outreach Event
8/27/14	Klamath, CA	Presentation of KRRBI during the FCC Tribal Broadband, Telecom, and Broadcast Training and Consultation Workshop
7/23/14	Coeur d'Alene, ID	Presentation of KRRBI during the FCC Tribal Broadband, Telecom, and Broadcast Training and Consultation Workshop
5/6/14	Tribal Council Chambers, Hoopa and Orleans, CA	Meetings with Karuk, Yurok and Hoopa tribes and CPUC to raise awareness and discuss challenges facing the KRRBI project
5/4/14	Willow Creek, CA	CPUC meeting with the City of Willow Creek and local agencies and municipalities to discuss Broadband Plans and how KRRBI will affect the town
3/11/14	Hoopa Valley Community Center	Meeting with River communities (Hoopa) to discuss economic impacts of Broadband along the river including the KRRBI project. This meeting was well attended by roughly 50 community and tribal members.
2/26/14	Yurok Tribal Offices, Weitchpec, CA	EnerTribe team hosts community meetings with Karuk tribe for further field engineering of KRRBI project
2/6/14	Trinidad, CA	EnerTribe presents - Tribally chartered Broadband efforts at the Northern California Tribal Chairmen's Association
1/27/14	news article	"Strike Up The Broadband" article posted in the Eureka Times-Standard: http://www.times-standard.com/article/zz/20140127/NEWS/140128981
1/22/14	news article	Karuk Tribe presents Broadband article, http://www.times-standard.com/…/karuk-tribe-presents-broadb…
1/21/14	Eureka, CA	presentation to the Humboldt County Board of Supervisors on KRRBI
12/12/13	Arcata, CA	Live radio interview on KHSU show Thursday Night Talk regarding KRRBI
11/15/13	Yurok Tribal Offices, Weitchpec, CA	Kickoff for the KRRBI project with Yurok Tribe and members of the community
11/3/13	news article	Sacramento Bee column Northern Exposure article "Remote area will get broadband": https://www.yumpu.com/en/document/view/52466401/northern-exposure-jane-braxton-little-dyerpress
10/30/13	news article	Live radio interview discussing the KRRBI project on Jefferson Public Radio, "Broadband Access Comes to Karuk & Yurok County": http://ijpr.org/post/broadband-access-comes-karuk-yurok-country
10/19/13	news article	Article in the Record Searchlight "$6.6M given to provide Internet service" (no link available).
10/18/13	news article	Article in the Eureka Times-Standard "Tribes get $6.6M for broadband service": http://www.times-standard.com/general-news/20131018/community-connection-tribes-get-66m-for-broadband-service/1
10/18/13	news article	Recorded radio interview "Broadband Internet Headed to Rural Humboldt County" on KMUD.org online radio (no link available).

1.5 Summary of Findings

The KRRBI Project has minimal impacts on the environment, none of which is significant when Proponent-proposed measures and permit terms and conditions are applied. The small possible impacts to special status species or cultural resources will be mitigated through avoidance and minimization measures.

2 Project Description

2.1 Introduction

This section presents the Project purpose and need in Section 2.2, then the roles and responsibilities of the proponent's team and the many involved agencies in Section 2.3. Section 2.4 provides a detailed Project description, including fiber optic and non-fiber Project components, construction details, and operations and maintenance plans. Section 5 covers the Proponent's proposed environmental protection measures (EPMs), which are explicitly a part of the Project as proposed.

2.2 Purpose and Need

2.2.1 Purpose and Goals of Project

The purpose of the KRRBI Project is to provide high-speed broadband Internet service to people living in the ancestral territories of the Karuk and Yurok Tribes (Tribes), including tribal and non-tribal community members, who are presently unserved or underserved by current service providers.

The Project will provide broadband access to 7 first responder agencies, 19 other anchor institutions, as well as 616 households in Orick, Orleans, Johnsons, Wautec, Weitchpec, and other neighbors and businesses along Segments 1-4 where 295 households are unserved and 321 households are underserved. To achieve this shared goal, the Tribes have agreed to partner under the Karuk Tribe's CLEC.

2.2.2 Current Internet Access

The KRRBI service area is very large, and identifying current internet access is best discussed at the community level. KRRBI is serving 5 unserved or underserved communities: Orleans, Weitchpec, Ka'Pel, Wautec, and Orick. In all 5 communities, satellite Internet was probably the most common form of Internet access. The communities are listed below with a description of the service that was available at the end of 2015.

Orleans: In October 2015, the Karuk Tribe launched Áan Chúuphan, a wireless Internet provider in Orleans. However, by the end of 2015, only 5 subscribers had been connected. Most of Orleans was still unserved, except by satellite Internet. Áan Chúuphan offered plans up to 3.2 Mbps download and 1.4 Mbps upload.

Weitchpec, Ka'Pel, and Wautec: These three communities are served by Yurok Connect, the Yurok Tribe wireless Internet provider. The maximum speed available to Yurok Connect subscribers was 3.2 Mbps download and 1.4 Mbps upload. A few households in these communities may have limited access to US Cellular or Verizon Wireless 3G service, but this is not available to the communities as a whole, but only to a lucky few who can reach cell towers over 20 miles away through dense forest.

Orick: In May of 2015, Tsunami Wireless expanded services into Orick. They offered speeds of 6.5 Mbps download and 1.6 Mbps upload. A few households in this community may have been served by Verizon Wireless 3G or 4G services, but these services are not available to the community as a whole.

The Karuk Tribe estimates that only 5% of Orleans had underserved access as of the end of 2015, while 75 to 90% of the populations of Weitchpec, Ka'Pel, and Wautec had underserved access. Orick was listed on the California broadband map as partially served, where an unknown percentage of households had access to full broadband service according to the California standard.

The current carriers in the region are:

- Yurok Connect
- Áan Chúuphan
- Tsunami Wireless
- Frontier Communications
- Verizon Wireless
- US Cellular

Áan Chúuphan, Yurok Connect and Tsunami wireless all use unlicensed radio frequencies for last mile service, with a mix of unlicensed and licensed radio frequencies for middle mile service. Áan Chúuphan also has a short fiber optic run as part of its middle mile infrastructure. Verizon Wireless and US Cellular use their own cellular networks for middle mile service. Frontier Communications acquired the telephone facilities of Verizon California in April of 2016.

2.2.3 Integration with Existing Broadband Carriers

The project area covered by KRRBI is extremely rural, and the Karuk Tribe believes the best way to serve the population of the region is to provide interconnections with existing providers. Although limited competition for the same households may occur, the benefits to providers for backhaul and transport cost savings make a solid business case for fiber optic interconnections between broadband carriers.

The Yurok Connect and Áan Chúuphan Wireless Internet Service Providers are owned and operated by the Yurok Tribe and the Karuk Tribe, respectively. As partners to implement KRRBI, the Yurok and Karuk Tribes will incorporate the existing Yurok Connect and Áan Chúuphan subscribers into the KRRBI network. The Karuk and Yurok Tribes intend to form a single new combined ISP that will maintain operations after KRRBI completes construction.

Frontier Communications is the Incumbent Local Exchange Carrier for most of KRRBI's project area. The Karuk Tribe contacted Frontier and arranged to provide fiber optic interconnections between KRRBI's and Frontier's networks at three locations: Frontier's central office in Orick, Frontier's central office in Orleans, and a fiber splice box in Weitchpec.

Tsunami Wireless has radio equipment attached to an existing tower near the town of Orick. The Karuk Tribe contacted Tsunami and offered to provide a fiber optic connection to the existing tower, which Tsunami accepted. Tsunami is now considered an anchor institution in the KRRBI project.

The fiber optic network built by KRRBI will be able to support cellular networks. Any cellular carriers, including Verizon Wireless and US Cellular, will be welcome to lease space on KRRBI towers or have KRRBI provide fiber to a private tower. However, such connections are outside the scope of KRRBI and are not part of the KRRBI Project.

2.2.4 Project Need

This Project is needed because the area to be served is so remote and with such a scattered population that commercial carriers have refused to extend adequate broadband service. The communities to be served by this Project have low median household incomes, high unemployment rates, and few economic opportunities in the local area. In order to curb the departure of tribal and non-tribal community members to larger urban areas, the KRRBI Project will contribute to better education, health care, and business opportunities available through access to broadband Internet facilities, thereby developing economic opportunities in the communities themselves.

Providing broadband to this previously unserved or underserved area will bridge the digital divide that currently separates remote rural communities from the rest of the digitally connected world. The benefits expected from this Project include:

- Improved on-line learning opportunities. The narrow one- and two-lane roads in this area are often closed in winter for hours or days at a time, and reliable broadband will allow students to avoid missing classes in remote high schools and colleges because they can attend from their homes or from community facilities like the Orleans Panamnik Library. Job training, including for emergency first responders, will be available to all community members.
- Improved emergency response. Broadband will enable fire departments and local rescue organizations to assist in communicating with first responders in the event of an emergency. The area to be served is a high-risk fire area and improved broadband speeds will facilitate the transmission of data and communications among first responders and the public.
- Improved health care. Distance to health care facilities is a large problem in remote communities. Access to remote doctors, Internet-based medical services for individuals, and the ability of small rural clinics to access sophisticated medical diagnostic tools are all important benefits of high-speed broadband Internet access.

- Improved business opportunities. Multiple business opportunities are available to develop and expand local businesses with high-speed Internet access, including on-line sales for businesses such as nurseries, organic farms, and orchards.
- Improved government interactions. Many government services are now available exclusively on the Internet or provide preferential access online. Paying taxes, registering an automobile, registering to vote, applying for jobs, and filing for unemployment all can be completed with broadband more quickly than driving to the local government office. Transportation costs are also saved, with less wear and tear on vehicles and roads.
- Cultural preservation. Access to broadband services will help facilitate cultural preservation by enabling the Yurok and Karuk tribes to have regular communication with tribal members not living within the tribal boundaries. Online classes in Native languages, beading, and cultural awareness, among others, will enable tribal members to contribute to the maintenance of cultural traditions and to make them a part of everyday life for tribal members regardless of where they live.
- Improved quality of life. Broadband provides a wide range of opportunities for residents in these remote areas to be connected to real time and current events that provide cultural, civic, health and recreational information as well as improved opportunities to interact with distant family and friends.

2.3 Roles and Responsibilities

This section explains the relationships among the Tribes and their contractors and subsidiaries, and the team's relationship with the various agencies responsible for funding or permitting the KRRBI Project. It also specifies the decision each agency is responsible for in approving the Project. Table 2.3-1 summarizes the major permits, approvals, and consultations that the KRRBI Project will need to go to construction and to operate.

Table 2.3-1. Major Permits, Approvals, and Consultations Required for KRRBI

Regulatory Agency	Permit, Approval, or Consultation	Agency Action
Federal		
US Department of the Interior (USDI), Bureau of Indian Affairs (BIA)	Approval for use of tribal trust lands	In consultation and coordination with the Yurok and Karuk Tribal Councils, consider permitting construction, operation, and maintenance of fiber optic cables, conduits, and related facilities on lands held in trust for either Tribe.
USDI National Park Service (NPS)	Right-of-Way Permit	Consider issuance of a Right-of-Way Permit
USDI Bureau of Land Management (BLM)	Right-of-Way Permit	Consider issuance of a Right-of-Way Permit

Table 2.3-1. Major Permits, Approvals, and Consultations Required for KRRBI (continued)

Regulatory Agency	Permit, Approval, or Consultation	Agency Action
US Department of Agriculture, Forest Service (USFS)	Temporary Use Permit	Consider issuance of a Temporary Use Permit for temporary activities in a construction right-of-way (ROW) on National Forest System (NFS) Lands
	Special Use Authorization	Consider issuance of a Special Use Authorization for use of NFS lands for construction and operation of a fiber optic line.
US Department of Defense, Army Corps of Engineers, San Francisco District (USACE)	Section 404, Clean Water Act Permit	Consider issuance of a Section 404 permit for the placement of dredge or fill material in waters of the United States, including jurisdictional wetlands.
Advisory Council on Historic Preservation (ACHP)	Section 106, Consultation, National Historic Preservation Act (NHPA)	Has the opportunity to comment if the Project may affect cultural resources that are either listed on or eligible for listing on the National Register of Historic Places (NRHP)
USDI, Fish and Wildlife Service (USFWS)	Section 7 Consultation, Endangered Species Act	Consult on lead agency finding of impact on federally listed species.
California		
California Public Utilities Commission (CPUC)	California Advanced Services Fund (CASF) Grant approval	After consideration of the environmental effects of the proposed Project, determine whether to issue grant funding under the CASF program.
	Revised Certificate of Public Convenience and Necessity (CPCN) for a Facilities-Based Competitive Local Exchange Carrier (CLEC)	Consider issuance of a revised CPCN to the Karuk Tribe as a Facilities-Based CLEC to allow the construction, operation, and maintenance of the fiber optic cable, wireless towers, and associated facilities.
California Department of Transportation (CalTrans)	Encroachment Permit	Consider issuance of an encroachment permit for underground and overhead installations within the easements or properties on California-managed state highways (96, 169, and 101)
California State Lands Commission (CSLC)	Easement, upland	Consider issuance of an easement for the KRRBI Project across an upland parcel along Bald Hills Road
	Easement, waters of the State	Consider issuance of an easement for the KRRBI Project across the Klamath River at Martins Ferry and at Orleans.
California Department of Fish and Wildlife (CDFW)	California Endangered Species Act concurrence (2080.1)	Determine whether the federal ESA declaration meets California ESA standards
	Stream and Lake Alteration Permit (1602)	Consider issuance of a 1602 permit to allow installation of fiber optic cable in roadside ditches that also carry waters of the State, and to allow installation of fiber optic cable beneath waters of the State.

Table 2.3-1. Major Permits, Approvals, and Consultations Required for KRRBI (continued)

Regulatory Agency	Permit, Approval, or Consultation	Agency Action
California (cont.)		
California State Water Resources Control Board (Board), Region 1, North Coast	Clean Water Act Section 401 certification of USACE 402 permit	Determine whether the terms and conditions of the USACE 402 permit meet California clean water standards
	Clean Water Act Section 402 Construction General Stormwater Permit	Decide whether to issue a General Stormwater Permit for construction based on application and best management practices
Humboldt County		
Board of Supervisors	Memorandum of Agreement (MOA)	Decide whether to sign a revised MOA with the Karuk Tribe allowing occupancy of county roads and bridges with fiber optic cable for the KRRBI Project
Public Works	Encroachment Permit	Consider issuance of an encroachment permit for underground and overhead installations within the easements of Humboldt County roads and bridges
Planning and Building	Building Permit	Issue a building permit to allow construction of the broadband tower, its appurtenant buildings, generator, and electrical connection, in Orick.

2.3.1 Karuk and Yurok Tribes

The Tribes, each a sovereign nation, are teamed for the purposes of the KRRBI Project and are the lead decision-makers for activities that occur within reservation boundaries and on tribal trust land outside of reservation boundaries. Where activities take place outside of reservation boundaries or trust lands, the Tribes recognize the authority of federal, state, and local agencies to conduct environmental review and issue permits for those activities. However, the Tribes anticipate that each government agency will recognize their unique government-to-government relationship with the Tribes and accord the permitting process every priority and attention so that the Tribes may timely provide this important service to Tribal members and to other members of communities in the service area. As the holder of the CLEC, the Karuk Tribe is the formal proponent of the project.

2.3.1.1 Tribal Contractors

The Karuk Tribe has retained the services of two Native-owned contractors to provide program management, Project management, permitting, and construction services. EnerTribe has been retained to provide overall program management, Project management, permitting, and easement acquisition for the KRRBI Project. Earthprint Technologies has been retained to provide last-mile wireless engineering, equipment, installation, and service.

The Karuk Tribe selected an Owner's Engineer, a firm that will provide design advice, drawings, and specifications during permitting, develop the final drawings and specifications for the construction contract, and oversee the technical aspects of construction. Trinity Valley Consulting Engineers, a Native-owned firm, and their partner N-Com, were awarded the

Owner's Engineer contract and have been providing additional details for the Project Description and technical options for avoiding environmental impacts.

2.3.2 Federal Agencies

The KRRBI Project will cross lands managed by three federal agencies: RNP, managed by the NPS, two parcels of Public Lands near Weitchpec on Highway 96 managed by the BLM; and Six Rivers National Forest, managed by the USFS. There may be a need for one or more permits under the Clean Water Act for temporary impacts to wetlands from the United States Army Corps of Engineers (USACE). The BIA, the surface management agency for Tribal lands held in trust and for allotments, will serve as the lead federal agency in the NEPA analysis. Detailed discussion of federal agencies follows.

2.3.2.1 Federal Communications Commission

While the Federal Communications Commission does not have a decision to make with regards to the KRBBI Project, this agency has a long-term commitment to assure high-speed broadband Internet service to Native Americans both on and off reservations throughout their ancestral territories. The service provided by the system installed under this grant has compliance and reporting requirements under Federal Communications Commission rules.

2.3.2.2 BIA

The BIA, Pacific Regional Office, is the surface management agency for lands held in trust and for allotments for the Yurok and Karuk Tribes and for the Hoopa Tribe to the south. Their decision is whether to approve the use of trust and allotment lands as requested by the Tribes for the KRRBI Project, subject to the approval of the Tribal Councils and allotment landowners, respectively. The BIA has accepted the role of lead agency for federal permitting purposes based on resolutions so requesting issued by the Karuk and Yurok tribes. The BIA is the lead agency for the NEPA environmental analysis and documentation. The BIA signed an agreement on January 21, 2016 with the CPUC for the production and review of a joint NEPA/CEQA environmental document. On October 28, 2015, the BIA issued letters offering cooperating agency status for the purposes of the NEPA review to the NPS, the USFS, and the USACE. On April 29, 2016, the BIA issued a similar letter to the BLM.

2.3.2.3 NPS

The Karuk Tribe submitted an application to the NPS on August 21, 2014 (Segments 3-5) and is preparing a revision to the application to request additional easements along Hilton Road and the West Side Access Road as part of the newly proposed Segment 5. Both easement requests are subject to the regulations in the federal Code of Regulations, Chapter 36, Part 14, and requests a right-of-way (ROW) through the Redwood National Park unit of the NPS that follows and is located within the existing disturbed road ROW for Bald Hills Road, Highway 101, Hilton Road, and the West Side Access Road. NPS will consider whether to issue the ROW,

dependent on finding that such issuance will have only minimal adverse effects on the natural or cultural resources of the park and will not be inconsistent with the purposes of the park. The Redwood National Park responded to the initial application with a letter dated October 8, 2014, stating that the application had been received but was considered incomplete because it lacked enough information to write a legal description of the ROW. The Karuk Tribe proposes to wait until the NEPA/CEQA process is complete and an agency-preferred set of alternatives identified before conducting the survey and writing a legal description in order to complete this application.

The NPS received the cooperating agency request letter from the BIA in November 2015 and also sent a comment letter to the Karuk Tribe regarding the proposed use of roads within the RNP on November 24, 2015. The Karuk Tribe provided a formal response to the NPS on April 22, 2016. Karuk and Yurok staff and councilmembers, including Reneé Stauffer, a Karuk Tribal Councilmember, and Joseph James, a Yurok Tribal Councilmember, met with the NPS on June 15, 2017, to discuss NPS cultural resources concerns.

2.3.2.4 BLM

The BLM manages two parcels of Public Land along Segment 1 between the Six Rivers National Forest and the Yurok and Hoopa Reservations (530-007-008 and 530-007-112, T 9 N, R 4 E, Section 1, Humboldt Base and Meridian). The Karuk Tribe submitted an SF-299 to apply for a ROW grant from the BLM to cross these two parcels in the easement for Highway 96 on June 13, 2016. The BLM must determine, under the Federal Land Policy and Management Act of 1976, as amended, whether to issue a ROW Grant to allow the KRRBI Project fiber optic cable and conduit components to occupy the easement already granted to CalTrans for State Highway 96 where that easement crosses Public Lands.

2.3.2.5 USFS

The USFS manages the National Forest System (NFS) lands that will be crossed by the KRRBI Project from Orleans to the Yurok Reservation boundary near Weitchpec (Segment 1). It also manages the land where the Orleans Mountain and Antenna Ridge repeaters will be placed (Yurok Signal Connection). The USFS must determine, under the Federal Land Policy and Management Act of 1976, as amended, whether to issue a Special Use Authorization to allow the KRRBI Project fiber optic cable and conduit components to occupy the easement already granted to CalTrans for State Highway 96 where that easement crosses NFS lands. The Karuk Tribe submitted an application to amend its existing Special Use Permit (OR-181) on August 21, 2014. While the USFS never responded to that application, they did respond to the amended application for a Special Use Authorization to include the Yurok Signal connection, submitted June 2, 2016, to occupy a portion of NFS lands in the Six Rivers National Forest. On June 22, 2016, USFS staff contacted EnerTribe staff for additional information and stated that a meeting

in Orleans would be scheduled in the next few weeks to go over the Project. As of November 30, 2017, no meeting has been scheduled.

The USFS received the cooperating agency request letter from the BIA in November 2015 but has not responded to the BIA as of November 30, 2017.

2.3.2.6 United States Army Corps of Engineers

The USACE is charged with the responsibility for overseeing the enforcement of Section 404 of the Clean Water Act, regarding activities within Waters of the United States, and for overseeing the enforcement of the Rivers and Harbors Act. While the KRRBI Project will not affect any large bodies of water or wetlands, the Project will cross streams now located in culverts or under bridges. The Project will cross the Klamath River with new overhead lines twice, once in Orleans and once at Martin's Ferry, and may install the fiber optic cable within floodplains, coastal zones, or wetlands, which may require consultation with the USACE and possible application for and issuance of a Nationwide 12 permit for utility installation.

The USACE received the cooperating agency request letter from the BIA in November 2015 and responded with a standard list of permit application requirements on December 21, 2015.

2.3.2.7 Advisory Council on Historic Preservation

The ACHP, under Section 106 of the NHPA, has the opportunity to comment if the Project may affect cultural resources that are either listed on or eligible for listing on the National Register of Historic Places (NRHP). The Karuk Tribe does not anticipate that the project will have an adverse effect on such properties, but until the cultural resources site review and field surveys are complete, this is unknown.

2.3.2.8 United States Fish and Wildlife Service

The USFWS, under Section 7 of the ESA, has the opportunity to consult with the lead federal agency finding of impact on federally listed species, if the BIA identifies adverse impact. The biological report for this project indicates there would be no adverse impact to any federally listed species identified at this time.

2.3.3 State Agencies

Several agencies will or may be involved in this Project.

2.3.3.1 California Public Utilities Commission

The CPUC, as the issuer of the CASF Grant to the Tribes, is the State of California Lead Agency under CEQA. The Commission issued a Resolution funding KRRBI (T-17418, October 17, 2013[3]) subject to environmental review and approval. This resolution requires, among other things, for the Tribes to provide a PEA. The CPUC will, employing the services of a third party

[3] Available online at http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M079/K045/79045675.pdf, last accessed December 15, 2017.

contractor (Environmental Science Associates), review the PEA, produce an IS, and likely issue a mitigated negative declaration MND decision document, since the impacts of this Project on the environment will be shown to be minimal. The CPUC will determine if the Project should be funded and what environmental protection measures may be needed to avoid, minimize, or compensate for any adverse effects of the Project.

The CPUC will also use this CEQA process to inform its decision to revise the Karuk Tribe's CLEC to a full facilities-based CLEC, accompanied by a revised CPCN that will permit the construction, operation, and maintenance of the KRRBI Project on and off tribal trust lands.

2.3.3.2 California Department of Transportation (CalTrans)

The Karuk Tribe will submit an encroachment permit application to CalTrans for use of an easement along Highways 96 (Segment 1), 169 (Segment 2), and 101 (Segments 4 and 5) for the construction, operation, and maintenance of the fiber optic cable. Based on the response of CalTrans for the Orleans Community Connect Project, it is expected that CalTrans will issue the permit without charge as a government-to-government courtesy. Table 2.4-2 details proposed installations within state highway easements or fee ownerships, by installation method.

The Karuk Tribe is also discussing the possible use of the CalTrans storage yard in Orick as an alternative location for the Orick broadband tower (Section 4.6.2.2).

2.3.3.3 California State Lands Commission

The KRRBI Project will use the previously disturbed road area of the Bald Hills Road for underground installation of its middle mile fiber optic cable and conduits. Bald Hills Road crosses a small portion of lands managed by the CSLC (Humboldt County Assessor's Parcel # 531-023-008). In addition, the CSLC asserts jurisdiction over any crossing of the Klamath River, and an easement for that crossing would be required, even for a bridge hang or an aerial crossing. The Karuk Tribe will submit an application for the upland crossing on Bald Hills Road and for an overhead crossing of the Klamath River at Orleans (Segment 1) and at Martin's Ferry (Segment 2). If Alternative 5A were selected, there would be an additional easement needed for state coastal water crossing at Big Lagoon.

2.3.3.4 California Department of Forestry and Fire Protection

The Elk Camp Fire Station occupies land owned and operated by CDF (Humboldt County Assessor's Parcel # 532-073-008). The Karuk Tribe applied on July 20, 2017, for permission to occupy the Bald Hills Road easement across this parcel.

2.3.3.5 California Department of Fish and Wildlife

CDFW, formerly Fish and Game, does not manage any land to be crossed by the KRRBI Project but must be consulted regarding possible impacts to waters of the state and to species on the California Endangered Species Act (CESA) lists. Because the Project will have minimal impact

on waters of the State and no impact on CESA-listed species, it is anticipated that these consultations will be *de minimis*.

2.3.3.6 State Parks

California State Parks manages the Humboldt Lagoons State Park and the Harry A. Merlo State Recreation Area and co-manages RNSP with the NPS. The proposed route will not cross any state parks, including the state components of the RNSP, but Alternative 5A would occupy the State Highway 101 easement across the Humboldt Lagoons Park and the Merlo State Recreation Area. Therefore, there may be a need to apply for a separate easement from the State Parks if agencies choose that alternative. The Project will confirm with State Parks the need for an easement, and if needed, will apply for permission to occupy the Highway 101 easement.

State Parks have requested broadband service from the KRRBI project to the following State Park facilities:

- Prairie Creek Redwoods State Park
- Proposed new Visitor's Center (old mill grounds at intersection of Bald Hills Road and Highway 101, co-located with NPS)
- Southern Operations Center (co-located with NPS)

Revised KRRBI plans include a short spur to the proposed Visitor's Center and another to the existing Southern Operations Center. The five-mile extension to serve Prairie Creek Redwoods State Park is not included in the KRRBI project at this time due to very high costs.

2.3.3.7 California State Water Resources Control Board

The Board, Region 1, North Coast, has two delegated duties under the federal Clean Water Act. Under Section 401 of that Act, the Board must determine whether a permit proposed for issuance by the USACE meets state water quality standards. Under Section 402 of that Act, the Board must determine whether to issue a General Stormwater Permit for construction based on an application from the Tribe's construction contractor and the best management practices proposed in that contractor's Stormwater Pollution Prevention Plan (SWPPP).

2.3.4 Humboldt County

The Karuk Tribe will request a building permit from Humboldt County for construction of the wireless broadband tower in Orick. The Tribe will also request an encroachment permit and long-term agreement to occupy the road prism of several county roads and bridges managed by Public Works. The Karuk Tribe and Humboldt County have signed a Memorandum of Agreement to accommodate these installations[4]. Table 2.4-2 details proposed installations within Humboldt County road easements or fee ownerships, by installation method. Humboldt County will be a responsible agency in the CEQA proceedings led by the CPUC.

[4] Karuk Tribe Resolution 16-R-142 (8/25/16);Humboldt County Board of Supervisors Resolution 16-A-20 (9/26/16)

2.3.4.1 Planning

The construction of the Orick Tower, presently planned for a non-exclusive occupancy easement on private lands outside the special Highway 101 commercial zone, does not require special permitting from Humboldt County Planning. The Project must comply with the requirements of a building permit, which requires additional soils studies, detailed drawings, periodic County inspections during construction, and final County approval before operations.

2.3.4.2 Public Works (Encroachment Permit)

The KRRBI Project has applied to Humboldt County Public Works for an Encroachment Permit to install fiber optic cable above (on existing poles) or within the road prisms of Humboldt County roads, wherever possible in the shoulder or uphill (inboard) ditch of the road. Issuance of this permit is subject to the terms and conditions of the updated and approved MOA between the Karuk Tribe and Humboldt County that provides county permission for long-term occupancy.

2.4 Project Description

This section describes and illustrates the fiber optic routes and installation methods. It also presents details on additional system components including the proposed wireless tower, a wireless signal transmission facility, and the last mile components that deliver high-speed broadband to individual anchor institutions, businesses, and residences.

2.4.1 Proposed Fiber Optic Cable Route

Figure 1.1-1, above, shows the Project area in Northern California and the proposed Project routes. The fiber optic cable is planned in five segments totaling about 104 miles as shown on Figures 2.4-1 through 2.4-5. Each segment is anchored by critical points in the path where service must be supplied. Alternatives for two of the segments have been considered and are discussed in Section 4. They are illustrated in Figure 4.1-1. The segments include:

- **Segment 1:** (15.2 miles) Orleans to Weitchpec, following Highway 96. No feasible alternatives (Figure 2.4-1). This segment includes a 0.5-mile spur that will serve Caltrans and the Karuk offices just north of the Orleans bridge along Highway 96 (Figure 2.4-1a). It also includes two short 0.1-mile spurs:
  - to the existing Orleans broadband tower
  - to the existing Frontier landline central office in Orleans
- **Segment 2:** Weitchpec to Wautec, entirely within the Yurok Indian Reservation. Includes a 2-mile spur to serve the Yurok Tribe's Tulley Creek facility for a total distance of 24.2 miles. No feasible alternatives (Figure 2.4-2).
- **Segment 3:** (21.9 miles) Weitchpec to Elk Camp. This segment has a proposed and an alternative route (see Section 4.1.1 for description of the alternative). The proposed

route travels from the Tulley Creek facility side route of Segment 2 along Bald Hills Road to Elk Camp and includes a short 0.1-mile spur to the existing Elk Camp Fire Station (Figure 2.4-3).

- **Segment 4:** Elk Camp to Orick Tower. No feasible alternatives (Figure 2.4-4). This segment follows Bald Hills Road from Elk Camp to Highway 101 just north of Orick, then through the town of Orick to the proposed tower location for a total distance of 11.8 miles. It includes four additional short spurs, all 0.1 mile or less:
  - to the proposed Orick tower for this project,
  - to the existing State Parks office at the Southern Operations Center facility shared with the National Park Service,
  - To the proposed Visitor Center at the intersection of Bald Hills Road and Highway 101 just east of Orick, and
  - to the existing Frontier office in Orick
- **Segment 5:** Orick Tower to Fiber Network Meet-Me. This segment has a proposed and an alternative route (see Section 4.1.2 for description of the alternative). The proposed route follows Highway 101 from the Orick tower, through the town of Orick to the intersection of Highway 101 and Hiltons Road. It then turns north and follows Hiltons Road to the gate for the NPS West Side Access Road. Along that stretch a 0.2-mile fiber spur will serve the existing Tsunami Wireless tower. The route then follows the NPS West Side Access Road about 5 miles to the BL-1300 Road on Green Diamond Resources (GDR) land, then follows the BL-1300, BL-1000, and BL-3000 roads to the Green Diamond road CR-1000 (also known as the A-Line or Hammond Truck Road). It then follows the CR-1000 road to the Humboldt County Crannell Road, where follows Crannell Road to Dows Prairie Road, then continues to the Dows Prairie Road meet-me point with Suddenlink for a total distance of 33.1 miles. (Figure 2.4-5).

Further details on the location of each segment and its proposed installation methods are found in Section 2.4.4.2.

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Klamath River Rural Broadband Initiative

Figure 2.4-1
Segment 1
Orleans to Weitchpec

SIX RIVERS NATIONAL FOREST

Orleans

96

Segment 1

Segment 2

169

96

Weitchpec

96

Legend

Yurok Reservation Boundary

Fiber Install Route

Segment

1

2

3

4

5

N

W E

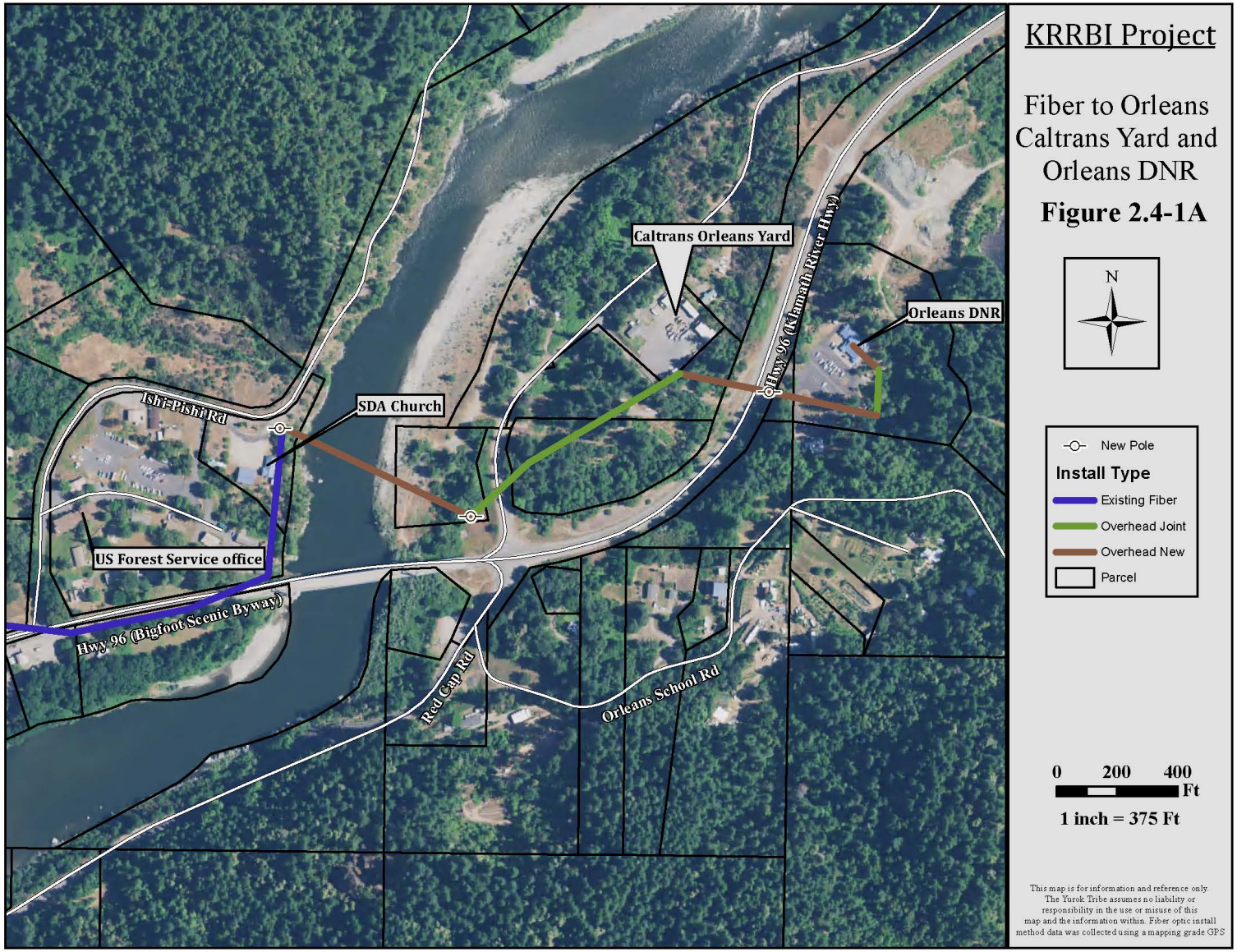
S

0 0.75 1.5 Miles

This map is for information and reference purposes only. The Yurok Tribe assumes no liability or responsibility in the use or misuse of this map and the information within. Fiber optic install method data was collected using mapping grade GPS.

Yurok Tribe GIS Program
March 5, 2016

Figure 2.4-1a. Segment 1 – Spur to Caltrans and DNR, Orleans



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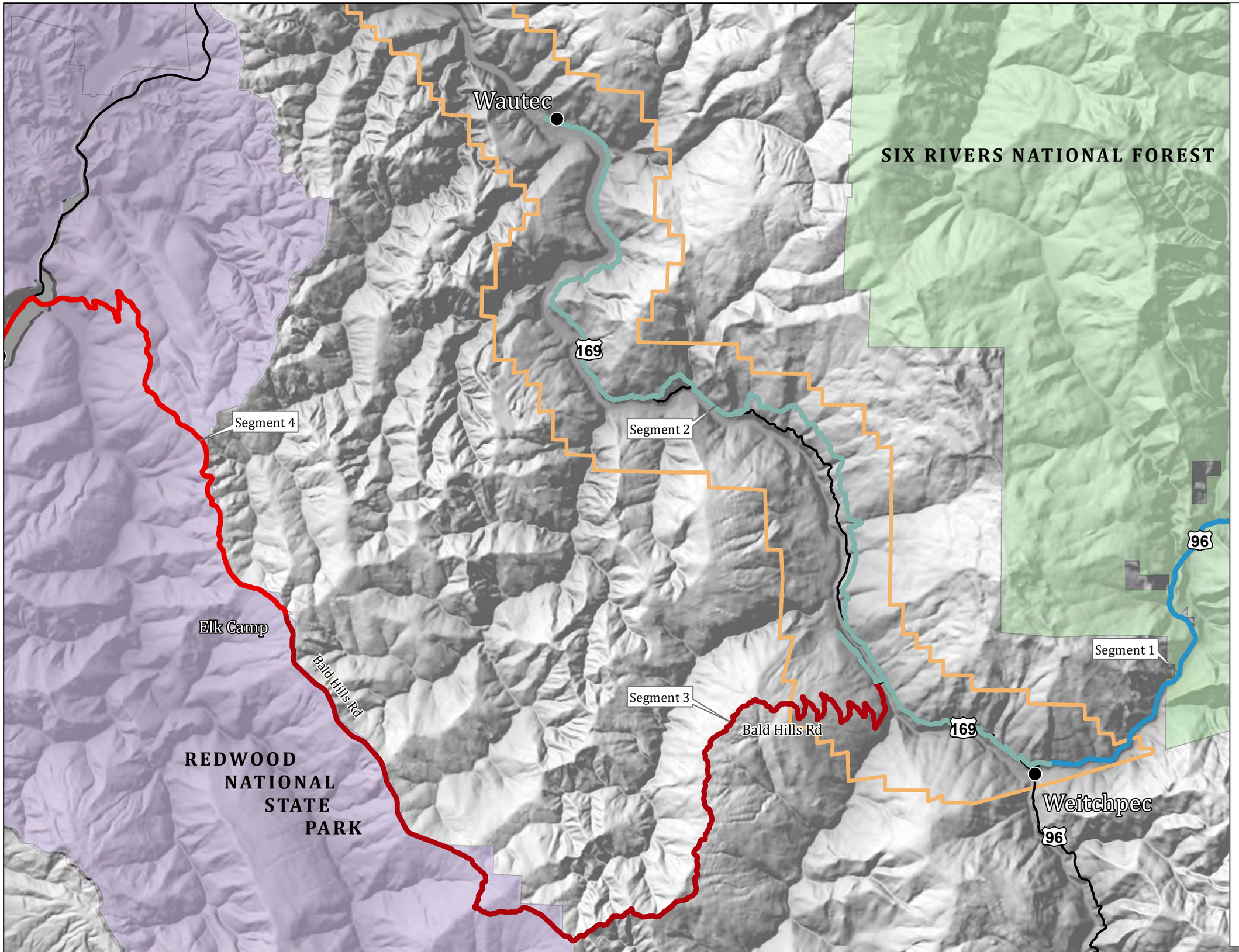
Klamath River Rural Broadband Initiative

Figure 2.4-2
Segment 2
Weitchpec to Wautec



Legend

- Yurok Reservation Boundary

Fiber Install Route Segment

- 1
- 2
- 3
- 4
- 5

N
W E
S

0 1.25 2.5 Miles

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Yurok Tribe GIS Program
March 15, 2016

Klamath River Rural Broadband Initiative

Figure 2.4-3
Segment 3
Segment 2 to Elk Camp

Wautec

SIX RIVERS NATIONAL FOREST

Segment 4

Orick

169

Segment 2

Elk Camp

REDWOOD NATIONAL STATE PARK

Bald Hills Rd

Segment 3

Bald Hills Rd

Weitchpec

96

Legend

- Yurok Reservation Boundary

Fiber Install Route Segment

- 1
- 2
- 3
- 4
- 5

N
W E
S

0 1.25 2.5 Miles

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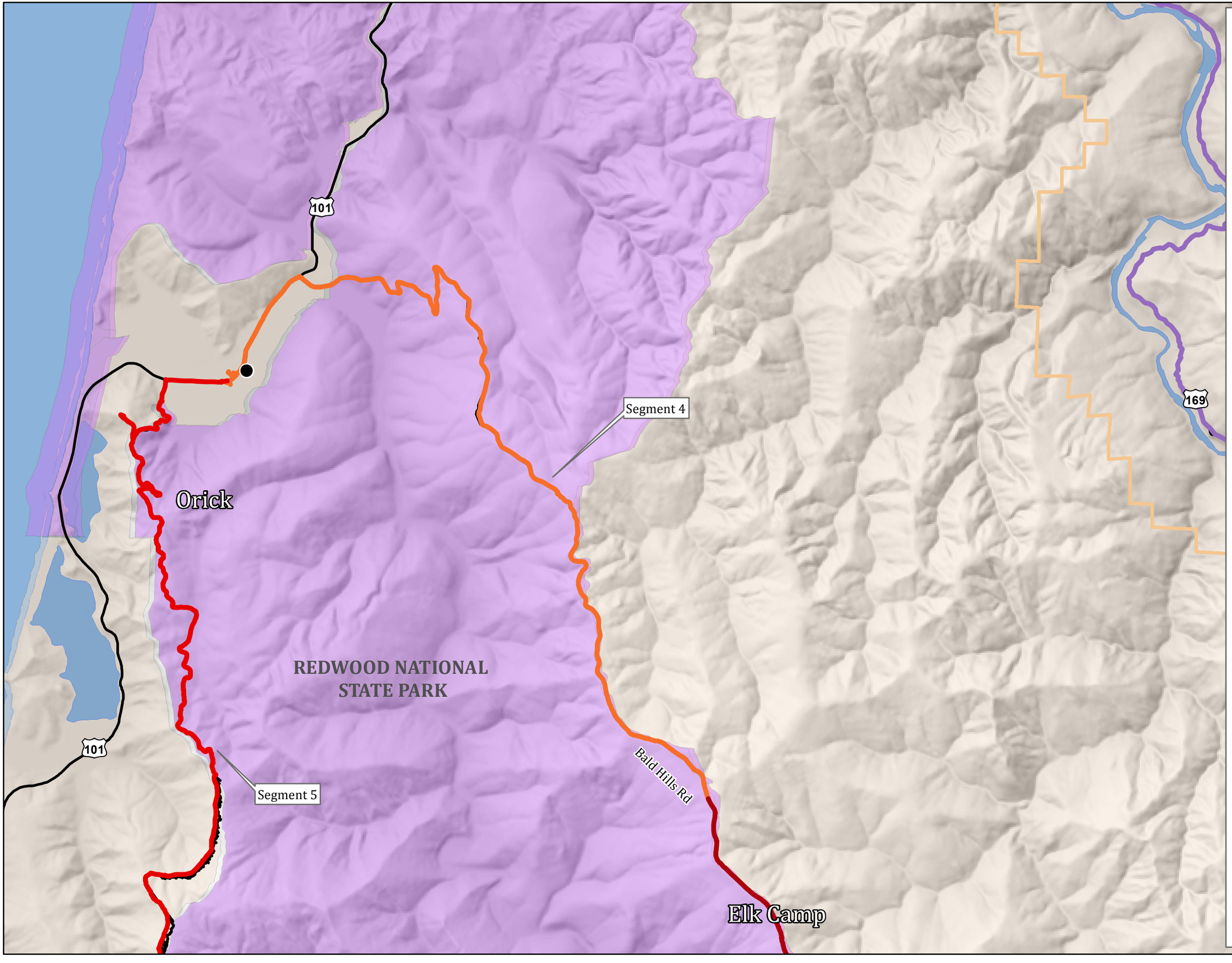
Yurok Tribe GIS Program
March 15, 2016

Klamath River Rural Broadband Initiative

Figure 2.4-4
Segment 4
Elk Camp to Orick



Legend

Fiber Install Route

Segment

- 2
- 3
- 4
- 5
- Yurok Reservation Boundary

N

W E

S

0 1 2 Miles

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Yurok Tribe GIS Program
June 19, 2017

Klamath River Rural Broadband Initiative

Figure 2.4-5
Segment 5
Orick to McKinleyville

Legend
Fiber Install Route
Segment
- 3
- 4
- 5

N E S W

0 1.25 2.5 Miles

This map is for information and reference purposes only. The Yurok Tribe assumes no liability or responsibility in the use or misuse of this map and the information within. Fiber optic install method data was collected using mapping grade GPS.

Yurok Tribe GIS Program
June 13, 2017

2.4.2 Anchor Institutions

An anchor institution is a basic community facility providing important public safety, education, or governmental services. The KRRBI Project was designed to offer services to these institutions and is required to do so under the terms of the CASF grant. Anchor institutions are so called because they anchor and largely dictate the location of the fiber optic routes serving them, limiting practical route alternatives. The KRRBI Project plans service for the following 26 anchor institutions, which are shown on Figures 2.4-6 through 2.4-13.

Fire & Police (Public Safety):

Orleans Volunteer Fire Department (Segment 1)
Public safety office- Yurok Tribal police & fire –near Weitchpec (Segment 2)
Yurok Tribal Wildland Fire Department– Tulley Creek – near Weitchpec (Segment 2)
Wautec Fire House (Segment 2)
Bald Hills Rd – Cal Fire Elk Camp Forest Fire Station (Segment 3)
Orick – Volunteer Fire Department (Segment 4)

Schools:

Orleans Head Start (Segment 1)
Orleans Elementary (Segment 1)
Weitchpec – Magnet School (Segment 2)
Head Start – Ka'Pel (Segment 2)
Jack Norton Elementary - Wautec (Segment 2)
Orick School District – Elementary (Segment 4)

Health Care:

Orleans Medical Clinic – Orleans (Segment 1)
United Indian Health Service – Weitchpec (Segment 2)

Tribal Offices:

Karuk Tribe Department of Natural Resources – Orleans (Segment 1)
Karuk Tribe Housing Office and Council Chambers – Orleans (Segment 1)
Karuk Tribe Computer/Senior Center and Library – Orleans (Segment 1)
Yurok Tribal Government – Weitchpec (Segment 2)
Yurok Tribal Facility at Tulley Creek (Segment 2)
California State Parks:
Redwoods National and State Parks South Operations Center, Orick (Segment 4)

CalTrans:

CalTrans Maintenance Station – Orleans (Segment 1)

USDA Forest Service:

Orleans Ranger Station, Six Rivers National Forest – Orleans (Segment 1)

Existing Broadband Providers:

Tsunami Wireless Broadband Tower near Orick (Segment 5)
Frontier Communications Orick Central Office (Segment 4)
Frontier Communications Orleans Central Office (Segment 1)
Frontier Communications Weitchpec Network (Segment 2)

KRRBI: Figure 2.4-6 Anchor Institutions Overview

Pacific Ocean

Figure 2.4 - 10

Figure 2.4 - 9

Figure 2.4 - 14

Figure 2.4 - 13

Figure 2.4 - 12

Figure 2.4 - 11

Figure 2.4 - 8

Figure 2.4 - 7

Antenna Ridge

Orleans Mountain

Legend

- Existing Broadband Towers
- Proposed Broadband Tower
- Anchor Point

Proposed Broadband Antenna

- Antenna Ridge
- Orleans Mountain

Fiber Install Route

Segment

- 1
- 2
- 3
- 4
- 5

0 1.25 2.5 5 Miles

N W E S

Yurok Tribe GIS Program
October 6, 2016

KRRBI:
Figure 2.4-7
Orleans
Anchor Institutions

Cal-Trans Maintenance Station

Karuk Tribe DNR

Six Rivers Ranger Station

Orleans Head Start

Orleans Elementary

Karuk Tribe Computer/Senior Center

Orleans Broadband Tower

Hwy 96

Orleans Volunteer Fire Dept.

KTHA/Council Chambers

Orleans

Karuk Tribe Medical Clinic

Legend

Broadband Towers

Anchor Point

Fiber Install Route

Segment

1

2

3

4

5

0 5 10 20 Miles

N

W E

S

Yurok Tribe GIS Program
August 5, 2015

KRRBI:
Figure 2.4-8
Weitchpec Anchor Institutions

Yurok Tribe Police & Transfer Station

Segment 2

Segment 1

Hwy 169

Weitchpec Yurok Magnet School

UIHS Medical Clinic

Hwy 96

Yurok Tribal Office and Community Center

Hwy 96

Po'to'yo

Legend

- Broadband Towers
- Anchor Point

Fiber Install Route

Segment

- 1
- 2
- 3
- 4
- 5

0 750 1,500 3,000 Feet

N
W E
S

Yurok Tribe GIS Program
August 5, 2015

KRRBI:
Figure 2.4-9
Kepel
Anchor Institutions

Segment 2

Kepel Head Start

Morek Won Community Center

Kepel Early Head Start

Hwy 169

Hwy 169

Legend

- Broadband Towers
- Anchor Point

Fiber Install Route

Segment

- 1
- 2
- 3
- 4
- 5

0 500 1,000 2,000 Feet

N
W E
S

Yurok Tribe GIS Program
August 5, 2015

KRRBI:
Figure 2.4-10
Wautec
Anchor Institutions

Segment 2

Wautec Fire House

Wautec Village

Wautec

Jack Norton Elem.

Hwy 169

Johnsons Road

Legend

- Broadband Towers
- Anchor Point

Fiber Install Route

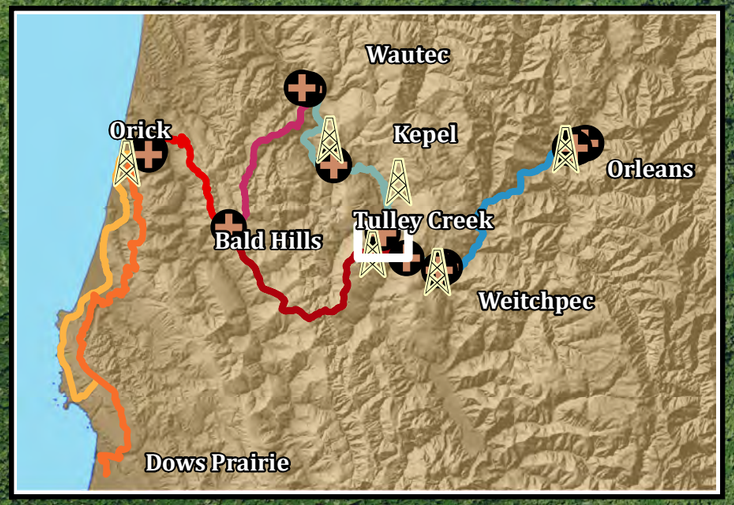
Segment

- 1
- 2
- 3
- 4
- 5

0 500 1,000 2,000 Feet

N
W E
S

Yurok Tribe GIS Program
August 5, 2015



KRRBI:
Figure 2.4-11
Tulley Creek
Anchor Institutions

Tulley Creek Fire & Fitness Center

Tulley Creek

Hwy 169

Segment 2

Segment 3

Martins Ferry Bridge

Bald Hills

Wiregrass

Legend

- Anchor Point
- Broadband Towers

Fiber Install Route

Segment

- 1
- 2
- 3
- 4
- 5

0 500 1,000 2,000 Feet

N
W E
S

Yurok Tribe GIS Program
August 5, 2015

KRRBI:
Figure 2.4-12
Bald Hills
Anchor Institutions

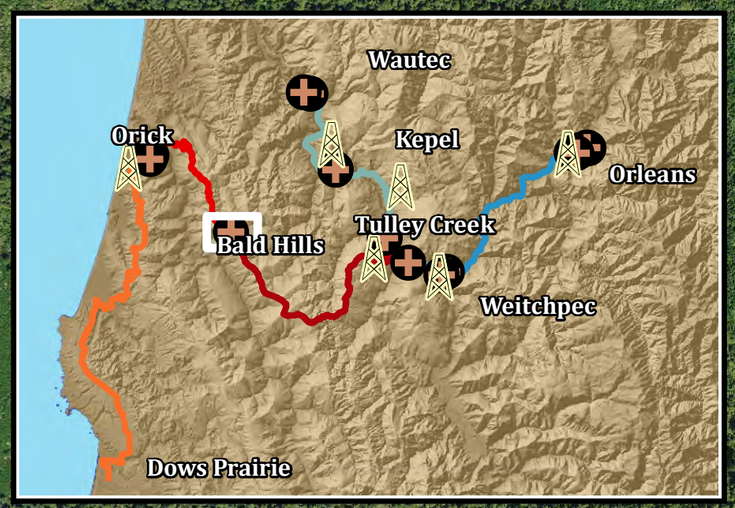
Segment 4

Bald Hills Road

Cal Fire
Elk Camp
Station

Johnsons Road

Segment 3



Legend

- Broadband Towers
- Anchor Point

Fiber Install Route

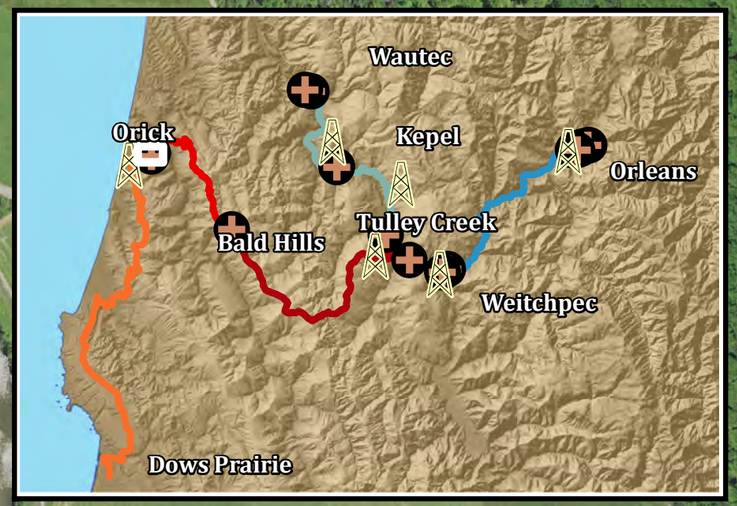
Segment

- 1
- 2
- 3
- 4
- 5

0 500 1,000 2,000 Feet

N
W E
S

Yurok Tribe GIS Program
October 6, 2016



Klamath River Rural Broadband Initiative

Figure 2.4-13 Orick Anchor Institutions

RNSP South Operations Center

Orick Volunteer Fire Dept.

Orick School District-Elem.

Segment 4

Segment 5

Orick

Hwy101

Legend

- Broadband Towers
- Anchor Point

Fiber Install Route

Segment

- 1
- 2
- 3
- 4
- 5

0 250 500 1,000 Feet

N W E S

Yurok Tribe GIS Program
March 15, 2016

2.4.3 Yurok Wireless Towers

Figure 2.4-14 shows the three towers (Wiregrass, Miners, and McKinnon) already installed and functional on the Yurok Reservation that communicate through wireless links to a tower in Requa (on the coast near Klamath) and thence to fiber optic service from Crescent City. Section 2.4.6.2 describes the replacement of generators for Wiregrass, Miners, and Wautec, and the addition of power backup equipment for the McKinnon tower.

2.4.4 Fiber Optic Cable Installation

2.4.4.1 Fiber Optic Cable

The KRRBI Project will use a 96-strand Single-Mode Fiber optic cable for its middle mile installations in all segments, a total distance of 103.4 miles. Where the fiber is placed underground, the Project will install two 31mm (1.25 in) diameter conduits, of which one will contain the fiber optic cable and one will serve as a spare for future or restoration. Alternatively, the Project may utilize one or two microducts, which are 20mm (0.79 inch) ducts with 3 to 4 microducts inside. For the purposes of this analysis, we have assumed the larger conduits will be installed. Where the fiber is placed overhead, the fiber may be lashed to a 1/4" steel cable (EHS) support strand and the cable secured to existing or new utility poles, or self-supporting cable may be used. The overhead fiber may be enclosed in a UV aerial-rated duct if the area is subject to high rates of firearm vandalism or rodent issues.

2.4.4.2 Installation Methods for Fiber

Figure 2.4-15 shows a map of the proposed installation techniques for the entire KRRBI Project.

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Mckinnon Hill

Bear Grass 40 Rd

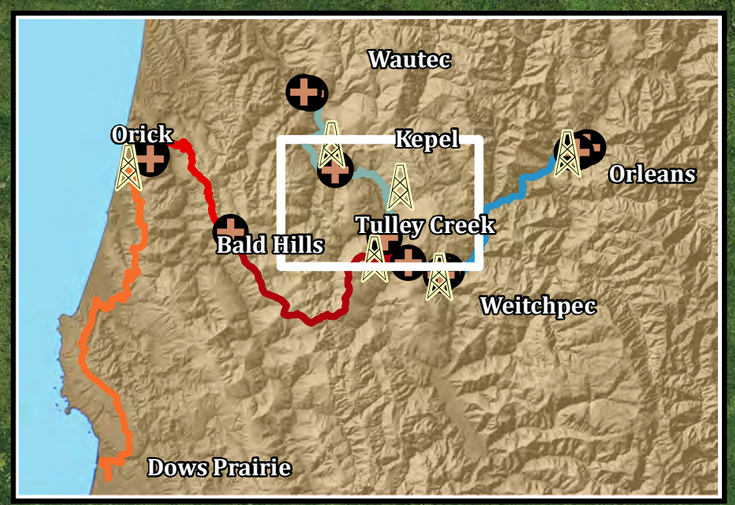
Miners

Telecom Site Rd

Lewis Rd

Bald Hills

Wiregrass



KRRBI

Figure 2.4-14

Yurok Wireless Tower Locations

Legend

- Broadband Towers
- Anchor Point

Fiber Install Route

Segment

- 1
- 2
- 3
- 4
- 5

0 0.375 0.75 1.5 Miles

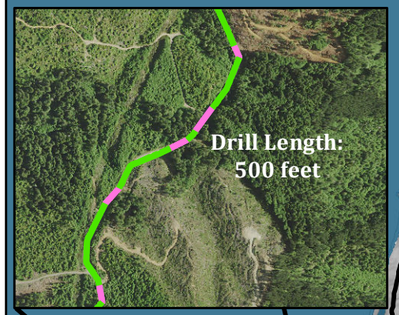
N
W E
S

Yurok Tribe GIS Program
August 5, 2015

Klamath River Rural Broadband Initiative

Figure 2.4-15

Installation Methods



Pacific Ocean

Wautec

Orick

Orleans

Weitchpec

Trinidad

Mckinleyville

Elk Camp

Bald Hills Rd.

Segment 1

Segment 2

Segment 3

Segment 4

Segment 5

101

96

169

Legend

- Community
- Road

Install Type

- Bridge Hang
- Directional Drilling
- Drill - Rock
- Existing Fiber
- Overhead Joint
- Overhead New
- SawCut
- SawCut - Rock
- Trench
- Trench - Rock
- Yurok Reservation Boundary

N

W E

S

0 50 100 Miles

This map is for information and reference purposes only. The Yurok Tribe assumes no liability or responsibility in the use or misuse of this map and the information within. Fiber optic install method data was collected using mapping grade GPS.

Yurok Tribe GIS Program
January 21, 2017

The Karuk Tribe will use existing poles where they are available for overhead installation, and will only use underground methods where existing poles are not available and installing new poles is not feasible or will have adverse visual or cultural resource impacts. The Tribe proposes to use overhead installation on existing poles because the environmental impact is minimal, limited to a small ground disturbance if an additional guy wire anchor is needed, and will not contribute to adverse visual impacts, as the poles and wires are already in place. It is also typically the more cost efficient method for installation, though more costly to maintain due to damage from winter storms, vehicle collisions, and falling trees. Special consideration is needed for water crossings. The methods, summarized here, are detailed further below:

- Installation overhead on existing poles where feasible. This includes "joint use" poles, where electric power poles (sub-transmission or distribution voltages) are already shared with one or more communications providers; "power" poles, typically wooden poles with an electric power component at sub-transmission or distribution voltages but no existing communications provider use; and "communication" poles, where one or more communications providers are installed, typically on a shorter pole, without an electric power component. Where there is an existing communications provider, the Karuk Tribe will enter into an agreement with that provider to share the communications space on that pole. For power poles without other communications providers, the Karuk Tribe will enter into an agreement with the electrical service provider to establish and use the communication space on those poles. Alternatives may be necessary when cable placements of existing carriers prohibit the addition of another carrier, or costs to adjust existing carriers' cables (make-ready costs), may exceed other placement methods.
- Installation overhead on new poles. New pole installation may be needed in some instances where existing poles are overburdened or where the impacts of a water crossing could be reduced by using an overhead installation.
- Underground installation techniques include:
  - Plowing in the unpaved road shoulder with a specialized plow designed to open a very small trench, install the two conduits, and close the trench immediately thereafter in one pass;
  - Trenching, typically in existing rights-of-way or roadside drainage ditch, by temporarily digging a trench or deepening the ditch, installing the two conduits and cable, then restoring the ditch profile and functionality;
  - Pavement saw cutting, a technique used for opening a narrow 3-6" trench in the paved portion of a road, installing the two conduits, backfilling the trench, and restoring the pavement cover. This technique is only used where there is no practical alternative for fiber optic cable installation in a road shoulder or ditch.

- Rock saw cutting, a technique needed when competent bedrock presents at or near the road shoulder surface, requiring a specialized rock saw and subsequent cement backfill.
- Directional drilling will be used to cross under a paved road where necessary. This method requires specialized equipment that directs a drill head at an angle down, below, and then back up on the other side of the roadway. This method is also useful for avoiding impacts to tree roots or to limited areas of environmental sensitivity.

In all cases for underground installation, 2 conduits will be installed to permit the future addition of another fiber optic cable without new ground disturbance.

Specialized water crossing methods depend on the watercourse to be crossed.

- Whenever possible, the Karuk Tribe will use existing poles where cables or power lines already cross the watercourse. Where these are not available, the following methods may be considered:
  - Installing new poles to cross the watercourse with an overhead cable, avoiding impacts to the watercourse and to the banks if the poles can be set back far enough;
  - Hanging the cable from an existing bridge to avoid impacts to wetlands and watercourses;
  - Directional drilling to install two conduits and cable below important structures that should not be disturbed or that may be replaced within the lifetime of the KRRBI Project (e.g. culverts). This method requires specialized equipment that directs a drill head at an angle down, below, and then back up on the other side of the identified obstacle. This method will routinely be used to avoid impacts to culverts and wetlands present in the road shoulder. In general it will not be used to cross under perennial streams that are not contained in a culvert.

Each of these techniques is described in detail in Sections 2.4.4.3 – 2.4.4.5.

2.4.4.3 Fiber Optic Cable Overhead

Existing Poles

Where feasible and where existing poles are available that are immediately adjacent to an existing road, the Karuk Tribe proposes to expand its existing agreement with Frontier (automatically transferred from Verizon), or to develop an agreement with the incumbent senior communications provider to utilize such poles. Where there are existing poles but no other communications provider, the Karuk Tribe will develop an agreement with Pacific Gas and Electric Company (PG&E, a public electric utility) to use those poles that do not already have a communications attachment. Joint authority poles typically have a 13kV distribution line at the top and one or more existing communications fiber or copper cable(s) at a lower

anchor point. Existing communications providers have recently wanted to retain the lowest point on the pole and may require the Karuk Tribe to move the incumbent down twelve inches and to install the Tribe's fiber optic cable between the incumbent's line and the distribution lines, at least 3 feet below existing power conductors (see Figure 2.4-16). Where the pole supports only existing telecommunications facilities, the KRRBI Project cable will typically be installed 12" above the existing communications cable(s) on those poles. Where there are multiple carriers utilizing the same pole, the Karuk Tribe will enter into an agreement with the carrier that owns the pole and locate where that carrier indicates. Where the pole is a "power" pole without existing communications providers, the Karuk Tribe will enter into an agreement with PG&E to occupy the communications portion of the pole.

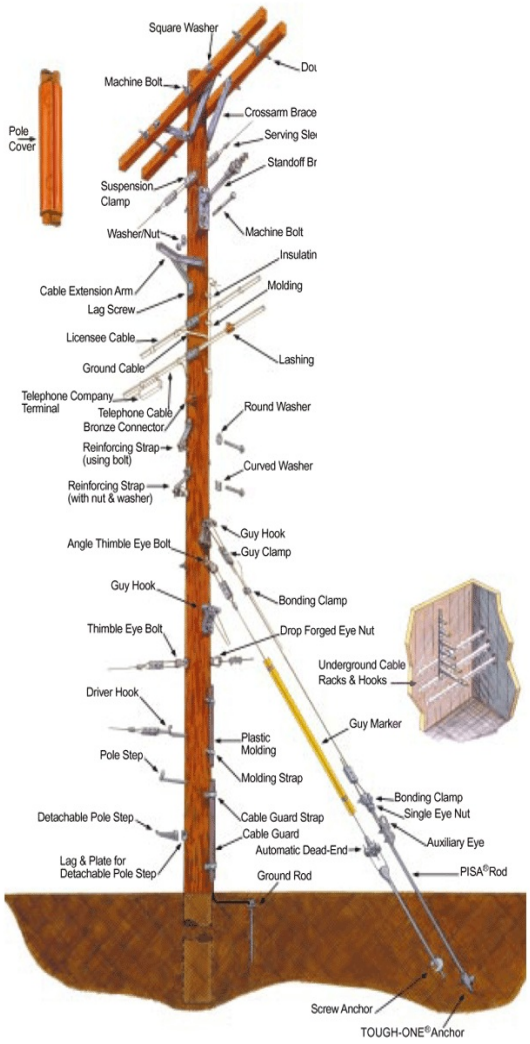


Figure 2.4-16. Typical Fiber Overhead Installation

Traffic control is often needed during installation of the overhead fiber optic cable if the poles are close to the travel way. Traffic control is typically dictated by the Manual of Uniform Traffic Control Devices and will in addition conform to permit requirements from the relevant road agency (see EPM TRANS-1).

Before the Project cable can be attached to the pole, other cable attachments may need to be moved to accommodate the new fiber. Specialized contractors, approved by the other communications providers, must be used for this step. The next step is to either utilize the J-hook attachments left in place when the other carrier cables were moved or to install a similar attachment. A hole is drilled through the pole followed by a machine bolt that goes through the whole pole; nuts and washers would be placed on one side followed by another attachment on the face of the pole that would serve to hold the aerial strand cable in place. In some cases the aerial strand cable would be attached with an extension arm, which would be used where needed to reduce the radius or tightness of the turns in the cable or where the existing cable is already at minimum clearance over the road.

There are many types of fiber optic cable that could be used—some are self-sustaining (have a built-in steel cable wrap within the cable covering) and some need an aerial steel cable strand. If the steel strand support is used, it is installed first and attached using the J-hooks.

Figure 2.4-17. Cable Lasher

As the aerial strand cable is being strung, it is tensioned and secured to the pole. When the cable has been secured to all the poles, the fiber optic cable itself is brought to the work area and attached to the strand cable. This is attached using a lasher that takes a form of tie wire and spins it around the cable strand and the fiber thus attaching the two together as one (Figure 2.4-17). Where vandalism is likely, the cable may instead be installed within a UV-rated aerial duct to further protect it.

At each pole, engineers determine the need for additional guys to anchor the pole to the ground based on the new weight and stress on the pole, and in consultation with the pole owner and other carriers. Anchors installed by other carriers generally have triple eye nuts for attachment, but often only one of the eyes is in use. If agreement can be reached with the other carriers, the KRRBI Project can use one of the remaining eyes and no ground disturbance for additional guy anchors is needed. If existing anchors are not available, an additional anchor is installed immediately adjacent to the existing anchor by drilling the guy anchor directly into the ground an average of six feet.

Figure 2.4-18. Bucket Truck and Splicing Truck

Work on the poles is conducted from a bucket truck (Figure 2.4-18). This truck allows safe access for workers to each pole.

After the fiber optic cable is installed it must be tensioned and spliced. Splicing is typically needed at least once a mile and often more frequently depending on the difficulty of installing a full mile of fiber optic cable through existing trees. These splicing locations also include a coil of extra fiber optic cable (typically about 100 feet), which facilitates repair if needed in future. Splicing can be conducted, and the splice anchored, in-line for overhead installations.

Fiber optic cable requires a specialized splicing truck, where the glass strands in the cable can be individually fused together to allow the light signal to pass through the fused area without distortion. This truck is also shown in Figure 2.4-18.

In strategic locations along the middle mile installation, loops of additional cable are attached to "snowshoes", which are reels suspended in-line that allow for storage of extra fiber optic cable to make future maintenance and repairs feasible without having to decommission large portions of the system during repairs (see Figure 2.4-19).

After the fiber has been installed, tensioned, secured, and spliced, the area is ready for cleanup. Most of the work is conducted from the pavement or shoulder of the road and no cleanup is required. However, where the equipment was located on a dirt shoulder, the shoulder is returned to preconstruction conditions or as dictated by the permit terms and conditions from the road management agency.

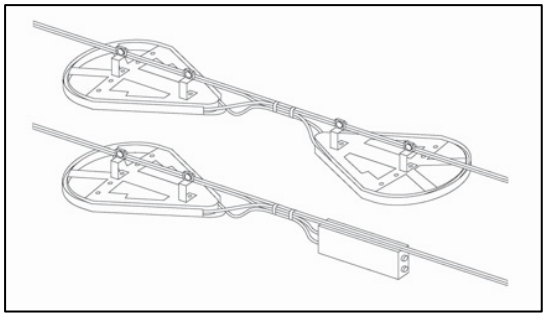


Figure 2.4-19. Snowshoe Reels

Installing New Poles

The installation of new poles will follow general industry practice (Figure 2.4-20). Note that the KRRBI Project anticipates using only direct-bury wooden poles with guys if needed. No specialized poles requiring foundations or towers are proposed. A specialized truck will use an auger to drill a hole far enough back from the side of the watercourse to avoid impacting the water or riparian vegetation. An industry-standard pressure-treated wooden pole, 20-30 feet total length (depending on the span and obstructions) will be brought to the site and the attachments for the fiber optic cable and for guys if needed will be installed on the pole while it is horizontal. A boom truck will then lift the pole and install it in the hole. The hole will be backfilled and compacted while the boom truck steadies the pole and holds it vertical. Backfill will depend on the existing soil conditions and may include a portion of concrete if necessary.

Figure 2.4-20. Installing New Pole

Installation of guy wires, if needed, is begun by attaching the wires to the pole while it is horizontal. Anchors are usually 3-4 feet long and equipped with a corkscrew-like anchoring device. They are installed by twisting into the ground, either by hand or using a specialized attachment on a boom truck. Where the ground is rocky or consists of competent bedrock, rock anchors may be used. Guy wires are strung through the eye of the anchor and tensioned and secured. A guy wire plastic cover is placed over the guy wire to make it more visible and to reduce injuries.

Where a new pole is needed because existing poles are fully committed to existing uses, the fiber optic cable will be strung from existing poles where KRRBI fiber can be attached to the new poles and installed as specified above for existing poles.

Where new poles are used to cross a sensitive feature such as a stream in an otherwise underground installation, the fiber from the underground portion will be terminated near the pole installation location on each side of the crossing. After poles are installed, the fiber optic cable will be strung and tensioned on the poles. The specialized fiber optic cable splicing team will then complete the connection between the overhead and underground cable. This connection is sometimes direct and sometimes secured in a vault located near the bottom of the pole on each side of the crossing.

2.4.4.4 Fiber Optic Cable Underground

In general, the fiber optic cable will be installed underground where there are no existing overhead joint authority or distribution power poles adjacent to roads that can be utilized. Underground installation will include plowing, trenching, pavement saw-cutting, rock cutting, and directional drilling where needed to cross under a road. Two conduits will be installed in all underground or bridge hang elements to permit the future addition of a second fiber optic cable without new ground disturbance.

Choice of Underground Installation Methods

The selection of a particular underground method is dependent on ground conditions and on the requirements of the permitting agencies, including land managing agencies and the road managers.

Trenching is the preferred method of underground installation. It can be conducted with a trencher in favorable terrain without heavy rock content and with a backhoe or excavator where terrain is difficult or rock content is higher. It will be the most common underground installation method. Trenching creates a 1-2-foot wide disturbance area at the bottom of the ditch and requires careful backfill and compaction after fiber install. Where there is a substantial amount of rock, trenching is slower and may need to use specialized digging equipment.

Pavement saw cutting is used where there is no ditch, or where other localized conditions require the fiber to be in the pavement area. Road managers typically prefer that pavement not be cut at all, so this method is restricted to areas where it is unavoidable. Saw cutting will only be used for parallel encroachments and will not be used for crossing roads unless specifically permitted by the road manager.

Rock cutting will be used in the event that competent bedrock underlies a road and its shoulder or ditch. It will create a minimal trench in the rock, typically 6" or narrower and 24 to 36" deep, into which the two conduits will be installed.

Directional drilling is used to cross underneath a road, typically perpendicular to the road or at a shallow angle, to avoid cutting the pavement across the road. It is also used to avoid impacts to infrastructure like culverts and waterlines by drilling well below the infrastructure. It can be used to avoid specific sensitive resources such as old-growth tree roots and archaeological sites where the approximate depth of cultural materials is known. Section 2.4.4.5 specifies how directional drilling is used for water crossings.

Trenching

Trenching opens a trench the width of the trenching device. Trenching can be conducted with a specialized trenching machine, often an oval or circular blade with a chain of cutting teeth on small buckets. This can be lowered into a ditch or directly into the dirt to cut a trench 6-12" in width and 36" deep. Where side slopes are steep or the working area is too limited, trenching can be conducted with a backhoe or excavator using a narrow bucket (Figure 2.4-21).

Figure 2.4-21. Roadside Trenching

For much of the KRRBI Project, trenching is proposed to install conduits at the bottom of existing road drainage ditches. These ditches may be full of vegetation and rocks and must first be cleaned out. The extent to which this is necessary depends on the frequency of routine ditch maintenance performed by the road manager. This is the only vegetation removal needed for underground installation. No mature trees will be removed, though seedlings established in and blocking the drainage ditch may be removed if present. The spoil from the cleaning effort will be disposed of as specified by the road manager (CalTrans, Humboldt County, NPS, or GDR). Typically road managers will specify a previously disturbed spoils dumpsite, and the material will be loaded into a dump truck and taken to the specified site. Those same road managers use this common practice during routine ditch maintenance.

After the ditch is clean, then the trench is dug into the bottom of the ditch. As shown in Figure 2.4-21, the material removed from the ditch is typically stored temporarily adjacent to the ditch. Typically, road managers want underground utilities 36-42 inches below the finish grade of the bottom of the ditch, so that when road maintenance crews conduct periodic ditch cleaning, they do not inadvertently damage the fiber optic cable. Trenching one foot wide by 3 feet deep will produce about 590 cubic yards of material per mile of ditch. Most if not all of that material in most cases will be returned to the trench as backfill. Actual amount of material hauled will not be known until the quality of the native material for backfill is tested with compaction.

If dewatering is needed, a vacuum truck will remove the water from the trench, store the water in its tank, then dump the water at an approved dumpsite. Trench dewatering will be completed per the Caltrans Best Management Practice (BMP) NS-2 specifications and Field Guide to Construction Site Dewatering[5] (EPM WET-3).

After the trench is complete, the two conduits and the warning tape are installed. Depending on the requirements of the road manager and sometimes also of the property owner or manager, the trench is backfilled with the material removed from it or with a specified aggregate base and compacted to road manager compaction requirements. Aggregate base, if needed, will be purchased commercially in the local area. Typically, compaction rates are specified and must be met in order to avoid shoulder or base failure in the future. Where material removed from the ditch cannot be used for backfill, it is also hauled to the specified spoils dumpsite. Roadside ditches are intended to function as drainage and vegetation is routinely removed to facilitate drainage. Therefore no vegetation will be re-introduced after trenching is complete.

Pavement Saw Cutting

Wherever possible, the KRRBI Project will be installed in road shoulders or roadside ditches. There are places where this is not feasible, where the road is paved to the guardrail, to the top edge of a steep fill slope, or to the edge of a full-bench cut in rock and cliffs and there is no inside ditch or the inside ditch is in an active slide zone. Where the conduits must be installed in pavement, the intent is to cut the pavement as close to the edge as permitted by the road

[5] California Department of Transportation. 2017. Construction Site BMP Manual. California Department of Transportation. 2014. Field Guide to Construction Site Dewatering. Both available online at http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm. Last accessed 12/5/2017.

manager. This is conducted with a concrete saw attached to a backhoe, which opens a trench about 12" wide. Using a trencher or a backhoe with a 12" wide bucket, the trench is opened below the saw cut to 36" or as specified by the road manager. The conduits and warning tape are then installed (see Figure 2.4-22). The trench is backfilled as specified by the road manager. Compaction standards will be met before the saw cut is repaved. The wheeled tractor that powers and directs this saw operates on the road surface. Specialized paving equipment will restore the pavement by patching the pavement with asphalt and sealing it to the existing asphalt, or by pouring concrete to match the existing road where indicated.

Figure 2.4-22. Saw Cut and Conduit Install

Rock Sawing

Where bedrock is present at or near the road shoulder surface, the KRRBI Project may require the use of rock saws. These are specialized saws, similar to those used for cutting pavement but specialized for harder rock types, attached to a backhoe. Like the pavement saw, these saws cut a narrow trench in the rock. The trench will be cut to the shallowest depth permitted by the road manager, typically 18" deep. The conduits and warning tape are installed, then the trench is backfilled as specified by the road manager.

Directional Drilling

Where the KRRBI Project is installed in road ditches, the intent is to utilize the ditch on the "high" or uphill side of the road. Roads in steep country frequently switch back and forth through tight curves as they make their way up and down the hills. The uphill side of the road also switches sides. To avoid multiple saw cuts across the road, the KRRBI Project proposes to use directional drilling to shift from one side of the road to another. Directional drilling can be used to avoid specific infrastructure like culverts and waterlines by drilling beneath them, and can be used to avoid sensitive resources like old-growth tree roots. Section 2.4.4.5 describes how directional drilling is used for water crossings.

Figure 2.4-23. Directional Drilling Rig

Directional drilling requires the use of a specialized drill rig, which sits tens to hundreds of feet back from the infrastructure to be drilled under (see Figure 2.4-23). The distance from the infrastructure is roughly estimated at 5 feet horizontal for every foot of vertical depth needed. For example, if the drill needed to be at 5 feet of depth at the edge of the road, the drill rig would need to set back 25 feet to have the drill bit at 5 feet deep at the edge of the road. At each end of the bore, there is a boring pit about 4 feet wide by 5 feet long and 5 feet deep to allow for the entrance and exit of the bore.

Using a drill bit selected based on the soil and subsoil, the drilling rig drills at an angle in the shoulder of the road, under the road and back out the other side. Guiding the HDD is a very important part of the drilling operation, as the drilling head is under the ground and is not visible from the ground surface. In most cases, a transmitter (called a sonde) that registers angle, rotation, direction, and temperature data will be located on the bore head. This information is encoded into an electro-magnetic signal and transmitted through the ground to the surface, where it is picked up by a hand-held receiver.

In order to lubricate the drill bit, drilling "mud" is circulated into and out of the drilling hole. This "mud" is made of naturally occurring bentonite clay and water with non-petroleum emulsifiers and other lubricant compounds. It lubricates, seals the hole, and provides a medium for removal of cuttings. Directional drilling requires an excavated hole at the beginning and end-point of each drilling location and relatively level surface on which to place the drilling machine. At the end-point of the drill, cable and conduit reels are placed. When the drilling machine has reamed out the drill hole to the desired diameter (3"), the two conduits, one with fiber optic cable pre-installed, are pulled back through the drill hole to the drilling machine.

When the conduit installation is complete, the directional drilling machine is moved and a splicing vault is typically installed. In the vault at each side of the directional drill, the fiber cable can be spliced to the cable already installed on either side of the drill area. Underground splice boxes or "vaults" require a hole about 3 feet by 4 feet by 2 feet deep and carry a traffic-proof cover that is 2 feet by 3 feet. They are typically located out of the travel way in the road shoulder.

Barriers such as straw bales, sediment fences, and silt socks will be used around bore sites and equipment to contain mud and lubricants during drilling. A vacuum truck will be available during all directional drilling operations to pick up routine drilling fluid as well as to be available for any spillage or frac-out of drilling fluid. The most direct method of avoiding fracturing out is constant monitoring of the pressure gauges on the drilling equipment and ensuring these are working properly during operation. An additional measure for detecting a "frac-out" is to monitor the drilling corridor during drilling to observe any signs of mud, water, or ground sinkage along the corridor. Directional drilling will not be used to cross under perennial or intermittent streambeds unless they are contained in a culvert, thus minimizing any chance that drilling mud could enter the streambed. Because this effort is conducted in road shoulders routinely graded to remove vegetation, restoration will be limited to re-grading the road shoulder to pre-construction contours and conditions.

The entrance and exit pits are backfilled with the native material originally removed to form them, and compacted around the vaults. Any surplus native material is hauled to an approved disposal site. An estimated 67 pairs of exit and entrance pits (134 pits total) will be needed for the multiple directional drills planned for the KRRBI Project. At 3.7 cubic yards per pit, the total excavation will be 496 cubic yards. About 1.77 cubic yards in each case will be displaced by a handhole box, requiring off-site disposal of about 237 cubic yards, with 259 cubic yards to be used as backfill.

2.4.4.5 Water Crossings

Water crossings include crossings of streams that may be considered waters of the State or waters of the US, and the crossing of road culverts, which usually convey road runoff water. Whenever possible, the KRRBI Project will cross flowing streams by installation on existing poles where there is an existing overhead crossing. Installation will follow the general guidelines of overhead installation as specified in Section 2.4.4.3, above. Where existing poles are not available for a water crossing and the installation of new poles is feasible new poles may be installed where vegetation removal and visual impacts are minimal. If there is an existing bridge and the bridge owner will allow it, the fiber optic cable will be installed by directly attaching it to the bridge, typically in a larger conduit than needed for underground installation. Where overhead methods or bridge crossings are unavailable or not permitted, directional drilling will be employed to install the conduits underneath the live stream if it is in a culvert.

Installing New Poles

See Section 2.4.4.3 for details on new pole installation. For water crossings, approximately 6 new poles will be installed, depending on final engineering and site conditions. The installation of new poles will follow general industry practice (Figure 2.4-20). A specialized truck will use an auger to drill a hole far enough back from the side of the watercourse to avoid impacting the water or riparian vegetation. The pole will be brought to the site and the attachments,

including for guys if needed, installed on the pole while it is horizontal. A boom truck will then lift the pole and install it in the hole. The hole will be backfilled and compacted and the pole guyed if appropriate.

The KRRBI Project includes new poles at the crossings of the Klamath River at Orleans (Segment 1) and at Martins Ferry (Segment 2). Poles will be placed immediately adjacent (within 30') of existing copper cable crossings in each case. For the Orleans crossing, poles are more than 100' from the high water mark. For the Martins Ferry crossing, poles are more than 200' from the high water mark. Engineering for these crossings will be completed and a permit obtained from the CSLC before construction. New poles may also be installed for the overhead crossing of Redwood Creek adjacent to Highway 101 in Orick. Poles will be set more than 100' from the high water mark. If poles are needed to cross Luffenholtz Creek east of Westhaven on GDR lands, two poles will be placed at least 50' back from the high water line.

Bridge Hang

Hanging a fiber optic conduit from a bridge can be accomplished easily using a specialized truck with a multiple-jointed boom and bucket that permits workers to be based on the road but work below the bridge (Figure 2.4-24). Conduit will be attached as specified by the bridge owner, but typically by drilling into the bridge structure enough to attach anchor bolts or hooks to which the conduit can then be secured. This method has no impact on the watercourse and is generally invisible once completed (Figure 2.4-25). The conduit is typically 2 or 3" in diameter, allowing for at least one additional fiber optic cable to be installed in the future.

Figure 2.4-24. Bridge Hang

Figure 2.4-25. Completed Bridge Hang

Directional Drilling for Water Crossings in Culverts

Road owners or managers usually require directional drilling for underground utility installations where culverts must be crossed. Even if the culvert is several feet deep and the utility could be installed in the road shoulder without any impact to the culvert, the road manager must take into account the need to periodically replace culverts—generally every 15 to 30 years. Typically directionally drilling the conduits under the culvert is the only acceptable

option. Where culverts are 10 or more feet below the road surface, and with the permission of the road owner, the KRRBI project proposes to install the fiber optic conduits by conventional trenching above the culvert.

The same techniques will be employed as for road crossings (see Section 2.4.4.4, above). Where culverts are very deep (10 feet or more below the road surface), the drilling machine would be set back 150 feet or more from the culvert crossing, using the same rough 5:1 ratio explained above. Where an uncontained live stream is to be crossed, the KRRBI project will not use directional drilling but instead will utilize two new poles and a short overhead span to avoid impacts to the live stream.

2.4.5 Segment Descriptions

Table 2.4-1 shows the approximate mileages of each type of initially proposed installation method for each segment of the middle mile fiber optic cable installation, while Table 2.4-2 details installation method by road manager. Final decisions regarding installation methods will be developed in close coordination with road managers, underlying landowners and land managers, and with agencies with jurisdiction on the overall Project. Table 2.4-2 totals do not reach the full Project length because a portion of the Project crosses overhead on private lands not adjacent to roads.

Table 2.4-1. Installation Types by Segment, in Miles

Segment	From/To	Existing Overhead	New Overhead	Trench	Saw Cut	Directional Drill	Bridge Hang	* Existing Infrastructure	Total
1	Orleans demarcation point-Weitchpec Road	1.7	0.3	8.0	3.3	1.3	0.1	0.6	15.2
2	Weitchpec Road Turnoff to end of Highway 169 at Wautec, plus Martins Ferry Bridge Crossing and Tulley Creek Road to Yurok facility	21.9	0.1	0.6	0.3	0.0	0.0	1.1	24.2
3	Segment 2 at Martins Ferry Bridge Crossing to Johnsons Road intersection on Bald Hills Road	0.0	0.0	20.9	0.7	0.3	0.0	0.0	21.9
4	Segment 3 at Johnsons Road intersection on Bald Hills Road to Orick Tower	1.2	0.0	10.0	0.4	0.1	0.1	0.0	11.8
5	Orick Tower on 101 to Hiltons, West Side Access Road, GDR Roads, Crannell Road, Dows Prairie Road to meet-me.	3.7	0.3	24.6	0.0	4.4	0.0	0.0	33.1
	TOTALS	28.6	0.8	64.2	4.7	6.1	1.7	0.2	106.2

** Includes existing fiber (0.5 miles in Segment 1), existing conduit underground and on bridge (0.1 miles in Segment 1 and 1.1 miles in Segment 2)*

Table 2.4-2. Installation Methods by Road Manager

Road Owner	Segment	Fiber Optic Cable Installation Methods						Total
		Overhead	Trench	Saw Cut	Directional Drill	Existing Infrastructure	Bridge Hang	
CalTrans								
Highway 96	1	0.5	8.0	3.3	1.3	0.4	0.1	13.6
Highway 169	2	12.7	0.0	0.3	0.0	1.1	0.0	14.2
Highway 101	4,5	1.7	0.3	0.1	0.1	0.0	0.0	2.1
Subtotal, CalTrans		14.9	8.3	3.7	1.3	1.6	0.1	29.9
Humboldt County								
Dredge Road	1	0.4	0.0	0.0	0.0	0.0	0.0	0.4
Weitchpec Road	2	0.3	0.6	0.0	0.0	0.0	0.0	0.9
Upper Capell road	2	3.6	0.0	0.0	0.0	0.0	0.0	3.6
Lower Capell Road	2	3.0	0.0	0.0	0.0	0.0	0.0	3.0
Tulley Creek Road	2	1.1	0.0	0.0	0.0	0.0	0.0	1.1
Bald Hills Road	3,4	0.0	30.6	1.0	0.3	0.0	0.0	32.0
Webster St.	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Barnum Rd.	4	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Hilton Road	5	0.2	0.8	0.0	0.1	0.0	0.0	1.1
Crannell Road	5	1.4	0.0	0.0	0.0	0.0	0.0	1.4
Dows Prairie Road	5	1.4	0.2	0.0	0.0	0.0	0.0	1.6
Subtotal, Humboldt		11.5	32.2	1.0	0.5	0.0	0.0	45.2
Other Roads								
McKinnon Hill Road	2	0.6	0.0	0.0	0.0	0.0	0.0	0.6
Bear Grass 40 Road	2	0.2	0.0	0.0	0.0	0.0	0.0	0.2
Westside Access (NPS)	5	0.0	4.7	0.0	0.6	0.0	0.0	5.3
GDR Roads	5	0.3	18.6	0.0	3.7	0.0	0.0	22.6
Subtotal, other roads		1.2	23.3	0.0	4.3	0.0	0.0	28.7
Total, all roads		27.6	63.8	4.7	6.1	1.6	0.2	103.9

2.4.5.1 Segment 1

Segment 1, 15.2 miles total length, starts at the Orleans Karuk Tribal buildings near the Orleans Elementary School at the demarcation point for the Áan Chúuphan Broadband Service and continues to the turnoff for the Weitchpec School Road in Weitchpec.

Main Segment Description

The fiber optic cable will be brought overhead out of the building and will follow the existing joint use utility poles west on Highway 96, west on Dredge Road, then across private land and across Karuk fee land back to Highway 96 near the crossing of Camp Creek, all overhead. About 1.3 miles from its origin, Segment 1 will go underground. While utility poles do continue approximately parallel to the highway south and west to Weitchpec, they are not near the highway and are inaccessible for any needed fiber optic cable repair should they fail during

a winter storm (an annual event in this area). Therefore, underground installation is planned from Camp Creek Road to the intersection of Weitchpec School Road. Bridge hangs are proposed to cross Slate Creek and Bluff Creek. With the exception of about 0.5 miles along Dredge Road (now a Humboldt County Road crossing private lands) and across private lands, Segment 1 is within the CalTrans easement for Highway 96, which crosses Karuk Trust land, private land, land owned in fee by the Karuk Tribe, NFS lands, BLM lands, and lands within the Yurok Reservation.

Segment 1 will augment the service to all Orleans anchor institutions (Orleans Volunteer Fire Department, the USFS Ranger Station, the Orleans Elementary School, the Orleans Head Start, Orleans Medical Clinic, Karuk Tribe Department of Natural Resources, Karuk Tribe Housing Office and Council Chambers, Karuk Tribe Computer/Senior Center and Library, Frontier Communications Orleans Central Office, and CalTrans Maintenance Station) including those served by the existing Áan Chúuphan system in the Orleans area. The KRRBI Project will strengthen their Internet service and reliability.

Land uses adjacent to Segment 1 are predominantly forest land. The first mile of Segment 1 passes through the small village of Orleans on existing poles. Orleans is not designated as "residential" or "commercial" though there are some buildings of each type in the village. The segment does not pass through any agricultural lands. After Segment 1 leaves Orleans in about a mile from its origin, it is all forested lands managed by the USFS. There are small inholdings along the river but the installation in the inboard road shoulder or ditch along Highway 96 only passes adjacent to the forested portions thereof.

Spurs

- A 0.5-mile long spur will be constructed to serve the Orleans Caltrans Maintenance Yard and the Karuk Tribal Department of Natural Resources (DNR)/Community Building (Figure 2.4-1A). This spur will take off from the existing overhead Áan Chúuphan fiber optic cable near the Seventh Day Adventist church along Ishi Pishi Road northeast of the demarcation point. A new pole will be erected immediately adjacent to the existing joint use utility pole and the new fiber optic cable will be strung across the Klamath River, parallel to the existing copper cable crossing owned by Frontier. The new fiber optic cable will connect to a new pole on the east side of the river immediately adjacent to the existing Frontier communication pole. The spur will then follow the existing joint use poles northeast to the Caltrans yard, then turn due east and utilize an intermediary new pole just in front of the Karuk DNR facility within the CalTrans ROW, then continue to the existing poles at the eastern edge of the Karuk DNR facility.
- About 0.1 miles from its origin, a spur less than 0.1 mile long will serve the existing Frontier Communications Orleans Central Office. This spur will be installed entirely on existing utility poles.

- About 1.0 miles from its origin, a spur line about 0.1 mile long will serve the existing Orleans Tower by following the existing overhead distribution spur line to near the tower (utilizing the existing lateral overhead line and pole one span length from the main overhead line), then going underground without additional ground disturbance in an existing 3" conduit placed for that purpose during construction of the Orleans Tower in 2013. Segment 1 continues in the inboard ditch of Highway 96 to the Weitchpec School Road turnoff where it terminates.

2.4.5.2 Segment 2

This segment, 24.2 miles total, begins where Segment 1 leaves the road prism of Highway 96 and follows Weitchpec Road (identified on the ground as Upper Weitchpec School Road and Lower Weitchpec School Road) and continues to the village of Wautec (Johnsons on older maps). The segment also crosses the Klamath River and serves the Yurok Tulley Creek Facility.

Main Segment Description

Segment 2 proceeds from Highway 96 to Highway 169, a distance of about 1.1 miles, the first 0.5 miles mostly trenched into the northern ditch of the Humboldt County Weitchpec Road except for two saw cut installs to cross Upper Weitchpec School Road as it turns up towards the school and Lake Prairie Road. Segment 2 transitions to overhead on existing multiuse poles at the existing lateral tap for the Yurok Tribal Facilities in Weitchpec. It then continues down Highway 169 to its end at Wautec, following the existing utility poles. The existing utility poles leave Highway 169 to follow Upper Capell Road, crosses several creeks including Miners Creek, then follows Lower Capell Road back to Highway 169, a distance of about 6.6 miles. From Lower Cappell Road it follows Highway 169 for about a mile, partially underground. Where the existing power and communications lines were installed underground, the KRRBI project will also install a fiber optic conduit underground by saw cutting the pavement. At Cappell Creek it goes overhead on existing poles across Ka'Pel Creek to the McKinnon Hill Road (Yurok Tribal Road) to the Ka'Pel Head Start building.

Utility poles were installed in 2017 from Ka'Pel to Wautec. The Karuk Tribe assumes that the extension to Wautec will be completed before KRRBI goes to construction, and that the PG&E poles will be available for fiber optic installation with an appropriate pole use agreement. No other communication carrier is installed on the new PG&E poles, nor are there plans at this time for another carrier. The last 6 miles of powerline construction include two substantial portions of underground installation and a bridge hang on the Pecwan Creek Bridge. PG&E plans call for the installation of an extra conduit that can accommodate the KRRBI fiber optic cable where the powerline goes underground and also on the bridge hang, facilitating the future installation of KRRBI fiber optic cable. This means that there will be no ground disturbance for the KRRBI project at those underground or bridge locations, because the PG&E plans also call for additional vault installation at each end of the extra underground and bridge hang conduits.

KRRBI will use existing vaults to install the fiber optic cable. Segment 2 will serve the Yurok Tribal Building in Weitchpec, the Weitchpec Elementary School, the Weitchpec Transfer Station facility, the Ka'Pel Head Start facility, Jack Norton Elementary School in Wautec, and the Wautec Volunteer Fire Department with either fiber optic line drops or wireless connections.

Land uses adjacent to Segment 2 are predominantly forest land. The first two miles of Segment 2 passes through the small and scattered village of Weitchpec in an underground (0.5 miles) and overhead (1.5 miles on existing poles) installation. Weitchpec lands are not designated as "residential", and though there are residences in the village, the installation does not pass near to the residences. The segment does not pass through any agricultural lands.

Spurs

- About 0.1 miles from its origin, a 0.3-mile spur to serve the Weitchpec Magnet School will be installed underground along the existing road.
- About 0.3 miles from its origin, a small, less than 0.1-mile long spur to serve the Yurok Tribal and Community Facility in Weitchpec will be installed on existing overhead utility poles.
- About 3.8 miles from its origin, a 1.1-mile spur to serve the Yurok Tulley Creek Facility, houses the Yurok Wildland Fire Department, Yurok Roads Department, and Yurok GIS Department, will be installed. The spur will be a splice off the main line running to Wautec, and will be installed on a new pole will be erected immediately adjacent to the existing joint use utility pole and fiber optic cable strung across the Klamath River, parallel to the existing cable crossing owned by Frontier. On the north side of the Klamath River a new pole will be erected immediately adjacent to the existing Frontier communication pole supporting the existing Frontier river crossing. The new fiber optic cable will then be installed on existing joint use poles along Tulley Creek Road until reaching the Yurok Facility.
- About 21 miles from its origin, a 0.2-mile spur will serve the Jack Norton School on existing utility poles.

2.4.5.3 Segment 3

Segment 3 is 21.9 miles long and starts at the intersection of Bald Hills Road and the Martins Ferry Bridge at the spur to the Tulley Creek Facility of Segment 2 and continues to the Elk Camp Fire Station on Bald Hills Road.

Main Segment Description

Segment 3 will pick up the fiber optic cable connection from Segment 2 and will continue underground along Bald Hills Road to the intersection with Johnsons Road and Bald Hills Road at Elk Camp Fire Station. This segment will originate within the Yurok Reservation and travel across trust, allotment, and private lands within the reservation, then private (including GDR

lands), California State, and RNP lands that underlie the Humboldt County easement for Bald Hills Road.

Land uses adjacent to Segment 3 are predominantly forest land and park land. The first 5 miles are within the Yurok Reservation and within dense forest stands, while the next 8 miles cross private parcels, also within dense forest stands. At about 13 miles, Segment 3 crosses into Redwood National Park and follows along Bald Hills, which forms its northeastern edge. This edge of the Redwood National Park borders on the remaining prairies (that have not been invaded by trees due to fire suppression) for which Bald Hills were named. The remaining 8.9 miles follow this edge to the CDF Elk Camp Fire Station.

Spurs

- About 4.8 miles from its origin, there will be a very short trenched 160-foot spur to serve the existing Yurok Wiregrass broadband tower adjacent to the existing Yurok Veterans Cemetery.
- At its end, there will be a very short trenched 100-foot spur to serve the existing CDF Elk Camp Fire Station.

2.4.5.4 Segment 4

Segment 4 will start at the end of Segment 3 at the intersection with Johnsons Road and Bald Hills Road at Elk Camp Fire Station and will continue to the proposed broadband tower in Orick.

Main Segment Description

From its origin at the end of Segment 3, Segment 4 will extend about 9 miles underground along Bald Hills Road to its terminus at Highway 101. At the terminus of Bald Hills Road, Segment 4 will travel under Highway 101 in a directional drill and be installed underground, trenching along the west side of the highway, until reaching the first existing overhead joint use pole. It will then go overhead on the existing poles from that point to the Orick Tower along Highway 101. Segment 4 total length is 11.8 miles and the segment will travel across private lands, including those held by GDR, a CDF parcel (Elk Camp Fire Station) Redwood National Park lands, and land held in fee by CalTrans along Highway 101. Segment 4 will serve the Orick Tower and the Southern Operations Center for the NPS with a secure fiber drop. Segment 4 will also serve the Orick Volunteer Fire Department, Orick Elementary School, businesses, and residents in Orick with a robust wireless signal from the Orick Tower.

Land use adjacent to Segment 4 is forested park lands for the first 10.3 miles. The last 1.5 miles from the Bald Hills Road intersection with Highway 101 can be characterized as rural residential and some commercial in the small town of Orick.

Spurs

- About 10 miles from its origin at Elk Camp, there will be a short 0.1 mile or shorter spur to serve the proposed RNP visitor center at the old mill site near the intersection of Bald Hills Road and Highway 101.
- About 11 miles from its origin, there will be a 0.1-mile spur to serve the existing Frontier Central Office facility in Orick.
- At the terminus of Segment 4, there is a less-than-0.1 mile spur to the proposed Orick Tower on existing overhead utility poles.

2.4.5.5 Segment 5

Segment 5, at 33.1 miles long, is designed to connect the KRRBI service area with the nearest reliable link into the larger fiber optic network in the Eureka-Arcata-McKinleyville area.

Main Segment Description

Segment 5 will travel on existing utility poles west along Highway 101 from the intersection with Segment 4 to Hiltons Road, then up Hiltons Road on existing joint use poles until they end, and then underground along Hilton Road until reaching the RNP boundary and the West Side Access Road. The segment will continue underground along the West Side Road about 5 miles to the southwest boundary of the RSNP with GDR lands. At that point Segment 5 will continue underground along a series of GDR logging roads to the GDR gate accessing Crannell Road. From just before the gate, where joint use poles are found on GDR lands, the fiber optic cable will transition from underground to overhead and follow existing poles out of GDR lands along Crannell Road, where the Humboldt County easement crosses private lands, to Dows Prairie Road. The Segment will continue overhead south on Dows Prairie Road, again utilizing existing joint use, PG&E, or telecommunications poles (depending on space availability), until reaching the "meet-me" point with Suddenlink.

Land uses along Segment 5 start with rural residential for 1.5 miles in Orick and transition to forested park, then commercial forest uses across the RNP and GDR lands, respectively. The last 3.0 miles of Segment 5 cross agricultural lands adjacent to Crannell Road (1.4 miles) and rural residential areas (1.6 miles) adjacent to Dows Prairie Road.

Spur

- About 1.7 miles from its origin at the intersection of Segment 4 there will be a 0.4-mile spur down a private farm dirt road to serve the existing Tsunami Wireless broadband tower.

2.4.6 Additional System Components

2.4.6.1 Yurok Signal Connection

Figure 2.4-26 shows the location of the existing Orleans Mountain radio repeater site and Antenna Ridge both on the Six Rivers National Forest. Antenna Ridge is a rocky ridge immediately south of the existing access road to Orleans Mountain that was used in the 1960s to pick up and rebroadcast television signal for the town of Orleans. The Antenna Ridge site was abandoned over a decade ago as people turned to satellite TV and no longer relied upon housetop antennas for signal. Remains of the old antennas, a solar panel set with a supporting pole, and a battery box remain on site.

The KRRBI Project will build a two-element repeater system using these two locations in order to pick up and rebroadcast the Yurok wireless broadband signal. The Karuk and Yurok have agreed to share the Yurok connection to the existing fiber optic network near Crescent City, CA. This connection is available to the Karuk Tribe wirelessly from the existing Wiregrass tower just above the Yurok Veterans Cemetery on Bald Hills Road.

This connection will strengthen and provide another signal source for KRRBI customers if anything should happen to one or more of the fiber optic connections either in place (Siskiyou Telephone) or proposed for KRRBI (Suddenlink).

Preliminary testing has shown that the signal from Wiregrass easily reaches Orleans Mountain, but topography prevents it from being rebroadcast directly to Orleans, where it will connect with the existing Orleans network and with the proposed future KRRBI fiber optic network linked through Orick to McKinleyville. In order to allow the signal to reach Orleans, a small relay station is needed on Antenna Ridge.

The proposed Yurok Signal Connection element of the larger KRRBI Project will have two components: an additional antenna and radio on Orleans Mountain (to be added to the newly installed and operational Forest Service antenna tower and vault with no ground disturbance), and a small relay station on Antenna Ridge.

Klamath River Rural Broadband Initiative

Figure 2.4-26 Yurok Signal Connection

SIX RIVERS NATIONAL FOREST

Mckinnon Hill

Segment 2

Miners

169

Wiregrass

Segment 3

Weitchpec

Weitchpec

96

Segment 1

Orleans Broadband Tower

Orleans

96

Antenna Ridge

Orleans Mountain

96

Legend

- Existing Tower
- Proposed New Relay

Fiber Install Route

Segment

- 1
- 2
- 3
- Yurok Reservation Boundary

N

W E

S

0 1.25 2.5 Miles

This map is for information and reference purposes only. The Yurok Tribe assumes no liability or responsibility in the use or misuse of this map and the information within. Fiber optic install method data was collected using mapping grade GPS.

Yurok Tribe GIS Program
July 5, 2017

Orleans Mountain Antenna

The Karuk Tribe already has a radio repeater and antenna installed on Orleans Mountain. The Yurok Signal Connection will require the addition of two dish antennas, one 24" in diameter and one 6" in diameter, to the existing tower. These antennas will be connected to radio equipment using weatherproof cable and the existing ice bridge between the tower and the existing Forest Service radio hut.

All needed equipment will occupy a small 3' x 2' x 2' space in the existing hut or vault. This hut space is only necessary if KRRBI cannot make use of the existing battery system and must install batteries. If existing battery power is sufficient, then KRRBI will require space only for two power adapters, about 2" x 3" x 2" each, and the power cable and data cables that run to those adapters. No signal regeneration is needed or proposed. No new ground disturbance will occur for this installation. The Forest Service radio technicians have indicated that sufficient space is available on the tower for the needed antennas. Access will be available on the existing and maintained Orleans Mountain Lookout Road (10N12). Typical drawings are supplied as Figures 2.4-27, 2.4-28, and 2.4-29.

Figure 2.4-27. Yurok Signal Connection, Orleans Mountain Plan

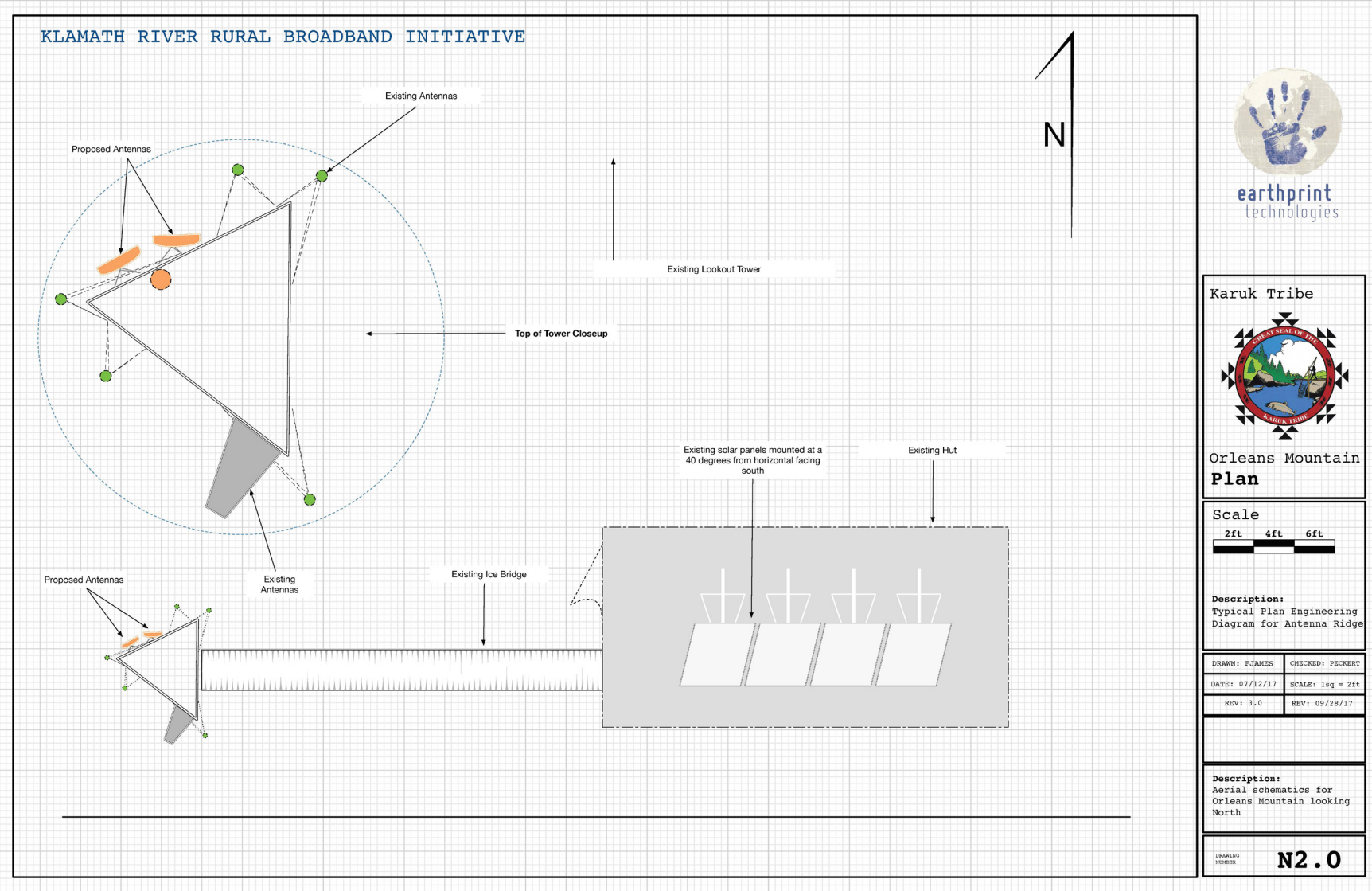


Figure 2.4-28. Yurok Signal Connection, Orleans Mountain Profile

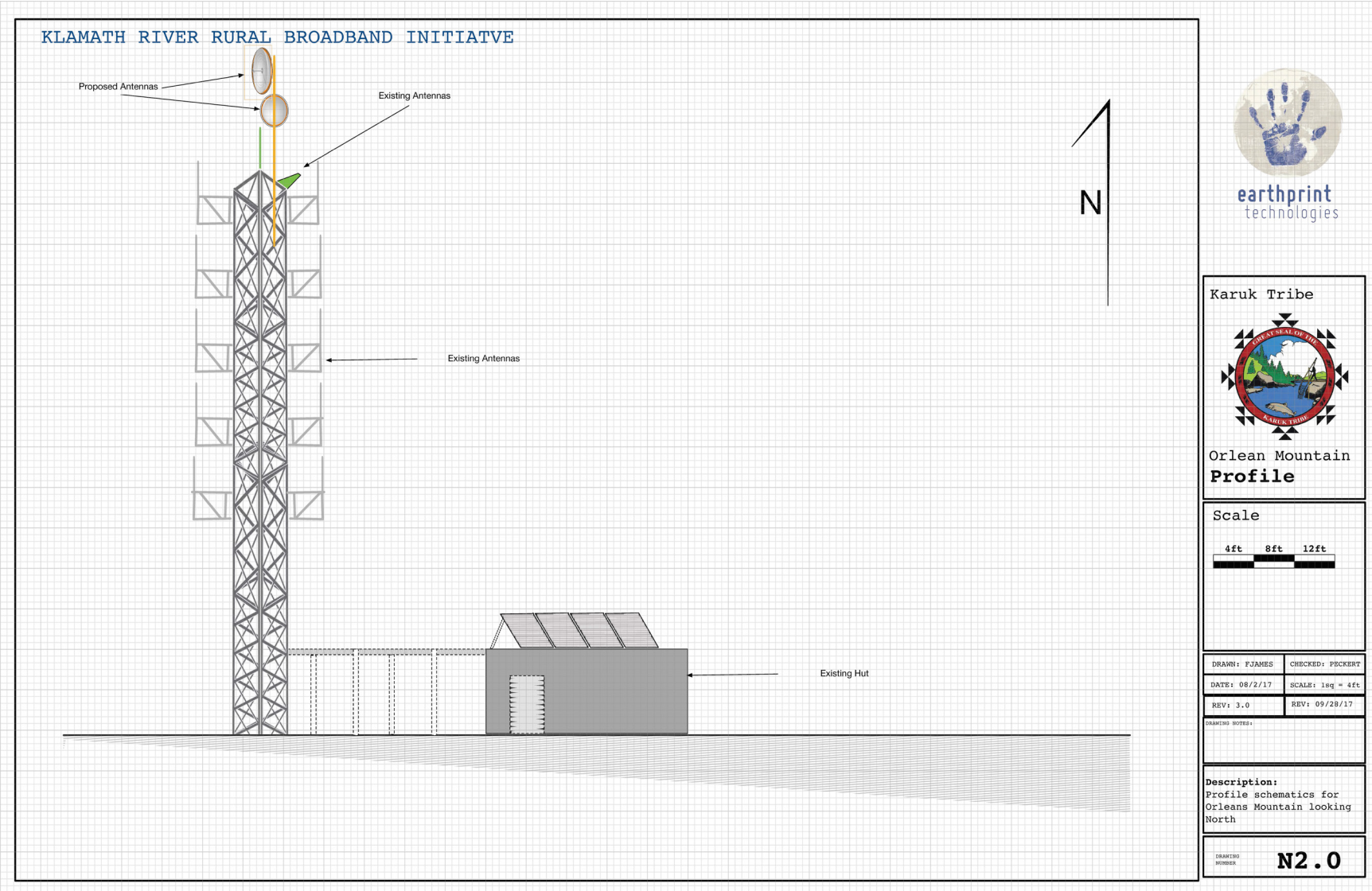
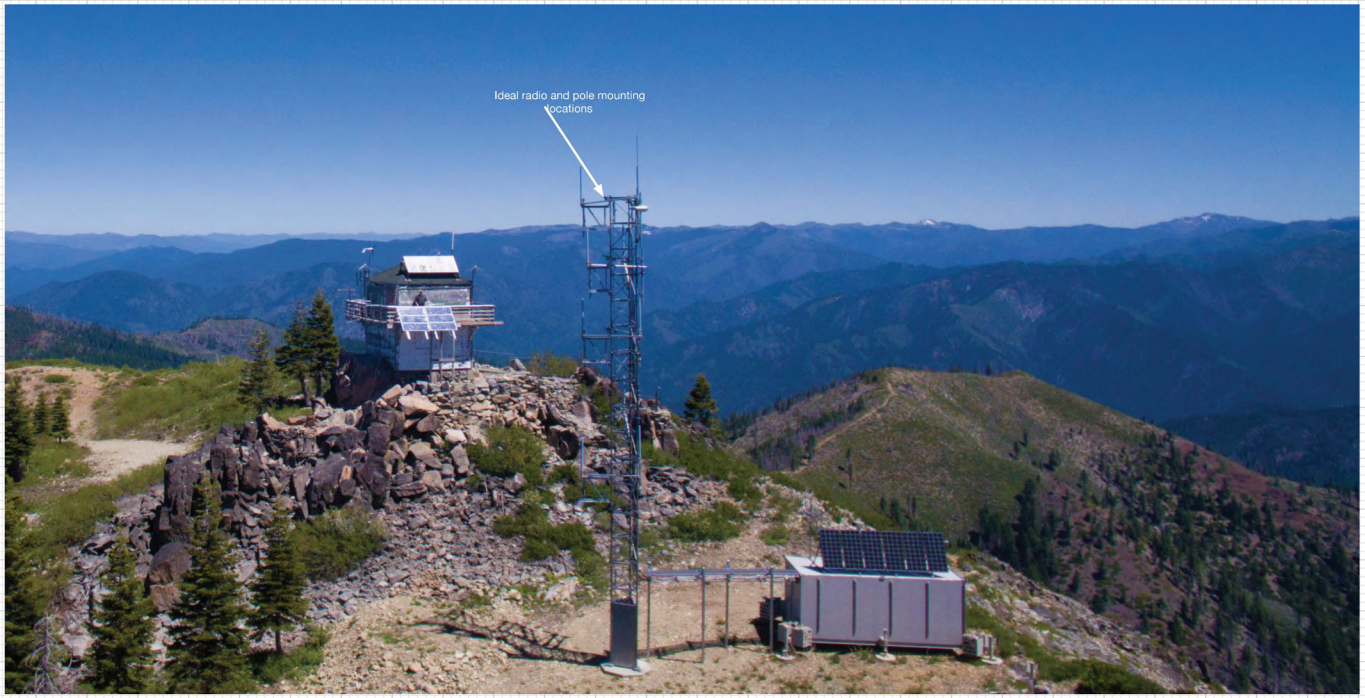


Figure 2.4-29. Yurok Signal Connection, Orleans Mountain Side Photo

KLAMATH RIVER RURAL BROADBAND INITIATIVE



earthprint technologies

Karuk Tribe

Antenna Ridge
Aerial Photo

Scale N/A
2ft 4ft 6ft

Description:
Aerial photo for Antenna Ridge

DRAWN: FJAMES	CHECKED: PECKERT
DATE: 08/2/17	SCALE:
REV: 1.0	REV: 08/2/17

Drawing Notes: T

DRAWING NUMBER **N2.0**

Antenna Ridge Relay Station

In order to transmit the signal from Orleans Mountain to Orleans, a small solar-powered relay station is needed on Antenna Ridge. The intent is to occupy the same space previously used by the Orleans Community Service Club (OCSC) for the television antenna relay station, now in disuse but with hardware still in place. The Karuk Tribe will remove and clean up the OCSC antennas, battery bank, and solar panels, and will work with the OCSC for their disposition once removed from NFS lands.

In their place, the Tribe will install a state-of-the-art solar-powered facility with a small lattice structure, about 30' tall, supporting two antennas. These antennas require power to receive and rebroadcast the signal, so a solar array and a bank of batteries will be installed. No signal regeneration is needed or proposed. The batteries and the radios will be enclosed in a weatherproof 6-foot by 6-foot hut, 8' tall, and the solar panels will be mounted on the roof. A security fence will be installed to reduce potential for vandalism and lost signal. See Figures 2.4-30, 2.4-31, and 2.4-32 for plan and profile typical drawings. Details for each component follow.

Figure 2.4-30. Yurok Signal Connection, Antenna Ridge Plan

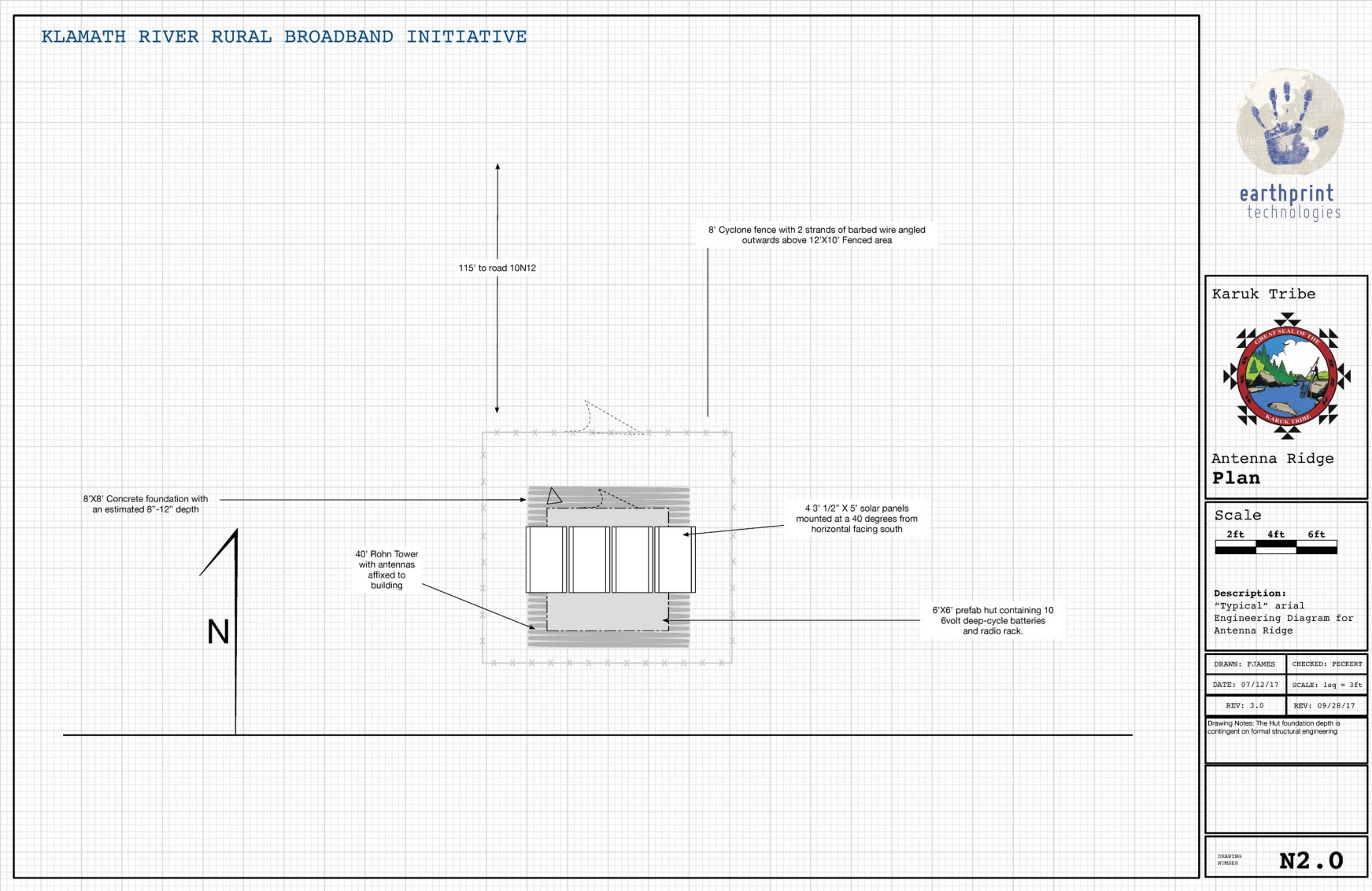


Figure 2.4-31. Yurok Signal Connection, Antenna Ridge Profile

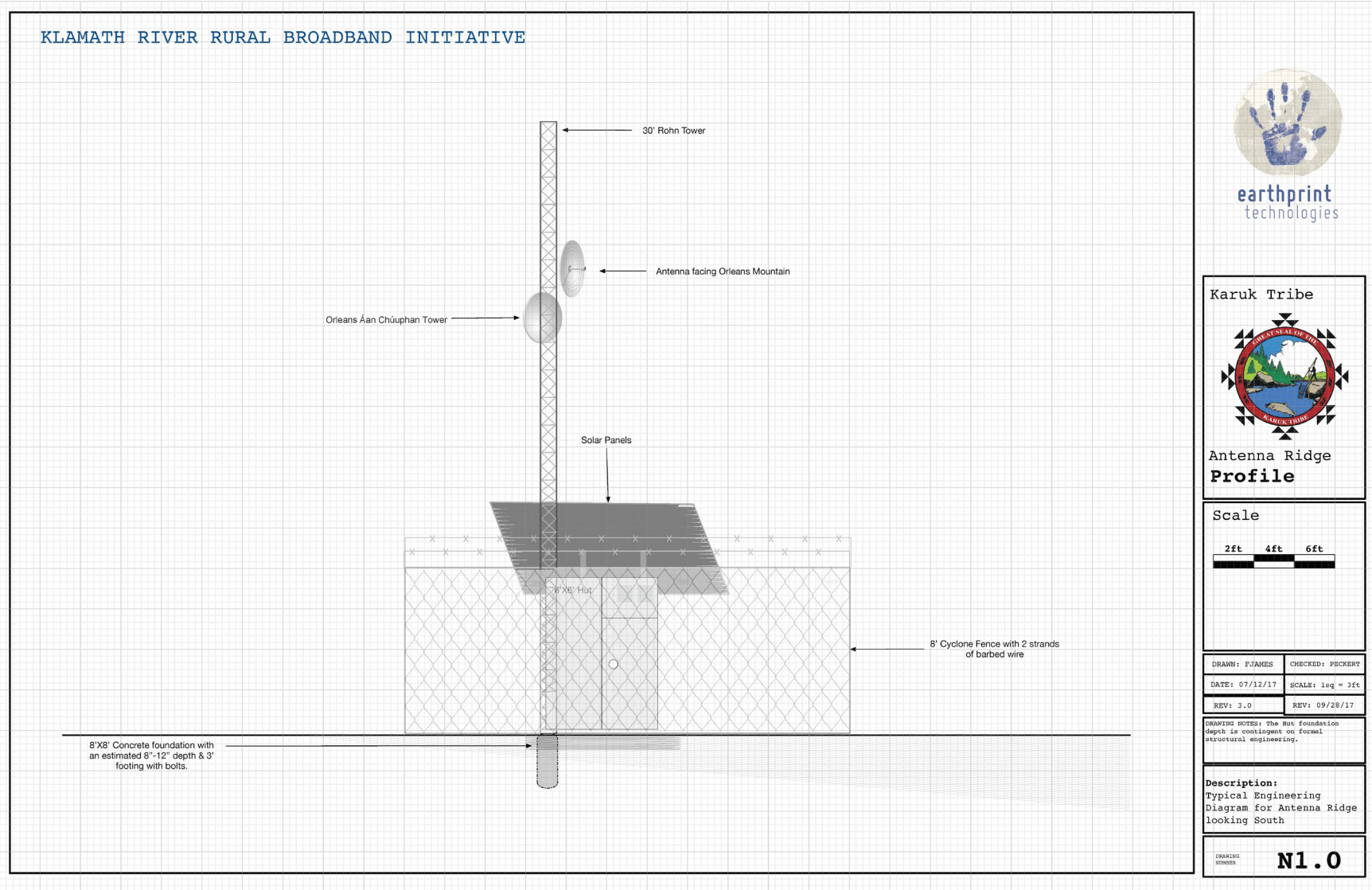


Figure 2.4-32. Yurok Signal Connection, Antenna Ridge Site Photo

KLAMATH RIVER RURAL BROADBAND INITIATIVE

earthprint technologies

Karuk Tribe

Antenna Ridge
Aerial Photo

Scale
2ft 4ft 6ft

Description:
Aerial photo for Antenna Ridge

DRAWN: FJAMES	CHECKED: PECKERT
DATE: 07/12/17	SCALE: 1sq = 3ft
REV: 1.0	REV: 07/12/17

Drawing Notes: The precise location can be any one of three areas depending on the permitting requirements and needs of the tribe.

DRAWING NUMBER **N2.0**

Tower and Antennas

In order to receive and rebroadcast the signal, a 30-foot Rohn (lattice) tower will be installed on Antenna Ridge. One of the 3′ x 6″ antennas mounted on its top will be in line with the signal from Orleans Mountain and the other, similarly sized, antenna, will rebroadcast the signal to the existing Orleans Broadband Tower near the intersection of 15N01 and Highway 96. The tower will be anchored 3′ in the rock of the ridge and will not require guys.

Solar Array

The solar array consists of four standard solar panels, REC 280 modules that are about 3 feet wide by 5.5 feet high by 1.5 inches thick. The three panels will be mounted on a fixed frame on the roof of the hut, mounted at 40 degrees from horizontal and facing due south. The array itself is about 12 feet wide and will overhang the 6-foot wide hut by 3′ on either side.

Fence

A 8-foot high cyclone fence will be installed around the facility, 12 feet wide by 10 feet long, with two rows of barbed wire at the top of the fence. A 36″ wide locked gate will be provided for pedestrian access to the facility.

Access for Construction

No vehicle or other wheeled or tracked equipment access is planned during construction. Construction equipment will be carried by hand to the site from the road. A generator or truck-mounted air compressor may be used to power some equipment and a gas-powered hand auger will be used to drill the holes needed to mount the solar array and the antenna pole.

Operations and Maintenance

No parking or vehicle access is contemplated for the Antenna Ridge facility. Access will be on foot from the Orleans Mountain Road.

Figure 2.4-33. Wireless Tower and Hut, Orleans

2.4.6.2 Wireless Towers

Existing Orleans Tower

The Orleans Community Connect Project installed a 90-foot tower southwest of the town center in Orleans in 2013 on property belonging to the Karuk Housing Authority in fee (see Figure 2.4-33). This tower, served wirelessly by the Community Connect Project, will be served by fiber optic cable with the KRRBI Project. Its construction and operation have been permitted through the Community Connect Project.

Fiber optic cable will be brought overhead from the main fiber optic cable to be installed on the existing joint use poles that cross the Karuk Housing parcel where the tower is located. It will

travel one pole to the existing transformer pole near the tower. It will then be brought down the side of the pole and into the previously installed three-inch conduit. There is a pulling tape inside the conduit ready for the installation of the fiber optic cable. The cable will be brought up inside the fenced area and terminated inside the building, where it will be connected with existing equipment to provide a secondary broadband connection for the Orleans tower. Ground disturbance will be limited to the uncovering of the previously installed conduit at the base of the transformer pole.

New Orick Tower

A tower will be erected in Orick as part of the KRRBI Project. Its location is proposed on agricultural land south of Highway 101 (See Figure 2.4-34). The Orick tower will be a self-supporting lattice tower similar to the Orleans tower, 90' tall, without guy wires, installed in a fenced enclosure that will include a back-up generator, a propane tank to supply the generator, and a pre-fabricated building to house the electronics to power and control the signals entering and leaving the tower. The tower will provide wireless broadband signal to the town of Orick. The tower is proposed for installation on private land that is zoned for agriculture. That zoning permits communications structures without a conditional or special permit. Therefore the construction would be subject only to the Humboldt County building permit process. The Tribes are also exploring the possibility of locating the tower on the CalTrans storage yard in Orick. Figure 2.4-35 shows a plan view and Figure 2.4-36 shows a profile of a typical tower installation.

The self-supporting 90' galvanized steel lattice tower proposed for Orick will have three legs and will stand on a poured concrete foundation about 15 feet in diameter. Once the foundation is poured and cured, the tower is constructed from its constituent parts on-site in three 30-foot sections. A construction crane will be brought to the site to lift each section. Workers with safety climbing gear will bolt the sections together. After the tower is completed, it will be electrically grounded for safety and for lightning protection for the electronics. Either or during or just after tower construction, two to four small antennas will be secured to the upper portion of the tower to allow for broadcasting the wireless broadband signal. These antennas will be about a foot in diameter and will be secured to the tower near the top, arrayed for maximum coverage of Orick and vicinity.

To assure public safety, the tower foundation will be enclosed in a 7' tall cyclone fence topped by a 1' barbed wire fence. This fence will also enclose a 250 or 500-gallon propane tank, a 10kW generator, and a pre-fabricated building that will enclose the power supply switching to the tower as well as the controls for the wireless signal deployment. The pre-fabricated building will be installed on a separate concrete pad and wired to accept PG&E power. The system will be designed to automatically trigger a propane generator to start up in case of power outages. The generator will sit on a pad adjacent to the hut and the propane tank will be located well away from any source of spark within the fenced enclosure.

Figure 2.4-34. Orick Tower General Location

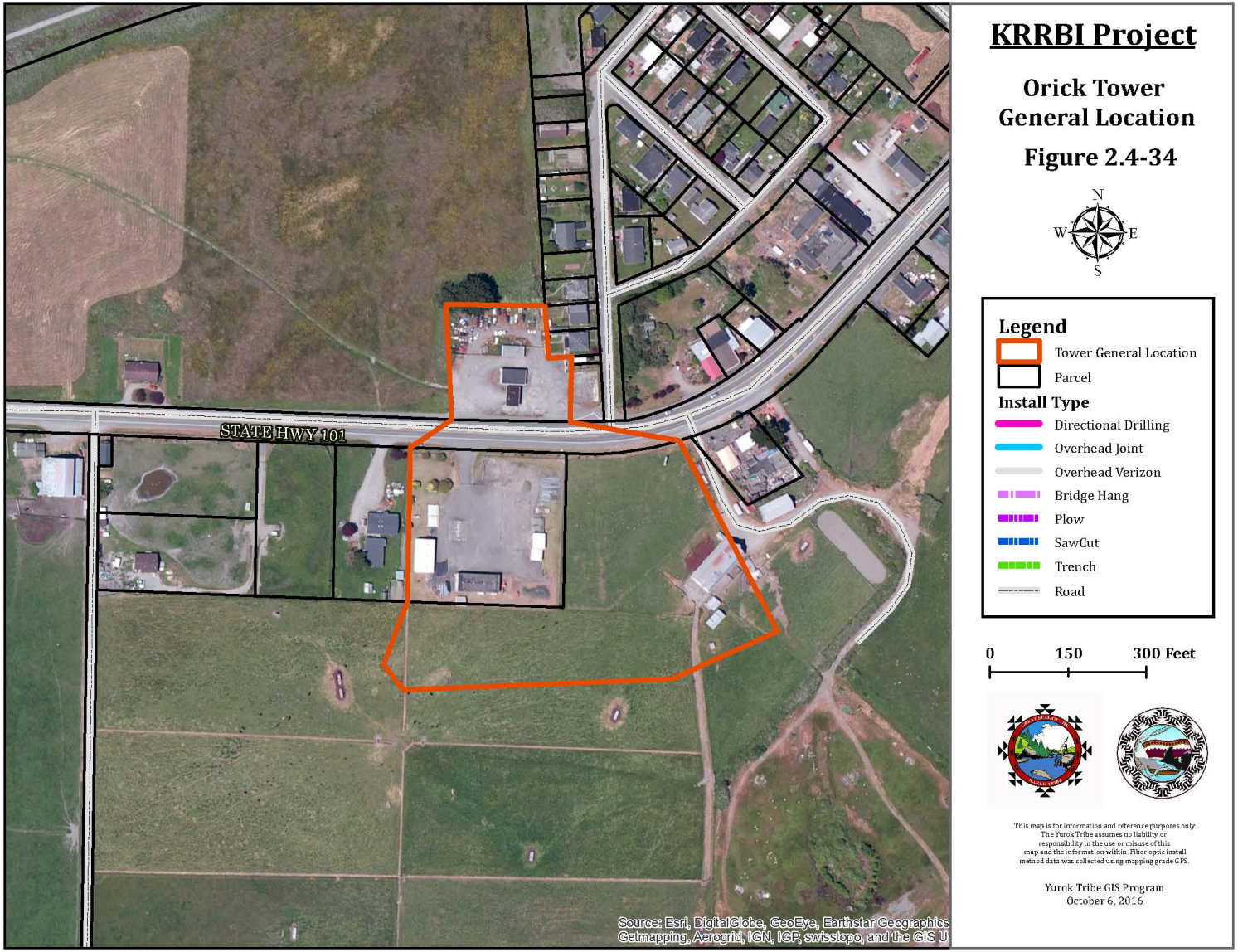


Figure 2.4-35. Typical Tower Profile

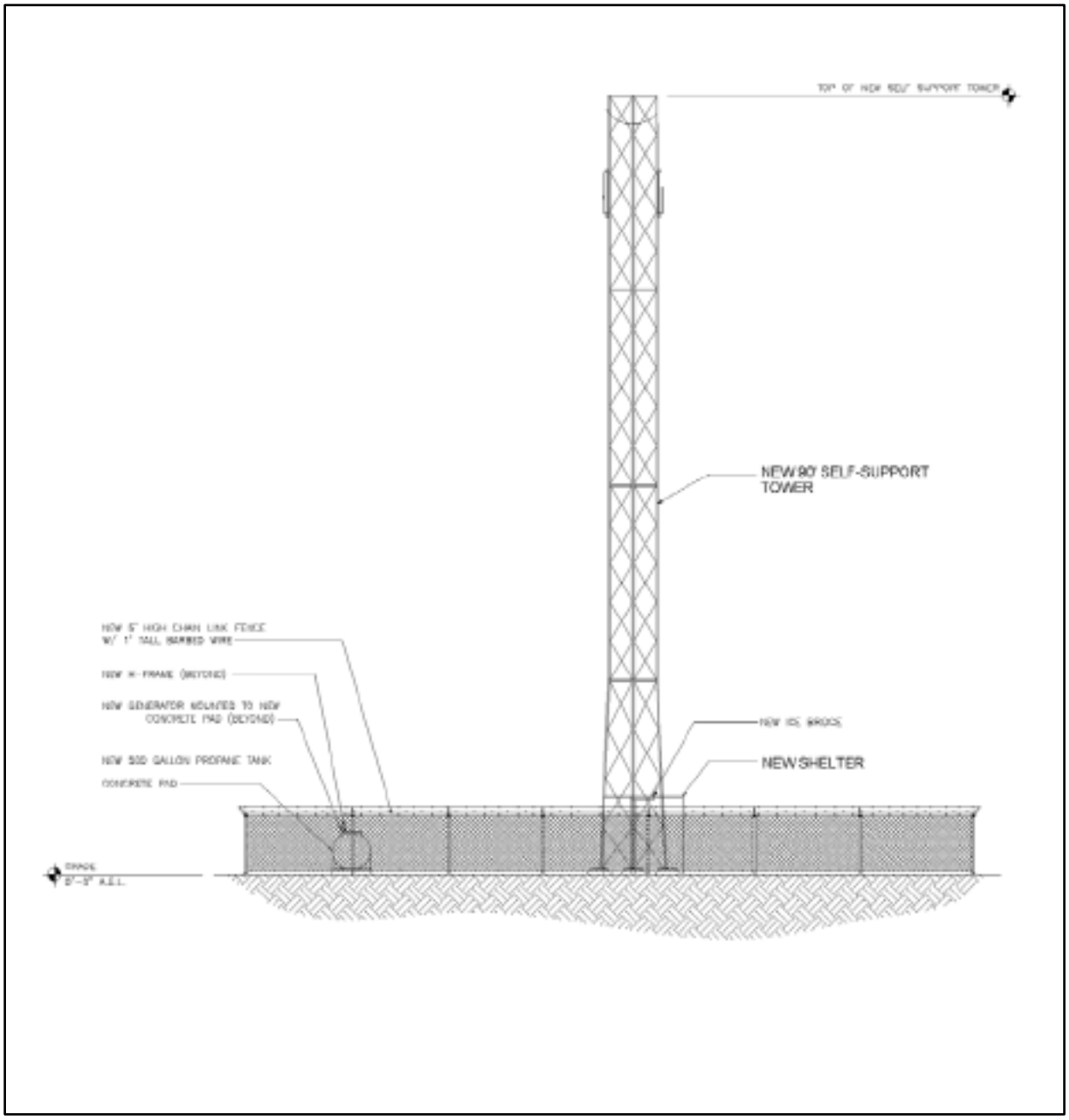
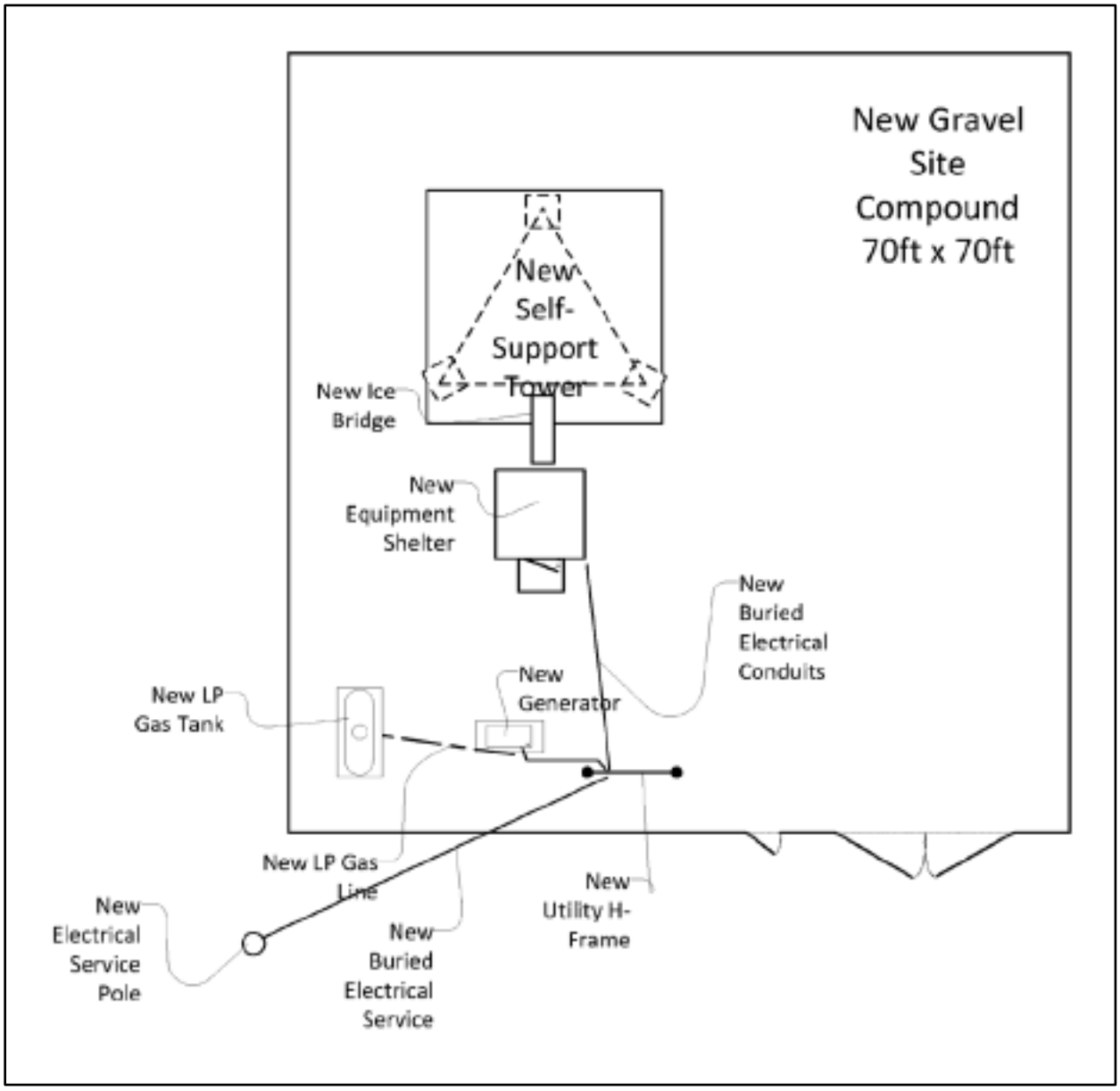


Figure 2.4-36. Typical Tower Site Drawing



Motion-detecting security lighting and cameras will be installed. Lights will only come on if there is motion near the building or generator. The area inside the fenced enclosure will be graveled or paved to control dust and weeds.

The propane-powered generator specifications show its noise level to be 63 dB(A) at 23' from the generator. It will consume slightly less than a gallon per hour under half load. It will be set up to run 12 minutes a week to maintain all elements of the engine fully lubricated and ready to run in the case of a power outage. The 250-gallon propane tank provides for the weekly maintenance runs and for all the power outages likely to occur in a year, and can be refilled from one of several local vendors as needed. Access to the propane tank and relay hut will be by a gate in the fence of sufficient size to allow for propane truck access. Major repairs on the installation could require a crane or safety climbing equipment and trained personnel.

Total construction ground disturbance for the tower, including the pad for the crane, access road improvements, and distribution power installation, will be less than ½ acre. The permanent footprint will be the area within the fence, which will include parking for maintenance and operation staff. Exact dimensions of the fenced area and the building will be determined in coordination with the landowner and Humboldt County permitting.

Yurok Wireless Towers

The Yurok Tribe, a partner in the KRRBI project, is managing several existing remote wireless towers on the Yurok Indian Reservation. These towers, and the Yurok system generally, will provide additional backhaul for the KRRBI system. Conversely, the KRRBI project will strengthen the Yurok system and will provide improved bandwidth and service. In order for the Yurok Wireless Towers to continue to function, generators on two of the towers (Wiregrass and Miners) will be replaced, the entire remote power system at McKinnon Hill will be upgraded, the generator at Wautec will be replaced, and the radio container and uninterrupted power supply (UPS) will be replaced at Weitchpec.

The Weitchpec Tower requires replacement of the existing equipment container. The existing container is inadequate and leaks. The replacement process will use the existing footprint. Only the container and UPS will be replaced at this site.

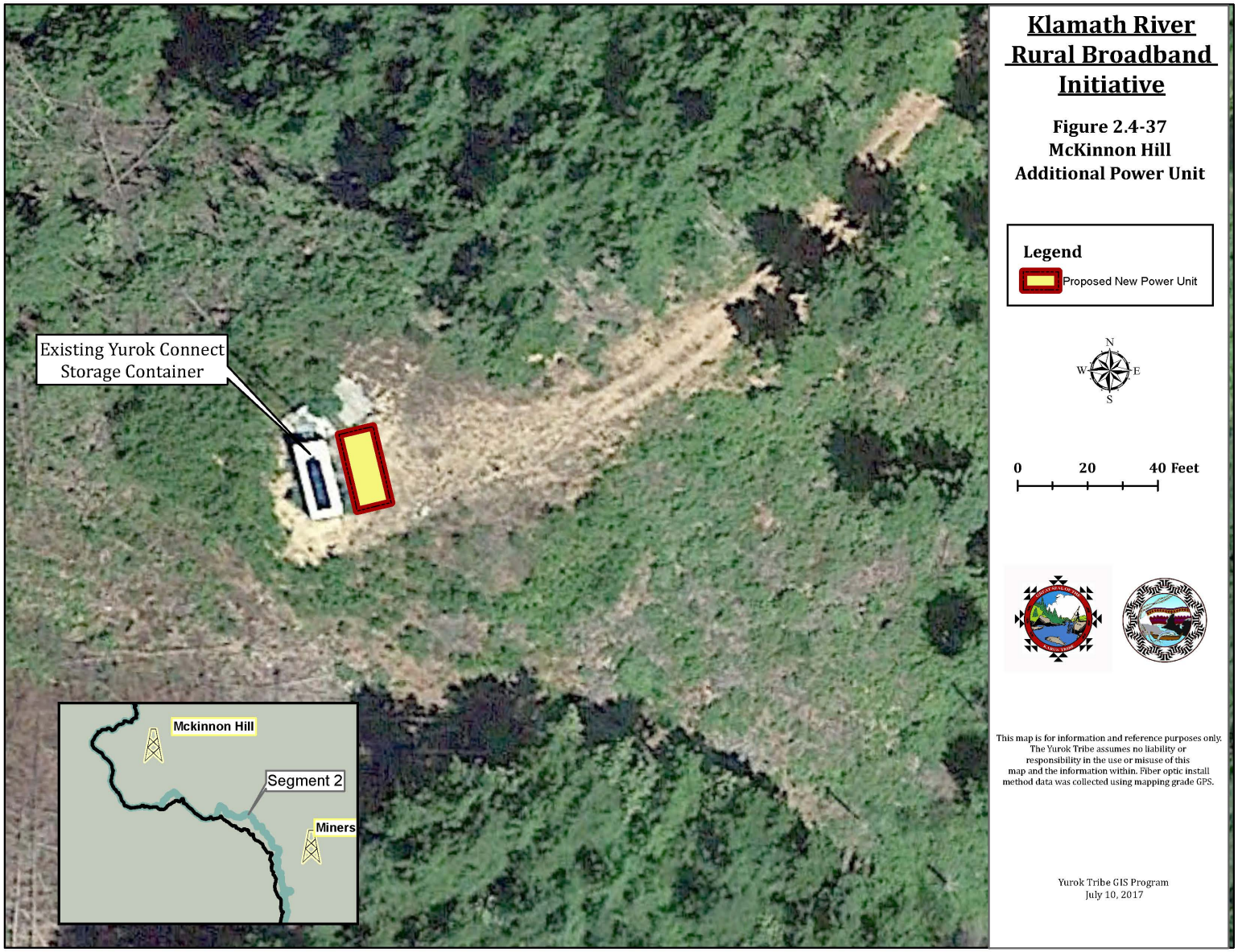
The Wiregrass Tower site, located on Yurok Trust land, requires a 20-foot extension on its existing tower and a replacement generator. The tower extension will require the installation of guy wires. The existing tower is approximately 30 feet and is self-supporting. With 20 additional feet, the tower will require guy wires for wind loading. The guy wires will require the excavation of 3 holes each of which will require the excavation of approximately 8 cubic feet of earth. The existing diesel backup generator will be replaced with a newer, more efficient generator. A Supervisory Control and Data Acquisition (SCADA) pack will be installed to remotely monitor fuel levels, battery charge levels, and other equipment status. Additional solar panels will be installed to reduce the use of the backup generator.

The Miners Creek Tower site, located on Yurok Trust land, requires the replacement of its 8ft by 20ft ConEx equipment container used to house the radio / switching /electrical equipment. The existing container roof is unstable and leaks. The new equipment container will sit on the same footprint as the existing container. The existing diesel backup generator will be replaced with a newer, more efficient generator. A SCADA pack will be installed to remotely monitor fuel levels, battery charge levels, and other equipment status. Additional solar panels will be installed to reduce the use of the backup generator. Solar panels will be mounted on the ConEx container.

The McKinnon Hill Tower site, located on Yurok Trust land, requires the installation of a redundant power system as the site is located off grid and will function as a major part of the backbone for the entire network. In order to provide a redundant power system an additional 8' by 20' ConEx equipment container will be installed and will be used to house a new generator, fuel tank, battery bank, charge controller, and additional solar panels. The new container will be placed next to the existing container on already cleared land. No ground disturbance will be required. A SCADA pack will also be installed to remotely monitor fuel levels, battery charge levels, and other equipment status. See Figure 2.4-37.

The Wautec firehouse will become a major backbone intersection point for the project and will require the installation of a backup generator with automatic transfer switch. The site already has a propane tank and an existing generator pad. The existing generator is in need of replacement and electrical upgrade to work with the newly installed PG&E grid. There will be no ground disturbance to change out the generator and add a switch.

Figure 2.4-37. McKinnon Hill Existing Tower Improvements



2.4.6.3 Other Last mile Components

Fiber Drops

Wherever fiber drops are proposed (anchor institutions and areas with clusters of homes), they will be installed underground in "hand-holes" or underground concrete boxes. Underground vaults are typically 3 feet long, 2 feet wide, and 2 feet deep. Where the middle mile fiber is traveling overhead, a loop of the cable will be brought down in an enclosed riser on the pole. In an underground vault adjacent to the pole, 2 strands of the 72-strand cable will be spliced into and routed from the main cable, likely as part of a 12-strand fiber optic cable. Where the middle mile fiber is traveling underground, the fiber will be brought directly into a vault and spliced as specified above. From the vault, the 12-strand cable will be carried in a conduit underground to the building, antenna, or tower to be served. At the delivery side, an Optical Network Terminal switch, a fiber-to-copper switch, or a fiber-to-wireless signal switch will be installed. These switches require a reliable power source. Where the final service location is within an anchor institution, the institution will likely provide the back-up power.

Access Points

Where there are clusters of homes or businesses, an access point (AP) may be installed (see Figure 2.4-38). An AP is a radio about the size of a football, mounted on an 8 to 20-foot pole (depending on location), and also 2 to 4 antennas, about 10-12" in diameter, on top of the pole. The pole may be installed independently, requiring either competent native material backfill or a small poured concrete footing, or attached to a building. These APs then receive and rebroadcast a signal for multiple homes or residences. They are installed within half a mile of the cluster of homes or businesses. APs can serve line-of-sight, near-line-of-sight and non-line-of-sight customers, depending on the radio frequencies used. If a building is used to support an AP, mounting brackets are attached to the building and a small stand-off pole may be attached if required.

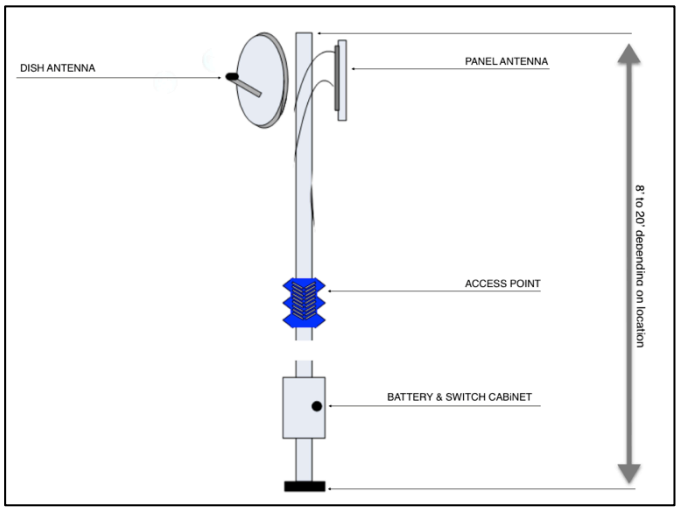


Figure 2.4-38. Access Point

Subscriber Modules

Subscriber modules will receive the wireless signal and translate it to a standard network signal for use in the home or business. A small radio, usually 6" x 6" but occasionally 3" x 8", is attached to the side of the building using a one-armed bracket near the top of the house. These

radios are designed to run on standard AC power, and connect with a CAT 5/6 Ethernet cable into the building where it will connect to a router for either WiFi or wired use. In some cases, an antenna is installed separately from the radio, with antenna sizes varying from 6" x 6" to a two-foot diameter dish.

2.4.7 Land Requirements and Right-of-Way

The KRRBI Project will seek long-term rights-of-way or easements from public land managing agencies, from CalTrans where the highway ROW is owned in fee, and from private parties alike for a 10-foot width for the fiber optic cable. Because construction disturbance area will also be approximately 10 feet wide, no additional temporary construction easement will be required. This will allow for long-term maintenance of the system with a minimal impact on other land uses. Table 2.4-3 shows underlying land ownership by Segment and Table 2.4-4 shows land ownership by installation type for the KRRBI Project. Where installation is overhead, no additional easements are needed, since the easements acquired by the original pole owners include communications. Where a CalTrans or Humboldt County easement occurs on public (state or federally managed lands), the Project must acquire an easement from the underlying land manager as well as from the easement holder, and has or will apply for the dual easements accordingly. Where those road easements cross private land, they generally hold easements that include utilities, and acquisition of permission to occupy the road easement is sufficient. The Project will or has applied for easements from private property owners where no such easements already exist. Where the Project crosses GDR lands, an easement will be obtained from GDR. The final easement obtained will depend on the final installation method but will be calculated as 10 feet width times the length of the proposed easement, converted to acres. The ROW acres shown in Table 2.4-4 are the maximum easement acres needed for underground installation.

The Orick Tower will require one half acre of land or less for the fenced installation. Other last mile facilities are unlikely to require additional land, but if needed, they will be included in requests for easements as engineering is completed.

The Karuk Tribe, with the exception of a small portion of trust land at the beginning of the project in Segment 1 and a small portion of fee land that underlies the existing Orleans Tower and surrounding areas, also in Segment 1, does not the land over which the project would cross. Table 2.4-2, above, details the ownership of the roads that the KRRBI project proposes to occupy.

Table 2.4-3. Miles Crossed by Land Ownership Crossed by Segment

Project Component	Land Owner/Manager												
	CalTrans	California State Lands	County	Yurok Fee	Yurok Trust	Yurok Allotment	Karuk Trust	Karuk Fee	NFS Lands	Redwood National Park	BLM	Private Lands	TOTALS
Segment 1	0.6	0.2	0.0	0.0	0.1	0.0	0.1	0.8	10.0	0.0	0.6	3.0	15.2
Segment 2	0.0	0.0	0.0	5.6	3.0	1.9	0.0	0.0	0.0	0.0	0.0	13.6	24.2
Segment 3	0.0	0.4	0.0	5.2	0.0	0.0	0.0	0.0	0.0	5.2	0.0	11.1	21.9
Segment 4	0.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	3.5	11.8
Segment 5	0.6	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	27.2	33.1
Total for Segments	2.1	0.7	0.5	10.9	3.0	1.9	0.1	0.8	10.0	17.2	0.6	58.4	106.2
Orick Tower	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Yurok Signal connection *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total for all components	2.2	0.7	0.5	10.9	3.0	1.9	0.1	0.8	10.0	17.2	0.6	58.5	106.2
*Yurok signal connection estimated at ¼ acre, or less than 0.1 mile equivalent													

Table 2.4-4. Miles Crossed by Land Ownership by Installation Type

Ownership	Overhead Existing	Overhead New	Trench	Saw Cut	Directional Drill	Bridge Hang New	Existing Infrastructure*	Total Miles	Total ROW Acres Needed
CalTrans	1.4	0.1	0.3	0.1	0.1	0	0.2	2.1	0.5
California State Lands	0.2	0	0.5	0	0	0	0	0.7	0.6
County	0.4	0	0.1	0	0	0	0	0.5	0.1
Yurok Fee	5.2	0.1	5.3	0.1	0.1	0	0	10.9	6.8
Yurok Trust	2.5	0	0	0	0	0	0.5	3	0.0
Yurok Allotment	1.6	0	0	0.2	0	0	0.1	1.9	0.2
Karuk Trust	0	0.1	0	0	0	0	0	0.1	0.0
Karuk Fee	0.7	0.1	0	0	0	0	0.1	0.8	0.0
NFS Lands	0.1	0	5.9	2.8	1	0.1	0.1	10	11.9
NPS/REDW	0.1	0	16	0.5	0.6	0	0	17.2	20.7
BLM	0	0	0.5	0	0.1	0	0	0.6	0.7
Private Lands	16.5	0.4	35.5	1	4.3	0	0.7	58.4	49.5**
Totals	28.6	0.8	64.2	4.7	6.1	0.2	1.7	106.2	91.0
* Includes existing conduit on bridge (0.04) and in road (1.11) (Segment 2) as well as existing fiber (0.52) (Segment 1) ** Generally covered in state or local road owner easement, includes 22.7 miles (27.5 acres) of new easement on GDR lands									

Most overhead installations will either occur within a road ROW or on Karuk-owned lands. Exceptions include a single existing joint utility pole in Orleans that is located on private lands in the village of Orleans away from a public road and the poles needed for the crossing of Redwood Creek in Orick. Installation on existing poles does not require additional ROW from the underlying landowner, as the easements already acquired by PG&E include communications, and PG&E makes available a portion of their distribution poles under CPUC regulation for communications use.

For underground installation in roadway ditches along Humboldt County roads, the Tribe has signed an MOA with Humboldt County to permit occupancy of its roads. The County has already acquired easements across private lands for its roads, and no further easement acquisition is needed.

For underground installation in roadway ditches on State Highways 96 and 169, the Tribe will submit an encroachment permit application to CalTrans. CalTrans District 1 staff has provided preliminary guidance regarding acceptable installation techniques. An encroachment permit will be acquired prior to construction. Caltrans advised the Karuk Tribe that it will not consider an encroachment permit application until engineering is completed. Final engineering will occur after environmental permitting is completed in order to incorporate any avoidance and minimization measures in the Project design that may be required in addition to the EPMs incorporated into the Project.

For underground installation in roadway ditches on Green Diamond Resources lands (Segment 5), an easement has been requested and will be acquired prior to construction.

For any form of installation across public and state lands, including overhead, additional permission is required from the public agency and has been applied for. NFS lands and BLM public lands are restricted to Segment 1, and the Karuk Tribe has applied for a special use authorization and right-of-way grant, respectively, from each agency. NPS lands are found along Segments 3, 4, and 5 (including the West Side Access road), and the Karuk Tribe has filed or will file an application for a right-of-way grant across those lands.

The State of California owns one upland parcel along Segment 3 and claims jurisdiction over the two overhead crossings of the Klamath River at Orleans (Segment 1, DNR extension) and at Martins Ferry (Segment 2). The Karuk Tribe has been in communication with the State and will request an easement on the parcel and for the crossings of the Klamath River. CDF owns a small parcel that is the anchor point for the west end of Segment 3 and the east end of Segment 4. The Karuk Tribe has begun the easement acquisition process for this parcel.

The Yurok Tribe owns some of the land in fee and some in trust along Segment 2 and along Bald Hills Road in the eastern portion of Segment 3 and has given its permission for the KRRBI Project, of which it is a joint sponsor, to occupy existing poles across those lands or to install in the road ditch. Allotment lands are considered private lands for the purposes of easement

acquisition. PG&E has already acquired easements on those lands and no further easements are required.

A GIS file is provided detailing ownership of the lands that the KRRBI Project proposes to cross.

2.4.8 Construction Practices

Although final details on construction schedule and staffing will not be available until the construction contractor is hired and has presented the plan for construction, what follows is a likely scenario for construction. Since all proposed construction will be conducted during daylight hours, no construction lighting will be anticipated. In the event of an emergency requiring night work, portable light standards with self-contained generators would be utilized only for the duration of the emergency.

The KRRBI Project can be considered for the purposes of construction to consist of six elements:

- Fiber optic cable installation, including overhead and underground, including needed links to anchor institutions;
- Orick tower construction, including appurtenant building, generator, and electrical connections;
- Yurok tower generator upgrades and additional component upgrades;
- Yurok signal connection facility construction on Orleans Mountain and Antenna Ridge above Orleans;
- Connection with service providers in Orleans and Dows Prairie "meet-me" and "lighting" the fiber optic cable;
- Installation of last-mile components including a node in Weitchpec, APs, individual home or business installations, and additions or changes to antennas and internal wiring on existing towers to facilitate delivery of service.

Details of construction for each of these elements follow. The Karuk Tribe has committed to provide environmental inspectors to assure compliance with the EPMs in Section 5 and with other permit terms and conditions.

2.4.8.1 Equipment and Staffing for Fiber Optic Installation

Table 2.4-5, below, shows the estimated equipment and staff for each element of fiber optic cable construction. It assumes the following kinds of cable installation: overhead installation (existing or new poles), underground installation (trenching, pavement saw cutting, rock saw cutting, and directional drilling), hanging from existing bridges, and utilization of existing infrastructure, including existing fiber in Segment 1 and existing underground and bridge hang conduit in Segment 2. Figure 2.4-15 shows where each of these techniques is likely to be applied. Traffic control crews will be deployed as needed across the project.

Table 2.4-5. Fiber Optic Cable Installation Crew and Equipment Needs

Crew Type	Peak # Crews	Crew Composition	Equipment Type	Motor Vehicles
Traffic Control	2	Lead Worker (1) Laborers (2)	none	4x4 Pick-up (1)
Overhead install on existing poles	2	Lead Worker (1) Equip Operator (2) Laborers (4)	Bucket Truck (2) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2)
Overhead install on new poles	2	Lead Worker (1) Equip Operator (2) Laborers (4)	Bucket Truck (2) Backhoe (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2)
Trenching	2	Lead Worker (1) Equip Operator (2) Laborers (4)	Trencher (1) Backhoe (1) Conduit Reel Trailer (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2) Water Truck (shared)
Saw Cutting in Pavement	2	Equip Operator (2) Laborers (4)	Trencher (1) Backhoe (1) Asphalt Saw (1) Conduit Reel Trailer (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2) Water Truck (shared)
Rock Cutting	2	Equip Operator (2) Laborers (4)	Rock Saw Trencher (1) Backhoe (1) Conduit Reel Trailer (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2) Water Truck (shared)
Directional Drilling	2	Lead Worker (1) Equip Operator (1) Laborers (2)	Directional Drill (1) Backhoe (1) Vacuum Excavating Equip (1) Conduit Reel Trailer (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2) Water Truck (1)
Bridge Hang	2	Lead Worker (1) Equip Operator (2) Laborers (4)	Knuckle Man-Lifts (2) Equip. Trailer (2)	4X4 Pick-up (1) 4x4 Crew (2)
Vault Placing	2	Equip Operator (1) Laborers (2)	Backhoe (1) Equip. Trailer (1)	4x4 Crew (1)
Cable Placement	2	Lead Worker (1) Equip Operator (3) Laborers (9)	Cable Pulling Equip. (3) Air Compressor (1) Cable Reel Trailer (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (3)
Cable Splicing	2	Splicer (2)	Splicing Trailer (1)	4X4 Pick-up (1)
Cable Marker Installation	2	Laborers (4)	Equip. Trailer (1)	4X4 Crew (1)

Traffic Control: Because the KRRBI Project is planned for roadside installation, there will be a need for traffic control to provide for the safety of the workers and the traveling public. Traffic control will include the installation of temporary signage warning of construction, even where all work can be conducted on the road shoulder. Where the equipment must occupy part of a lane, traffic control will restrict travel to a single lane and will provide appropriate flaggers. In general the flaggers will be intervisible and a pilot car will not be needed. All traffic control will conform to the permits issued by road managers (EPM TRANS-1). Traffic may be stopped for short periods of time to accommodate construction, but access will be available for emergency vehicles at all times (EPM TRANS-2). Traffic control will be conducted from a standard pickup

that will carry and deploy signs, cones, and flagging stations, and will be staffed by up to three people who will set signs and conduct flagging operations as needed.

Overhead, existing poles: Overhead construction will require up to two bucket trucks with their operators and up to four laborers and one lead worker. For poles with existing communications cable(s) already attached, "make-ready" work must be completed first that readies the poles for a new cable. Make-ready may include limited vegetation trimming to accommodate the stringing of the cable, and may include moving one or more incumbent providers down on the pole so that the new cable is at the top of the communications space on a joint use pole, typically a requirement of the incumbent communications providers. Typically make-ready includes attaching brackets for attaching the cable to the poles. The actual installation includes installing attachments, strand, guys, and anchors in accordance with specifications, stringing the cable between poles, lifting it up to attach to the poles, then tensioning it correctly before final attachments are made. Installation also includes attaching additional guy wires to the top of the pole and to either existing anchors or new anchors. Anchor installation is typically completed by the laborers with the installation crew. Average production is about 8,000 feet per day (about 1.5 miles per day) on existing poles.

Overhead, new poles: Installation of new poles will require a crew consisting of a lead worker, two equipment operators, and up to four laborers to bring and install poles. A standard flatbed or pole truck will deliver the poles to the job site. Either a truck with an auger or a backhoe will dig the holes for the poles, followed by setting the poles into the holes using either a small truck-mounted crane or the backhoe. Once the poles are set and guy wires installed, fiber installation proceeds as for existing poles. The KRRBI project anticipates setting two new poles for the Klamath River crossing at Orleans (Segment 1) and two new poles for the Klamath River crossing at Martins Ferry (Segment 2), each immediately adjacent to an existing Frontier crossing. Two poles will be set in Segment 4 to cross Redwood Creek immediately adjacent to an existing Frontier crossing. There may be a need to set two poles on Green Diamond Resource lands in Segment 5 to avoid any impact to the Luffenholtz Creek water supply for the town of Trinidad. Avoidance may also be achieved by use of a bridge hang. None of these crossings has yet been engineered but are anticipated to be very similar to the poles supporting the existing crossings; that is, of wood, less than 60', tall with guys to support the weight and direction of the fiber optic cable. Spans are estimated at 680' (Orleans) and 705' (Martins Ferry) for the two crossings of the Klamath River, at 455' for Redwood Creek in Orick, and at about 100' if needed for the crossing of Luffenholtz Creek on GDR lands.

Trenching: One crew (lead worker, two equipment operators, and four laborers) with a backhoe/excavator or a trencher, conduit reel trailer, and equipment trailer will conduct trenching. A water truck plus driver will be available for dust control. Loader plus operator to pick up material from cleaning the ditch, where that is necessary, and will utilize a dump truck

plus driver to haul the spoil material from the ditch to an approved dump site. Trenching averages 2,500 feet per day.

Rock Cutting: Where the installation method is listed as trenching or pavement cutting but the underlying material is too hard to cut with a backhoe, specialized rock cutting machinery and crew will be brought in to make the trench. This crew consists of two equipment operators and four laborers, and will use a specialty rock saw trencher and backhoe to complete the trench in rock. Average production with the rock saw is 500 feet per day.

Paving saw cut: There will be two crews for saw cutting in the pavement. The first crew will cut the pavement with a specialized saw mounted on a backhoe or similar equipment, then open the trench with a narrow-bucket backhoe. This crew will have two equipment operators and four laborers. After the conduits are placed, that crew will use material removed from the trench to backfill the trench, which will be delivered if needed with a dump truck. Once the trench is restored to preconstruction height and compaction of base material, the first crew will place a temporary cold asphalt patch in the trench. Then the second crew will remove the cold patch, prepare the trench with a bituminous emulsion application truck or trailer that will apply the sealant, then add hot mix asphalt into the trench, roll it, and seal the edges with the existing asphalt and will consist of two equipment operators and two laborers. The second crew will work with a dump truck that delivers the hot mix from a local commercial source. Average production for pavement cutting is 1,500 feet per day and pavement repaving is 750 feet per day.

Directional Drilling: This element requires a specialized crew that will include a lead worker, an equipment operator, and two laborers. Equipment will include the directional drilling rig, vacuum excavation specialty equipment, and a backhoe to dig the entry and exit pits. Average production for directional drilling is about 1,000 feet per day.

Bridge Hang: A specialty crew of two operators and four laborers will utilize special multiple-jointed personnel hoists (see Figure 2.4-24 for illustration of this equipment) for the installation of conduit and cable on the bridge. Average production is 250 feet per day for bridge hang.

Vault Placement: In general, when there is a transition in installation method, whether from overhead to underground, or from trenching to directional drilling, for example, a vault is installed to facilitate the splicing and to provide an access point for future maintenance. Vault placement crews consist of an equipment operator and two laborers, and can install up to six vaults per day.

Cable Placement: After the conduits are installed in underground installations, the cable must be pulled into the conduit. These operations require a crew of 1 lead worker, three equipment operators, and 9 laborers using 3 sets of cable pulling equipment, an air compressor, and a cable reel trailer.

Final Splicing: To complete the final fiber optic cable splicing, one operator with a specialized set of equipment either in a van, truck, or trailer, plus one laborer will work on roadsides to splice various kinds of installation together and to splice long runs together.

Cable Marker Installation: Once the fiber optic cable is in place in underground installation, it must be marked so that anyone considering ground-disturbing activities will know that it is present and to call the underground location service to determine its exact location. These markers will be installed by a crew of 4 laborers with a pickup and equipment trailer.

2.4.8.2 Equipment and Staffing for Orick Tower Construction

Table 2.4-6, below, summarizes equipment and staffing for Orick tower construction.

Table 2.4-6. Orick Tower Installation Crew and Equipment Needs

Crew Type	Peak # Crews	Crew Composition	Equipment Type	Motor Vehicles
Foundation	1	Lead Worker (1) Equip Operator (2) Laborers (6)	Backhoe (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2) Concrete Truck
Tower Installation	1	Lead Worker (1) Equip Operator (2) Laborers (6)	Erector Crane (1) Equip. Trailer (1)	4X4 Pick-up (1) 4x4 Crew (2)
Hut, generator, propane tank installation	1	Lead Worker (1) Equip Operator (2) Laborers (6)	Backhoe (1)	4X4 Pick-up (1) 4x4 Crew (2) Concrete Truck
Fencing installation	1	Lead Worker (1) Laborers (4)	Equip. Trailer (1) Small concrete mixer (1)	4X4 Pick-up (1) 4x4 Crew (2)

The Orick Tower construction will start with preparation for and installation of the foundations: One for the tower and one for the hut, propane tank, and generator. Note that the propane tank and generator must be separated by at least 10 feet and may be placed on separate pads, depending on final design. The tower foundation will be dug with an excavator to the specifications of the tower manufacturer—typically deep enough to accommodate the three 3-foot-deep columns that will support the legs, surrounded by an 18" thick concrete pad about 12 feet square. An additional foundation will be installed for the hut, typically 18" deep for a foot all the way around the perimeter (two feet wider all around than the building, or 12 x 17') and a 6" steel-reinforced concrete pad on which to mount the hut, with pre-installed bolts that will fit the predrilled holes in the hut foundation.

The foundation construction will require a crew of three to assemble and install the rebar and to work with the concrete trucks as they bring in the required volume of concrete to pour the columns for the leg foundations and the pads. Foundation construction will take three to five days.

Once the foundations are in place, the tower components will be delivered by truck. The tower will be assembled on-site with a crew of three using hand tools and air-powered tools running

on an air compressor mounted on a pickup truck. The tower components will be installed into three thirty-foot segments. A telescoping rubber-tired crane will be brought in to install and to hold the tower components while the specialty crew with climbing and safety gear bolts the three segments together. A climbing safety system will be installed on the tower for subsequent maintenance and antenna installation needs. Tower installation can be completed in two days.

After the tower is in place, the pre-assembled hut will be brought to the site and placed on the pre-set bolts and secured. This process will require a rubber-tired crane to remove the hut from the truck and place it on the foundation bolts and will take one day. After the hut and tower are in place, the electrical service panel will be placed, the generator will be placed and secured, and the propane tank will be delivered by the propane fuel company and plumbed to the generator. Installation of these services will take about one day each. Immediately after the placement of the hut, the permanent fence will be installed with a large equipment gate and a small person-sized gate to allow for routine pedestrian access for maintenance and service. The fence crew will be one leadworker and three laborers with two pickup trucks and a backhoe to dig the holes for the corner fenceposts, pour the concrete footings for those posts, and to tension and apply the chain-link fencing and barbed wire fencing.

After the hut has been installed, an ice bridge will be constructed and installed between the hut and the tower. This bridge allows for the hanging of communications lines below the bridge to protect the lines from high winds, heavy rains, snow, and ice accumulations. The 18-inch-wide ice bridge will be installed about 8 feet above the ground on an independent, grounded, galvanized pipe structure to allow for free pedestrian movement beneath it. Installation of the ice bridge will take about one day.

2.4.8.3 Equipment and Staffing for Yurok Signal Connection

The Yurok Signal Connection will be installed by a qualified electrician and two assistants. No specialized equipment will be needed but a 4x4 shop truck will be needed to haul the solar panels, batteries, hut, repeater radio, Rohn lattice tower, and antennae. A gas-powered auger may be used to install the foundations for the Rohn lattice tower. Sufficient concrete to construct the foundation and the footing for the tower will be hauled by pickup to the site. Water will also be hauled to the site and the concrete mixed by hand on-site for the foundation, footing, and any needed reinforcement for fenceposts. Work will be completed in two days. Other tools will be unpowered, battery powered, or powered by a portable generator or an air compressor on the truck.

2.4.8.4 Equipment and Staffing for Last Mile Installations

Last Mile installations may vary on a case-by-case basis, but would typically involve an equipment operator, installer, and two laborers to complete the drop installation. The drop installation would commence at an access location in the fiber ROW and extend a fiber drop cable to the premise location. The operator (with the assistance of the two laborers), utilizing a

small trencher or vibratory plow, would install a fiber cable drop at a minimum depth of 12 inches to the premise. Once at the premise, the installer would complete the termination of the fiber drop with fiber terminal equipment, dependent on the customer's needs. This equipment is mounted on the outside of the building or inside the customer's premise. These installations can take anywhere from 3 to 8 hours to complete.

2.4.8.5 Water Use

Water use for this Project will be limited to support for underground installation methods, dust control, water needed for the directional drills, and water needed for concrete at the Orick Tower site. Table 2.4-7, below, summarizes water use for fiber optic cable installation. Water will be purchased where available from municipal water sources or withdrawn from approved water sources where other roadwork water is available.

Water use for construction of the Orick Tower, including dust control, is estimated at 6,000 gallons. Concrete will be delivered from a commercial facility ready to pour. Water use for construction of the foundations on Antenna Ridge is estimated at 200 gallons, which will be carried in a pickup truck to near the site, then carried by hand to the construction site. Concrete will be mixed in small batches by hand on site.

Table 2.4-7. Water Use for Fiber Optic Cable Installation

Install Method	Miles	Water Use per Mile (gal)	Total Water Use (gal)
Overhead	29.3	-	-
Trench	63.7	4,000	254,828
Trench--rock saw	0.5	1,000	473
Pavement Saw Cut	4.7	1,000	4,696
Directional Drill	6.1	1,500	9,145
Bridge Hang	1.3	-	
TOTALS	105.6		269,142

Total estimated water use for the entire project is estimated at 275,342 gallons.

2.4.8.6 Access Roads

The entire KRRBI Project is planned along existing roads. No new permanent or temporary access roads will be needed to construct or operate this Project, with the exception of setting new poles at the Klamath River crossing in Orleans and Martins Ferry and the new poles for the crossing of Redwood Creek in Orick. Existing roads do not need any improvement, either temporary or permanent, for the construction or operation of this project. No helicopter access will be needed, as all poles are located near existing roads.

A 100-ft. temporary, overland access path may be required to construct the newly proposed aerial fiber cable river crossings at both Orleans and Martins Ferry. The temporary paths will gain access to place new poles, new aerial hardware, and new aerial fiber cable across the Klamath River and Redwood Creek. No grading activities will be needed for the temporary

overland access paths. However, the disturbed access paths will be restored as required by the landowner or land manager. Temporary overland access paths will be used by:

- A Pole Setting Truck (2 trips) to dig holes and set the new crossing poles;
- A Backhoe (2 trips) to assist with setting the new crossing poles;
- A Pole Hardware Set-up Crew Truck (2 trips) to install the aerial cable hardware;
- A Cable Installation Crew Truck (2 trips) to install the new aerial fiber cable over the river.

Each of the poles is accessible on foot from the road, and laborers needed to assist with the installation will walk in from the existing roads.

2.4.8.7 Laydown and Staging Areas

The construction contractor will be responsible for selecting final laydown and staging areas. For the purposes of this project, laydown areas are places where reels of conduit and reels of fiber optic cable are stored. Also stored in laydown areas are vehicles, equipment, supplies, and materials. They may be used for worker parking to reduce the number of vehicles along the roads during construction. The Karuk Tribe assumes that there are sufficient areas that are previously disturbed, were used for similar functions in the past, and are or can be fenced and gated to provide security for the stored items. Laydown areas are estimated at 250 feet x 250 feet, or about 1.4 acres. Known available laydown areas are listed below. None of these areas will need grading, vegetation removal, or other site preparation other than the installation of temporary construction fencing in the case of the laydown areas.

- Segment 1 (L-1): TT construction storage area. Old mill site, paved or graveled, already fenced and secured.
- Segment 2 (L-2): Staging area used for Martins Ferry Bridge, a graveled turnout at the intersection of Highway 169 and the Martins Ferry Bridge, will need temporary construction fencing.
- Segment 3 (L-3): The old landing at the Wiregrass wireless broadband tower location, just above the Yurok Veterans Cemetery on Bald Hills Road. Currently graveled and gated, may need temporary construction fencing.
- Segment 4 (L-4): Use the Orick tower site for laydown. Will be graveled and fenced.
- Segment 5:
  - L-5A: Old mill site at Big Lagoon on GDR land. Portions are fenced. Additional construction fencing
  - L-5B: Old log landing, still clear, at the gate between RNP land and GDR land at the top of the West Side Access Road, will need temporary construction fencing.

Temporary construction fencing will be determined by the construction contractor, but will likely consist of 8' tall cyclone fencing components and a gate wide enough to admit equipment and large trucks. No electrical power will be needed at either laydown or staging areas.

For the purposes of estimating disturbance, the Project engineers have chosen likely staging areas, although this will be up to the construction contractor. Staging areas, unlike laydown areas, are places where equipment might be stored for a day or two during active construction and will not be fenced. Typically, they are wide turnout areas along each of the roads in the area that have been used for this purpose by other projects, including Caltrans maintenance, in the past. None of the chosen staging areas will need additional grading or ground disturbance for site preparation. There are sufficient previously disturbed turnout areas to cover staging needs. Staging areas shown in Figure 2.4-39 include 6 for segment 1, 6 for Segment 2, 7 for Segment 3, 4 for Segment 4, and 10 for Segment 5 in addition to one larger laydown area each for Segments 1-4 and two for Segment 5.

Proponent-proposed measure EPM G-7 states that if the construction contractor wishes to utilize other laydown areas or staging areas, it is up to the contractor to show to the satisfaction of agencies with jurisdiction prior to their use during construction that those areas provide similar or less disturbance than those shown in this document.

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Klamath River Rural Broadband Initiative

Figure 2.4-39

Staging & Laydown Areas

Pacific Ocean

Wautec

Orleans

Orick

Segment 4

Segment 1

Segment 2

Elk Camp

Segment 5

Bald Hills Rd.

Segment 3

Weitchpec

Trinidad

Mckinleyville

101

96

169

Legend

- Community
- Laydown Area
- Staging Area
- Road
- Yurok Reservation Boundary

KRRBI Segment

- 1
- 2
- 3
- 4
- 5

N

W E

S

0 50 100 Miles

This map is for information and reference purposes only. The Yurok Tribe assumes no liability or responsibility in the use or misuse of this map and the information within. Fiber optic install method data was collected using mapping grade GPS.

Yurok Tribe GIS Program
December 11, 2017

2.4.8.8 Worker Housing and Commute

The construction contractor will be responsible for hiring and housing workers. The Tribe estimates that workers for Segments 1, 2, and 3 will be housed in Willow Creek, and for Segments 4 and 5 in Orick. Average commute for Segments 1, 2, and 3 is 37 miles, while average commute for Segment 4 is 11 miles and for Segment 5 is 36 miles. Workers will be encouraged to carpool from their housing to the job site (EPM G-6).

2.4.8.9 Construction Schedule

For the purposes of the PEA, the Karuk Tribe assumes that the NEPA/CEQA process will be complete in fall of 2018 and that all permits will be in place and construction can begin in spring of 2019. Table 2.4-8, below, summarizes the scenario schedule. The darker colors indicate construction without seasonal restrictions due to nesting birds, while the lighter colors indicate that seasonal restrictions may be in place for at least part of the route. No construction is planned during December through February due to the high likelihood of the presence of rock slides and snow on the roads.

Table 2.4-8. Estimated Construction Schedule

Construction Component	2019												2020											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Fiber Installation																								
Orick Tower Construction																								
Yurok Signal Connection																								
Connecting to service providers																								
Last Mile Service Installation																								

2.4.8.10 Best Management Practices

The following Best Management Practices (BMPs) will be applied where appropriate throughout the Project area and throughout its duration. Items in parentheses are the applicable EPMs found in Table 5-1, page 5-2, below.

- Limit soil disturbance and vegetation removal to the minimum necessary to provide for safe and complete installation (EPM SOIL-1).
- Where inadvertent road damage has occurred during construction, roads will be restored to their pre-construction condition as specified by the road manager (EPM TRANS-3).

- Avoid the spread of weeds through worker education and equipment cleaning before entering the Project area (EPMs WEED 1, WEED-2). On federally managed lands, backfill if needed will be from certified weed-free sources (EPM WEED-3).
- Fugitive dust produced during construction will be controlled with watering as needed (EPM AIR-1).
- Trucks and heavy equipment used during construction of this Project will meet CARB standards for air pollution control for their model year (EPM AIR-2).
- The Stormwater Pollution Prevention Plan developed by the construction contractor will provide for erosion and sedimentation control as needed to avoid contamination of streams and rivers (EPM WATER-1).
- Industry standard practices will be used for spill prevention and containment, especially when fueling is needed within the Project area (EPM WATER-2).
- The construction contractor will prepare a Fire Plan. This plan will include a training program for all personnel about the measures to take in the event of a fire including; fire dangers, locations of extinguishers and equipment, emergency response, and individual responsibilities for fire prevention and suppression. The plan will also include the requirements that all motor vehicles and equipment must carry, and individuals using handheld power equipment must have, specified fire prevention equipment. Shovels, water, and fire extinguishers will be carried on all equipment and vehicles (EPM FIRE-1).

2.4.9 Post-Construction Cleanup and Site Restoration

Cleanup is an integral part of fiber optic cable installation. Each crew will be responsible for cleaning up the worksite at the end of the day and closing or covering any open trenches to avoid creating a roadside safety hazard. All worksite litter and debris will be cleaned up and removed from the roadside at the end of every day (EPM REC-1). Trenches that must be left open overnight or longer will be covered with steel plates that can withstand light traffic. Where there is a transition between installation methods, such as between trenching and overhead installation, or between trenching and directional drilling, one crew will finish its installation before the next crew is on site. Therefore, conduits will be exposed, along with the fiber optic cable inside one of them, on the surface for one or more days until the second crew's installation is complete and the two runs of conduit can be connected and buried or secured to a pole. Once the fiber optic cable has been spliced, preconstruction contours will be restored. This means that road shoulders will be graded to their preconstruction configuration and ditches will be left cleaned of debris and vegetation.

All other component installations will also require daily site cleanup. The Orick tower enclosure will be graveled and maintained vegetation-free. The Yurok Signal Connection site is naturally rocky with very limited vegetation and no vegetation will be removed during the installation on Antenna Ridge. Antenna installation on Orleans Mountain will require no

ground disturbance. Last-mile component installation generally requires no ground disturbance, with the exception of installing poles for APs.

2.4.10 System Operation and Maintenance

Once installed and operational, this system will require very little routine maintenance.

2.4.10.1 Overhead Components

Routine maintenance consists of visually checking on the integrity of the system components, running the backup generators where they have been installed at tower sites, and making annual electrical checks on the switches and other components. These checks will be conducted from the public road in the case of the fiber optic network, using a pickup truck, and be conducted once annually by one staff person. Visual inspection will include all exposed components including the fiber optic cable where overhead, horseshoes, and splice boxes. Aerial cable maintenance includes maintaining proper clearance heights and trimming of vegetation around cables to avoid damage, which can be accomplished with 2-3 crewmembers, a bucket truck, a chainsaw or hand pruning tools, and wood chipping equipment.

The greatest hazard to the operation of the system is damage to the overhead components from natural events such as storms, falling trees and branches, or fires, and human-caused events like vehicles crashing into poles or vandalism. Underground installation is less vulnerable but still subject to damage by inadvertent exposure, landslides, or cutting by others. A critical element of the KRRBI Project design is to assure that as much of the Project as possible is accessible by vehicle. The specialized fiber optic cable splicing required for emergency repairs is typically conducted in or from a specialized trailer or truck. While portable equipment is available, it is slow and expensive to use.

When the fiber optic cable is severed or damaged, a repair crew, typically of two people, is immediately dispatched to find the damage and to repair it. If the fiber optic cable is overhead, a bucket truck will be needed to allow one of the workers to lower the line to the splicing trailer or truck, where the second person will repair it, and the first worker, working form the bucket truck, will re-suspend it from the pole. If the cable is damaged in the underground installation, it must be dug up with one operator on a backhoe or excavator several feet on each side of the damaged section, the damaged section repaired or replaced and re-spliced to the original cable, and the cable returned to the conduit and re-buried. This process will likely require three crewmembers, including a specialist to conduct the splicing. Emergency repairs are facilitated by the planned installation of extra cable in vaults and in overhead snowshoes, allowing the cable to be extracted, repaired, and replaced with minimal disturbance. To avoid inadvertent damage to environmentally sensitive areas, the Tribe will provide crews and contractors with maps showing environmentally sensitive areas; these maps will include work zones as well as ROW areas where ground disturbance will be avoided (EPM OM-2).

2.4.10.2 Underground Components

Membership in USA North 811 means that locates will be provided for other third party construction activities near the underground cable easement, thus avoiding damage to the cable. For underground portions, vaults and markers will be inspected. Missing markers will be replaced with the same type of marker.

2.4.10.3 Wireless Towers

For the Orick Tower and for the existing towers in the Karuk and Yurok systems, an inspector will drive to the site in a pickup truck and test the various components once a month. Testing is expected to take less than two hours per site per month. The tower itself does not require maintenance but is subject to an annual safety inspection, conducted by a trained worker using climbing harness and safety lines. The propane tank is filled once a year or more often if there are extended power outages requiring backup power to keep broadband available. The propane generator is maintained by automatic weekly operation to keep all parts lubricated and ready to work instantly in the case of a power outage. A single crewmember inspects the generator monthly as part of other duties, which include inspecting the power sources and electronic connections for each of the radios.

2.4.10.4 Wireless Subscriber Modules

The largest maintenance task in the system is maintaining subscriber radios and antennas. The Karuk Tribe owns the antennas and radios that are placed at each subscriber's residence or business, and charges a nominal lease fee for them. The expanded system will require ongoing maintenance of the subscriber system, replacing radios if they fail and repointing or replacing antennas as needed.

Before beginning an operations or maintenance project, KRRBI contractors or their subcontractors will clean all equipment that will operate off-road or disturb the ground. The entire vehicle or equipment will be cleaned at an off-site location (EPM OM-1).

2.4.10.5 System Monitoring and Control

Once fully operational, KRRBI will have a dedicated monitoring system that automatically detects any failures in the system. These failures may include, but are not limited to:

- Physical damage to the fiber optic cable somewhere in the system (e.g. a backhoe inadvertently digs up the fiber optic cable and severs it while working on an emergency road drainage problem)
- Physical damage to a node (e.g. someone shoots at an antenna and damages it)
- Electrical failure at a node or at a switch that controls all or part of the system (e.g. power outage and a failure of the backup power to cover the outage)
- Electronic failure of a node or a switch

The monitoring system is designed to continuously test for and report on the health of each of the nodes, points of presence, and other physical switches in the system. It can "ping" each of the switches, nodes, and radios to determine the health of each one. If the signal of the "ping" does not reach past a particular node to the next node, the monitoring system deploys an alarm and the technician can follow up to determine the location of the failure and initiate repairs. Repairs can be as simple as rebooting a switch remotely or as complex as summoning a repair crew to isolate and repair a broken fiber cable.

The fiber optic network will use standard routing protocols to self-heal whenever an outage is detected. When a connection goes down, the routing protocol automatically re-routes traffic to secondary and backup connections, and a notification is sent to technical staff to repair the issue.

To meet subscriber security and privacy requirements, the KRRBI fiber network is designed to separate traffic both physically and logically to prevent subscribers from accessing the data of other subscribers. The network design will be compliant with healthcare (HIPAA), credit card (PCI) and government (NIST) security standards.

2.4.10.6 Maintenance Staffing

Staffing for maintenance of the KRRBI system will include:

- An office manager, who will be responsible for managing and billing for subscriptions, taking new applications, and closing accounts as needed for both residential and commercial subscribers. This person will also be responsible for maintenance of any licensing and interconnection agreements with other utilities.
- A network manager, who will be responsible for the administration and configuration of the entire system and will be the person who manages the various power backup options for each component of the system. This person will also monitor and maintain the electronics of the fiber optic cable system, and will be responsible for detecting failures in the network and dispatching repair teams.
- Two wireless technicians, one for the coastal communities (Orick and vicinity) and one for the inland communities (Orleans, Weitchpec, Tulley Creek, and the downriver communities to Wautec). These technicians are responsible for the initial installation of radio and antenna for each subscriber, maintenance of those radios and antennas, and the maintenance of the wireless tower sites and generators.

Maintenance of the physical fiber plant is periodic and can be economically managed through a third party maintenance agreement with a regional company whose personnel and resources periodically maintain the fiber plant and to respond to emergency situations to fix damaged cable and bring the network back online.

2.4.11 Foreseeable Consequences of the Klamath River Rural Broadband Initiative

At this time the Karuk Tribe does not have any future phases planned once KRRBI completes construction. There are several predictable outcomes that may result from KRRBI, and exciting possibilities for future regional improvements to the broadband landscape. The CPUC has approved two CASF projects after KRRBI that combined with KRRBI will have far reaching impacts on the far Northern California Region.

Resolution T-17539 granted funding to the Siskiyou Telephone Company for the Happy Camp to Somes Bar Fiber Connectivity Project. Once both KRRBI and the Siskiyou Telephone project are complete, true east to west fiber will exist in California from Eureka to Yreka. Most fiber optic installations in Northern California run north to south. Currently, the northernmost east to west fiber in California travels along highway 36 from Red Bluff to Fortuna. The reduced transport costs and redundancy offered by the combination of these two projects will greatly enhance the reliability and reduce the costs for broadband access in the north state.

Resolution T-17548 awarded to Inyo Networks for the Digital 299 project will provide an additional east to west fiber run, from Eureka to Redding. Digital 299 also has a spur which will provide fiber along Highway 96 to the Hoopa Tribe reservation. Although no specific plans have been made, the Digital 299 fiber spur gets within 12 miles of the KRRBI fiber in Weitchpec. A potential future project could connect these two communities and provide additional redundancy to both Digital 299 and KRRBI.

KRRBI will also connect to the Yurok Tribe's existing network, which provides support for the Yurok government offices in Klamath, California in Del Norte County. Although the connection to Klamath will be wireless, not fiber optic, KRRBI will bridge a north to south gap that current exists between Trinidad and Crescent City. Another potential future project could provide a fiber link between Orick, where KRRBI will have fiber, and Crescent city, which will allow for a coastal fiber connection to Oregon, because Crescent City has fiber connections north to Brookings, Oregon and northeast to Grants Pass, Oregon. Currently the only other fiber optic connections to Oregon occur along Interstate 5 and highway 97, in the central and eastern portions of the California-Oregon border.

KRRBI will address the broadband needs of the communities directly served by its fiber optic and wireless services. KRRBI will also strengthen the telecommunications infrastructure of the remote region of the redwood coast in far northern California, becoming part of a much broader landscape of communication installations that will provide Internet access and broadband to dozens of unserved and underserved communities. The public safety, educational, health care and economic impacts of KRRBI will be substantial. Only future generations will perceive the far reaching and meaningful the consequences of KRRBI on the people of California.

3 Environmental Assessment

The Karuk Tribe is committed to avoid and minimize as many environmental impacts through project design as feasible. Through early conversations with the relevant agencies, additional measures have been incorporated as part of the project. In addition, EPM G-1 specifies that Environmental Compliance Monitors will be hired by the Tribe to monitor construction activities and to report to the Tribe and to the agencies regarding construction compliance with permit terms and conditions. Monitoring activities will be structured in accordance with an Environmental Compliance Management Plan, developed by the Tribe and approved by the lead state and federal agencies prior to construction. Further, the Construction Contractor will be required to develop and implement a Health and Safety Plan (EPM G-8) and a Worker Environmental Awareness Program (WEAP) (EPM G-9).

3.1 Aesthetics and Visual Resources

3.1.1 Regulatory Setting

The regulatory setting for aesthetics and visual resources includes the management plans written for the Redwood National Park, Six Rivers National Forest, the scattered tracts of Public Land managed by the BLM, and the Humboldt County General Plan. There are two important features on the landscape that receive special regulatory attention: the Klamath River, designated as "recreational" under the Wild and Scenic Rivers Act, and the Redwood National Park. Other nearby features include several state parks along Highway 101, some managed with the Redwood National Park and some managed independently.

3.1.1.1 Wild and Scenic River Designation for the Klamath River

The Wild and Scenic Rivers Act states, in part:

> It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. (Wild & Scenic Rivers Act, October 2, 1968)

The Klamath River from 3,600 feet below Iron Gate Dam to the mouth as listed under this act on January 19 1981[6]. Of its total 286 miles designated, 251 of those are designated "recreational", including the stretch from Orleans to Weitchpec (Segment 1) and the stretch within the Yurok Reservation from Weitchpec to Wautec (Segment 2) and on to the mouth. The recreational designation was assigned to those rivers or sections of rivers that are readily accessible by road

[6] http://www.rivers.gov/rivers/klamath-ca.php, accessed 3/10/16.

or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

The management of the river varies by underlying land ownership. Where the land is managed by the USFS, the Six Rivers National Forest Plan describes how the USFS will manage the river for recreational uses. Where the river crosses isolated tracts of land managed by the BLM, the Arcata Resource Management Plan directs river management for its values as a Wild and Scenic River. Where it is privately owned outside the Yurok Reservation, the Humboldt County General Plan and Humboldt County zoning ordinances are used to maintain the area's aesthetic values. Within the Yurok Reservation, the Yurok Tribe specifies the protection of the river and surrounding areas for its cultural as well as aesthetic values.

3.1.1.2 USFS

The USFS manages the Klamath River along Segment 1 for its recreational values. The existing 21-year-old plan for the Six Rivers National Forest (1995) identifies the recreational river portion as "Management Area 15". Visual objectives for this management area include a Visual Quality Objective of partial retention within the recreational river corridor and in middleground areas visible from the recreational river corridor. The goals for "Partial Retention" are as follows: "Maintain the area in a near-natural appearing condition. Provide an attractive, forested landscape where management activities remain visually subordinate to the character of the landscape. Manage human activities so they are subordinate to the character of the landscape. Roads and trails may be constructed. Bridge crossings and numerous river access points may occur.[7]"

3.1.1.3 NPS

The RNP was designated in 1968 and expanded in 1978. It is managed as the Redwood National and State Parks together with some of the California State Parks that were designated to preserve important stands of old-growth redwoods. The KRRBI Project crosses only the federally designated park. The RNP was established "to preserve significant examples of the primeval coastal redwood (*Sequoia sempervirens*) forests and the streams and seashores with which they are associated, for purposes of public inspiration, enjoyment, and scientific study, there is hereby established a Redwood National Park in Del Norte and Humboldt Counties, California." (Public Law 90-545, October 2, 1968.)

Its expansion ten years later to encompass much of the lower watershed of Redwood Creek was completed "[I]n order to protect existing irreplaceable Redwood National Park resources from damaging upslope and upstream land uses, to provide a land base sufficient to insure preservation of significant examples of the coastal redwood in accordance with the original

[7] USDA Forest Service. 1995. Six Rivers National Forest Management Plan.

intent of Congress, and to establish a more meaningful Redwood National Park for the use and enjoyment of visitors (PL 95-250, March 27, 1978)."

The 2000 plan for the RNP does not explicitly address visual resources but includes them throughout the plan as part of the visitor experience. The general intent is to allow visitors to enjoy scenic vistas and to have the opportunity to view not only the old-growth redwoods for which the park was initially designated, but also to view the active management of the park for landscape restoration and cultural resources.

3.1.1.4 BLM

The BLM manages three isolated tracts of land in the vicinity of Segment 1. Segment 1 crosses one of these tracts at about milepost 26.1 on Highway 96. The 1991 Arcata Resource Management Plan specifies that this area be managed as part of the "Isolated Tracts Management Area[8]." There are no visual resource guidelines for these tracts.

3.1.1.5 Humboldt County

The existing Humboldt County General Plan specifies that the county shall:

"Ensure that Projects located within state designated wild, scenic or recreational river basins are consistent with the guidelines in the State Wild and Scenic Rivers Act (as amended)[9]."

The Plan further calls for consideration of visual impact of any proposed Project and for minimizing any adverse effects on visual resources.

3.1.2 Environmental Setting

3.1.2.1 Fiber Optic Cable

The fiber optic installation portion of the Project will be located entirely above or within roadways in rural Humboldt County. Proposed installation methods are discussed in Section 2 and mapped in Figure 2.4-15, above. Where existing overhead poles are available and accessible for subsequent vehicle-based maintenance, the fiber optic line will be installed on those poles using a joint attachment agreement with Frontier or with PG&E. Where existing poles are not available, the Project will be installed underground, either immediately adjacent to the existing roadway or within the road prism where necessary and permitted.

Segment 1 is proposed for location either on existing poles (through Orleans) or underground (from Camp Creek to Weitchpec) along Highway 96. Highway 96, a paved two-lane road with some shoulders, is located within the inner canyon of the Klamath River along Segment 1, varying from 100 to 500 feet above the river, and generally screened from the river by

8 USDI. BLM. 1992. Record of Decision. Arcata Resource Area Resource Management Plan and Environmental Impact Statement, as amended in 1995 for incorporation of the NW Forest Plan.

9 Humboldt County. 1984. Humboldt County General Plan. Available online at http://www.humboldtgov.org/205/Plans last accessed 6/26/16.

intervening forest vegetation. The Klamath River along this section is designated as recreational within the Wild and Scenic River program.

Segment 2 lies entirely within the Yurok Indian Reservation and follows the existing alignment of electric power poles to Wautec. Where the electric service has been installed overhead, the KRRBI fiber optic cable will be installed on the same poles. Where the electric service has been or will be installed beneath the pavement on Highway 169 or attached to the Pecwan Creek Bridge, the KRRBI fiber optic cable will follow that same installation technique. This alignment follows or parallels Highway 169, a single-lane paved dead-end road that is located in the inner canyon of the Klamath River. The road is generally located well above the river and is screened by forest vegetation from the river, with some notable exceptions. Where visibility from the river raised cultural concerns, the Yurok Tribe and PG&E cooperated to bury the electric line, and KRRBI will also be buried in that area. The Klamath River along this section is designated as recreational within the Wild and Scenic River program.

Segment 3 begins in the Yurok Reservation in dense mixed conifer forest at the Martin's Ferry Bridge and follows the one-lane, paved Bald Hills Road steeply up the hillsides with a series of 9 sharp switchbacks, all of which are within the Reservation. It continues through dense forest until emerging, with the road, into the prairies and meadows along the ridge that give the road and the area its name. Where it emerges into the first large open area is the boundary of the Redwood National Park (RNP), and the road is unpaved for the next 7 miles, where it follows the boundary between the RNP to the south and private lands to the north. It continues through the Lyons Ranch Historic District, and into young, dense redwood and Douglas-fir timber stands as the paving begins again. It ends in the timbered area at the intersection of Johnsons Road with Bald Hills Road. Elk Camp CDF Fire Station, staffed during the summer, is located at that intersection also. Segment 3 will be installed entirely underground. The only visible evidence of its presence, once constructed, will be the access vaults about once a mile and the markers that indicate the presence of underground utilities. In visually sensitive areas, the markers can be omitted and additional detection systems installed in the vaults and along the fiber optic line (EPMs VIS-1, VIS-2).

Segment 4 continues underground, installed in the roadside ditch or in the edge of the road along the ridge in young-growth timber and starts the descent through older forests until reaching some of the iconic groves of ancient redwoods for which the Redwood National Park was established. The road is narrow, two-lane, and partially paved with a patchwork of repairs. The route passes trailhead access points along Bald Hills Road and also passes through the Lady Bird Johnson redwood grove. The route follows the road as it switchbacks through the old redwood forest until Bald Hills reaches the large Redwood Creek valley near Orick. The route then runs adjacent to an abandoned lumber mill yard and turns west on Highway 101 just east of the community of Orick. The fiber optic cable will be on existing poles through Orick, a

small community with mixed residential and commercial properties clustered along the two-lane Highway 101.

Segment 5 will start at the Orick tower and continue south on Highway 101 for about a mile on existing overhead poles until turning south up Hiltons Road, a county road with scattered rural residences and pasture lands. Where the overhead poles end, the KRRBI fiber will be placed underground in the road ditch. Hiltons Road was a haul road for the commercial timber interests that owned the land and harvested redwoods and other conifers until 1978, when this portion of the RNP was purchased and added to the park. The single-lane with turnouts road starts steeply up the hills southwest of Orick and continues into dense young stands of mixed conifer, including redwood, Douglas-fir, and hardwoods. The KRRBI fiber will continue underground into the RNP. At the RNP gate about 1.4 miles up Hiltons Road the fiber will continue underground along the West Side Access Road, originally a part of the commercial timber operation and still a one-lane unpaved road with turnouts, heavily graveled and drained. The road runs along a ridge with younger redwoods, other conifers, and hardwoods forming a dense forest on either side. The route follows the West Side Access Road until leaving the RNP at the junction of this road with the GDR roads and commercial timberlands. There is a recent clearcut at the gate that affords excellent views of the ocean, shore, and farmlands below. However, given the quick regrowth of the redwoods and hardwoods, this view will be obscured by trees within a decade. The route will continue in a series of active timber haul roads, underground in the road ditch the whole way, until reaching the site of a prior log loading facility at the end of Crannell Road. At that point the fiber optic cable will be brought overhead on existing poles within GDR lands to cross the Little River and follow those poles out of GDR lands onto the Humboldt County's Crannell Road, which roughly parallels that River through pastures and farms to Dows Prairie Road. The fiber will be installed on existing poles along both Crannell and Dows Prairie Road to the meet-me with Suddenlink on an existing pole on Dows Prairie Road.

3.1.2.2 Orick Tower

The final mile wireless installation will require a 90-foot (estimated) tower in Orick. In the area proposed for installation there are existing overhead utility lines, abandoned commercial buildings, a CalTrans storage yard, and pasture lands. See Figure 2.4-34, which shows the general location.

3.1.2.3 Yurok Signal Connection

The Yurok Signal Connection includes the Orleans Mountain component, which will show no change to existing conditions, and the Antenna Ridge component, which will have a minor change of visual appearance. Current conditions on Antenna Ridge include four poles with antennas, a small set of solar panels mounted on a pole, and a partially damaged battery box with remaining batteries.

3.1.3 CEQA Checklist Criteria for Potential Impacts

I. AESTHETICS: 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) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

3.1.4 Analysis of Potential Impact to Visual Resources

3.1.4.1 Fiber Optic Cable

Highway 96 and the basic alignment of the electric power poles were in place when the river was designated "recreational" in 1981, as was Highway 169 and the county and tribal side roads in the Klamath River canyon. The Yurok Tribe has been awarded a series of grants to provide electricity for the first time to the river communities downriver of Weitchpec. Where overhead lines would intrude on the visual setting of important cultural areas, the powerlines and telephone line were installed underground. The same approach is in place for the last six miles of the electrification Project from Ka'Pel to Wautec, and all lines will be underground or on a bridge attachment in culturally sensitive areas.

The KRRBI fiber optic cable would be installed in a similar manner for the portion of Segment 1 in the road prism of Highway 96, which is within the Wild and Scenic River corridor for 7.8 miles. It would not be visible from the river or by recreationists traveling on Highway 96 to view or recreate in the river, and would meet the USFS partial retention Visual Quality Objective.

The fiber optic installation will have no appreciable impact on the visual environment, as it will be installed either underground or attached to existing poles. Where placed underground, the fiber must be marked so that other users of the area do not inadvertently dig it up. Traditional fiber markers are white plastic poles with orange tops and lettering indicating the nature of the underground utility. In areas with high scenic sensitivity, such as the National Park, these markers will be 2' tall 4 x 4" treated wooden posts with attached dulled metal signs that are legible but not visually intrusive, or as specified by the land managing agency (VIS-1).

It is feasible to use an underground marking technique that utilizes specialized devices installed in the underground vaults that allow for precise location of the fiber optic cable between vaults (EPM VIS-2). However, without visible markers, it is probable that road maintenance crews and others using heavy equipment for efforts like driveway maintenance will be unaware that

the cable is in the area. This EPM is proposed for use only where absolutely necessary to avoid damage to the fiber cable in the future.

3.1.4.2 Orick Tower

The 90-foot tower for wireless signal routing in the town of Orick will be visible from Highway 101. Figures 2.4-35 and 2.4-36 show a model of the tower. The setting includes commercial and residential structures, overhead power lines, and a storage yard for CalTrans. Adjacent to the tower will be a hut and both will be enclosed in a 7' fence topped with two strands of barbed wire to reduce damage due to vandalism. There will be no permanent lighting but there will be a motion-sensitive light at the entrance.

The tower and its accessory structures will be a new item on the landscape but is not planned in the vicinity of sensitive viewers and will be in the vicinity of other commercial structures. It will not be visually intrusive. It will not substantially degrade the existing visual character or quality of the site, nor will it create a new source of substantial light or glare.

3.1.4.3 Yurok Signal Connection

The addition of two antennas to the top of the existing lattice tower on Orleans Mountain will not change the visual impact of the existing tower to observers. The remaining work will be conducted inside the vault and will not be visible. Figures 2.4-27, 2.4-28, and 2.4-29 show a plan, a profile, and a current conditions photo of the proposed work on Orleans Mountain.

The proposed changes on Antenna Ridge will change the existing landscape element that currently includes several antenna poles, solar panels, and a battery box. These elements are not visible now from the road that accesses Orleans Mountain and are not visible without binoculars from Orleans Mountain. The existing poles will be removed and a short tower with a hut will be installed. Figures 2.4-30, 2.4-31, and 2.4-32, respectively, show a plan, a profile, and a current conditions photo of the proposed work on Antenna Ridge. These new elements will not be visible from the road or from Orleans Mountain without binoculars. The Karuk Tribe has reviewed the proposed installation and has stated that the installation will have no adverse visual effect on sacred sites.

3.2 Agriculture and Forest Resources

3.2.1 Regulatory Setting

CEQA requires consideration of the possible conversion of certain classes of farmland and forestland to non-agricultural or non-forestry uses, respectively. The State of California regulates timber production through several means, including the California Timberland Productivity Act of 1982[10], which required designation as Timberland Production Zones (TPZ) all parcels listed on a 1977 list that were not contested. "Land use under a TPZ will be restricted

[10] California Government Code 51000 et. seq. available on-line at http://www.leginfo.ca.gov/cgi-bin/displaycode?section=gov&group=51001-52000&file=51100-51104, last accessed 6/22/16

to growing and harvesting timber, and to compatible uses approved by the county (Gov. Code 51110(b))". Much land in Humboldt County was so zoned then and is still so zoned, both by the state and by Humboldt County.

The Humboldt County general plan and zoning ordinances protect agriculture in some locations, including in the town of Orick and vicinity. They further protect timberlands through TPZ zoning and restrictions on subdivision for larger parcels of non-TPZ forestland. Lands with a Williamson Act contract also require special consideration, though utility uses are not necessarily a conflict with ongoing agricultural uses and are so recognized in the Act.

3.2.2 Environmental Setting

The fiber optic portion of the Project will be entirely installed either on existing poles or underground within county and state rural road rights of way. There are no areas of Unique Farmland or Farmland of Statewide importance in the Project area. The project does not cross any lands with a Williamson Act contract. Table 3.2-1 shows the miles crossed in lands zoned in Humboldt County as Timber Production Zone (TPZ) or Prime Farmland:

Table 3.2-1. Miles Crossed by Segment for TPZ and Prime Farmland

Land Use Type	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Total
TPZ	0.7	6.4	12.1	3.1	25.3	47.6
Prime Farmland	0.0	1.9	6.8	0.7	2.0	11.4

The fiber optic cable route travels adjacent to and through many parcels zoned TPZ, including GDR lands along Segments 3 and 4 along Bald Hills Road and all of the GDR lands along Segment 5 between the boundary of RNP and GDR land boundary at Crannell Road. NFS lands along Segment 1 and RNP lands along Segment 4 and portions of Segment 3 are forested, as is much of the private and trust lands within the Yurok Reservation along Highway 169 and Tulley Creek Road in Segment 2 and along Segment 3 on Bald Hills Road. Note that while existing roads do cross prime farmland and TPZ lands, the roads are not vegetated and are not part of the managed lands in those designations. Installation in the roadside ditch or on existing poles through these areas does not affect those land uses.

The Orick Tower will be located within a one-mile radius of the intersection of Highway 101 and Lundblade Road in Orick. This location allows the KRRBI Project to serve the anchor institutions in Orick as well as a large majority of the residences, including more remote farm residences. One private property is under consideration for the tower location, as is the CalTrans storage yard. The private parcel is currently used for cattle production. If the tower were to be located on that property, a small portion of the ranch would become a fenced and graveled yard surrounding the 90' tower and fence. This would represent a loss of about ½ acre of prime farmland. This use of prime farmland is a permitted use under Humboldt County Code. If located in the Caltrans storage yard, the tower would have no impact on farmland.

Orleans Mountain and Antenna Ridge are both located on rocky ridges with no forest on NFS lands.

3.2.3 CEQA Checklist Criteria for Potential Impacts

II. AGRICULTURE AND FOREST RESOURCES: 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 Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

3.2.4 Analysis of Potential Impact to Agriculture and Forest Resources

3.2.4.1 Fiber Optic Cable

The installation of fiber optic cable, either overhead on existing utility poles or underground within the road easements of Bald Hills Road, Highway 101, Hiltons Road, Crannell Road, and Dows Prairie Road will not affect the adjacent farmland, including prime farmland, or farming operations. It will not convert land to non-agricultural use.

The installation of fiber optic cable on existing poles or within the road prisms or ditches is a compatible use and will have no effect on the management of lands zoned as TPZ for timber production. Where crossing lands managed by GDR in Segments 3, 4, and 5, the Project will coordinate closely with GDR land and road managers to conduct the installation in a manner that avoids conflict with active logging or road maintenance or construction operations. The Project will not convert land to non-timber use or interfere with the use of the land for timber production.

The presence of a buried fiber optic cable will not induce growth or encourage removal of lands from TPZ or farmland category for the purposes of subdivision, because fiber optic cable does not provide the needed infrastructure for such activities.

3.2.4.2 Orick Tower

If the tower were to be located on that property, a small portion of the ranch would become a fenced and graveled yard surrounding the 90' tower and fence. This would represent a loss of about ½ acre of prime farmland. If located in the Caltrans storage yard, the tower would have no impact on farmland. Regardless of location, the Orick tower would have no impact on any lands zoned TPZ.

3.2.4.3 Yurok Signal Connection

No ground disturbing activities are proposed for Orleans Mountain. The minor changes to existing structures on Antenna Ridge will have no impact on agricultural lands or on lands zoned TPZ.

3.3 Air Quality

3.3.1 Regulatory Setting

The Environmental Protection Agency sets national ambient air quality standards for six common air pollutants called criteria air pollutants, as mandated by the federal Clean Air Act of 1970[11]. The California Air Resources Board also administers California ambient air quality standards for the 10 air pollutants designated in the California Clean Air Act. The KRRBI Project is entirely within the North Coast Unified Air Quality Management District (NCUAQMD), which includes the counties of Del Norte, Trinity, and Humboldt.

3.3.2 Environmental Setting

There are two weather stations in the Project area: one in Orleans (data since 1905) and one in Orick (data since 1913). Average precipitation in Orleans is 51 inches and in Orick is 67 inches. Virtually all of the precipitation falls as rain and most of it falls in the winter rainy season from November through April. Fog is common along the coast in Orick throughout the year, but particularly common in the summer months. Thus the average monthly high temperature in Orleans is seen in July at 93.1 °F, but in Orick the average monthly high temperature is seen in September and is only 70.6°F. Average monthly low temperatures are reached in January in both communities, in Orleans at 35.2°F and in Orick at 36.7°F. The hills between Orleans (604 feet elevation) and Orick (10 feet elevation) reach 2,640 feet at School House Lookout on Bald Hills Road[12]. There is slightly more snow at that elevation and rainfall averages approximate those of Orick.

The NCUAQMD is listed as "attainment" or "unclassified" for all the federal and state ambient air quality standards except for the state 24-hour particulate (PM10) standard in Humboldt County only. The District has not exceeded the federal annual standard for particulate matter during the last five-year period. Primary sources of particulate matter in the Eureka area are on-road vehicles (engine exhaust and dust from paved and unpaved roads), open burning of

[11] https://www.epa.gov/laws-regulations/summary-clean-air-act accessed 3/1/16
[12] School House is a NWS RAWS weather station: http://raws.dri.edu/cgi-bin/rawMAIN.pl?caCSHH

vegetation (both residential and commercial), residential wood stoves, and stationary industrial sources (factories)[13].

Air quality is generally good in the Project area. Most remote rural homes are heated with wood, as firewood is cheap or free, easily accessible, and not dependent on unreliable power or sometimes-expensive propane, the other two fuel alternatives for most homes. A handful of homes are heated with fuel oil if they are located where they can receive deliveries of this fuel. Many remote rural roads are unpaved and during the summer are very dusty. These factors may have contributed to Humboldt County's only "non-attainment" category of PM10, though most of the population, and concern, is concentrated from the Humboldt Bay communities of Eureka and Arcata south through Garberville.

Sensitive receptors are few along the project route. They are:

- Segment 1: the Orleans Elementary School and Head Start,
- Segment 2: Weitchpec School, Ka'Pel Head Start, Jack Norton School
- Segment 3: No sensitive receptors.
- Segment 4: Orick Elementary School.
- Segment 5: No sensitive receptors.

All construction near those schools will be installation of overhead components, estimated to take less than one day near each of those schools. There are no hospitals or long-term care facilities along the route.

3.3.3 CEQA Checklist Criteria for Potential Impacts

AIR QUALITY: Would the Project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or Projected air quality violation?	☐	☐	☐	☒
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☒
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒
GREENHOUSE GAS EMISSIONS: Would the Project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☐	☒

[13] http://www.ncuaqmd.org/index.php?page=aqplanning.ceqa#T1, accessed 3/1/16

AIR QUALITY: Would the Project:	**Potentially Significant**	**Potentially Significant Unless Mitigation Incorp.**	**Less Than Significant Impact**	**No Impact**
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

3.3.4 Analysis of Potential Impact

This section on air quality is fully supported by Appendix A, the Air Quality Report.

3.3.4.1 Fiber Optic Cable

The Project will have two kinds of impact on air quality, neither of them substantial. During construction, there will be minor contributions of PM-10 and other pollutants generated through the creation of diesel and gasoline exhaust from the equipment used for installation of the fiber optic cable. Emissions from trucks and equipment will be reduced as required by California law, based on type of equipment and model year (EPM AIR-2).

Construction will also generate some fugitive dust during the driest part of the year, though the construction contractor is required to control fugitive dust emissions by watering to avoid most of this impact (EPM AIR-1).

The use of this equipment would be temporary and for a limited duration, and therefore will not have a significant impact on air quality. The Project does not include the manufacture or processing of materials that may release substantial pollutant concentrations or objectionable odors. The Project will not result in the exposure of substantial pollutant concentrations to sensitive receptors or create objectionable odors affecting a substantial number of people. Construction-related air impacts will be less than significant.

Greenhouse gas emissions are similarly temporary, short-term, and less than significant. Because of the temporary nature of the greenhouse gas contributions, coupled with the modest quantity of emissions, the proposed Project will not have a significant impact on the environment, nor conflict with applicable plan, policy, or regulation for the purposes of reducing greenhouse gas emissions. The amount of work required and directly related to this Project is small, short-term, and will not generate a significant amount of greenhouse gases, nor conflict with any plan or policy regulating such gases.

The Karuk Department of Natural Resources is working collaboratively as Co-Lead of the Western Klamath Restoration Partnership to integrate GHG reduction factors into forest management principles and practice.

During normal operation of the fiber optic cable portion of the Project, there are virtually no emissions that could affect air quality. The Project does not routinely generate any pollutants through the use of fiber optic cable, wireless towers, or last mile antennae, radios, and routers.

3.3.4.2 Orick Tower

Construction of the Orick Tower would occur over a period of two to three weeks and will have a negligible impact on air quality. During construction, there will be minor contributions of PM-10 and other pollutants generated through the creation of diesel and gasoline exhaust from the equipment used for the construction of the wireless tower and its appurtenant structures. Emissions from trucks and equipment will be reduced as required by California law, based on type of equipment and model year (EPM AIR-2).

The only impact on air quality during operation will come from the use of the propane generator at Orick. Each generator is designed to run on propane and will consume slightly less than 2 gallons per hour under full load. It will be set up to run 12 minutes a week to maintain all elements of the engine fully lubricated, to keep the starter battery charged, and ready to run in the case of a power outage. The contribution of this use of a propane generator will have a negligible impact on air quality.

3.3.4.3 Yurok Signal Connection

Construction of the Orleans Mountain and Antenna Ridge components of the Yurok Signal Connection will occur over a period of two to four days and will have a negligible impact on air quality. Access to the construction sites will be with pickups, which will have very minor contributions of PM-10 and other pollutants generated through the creation of diesel or gasoline exhaust. Construction may use diesel or gasoline powered equipment over the course of a single day for foundations for the hut and antenna on Antenna Ridge. All other work on Antenna Ridge will be conducted by hand or with battery-powered tools.

3.4 Biological Resources

3.4.1 Regulatory Setting

Plant and animal resources on federally managed lands are regulated by the management plans promulgated by the agencies managing those lands. They are also protected by national and state laws regarding wildlife and special status plants. GDR, in compliance with those laws, has written and is executing conservation plans for several species on its lands.

3.4.1.1 Federal Endangered Species Act

The Federal Endangered Species Act of 1973 (ESA) protects endangered and threatened species by prohibiting Federal actions that would jeopardize the continued existence of such species or result in the destruction or adverse modification of habitat of such species. Under Section 7(a)(2) of the ESA, the BIA, as the lead federal agency, may consult with Federal resource agencies (i.e., USFWS) and prepare a Biological Assessment if listed species and/or critical habitat are present in an area to be impacted by Proposed Project activity.

3.4.1.2 California Endangered Species Act (California Fish and Game Code Sections 2050-2116)

The California Endangered Species Act (CESA) parallels the federal ESA. As a responsible agency, the CDFW has regulatory authority over State-listed endangered and threatened species. The State legislature encourages cooperative and simultaneous findings between State and Federal agencies. The Proposed Project would comply with this act.

3.4.1.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act[14], enacted in 1940 and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts, nests, or eggs. "Take" includes disturbing an eagle in a way that interferes with its normal breeding, feeding, or sheltering behavior. For construction projects like KRRBI, this means that noise or other disturbance associated with installation must be shown to be similar to or less than the disturbance level to which the eagles are already acclimated.

3.4.1.4 Migratory Bird Treaty Act

The Migratory Bird Treaty Act[15] was passed in 1918 in order to put an end to the commercial trade of migratory birds and their feathers. This Act decrees that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected. Virtually all birds in the United States are covered by this law (exceptions are made for non-native species like English sparrows and starlings). In effect, it means that it is illegal to "take" a bird or a nest. For construction Projects like KRRBI, that means that any vegetation removal conducted during nesting season (typically spring and summer) should be preceded by a search for bird nests and may be postponed if nests are found until the birds have fledged their young.

3.4.1.5 USFS Sensitive Species

Forest Service Sensitive species are plant and animal species identified by a Regional Forester for which population viability is a concern (FSM 2670.5). The analysis of effects must include an assessment of the effects, if any, on Forest Service Sensitive species; if necessary, this assessment is documented in a Biological Evaluation.

3.4.1.6 USFS Management Indicator Species

Forty-one Forest fish and wildlife species are identified as management indicator species or assemblages for a variety of habitats that are affected by resource management activities on the Forest in the 1985 Six Rivers National Forest and Land Management Plan. Management Indicator Species are not federally listed as threatened, endangered, or Forest Sensitive; but they have the potential to be affected by Project activities.

[14] 16 U.S.C. §§ 668-668c, 1940 as amended.
[15] 16 U.S.C. §§ 703-712, 1918, as amended.

3.4.1.7 BLM Sensitive Species

BLM Sensitive Species are species that are not federally listed that occur on BLM public lands, where BLM "has the capability to significantly affect the conservation status of the species through management." BLM's policy is to "ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered."

3.4.1.8 California Special Status Species

CDFW has identified California Species of Special Concern (CSSC) that are also protected. The purpose is to identify animals that need conservation in order to avoid the need to list under the CESA.

CSSC are defined as those species, subspecies, or distinct populations of native animals and plants that currently satisfy one or more of the following (not necessarily mutually exclusive) criteria:

1) are extirpated from the state totally or in their primary seasonal or breeding role and were never listed as state threatened or endangered.
2) are listed as federally, but not state, threatened or endangered.
3) meet the state definition of threatened or endangered but have not formally been listed.
4) are experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify them for state threatened or endangered status.
5) have naturally small populations exhibiting high susceptibility to risk from any factor(s) that if realized could lead to declines that would qualify them for state threatened or endangered status.

3.4.1.9 GDR Conservation Plans

GDR has reached agreement with the USFWS, National Marine Fisheries Service, and CDFW on the management of aquatic species and on the management of the Northern Spotted Owl where it exists on or adjacent to GDR lands[16].

3.4.2 Environmental Setting

3.4.2.1 Habitat and Vegetation

The Project is located in the Klamath River valley from Orleans to Wautec following existing state highways (Segments 1 and 2), over the Coastal Range to the west coast following Bald Hills Road (Segments 3 and 4), through the coastal plain in the town of Orick, following state highway 101 (Segments 4 and 5), then in the coastal hills and valleys south to the "meet-me"

[16] Simpson Timber Company. 1992 as amended. Habitat Conservation Plan for the Northern Spotted Owl on the California Timberlands of Simpson Timber Company. Green Diamond Resource Company. 2006. Aquatic Habitat Conservation Plan and Candidate Conservation Agreement with Assurances. CDFW. 2014. Consistency Determination for the Northern Spotted Owl Habitat on California Timberlands.

point at Dows Prairie Road (Segment 5). Following is a description of habitat and vegetation by Project Component.

Fiber Optic Cable

Segment 1: The Project will be located overhead on existing joint use poles from its origin in Orleans at the Karuk Tribe's Áan Chúuphan demarcation point south about a mile to where the poles leave the roadside at about Camp Creek Road. The poles travel along state Highway 96. The bases of the poles are kept clear of vegetation for fire prevention purposes, and the distribution and telephone lines travel in front of residences and businesses in Orleans. Starting at Camp Creek Road, the fiber optic cable will be installed on the outside edge of the Highway, in the maintained shoulder. Roadside vegetation is dominated by introduced invasive species such as Dyers woad, Scotch broom, star thistle, chicory, Himalaya berry, and English Ivy. Adjacent terrestrial habitats include mixed Douglas-fir and hardwood forests and developed residential land parcels. Where the highway crosses perennial streams, the adjacent vegetation is typically alder-dominated riparian forest with willows and Himalaya berry in the understory.

Segment 1 Spurs: The spur that will extend from the existing Áan Chúuphan fiber optic cable to the Caltrans maintenance yard and to the Karuk DNR offices includes a new overhead crossing of the Klamath River, immediately adjacent to an existing communication cable crossing and planned to be at the same height above the river. The additional cable crossing will be similar visually to the existing cable. It also includes two new poles, each installed adjacent to the poles carrying the existing communication cable. The pole to the northeast will be located outside the riparian area of the Klamath River in a young forested area with hardwoods and conifers. A single new pole, to be located in the Highway 96 right-of-way in previously disturbed soils and vegetation, will be installed just southwest of the DNR driveway. The fiber optic cable will be attached to the new and the existing poles. On existing poles, it will be attached between the distribution conductors and the existing communication cable. Vegetation under the existing line includes young mixed conifer/hardwood forest, invasive species including Himalaya berry (*Rubus armenaicus*), and shrub species including introduced (e.g. *Pyracantha*) and native (e.g. *Ceanothus* sp.).

The spur to the Frontier will be mounted to existing poles between the existing distribution power conductors and the existing communications cable. The spur to the existing Áan Chúuphan tower will be mounted to existing poles below the existing distribution power conductors and will use the existing spare conduit placed during initial tower construction to complete the connection unground. No ground disturbance is anticipated for the underground portion of the installation.

Segment 2: The Project will be located underground in the high-side ditch along the existing Weitchpec Road from its intersection with Highway 96 for 0.5 miles, then continue overhead on existing joint-use poles to Ka'Pel along Highway 169 and the upper and lower Capell roads. All

of Segment 2 is within the Yurok Indian Reservation and travels through conifer and hardwood forests disturbed by road construction, road maintenance, and the recent installation of the utility poles. Like Segment 1, roadside vegetation includes mostly invasive annual and perennial plant species. Adjacent vegetation includes mixed Douglas-fir and hardwood forests. Where the highway crosses perennial creeks, the adjacent vegetation includes riparian forests dominated by alder with some Douglas-fir and other riparian vegetation. Himalaya berry is a common invasive in riparian areas.

Segment 3: The Project will be located in road prism of the Bald Hills Road from its intersection with the Tulley Creek Road at the west end of the Martins Ferry bridge to the intersection with Johnsons Road near the CDF Elk Camp Fire Station. The Bald Hills Road travels through mixed Douglas-fir and hardwood forests, many of them recent plantations, until reaching the RNP boundary and the beginning of the meadows or "balds" that give the road and the area its name. The meadows are remnants of much larger meadows that were maintained through routine application of intentional Native American burning before EuroAmerican settlement began around 1850[17]. Douglas-fir and other trees have steadily invaded these meadows since suppression of burning became common in the late 1800s and early 1900s. The segment terminates at Elk Camp in a mixed young-growth redwood/Douglas-fir/hemlock forest.

Segment 4: The Project will be located in road prism of the Bald Hills Road from its intersection with Johnson Road at Elk Camp to its intersection with Highway 101 just north of Orick. Bald Hills Road travels largely through mixed young-growth redwood/Douglas-fir/hemlock forest stands along the ridge, then descends through several groves of old-growth redwoods, the best-known being the Lady Bird Johnson Grove. Bald Hills Road travels through the Redwood Creek floodplain with alders and other facultative wetland species as well as non-native invasive species like Himalaya berry just before its intersection with Highway 101. After a short underground portion along Highway 101, the remainder of Segment 4 will be installed overhead on existing joint use poles. Segment 4 will cross Redwood Creek in an overhead crossing parallel and immediately adjacent to the existing telephone cable crossing just west of the Highway 101 bridge over Redwood Creek, about 2.2 creek miles from its mouth at the Pacific Ocean. Terrestrial habitats are predominantly developed residences, commercial buildings, and pasture along this stretch of Highway 101. Aquatic habitat at the Redwood Creek crossing includes alders and willows.

Segment 5: The Project will be installed overhead on existing poles along Highway 101 for about 0.6 miles before turning south on Hiltons Road and continuing on existing joint use poles until the existing poles end as the road turns steeply up towards the ridge that separates the RNP to the east from private lands to the west. The fiber optic cable will be installed underground in the high-side roadside ditch from that point south. Where the Project encounters culverts, the fiber optic cable will be installed by directionally drilling beneath the

[17] National Park Service. ND. Lynne Mager. The Bald Hills. Secret Spaces.

culverts to avoid impacts to the culverts. The Project also intends to directionally drill wet areas found in the ditches. The adjacent vegetation is young-growth redwoods with an understory of dense brush, hardwoods, and other conifers such as Douglas-fir. This portion of the RNP was acquired in 1978 to protect the Redwood Creek watershed and was logged shortly before purchase, making adjacent trees around 40 years old for much of the route. The Project crosses RNP for about 5 miles in the roadside ditch of the West Side Access Road, previously a main haul road for logging. The Project leaves RNP and continues in roadside ditches across GDR lands, through second-growth redwood and mixed redwood-Douglas-fir forests with a variable hardwood component. GDR has, as part of its Aquatic Habitat Conservation Plan, replaced many of the culverts on its property and on the KRRBI route with bridges or with larger culverts. Where the Project encounters culverts, the fiber optic line will be installed by directional drilling. Where there are bridges, the fiber optic line will be hung from the bridges. This will avoid impacts on the perennial streams and their associated wetlands, which are vegetated with alders and willows. At the south end of CR1000 (a GDR main haul road) the Project will be installed on existing overhead poles, crossing the Little River as an overhead installation, and staying overhead off GDR property and along Crannell Road on existing joint use poles through cattle pasture and the floodplain of the Little River. At the intersection with Dows Prairie Road the Project will turn south and follow Dows Prairie Road to the meet-me point where the Project ends. Vegetation along Dows Prairie Road includes pasture, farmland, and rural residence yards and gardens.

Orick Tower

The Orick Tower is proposed for construction in agricultural land, adjacent to a barn and driveway. Surrounding vegetation is grass. Domestic cattle are the predominant animal life.

Yurok Signal Connection

The Antenna Ridge component of the Yurok Signal Connection will be built on a rocky ridge with adjacent scattered *Ceanothus* and *Arctostaphylos* shrubs.

3.4.2.2 Special Status Species

Study Area

The Direct Impact Area (DIA) is an area 10 feet on either side of the proposed centerline for the Project, as there will be no ground or vegetation disturbance further away from the line than that distance. The Indirect Impact Area (IIA) varies by species (depending on the species' sensitivity to construction noise, light, dust, etc.) and may be as large as one half mile on either side of the centerline. Because there are species that may be disturbed by construction even if the species is located well away from the DIA, the full study area, or Biological Assessment Area (BAA), was defined as an area one half mile on either side of the proposed centerline for the KRRBI fiber optic line, plus an area one half mile on either side of Alternative 5A.

Literature and Database Review

The study included special status animals and plants within Humboldt County, CA. The study for wildlife began with the list published periodically by the California Department of Fish and Wildlife, the Special Animals List[18]. This list of species was reviewed and species outside the influence area of the Project, or with no habitat in the Project area, were eliminated from consideration. This resulted in a list of special status species with suitable habitat potentially present in the BAA.

The definition of "special status species" is found in the California Natural Diversity Database (CNDDB) publications above-referenced, is used as specified in those publications, and is incorporated herein by reference.

On June 8, 2016, the CNDDB was queried for recorded instances of special status animal and plant species on quadrant maps that are crossed by this Project. The CNDDB provides "location and natural history information on special status plants, animals, and natural communities to the public, other agencies, and conservation organizations[19]." "Records in the database exist only where species were detected. This means there is a bias in the database towards locations that have had more development pressures, and thus more survey work.[20]"

On December 9, 2016, the CNDDB database was queried for recorded instances of special status animal and plant species on quadrant maps crossed by the DNR spur in Segment 1 and by the Yurok Signal Connection on Orleans Mountain and Antenna Ridge.

Results are returned from the CNDDB by 24,000-scale topographic quadrant maps, as refined by the BAA. Table 3.4-1 shows quadrants returning results by segment.

Table 3.4-1. Quadrants Returning Results by Segment

Segment 1	Orleans, Weitchpec, Hopkins Butte, and Fish Lake
Segment 1 DNR Spur	Orleans
Yurok Signal Connection	Orleans Mountain
Segment 2	Weitchpec, Johnsons, and French Camp Ridge
Segment 3	Weitchpec, French Camp Ridge, and Bald Hills
Segment 4	Bald Hills, Johnsons, Orick, Holter Ridge, and Rodgers Peak
Segment 5 and Alternative 5A	Orick, Rodgers Peak, Bald Hills, Crannell, Trinidad, Arcata North, and Fern Canyon

[18] California Department of Fish and Wildlife, Natural Diversity Database. April 2016.Special Animals List. Periodic publication.

[19] California Department of Fish and Wildlife, Natural Diversity Database. 2016. California Natural Diversity Database Info (accessed July 2, 2016) at: http://www.dfg.ca.gov/biogeodata/cnddb/cnddb_info.asp,

[20] California Department of Fish and Wildlife. 2016. CNDDB Quick Facts. Electronic version available online (accessed July 2, 2016) at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=43527&inline=1

The query is conducted by overlaying the BAA on the Geographic Information System (GIS) database. That database represents species presence by polygons of varying sizes, depending on the reliability of the data and the species. A species presence is returned if its polygon is overlapped by the BAA, even though the species sighting might have been outside the BAA.

The query does not return information on the Northern Spotted Owl (NSO) in the list with all other species. Instead, NSO survey information is provided in a separate set of tables. The Forest Service, Yurok Tribe, GDR, and the NPS all survey annually for NSO in the Project area. Data from the 2015 survey were reviewed for this report.

The results from the CNDDB search, results from other searches known to the author from the general area, and the refined list from the initial CDFW lists were all reviewed. Species without suitable habitat along the proposed Project route were dismissed. Species were also eliminated if they occupy a habitat type that is technically within the BAA but not at all impacted by the Project. For example, Alternative 5A travels along Highway 101 and Patrick's Point Drive. Within half a mile of the centerline of that alternative there are rocky coastline or outer dune habitats, but the Project will not have any impact on those habitats and species using those habitats were eliminated from consideration.

Results

Table 3.4-2 shows a summary of the results of the CNDDB search with additional species known to the author with presence in the BAA. Full discussion is found in Appendix B, Biology Report. The table provides the species common and scientific names, global and state ranking for imperilment, and listing where appropriate as federally or state-listed species under the respective endangered species acts. Designations from the California Native Plant Society are listed in addition for native plants. Global and state imperilment estimates are represented by codes as shown below. Global ratings (G) are further detailed where a subspecies or variety requires a separate rating and is represented by a secondary T code that follows this same ranking. State codes (S) apply only to the species within California. A species may be relatively secure globally but very rare and imperiled where it exists in California, so global and state ratings may be dramatically different.

1) Critically Imperiled
2) Imperiled
3) Vulnerable
4) Apparently Secure
5) Secure

Abbreviations under the federal and state ESAs are: E = listed as endangered, T = listed as threatened, C = candidate for listing under that ESA. Abbreviations in the California (CA) special status column include those used in the CSSC, where W = CDFW Watch List, S = CDFW Sensitive List, FP = CDFW fully protected, and CSSC = other list within the CSSC list.

The following alphanumeric codes are the California Native Plant Society List, California Rare Plant Ranks (CRPR):

- 1A Presumed extirpated in California and either rare or extinct elsewhere
- 1B Rare or Endangered in California and elsewhere
- 2A Presumed extirpated in California, but more common elsewhere
- 2B Rare or endangered in California, but more common elsewhere
- 3 Plants for which more information is needed – Review List
- 4 Plants of limited distribution – Watch List

The CRPR use a decimal-style threat rank. The threat rank is an extension added onto the CRPR and designates the level of threats by a 1 to 3 ranking with 1 being the most threatened and 3 being the least threatened.

Table 3.4-2 is a summary of all the species reviews conducted for this Project. Details for each of the habitats crossed or nearby and the species considered can be found in the biological report, provided as Appendix B to this report. Animal species are listed in taxonomic order while plant species are alphabetical by scientific name. Where there is a possible impact shown to the species, proposed mitigation measures are also listed, including but not limited to BMPs for sedimentation control. The Comments section also provides brief rationale for determinations of potential effect, found in greater detail in the biological report.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments present	Likely Habitat in DIA	Likely Habitat in IIA	Possible adverse impact	Comment
BIRDS												
RUGR	Ruffed grouse	*Bonasa umbellus*	G5	S3S4	N	N	W	2	N	Y	N	Woods; no effect
FTSP	Fork-tailed storm petrel	*Oceanodroma furcata*	G5	S1	N	N	CSSC	5A	N	N	N	Dismiss. No habitat in IIA.
DCCO	Double-crested Cormorant	*Phalacrocorax auritus*	G5	S4	N	N	W	5A	N	N	N	Dismiss. No nesting habitat in IIA, no effect.
GBHE	Great Blue Heron	*Ardea herodias*	G5	S3	N	N	S	1, 4	N	N	N	Found along Klamath, Redwood Creek. No effect. Very unlikely to nest adjacent to proposed route due to current disturbance levels.
BCNH	Black-crowned Night Heron	*Nycticorax nycticorax*	G5	S4	N	N		4	N	N	N	Dismiss. Behind Orick Hill, no impact.
CACO	California Condor	*Gymnogyps californianus*	G1	S1	E	E		none	N	Y	N	No presence. Yurok tribe planning eventual re-introduction.
COHA	Cooper's Hawk	*Accipiter cooperii*					W	none	N	Y	N	No effect. Very unlikely to nest adjacent to proposed route due to current disturbance levels.
NOGO	Northern Goshawk	*Accipiter gentilis*	G4	S3	N	N		1	N	Y	N	Found higher in Slate Creek, Bluff Creek drainages. No effect. Very unlikely to nest adjacent to proposed route due to current disturbance levels.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments present	Likely Habitat in DIA	Likely Habitat in IIA	Possible adverse impact	Comment
SSHA	Sharp-shinned Hawk	*Accipiter striatus*					W	none	N	Y	N	No effect. Very unlikely to nest adjacent to proposed route due to current disturbance levels.
GOEA	Golden Eagle	*Aquila chrysaetos*	G5	S3	N	N	FP	none	N	Y	N	No effect. Very unlikely to nest within 0.25 miles due to current disturbance levels.
NOHA	Northern Harrier	*Circus cyaneus*	G5	S3	N	N	CSSC	none	N	Y	N	No effect. Very unlikely to nest adjacent to proposed route due to current disturbance levels.
WTKI	White-tailed Kite	*Elanus leucurus*	G5	S3S4	N	N	FP	none	N	Y	N	No effect. Very unlikely to nest adjacent to proposed route due to current disturbance levels.
BAEA	Bald Eagle	*Haliaeetus leucocephalus*	G5	S3	D	E	FP	1,2,4,5	N	Y	N	No effect. Construction activity similar to existing disturbance levels
OSPR	Osprey	*Pandion haliaetus*	G5	S4	N	N	W	1-5	N	Y	N	No effect. Common along Klamath River; construction activity similar to existing disturbance levels.
SNPL	Snowy Plover	*charadrius alexandrinus nivosus*	G2G3	S2S3	T	N	CSSC	5A	N	N	N	Dismiss. No habitat in IIA.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments present	Likely Habitat in DIA	Likely Habitat in IIA	Possible adverse impact	Comment
MAMU	Marbled Murrelet	*Brachyramphus marmoratus*	G4	S1	T	T		3,4,5	N	Y	M	Seasonal restrictions for old-growth murrelet habitat, within portions of the RNP.
RHAU	Rhinoceros Auklet	*cerorhinca monocerata*	G5	S3	N	N	W	5A	N	N	N	Dismiss. No habitat in IIA.
TUPU	Tufted Puffin	*Fratercula cirrhata*	G5	S1S2	N	N	CSSC	5A	N	N	N	Dismiss. No habitat in IIA.
NSO	Northern Spotted Owl	*Strix occidentalis*	G3T3	S2S3	T	N	CSSC	1-5	N	Y	M	Seasonal restrictions in RNP adjacent to suitable habitat. No active nests within ¼ mile of project area per 2015 data.
VASW	Vaux's Swift	*Chaetura vauxi*	G5	S2S3	N	N	CSSC	none	N	Y	N	Dismiss. Ample habitat available.
BLSW	Black Swift	*Cypseloides niger*	G4	S2	N	N	CSSC	1	N	N	N	Dismiss. Extremely rare record in Humboldt County.
PEFA	Peregrine Falcon	*Falco peregrinus*	G4T4	S3S4	D	N	FP	none	N	Y	N	No effect. Historical presence near Segment 1 and Yurok Signal Connection. Unlikely to nest adjacent to proposed route or Orleans Lookout due to current disturbance levels.
OSFL	Olive-sided Flycatcher	*Contopus cooperi*	G4	S4	N	N	CSSC	none	N	Y	N	No effect. Habitat in conifer forests with openings.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments present	Likely Habitat in DIA	Likely Habitat in IIA	Possible adverse impact	Comment
WIFL	Willow Flycatcher	*Empidonax traillii*	G5T3T4	S1S2	N	E		none	Y	Y	M	Seasonal restrictions in RNP. Directional drill to avoid Seg 4 Redwood Creek riparian.
PUMA	Purple Martin	*Progne subis*	G5	S3	N	N	CSSC	none	N	Y	N	No effect. Habituated to human presence.
BANS	Bank Swallow	*Riparia riparia*	G5	S2	N	T		5A	N	Y	N	Dismiss. SW of Orick, nesting colony at distance from project.
YBCH	Yellow-breasted Chat	*Icteria virens*	G5	S3	N	N	CSSC	none	Y	Y	M	Common species along rivers, riparian nester; Any nests in DIA discovered during Project construction buffered until fledged
YWAR	Yellow Warbler	*Dendroica petechia*	G5	S4	N	N	CSSC	none	Y	Y	M	Riparian canopy nester; removed from construction activities. Any nests discovered during Project construction in DIA buffered until fledged
GRSP	Grasshopper Sparrow	*Ammodramus savannarum*	G5	S3	N	N	CSSC	none	N	Y	N	Grassland along Bald Hills, Any nests discovered during Project construction in DIA buffered until fledged
MAMMALS												
PABA	Pallid bat	*Antrozous pallidus*	G5	S3	N	N	CSSC	3,4	Y	Y	M	Bat roost avoidance during construction of bridge hangs.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments present	Likely Habitat in DIA	Likely Habitat in IIA	Possible adverse impact	Comment
TBEB	Townsend's big-eared bat	*Corynorhinus townsendii*	G3G4	S2	N	N	CSSC	none	Y	Y	M	Bat roost avoidance during construction of bridge hangs.
SHBA	Silver-haired bat	*Lasionycteris noctivagans*	G5	S3S4	N	N		3,4	N	N	N	No effect. Forest rooster.
YUMY	Yuma myotis	*Myotis yumanensis*	G5	S4	N	N		4	Y	Y	M	Bat roost avoidance during construction of bridge hangs.
WFVO	White-footed vole	*Arborimus albipes*	G3G4	S2	N	N	CSSC	5A	N	N	N	Dismiss. No habitat in IIA.
STVO	Sonoma tree vole	*Arborimus pomo*	G3	S3	N	N	CSSC	3-5	N	N	N	Dismiss. arboreal, Douglas-fir habitat abundant, no habitat in IIA.
HUMA	Humboldt marten	*Martes caurina humboldtensis*	G5T1	S1	N	C	CSSC	none	N	N	N	No impact. Known near Johnson's, very rare species, possible dispersal habitat use at night.
PAFI	Pacific fisher	*Pekania pennanti*	G5T2T3	S2S3	N	N	CSSC	1-4	N	N	N	No effect. Well distributed throughout the nearby forested habitat.
REPTILES AND AMPHIBIANS												
STSA	Southern torrent salamander	*Rhyacotriton variegatus*	G3G4	S2S3	N	N	CSSC	2-5	N	Y	M	BMPs to limit sedimentation
DNSA	Del Norte salamander	*Plethodon elongatus*	G4	S3	N	N	CSSC	1	N	Y	M	BMPs to limit sedimentation
NRLF	Northern red-legged frog	*Rana aurora*	G4	S3	N	N	CSSC	2-5	N	Y	M	BMPs to limit sedimentation
FYLF	Foothill yellow-legged frog	*Rana boylii*	G3	S3	N	N	CSSC	1, 4	N	Y	M	BMPs to limit sedimentation

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments present	Likely Habitat in DIA	Likely Habitat in IIA	Possible adverse impact	Comment
PTFR	Pacific tailed frog	*Ascaphus truei*	F4	S3S4	N	N	CSSC	5	N	Y	M	BMPs to limit sedimentation
WPTU	Western pond turtle	*Clemmys marmorata*	G3	S4S3	N	N		none	N	N	N	Dismiss. Banks of rivers, easy dispersal.
FISH												
CCTR	Coast cutthroat trout	*Oncorhynchus clarkii clarkii*	G4T4	S3	N	N	CSSC	2-5	N	Y	M	BMPs to limit sedimentation
SONCC	Chinook salmon	*Oncorhynchus tshawytscha*	G4T1	S2	T	N		1	N	Y	M	BMPs to limit sedimentation
CCTS	Coho salmon	*Oncorhynchus kisutch*	G4T1	S2	T	N		none	N	Y	M	BMPs to limit sedimentation
NCST	North Coast steelhead	*Oncorhynchus mykiss*	G5T2	S2S3	T	N		none	N	Y	M	BMPs to limit sedimentation
EULA	Eulachon	*Thaleichthys pacificus*	G5	S3	T	N		4, 5	N	N	M	BMPs to limit sedimentation
LOSM	Longfin smelt	*Spirinchus thaleichthys*	G5	S1	C	T		5A	N	N	N	Dismiss. No habitat in IIA.
TIGO	Tidewater goby	*Eucyclogobius newberri*	G3	S3	E	N	CSSC	5A	N	N	N	Dismiss. No habitat in IIA.
INVERTEBRATES												
WEPE	Western pearlshell	*Margaritifera falcata*	G4G5	S1S2	N	N		1	N	Y	M	In Klamath River; BMPs to limit sedimentation
HOLA	Hooded lancetooth	*Ancotrema voyanum*	G1G2	S1S2	N	N		1	N	Y	M	Red Cap Gulch: BMPs to limit sedimentation
ORSH	Oregon shoulderband	*Helminthoglypta hertleini*	G1	S1	N	N		1	N	Y	M	Klamath River; BMPs to limit sedimentation
TRSH	Trinity shoulderband	*Helminthoglypta talmadgei*	G2	S2	N	N		1	N	Y	M	Camp Creek; BMPs to limit sedimentation
JUOR	Redwood juga	*Juga orickensis*	G2	S1S2	N	N		4, 5	N	N	N	In downtown Orick, overhead install; BMPs to limit sedimentation

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments present	Likely Habitat in DIA	Likely Habitat in IIA	Possible adverse impact	Comment
BSBU	Behren's silverspot butterfly	*Speyeria zerene behrensii*	G5T1	S1	E	N		4, 5	N	N	N	Dismiss. Extirpated; recorded 1975 vicinity of Orick, currently now only found in Mendocino, CA
OBBE	Obscure bumble bee	*Bombus caliginosus*	G4?	S1S2	N	N		4, 5, 5A	Y	Y	N	No adverse effect. Mobile while foraging; minor vegetation removal.
WBBE	Western bumble bee	*Bombus occidentalis*	G2G3	S1	N	N		1, 2, 4, 5	Y	Y	N	No adverse effect. Mobile while foraging; minor vegetation removal.
SCBB	Suckley's bumble bee	*Bombus Suckleyi*	GU	S1	N	N		1	Y	Y	N	No adverse effect. Mobile while foraging; minor vegetation removal.
PLANTS												
ABUM	Pink Sand Verbena	*Abronia umbellata breviflora*	G4G5T2	S1	N	N	1B.1	5A	N	na	N	Dismiss. No habitat impact in DIA.
ASUM	Bald Mountain vetch	*Astragalus umbraticus*	G3	S2	N	N	2B.3	2, 3	Y	na	N	No impact. Occasional roadside.
CAAM	Humboldt Bay owl's clover	*Castilleja ambigua humboldtiensis*	G4T2	S2	N	N	1B.2	5A	N	na	N	Dismiss. No coastal marshes and swamp habitat in DIA.
CAAR	Northern clustered sedge	*Carex arcta*	G5	S1	N	N	2B.2	5A	N	na	M	Avoid wetlands by overhead installation or directional drilling
CALE (1)	Lagoon sedge	*Carex lenticularis limnophila*	G5T5	S1	N	N	2B.2	5A	N	na	N	Dismiss. No bog, marsh, gravelly beach or shoreline habitat in DIA.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments present	Likely Habitat in DIA	Likely Habitat in IIA	Possible adverse impact	Comment
CALE (2)	Bristle stalked sedge	*Carex leptalea*	G5	S1	N	N	2B.2	5A, 5	Y	na	M	Avoid wetlands by overhead installation or directional drilling
CALI	Oregon coast paintbrush	*Castilleja litoralis*	G3	S3	N	N	2B.2	5A	N	na	N	Dismiss. No sandy coastal bluff scrub habitat in DIA.
CALY	Lyngbye's sedge	*Carex lyngbyei*	G5	S3	N	N	2B.2	5A	N	na	N	Dismiss. No coastal salt marsh habitat in DIA.
CAME	Mendocino coast paintbrush	*Castilleja mendocinensis*	G2	S2	N	N	1B.2	5A	N	na	N	Dismiss. Outside of Project area along PP State Park bluffs. No coastal scrub habitat impact in DIA.
CAPR	Northern meadow sedge	*Carex praticola*	G5	S2	N	N	2B.2	4	Y	na	M	Avoid wetlands by overhead installation or directional drilling
CASA	Deceiving sedge	*Carex saliniformis*	G2	S2	N	N	1B.2	5A	Y	na	M	Coastal prairies, scrub, marshes, swamps; Humboldt Lagoons SP. Avoid wetlands by overhead installation or directional drilling.
CAVI	Green-yellow sedge	*Carex viridula viridula*	G5T5	S2	N	N	2B.3	5A	Y	na	M	Freshwater swamps and bogs. Avoid wetlands by overhead installation or directional drilling.
COLA	Oregon goldthread	*Coptis laciniata*	G3	S3	N	N	4.2	3	N	na	N	No impact. Closed canopy/wet soils species; impact not expected in open areas of the proposed route.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments present	Likely Habitat in DIA	Likely Habitat in IIA	Possible adverse impact	Comment
DINU	Naked flag moss	*Discelium nudum*	G4G5	S1	N	N	2B.2	5A	N	na	N	Dismiss. No coastal bluff scrub or unstable silt banks of rivers habitat in DIA.
EMNI	Black crowberry	*Empetrum nigrum*	G5	S1?	N	N	2B.2	5A	N	na	N	Dismiss. No coastal habitat in DIA.
ERBL	Waldo daisy	*Erigeron bloomeria nudatus*	G5T4	S3	N	N	2B.3	5A	N	na	N	Dismiss. No serpentine slopes and meadows habitat in DIA.
ERRE	Coast fawn lily	*Erythronium revolutum*	G4G5	S3	N	N	2B.2	1, 2, 3	N	na	N	Dismiss. Recorded on GDR lands 2005/2006; unlikely to be in roadside ditches; no habitat in DIA.
GICA	Pacific gilia	*Gilia capitata pacifica*	G5T3	S2	N	N	1B.2	5A	N	na	N	Dismiss. No coastal bluff and prairies habitat in DIA.
GIMI	Dark-eyed gilia	*Gilia milefoliata*	G2	S2	N	N	1B.2	5	N	na	N	Dismiss. No habitat along Crannell or Dows Prairie Road in DIA.
JUDU	Dudley's rush	*Juncus dudleyi*	G5	S1	N	N	2B.3	1	N	na	M	Orleans area; moist stream banks, ditches, around springs; overhead install past Camp Creek. Avoid wetlands by overhead installation or directional drilling.
JUNE	Sierra rush	*Juncus nevadensis inventus*	G5T3T4	S1	N	N	2B.2	5A	N	na	N	Dismiss. No coastal habitat in DIA.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments present	Likely Habitat in DIA	Likely Habitat in IIA	Possible adverse impact	Comment
KOHO	Small groundcone	*Kopsiopsis hookeri*	G4?	S1S2	N	N	2B.3	1	N	na	N	No population impact. Parasitic on common salal and huckleberry, abundant outside DIA.
LACA	Beach layia	*Layia carnosa*	G2	S2	E	E	1B.1	5A	N	na	N	Dismiss. No coastal dunes habitat in DIA.
LAJA	Seaside pea	*Lathyrus japonicus*	G5	S2	N	N	2B.1	5A	N	na	N	Dismiss. No seashore habitat in DIA.
LAPA	Marsh pea	*Lathyrus palustris*	G5	S2	N	N	2B.2	5A	N	na	N	Dismiss. No shoreline habitat in DIA.
LECO	Heckner's lewisia	*Lewisia cotyledon var heckneri*	G4T3	S3	N	N	1B.2	1, 2	N	na	N	Dismiss. NO shady north slope rocky slopes and cliffs habitat in DIA.
LIOC	Western lily	*Lilium occidentale*	G1	S1	E	E	1B.1	none	Y	na	N	No impact to roadside vegetation as this is overhead installation in Dows Prairie and Crannell Road.
LLLA	California globe mallow	*Iliamna latibracteata*	G2G3	S2	N	N	1B.2	3, 4	Y	na	M	Prefers mesic areas. Avoid wetlands by overhead installation or directional drilling.
LYIN	Inundated bog-clubmoss	*Lycopodiella inundata*	G5	S1?	N	N	2B.2	5A	N	na	M	Requires wet habitats. Avoid wetlands by overhead installation or directional drilling
LYCL	Running pine	*Lycopodium clavatum*	G5	S3	N	N	4.1	5A	Y	na	N	Recolonizes readily after disturbance. No mitigation needed.
MOHO	Howell's montia	*Montia howelii*	G3G4	S2	N	N	2B.2	1, 2, 4	Y	na	N	Disturbance-accommodating species. No mitigation needed.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments present	Likely Habitat in DIA	Likely Habitat in IIA	Possible adverse impact	Comment
MOUN (1)	Woodnymph	*Moneses uniflora*	G5	S3	N	N	2B.2	5A	N	na	N	No impact. Not a disturbed habitat species.
MOUN (2)	Ghost-pipe	*Montropa uniflora*	G5	S2	N	N	2B.2	4	N	na	N	No impact. Not a roadside species. Found along Bald Hills Road in old-growth Redwood forest.
OEWO	Wolf's evening primrose	*Oenothera wolfii*	G2	S1	N	N	1B.1	1 (maybe), 5, 5A	N	na	N	No impact. Unlikely to be present in road shoulders, reported on Freshwater Lagoon Spit,
PLRE	Nodding semaphore grass	*Pleuropogon refractus*	G4	S4	N	N	4.2	none	N	na	N	Known above Freshwater Lagoon, near but not along 5A. Avoid wetlands by overhead installation or directional drilling.
PICA	White flowered rein orchid	*Piperia candida*	G3	S3	N	N	1B.2	1, 2	N	na	N	No impact. Not a disturbed habitat species, unlikely along roadside.
POCA	Oregon polemonium	*Polemonium carneum*	G3G4	S2	N	N	2B.2	5A	N	na	N	NO impact. Unlikely to be present. 1930s report south end of Big Lagoon.
ROCO	Columbia yellow cress	*Rorippa columbiae*	G3	S1	N	N	1B.2	1	N	na	N	Dismiss. 1956 reference in Camp Creek. No impact from overhead installation
ROTR	Tracy's mistmaiden	*Romanzoffia tracyi*	G4	S2	N	N	2B.3	5A	N	na	N	Dismiss. Along coast outside of IIA.

Table 3.4-2. Species identified or with habitat within 1/2-mile buffer on KRRBI centerline (continued)

Species Code	Common Name	Scientific Name	Global Rank	State Rank	FESA	CESA	CA	CNDDB Segments present	Likely Habitat in DIA	Likely Habitat in IIA	Possible adverse impact	Comment
SATR	Tracy's sanicle	*Sanicula tracyi*	G4	S4	N	N	4.2	3	N	na	N	No impact. 1929 record in Wiregrass area along Bald Hills Rd.
SIMA	Siskiyou checkerbloom	*Sidalcea malviflora patula*	G5T2	S2	N	N	1B.2	3, 4, historic south of 5	Y	na	M	Roadcut rare species. Avoid road cut during installation.
SIOR	Coast checkerbloom	*Sidalcea oregana eximia*	G4G5	S3	N	N	2B.2	1	Y	na	M	Roadcut rare species. Avoid road cut during installation.
THRO	Robust false lupine	*Thermopsis robusta*	G2	S2	N	N	1B.2	2	Y	na	Y	Project will not provide additional impact over routine road maintenance.
TRCY	Cylindrical trichodon	*Trichodon cylindricus*	G4	S2	N	N	2B.2	5A	Y	na	Y	Roadcut rare species found near 5A between Trinidad and PP State Pk along 101 N of Big Lagoon. Avoid road cut during installation.
VIPA	Alpine marsh violet	*Viola palustris*	G5	S1S2	N	N	2B.2	5A	N	na	N	Big Lagoon Rancheria area. Wet areas will be avoided by overhead installation or directional drilling.

3.4.3 CEQA Checklist Criteria for Potential Impacts

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 Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

3.4.4 Analysis of Potential Impact

3.4.4.1 Habitat and Vegetation

The Project will not adversely affect wetlands or other aquatic habitats because it will avoid impacts to those habitats through overhead installation, bridge hanging, or directional drilling. The Project will not adversely affect terrestrial habitats because it will be installed in or along existing roads that do not contribute to those habitats. Vegetation removal for fiber optic installation will mimic or replicate the periodic removal conducted by road maintenance crews on state highways and county roads. Vegetation that thrives along roadsides readily recolonizes disturbed areas and no long-term adverse effects are anticipated.

Installation of the hut and tower at Antenna Ridge will not disturb vegetation because it will be conducted on rock.

Roadsides are also typically weed-infested. EPMs WEED-1, WEED-2, and WEED-3 all help prevent the spread of weeds from one area to another and avoid introducing new weeds with the construction equipment, while EPM REC-1 requires full cleanup after construction. These measures will avoid the introduction of new weed species and will limit the spread of existing species.

The Project plans to avoid all wetlands by either overhead installation on existing or new poles, by bridge hangs over aquatic habitats, or by directionally drilling. If any permanent wetland impacts are anticipated, EPMs WET-1 and WET-2 would apply. These measures require the Project to conduct wetland delineations and to develop site-specific crossing plans and measures to mitigate impacts where appropriate, and specifies that the Karuk Tribe will obtain all needed permits prior to construction in wetlands.

3.4.4.2 Animals

This Project will not affect individuals or lead towards Federal or state listing or loss of viability of these species. In general, the Project will avoid adverse impacts on animal species by installation in or along roads, which most species avoid or are habituated to. EPM BIO-1 will protect the nests of migratory birds if they are found in vegetation planned for removal during breeding season with a preconstruction survey and avoidance of vegetation removal until the birds have fledged their young. This measure protects all migratory birds, including those in Table 3.4-2, above, such as yellow-breasted chat or yellow warbler. Therefore there will be no adverse impacts on any migratory birds.

There are several species where the indirect effects of noise could be an adverse effect if construction were to be conducted during breeding season and nesting birds were to be present within audible range of the construction. Those species are shown in Table 3.4-2 as needing the additional avoidance mechanism of limited operating seasons. EPM BIO-2 specifies that limited operating periods imposed by RNP and GDR to protect bird species, especially marbled murrelets and NSO, will be followed. Although there are no known active NSO nests within ¼ mile of the Project, including Yurok Signal Connection, EPM BIO-3 specifies that data acquired by routine NSO surveys (conducted by land managing agencies and companies) from the season prior to construction will be examined to determine if new NSO nests have been established within ¼-mile of the Project centerline or ancillary facilities. If so, the nests will be buffered by ¼ mile and no disturbance will be allowed until the young have fledged or the nest is abandoned.

The wetland area along Redwood Creek at the intersection of Bald Hills Road and Highway 101 will be avoided by a directional drill, thus protecting nesting birds (including listed species) from adverse effects of noise if any are present there (EPM G-4).

While it is unlikely that any bats roost under the various bridges proposed for bridge hangs, EPM BIO-5 specifies a pre-construction survey for listed species of bats under the bridges. If there are maternal colonies of any bat species, the bridge hang will not be conducted until after the young have been weaned.

Listed water-dependent species, including fish, invertebrates, amphibians, and reptiles not present in the DIA will be protected from the adverse effects of sedimentation by control of

erosion and sedimentation (WATER-2). See Section 3.8.1.1 for further discussion of control of erosion and sedimentation.

3.4.4.3 Plants

The Project would have virtually no impact on vegetation, and one of the Project EPMs is to limit vegetation removal to the minimum necessary to allow for safe and complete installation (SOIL-1). Where the fiber optic cable will be installed overhead on existing poles, the existing utilities periodically trim overhanging or intruding vegetation to avoid power or communication outages during winter storms or tree failures. In order to install an additional cable on these poles, some trimming would be necessary for worker safety during installation. Further maintenance trimming would be handled by PG&E or Frontier as needed. Where the fiber optic cable will be installed on new overhead poles to avoid impacts to wetlands, some overhanging or intruding vegetation will be trimmed to avoid damaging the fiber optic line during winter storms. Vegetation will be cleared in an area about 3 feet in diameter to install the poles.

Where the fiber optic line will be installed in the road shoulder or ditch, some vegetation will be removed. This vegetation is also annually mowed or dug out of the ditches to maintain the integrity of the road drainage system on state highways (Highway 96, 169, and 101) and periodically removed from the ditches for the same reason on Humboldt county roads. Installation of the fiber optic cable will disturb the roadside vegetation in much the same way as routine road maintenance. The Karuk Tribe anticipates that the vegetation common to the roadside ditches will rapidly recolonize the installation area as it does after ditch maintenance.

Damage to old-growth redwood roots will be avoided by directionally drilling beneath them where needed within RNP (BIO-4). Redwood tree roots are relatively shallow, but extend horizontally from the tree many feet. Where specified by RNP staff, the project will be designed to directionally drill at least 6 feet or the distance specified by the RNP staff, where feasible, below the roots of specific old-growth redwoods that are found immediately adjacent to Bald Hills Road in the last two miles before its intersection with Highway 101. Listed wetland plants will be avoided by avoiding permanent impacts to wetlands (G-5) or by a specific plan for wetland restoration after construction (WET-2). Roadside rare species will be avoided by installation method if they are road-cut species. For species that may be found in ditches, the installation method is no different from routine ditch and road maintenance that has occurred and will continue to occur in these areas. If the species has recolonized after road maintenance, it will also recolonize after fiber optic cable installation.

For the installation of the tower, pasture vegetation may be permanently removed if the tower is placed in pastureland. Pasture vegetation is introduced grasses and forbs, including invasive species like Himalaya berry, and provides habitat principally for cattle. The proposed tower location is immediately adjacent to the barn where animals have been corralled in the past and

where substantial vehicle and pedestrian traffic have compacted the soil and reduced the vegetation cover. About one quarter acre of vegetation may be replaced by a leveled graveled yard containing the tower, the hut, and a small parking area as well as the propane tank and generator. The pasture vegetation impact will be minimized by restricting the fenced area to the minimum needed for the tower. The removal of this small area, already outside the area managed for pasture, will have negligible impact on the larger pasture area.

3.5 Cultural Resources and Tribal Cultural Resources

3.5.1 Regulatory Setting

The Karuk and Yurok Tribes are proposing this Project within their respective ancestral territories with the explicit intent of improving living and working conditions for tribal and nontribal members of the communities in those territories. Each proposed ground-disturbing activity has been reviewed by the Tribes for impacts to cultural resources, including tribal cultural resources, before being proposed as part of this Project Description. For the Tribes, protection of Cultural Resources includes Tribal Cultural Resources as a matter of course and of Tribal policy.

Laws for the protection of cultural resources include federal and state laws. The principal federal law is the National Historic Preservation Act (NHPA).

3.5.1.1 National Historic Preservation Act of 1966, as amended (16 USC 479)

Section 106 of the NHPA established the National Register of Historic Places (NRHP), which is a list of historic properties of National, State, and local significance. Under Section 106, agencies are required to consider the effects of their actions on properties that may be eligible for or are listed in the NRHP.

3.5.1.2 National Environmental Policy Act

The National Environmental Policy Act of 1969, as amended, requires analysis of potential environmental impacts to important historic, cultural, and natural aspects of our national heritage (United State Code, section 4321, *et seq*.; 40 Code of Federal Regulations, section 1502.25).

3.5.1.3 California Environmental Quality Act

The California Environmental Quality Act of 1970, as amended, requires analysis of potential environmental impacts to historical resources, which includes prehistoric and historic resources. "A project with an effect 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. (14 CCR 15064.5 (b)." AB 52 recently added Tribal Historical Resources to resources required for consideration.

3.5.2 Environmental Setting

3.5.2.1 Area of Potential Effect

Study Area

The study area for the purposes of literature review, identification of previous surveys and recorded sites, and review of the Tribal databases, includes lands comprising the immediate project area and adjacent areas to a distance of one-half mile on either side of the centerline of the KRRBI Proposed Route and one-half mile on either side of the Alternative alignments (termed Study area). The study area also includes a half-mile radius circle around components of the Yurok Signal Connection.

Area of Potential Effect (APE) for Direct Effects

The APE, and therefore the survey width, varies depending on install method and is intended to define the area of pedestrian survey, where recent satisfactory prior surveys have not been conducted:

- Install on existing poles: a circle 10 meters (m) in radius centered on the pole.
- Install on new poles: survey a 20-m circle around the existing poles that support the existing overhead crossing, because new poles will be installed immediately adjacent.
- Underground install (trenching, plowing, or directional drill): The equipment and field personnel will be restricted to the road shoulder itself. There will be no disturbance beyond the shoulder or ditch. Trenching will be to a depth of 42" below the bottom of the ditch and directional drilling will be at least 12" and up to 36" below resource concerns like culverts. This possible disturbance area is entirely encompassed by a 10-m swath from the edge of the traveled roadway (edge of pavement where road is paved, edge of gravel or other surface where road is not paved). Pedestrian survey will be conducted on both sides of the road.
- Bridge hang: Survey a 10-m wide circle centered on the bridge abutment or bridge anchor point where terrain permits (35% slope or gentler) on each side of the bridge.
- Antenna Ridge, Yurok Signal Connection: 20m diameter circle centered on the existing antennas.

APE for Indirect Effects

In order to provide for adequate consideration and evaluation of the indirect auditory and visual impacts that could occur during construction and the possible indirect visual impacts from standard utility markers used to indicate underground installations, an APE for indirect effects of one half mile on either side of the centerline of the project will be used where known resources require such consideration. This will include areas within Redwood National Park

and other areas that may be considered based on the results of the literature review and tribal consultation. Pedestrian surveys will be confined to the direct APE.

3.5.2.2 Cultural Resources Records Search

The cultural resources research and field studies were divided into those conducted by the Karuk Tribe in Karuk ancestral territory and those authorized by the Yurok Tribe in Yurok ancestral territory. For the purposes of this project alone, and without making any claims for either tribe, the area included in the Karuk ancestral territory study includes all of Segment 1 from Orleans to MP 26.5 on Highway 96, about 12.5 miles southwest of Orleans. The area included in the Yurok ancestral territory study includes a portion of Segment 1, starting at MP 29.9 on Highway 96, about 8 miles downriver of Orleans, and all of Segments 2 through 5.

This joint responsibility was negotiated between the Tribes for the purposes of this project only on July 15th, 2015. Historically, there were various people from different language groups living along the Klamath River between the modern Orleans and Weitchpec. Ethnographic sources indicate that there were five languages spoken by people resident in that stretch. In the years before Euro-American settlers came, there were some places that were exclusively Yurok, and some that were exclusively Karuk. The shared interest area has been designated to take into account this variety.

The cultural resources pre-field research was limited to the Study Area as defined above of about ½ mile on either side of the proposed centerline for Segments 1-5, for Alternative 5A, and to an area of a ½-mile radius around Orleans Mountain and Antenna Ridge for the Yurok Signal Connection component. The objective of the records search was to identify any previously documented resources within the Study Area to determine the nature and type of each listed resource and to understand its most recently documented condition.

Karuk Ancestral Territory

Records searches were conducted at the Northwest Information Center (NWIC) at Sonoma State University in Rohnert Park, CA. on December 10, 2015 and December 14, 2016. A search was also conducted at the Heritage Resources Center, Six Rivers National Forest, for records pertaining to areas of National Forest along Segment 1. A record search was conducted at the CalTrans District 1 office in Eureka on May 16, 2017. The Karuk Tribe also maintains a comprehensive and confidential database of cultural resource information that was consulted as well.

Yurok Ancestral Territory

The Yurok Ancestral Territory records search was initially conducted at the NWIC on May 5, 2017 (IC File # 16-1505) and October 20, 2017 (IC File # 17-1200). This search included the southern portion of Segment 1, starting at MP 26.5 on Highway 96, about 8 miles downriver of Orleans, and all of Segments 2, 3, 4, 5 and 5A. The NWIC provided all information on file

regarding pre-contact and historic-era resources found within the Study Area. The search results also included cultural resource investigation reports that were conducted within the Study Area.

The Yurok Ancestral Territory records search area passes through private land as well as public land managed by the NPS, USFS, the BLM and the California Department of Parks and Recreation (DPR). In order to conduct a comprehensive record search, all information on file regarding pre-contact and historic-era resources found within the Segment 1, 2, 3, 4, 5 and Alternative 5A APEs, as they pass through these various public lands, was requested from the above listed agencies. Additionally, the Yurok Tribe maintains a comprehensive and confidential database of cultural resource information that was consulted as well.

Data was requested from NPS on August 18, 2016 and delivered to the Yurok Tribe's Cultural Resources department on October 28, 2016. Mr. William Rich made an additional inquiry that was answered October 24, 2017 for Segments 3, 4, 5 and 5A. Mr. William Rich requested data from the USFS and the BLM on October 17, 2017 that covered a small portion of Segment 1. Mr. William Rich also requested data from the California DPR on August 7, 2017 for Segments 5 and 5A. The search of the Yurok Tribe's database of cultural resource information on June 16, 2017 and October 25, 2017 included all of Segment 2, and portions of Segment 3.

3.5.2.3 Records Search Results

Table C-1, Appendix C, summarizes the records search results. Eligibility information is supplied for properties in the direct APE only. Note that where eligibility has not been determined or recommended, the Karuk Tribe will assume eligibility and avoid the sites where feasible. Table C-2, Appendix C, summarizes the studies that have been conducted in the Study Area. These two tables are public information, while the rest of Appendix C is confidential to protect sensitive information. Further details are supplied by ancestral territory and by segment in the following text.

Karuk Ancestral Territory

Segment 1 (North)

The records search shows that at least 16 technical studies have been conducted in the Study Area from the 1950s to date. Of those studies, 6 include a portion of the APE, of which none was conducted in the last 5 years. The results of the records search identified 21 sites in the Record Search Study Area, of which 6 were located in the APE. None is from the prehistoric period, 6 are historic-period, and 0 are multi-component sites. None of the 6 sites previously identified within the APE have been evaluated for eligibility for listing in the NRHP.

Yurok Signal Connection

A visit was made to the Northwest Information Center on December 14th 2016, to gain more information about archaeological sites and other historic properties not previously known, and

also to investigate potential viewshed impacts. In view of these concerns, the radius for information was set at three miles (ca. 4830 m). In addition, Tribal documents were consulted to see if there were anticipated impacts to any ceremonial activities.

No cultural resources were found in the immediate work area. A number of sites were found within this larger radius of investigation. These included one historic site (Orleans Mountain Lookout), one historic trail, and five sites with prehistoric components. In addition to these, there were four longer archaeological studies that applied to some part of this wider circle. These studies included some extra information from interviews, but did not yield any additional sites besides the ones noted. All of the prehistoric-era sites were considered to be outside of any potential impact area for the work on Antenna Ridge.

Segment 1 Spur to DNR

Previous records searches and ethnographic information were presented at the December 2016 meeting, which demonstrated that the project was in a generally sensitive area. The project area occurred within the "Karok Panamenik World Renewal District", which was found eligible for the National Register of Historic Places in 1978. There were three documented archaeological sites nearby, and three archaeological studies were consulted that discussed the documented sites in the area. Of these sites, two are located on the west side of the river, and one is located on the east side. The two sites located on the west side are located a considerable distance from the potential APE of the pole replacement work, although they are within the standard half mile radius. There is one site on the east side of the river. It is a known and documented site, and in view of the ethnographic evidence surrounding it, it is possible that the new pole location is within that site.

Yurok Ancestral Territory

Segment 1 (South)

NWIC Search: The NWIC records search revealed seventeen technical studies on file that have been conducted within the Segment 1 (south) Study Area from the 1950s to the present. Of those studies, seven included portions of the APE, one of which was conducted in the last five years. The NWIC records search identified one archaeological site, located 0.4 miles southwest of the APE (P-12-001930). No sites have been documented within the direct Segment 1 APE.

USFS Search: On October 25, 2017 Brandy Clarke, Pathways Intern - Archaeologist, responded to the William Rich and Associates (WRA) request for a USFS File Search. Ms. Clarke stated that no cultural resource surveys have been conducted within the vicinity of Segment 1, as it passes through USFS land. Additionally, no resources have been recorded in this area.

BLM Search: On October 25, 2017 Sharyl Kinnear-Ferris, BLM Arcata Field Office Archaeologist, responded to the WRA request for a BLM File Search. Ms. Kinnear-Ferris stated that no cultural resource surveys have been conducted within the vicinity of Segment 1, as it passes through BLM land. Additionally, no resources have been recorded in this area. Ms.

Kinnear-Ferris did state that they do have one survey on file, located immediately north of the BLM parcel. This survey is also on file at the NWIC (IC File #S-15519).

Segment 2

NWIC Search: The NWIC records search revealed eleven technical studies on file that have been conducted within the Segment 2 Study Area from the 1950s to the present. Two of these studies include a portion of the APE, however, neither was conducted in the last five years. The NWIC identified two resources located within the Study Area. One resource is located outside the APE (P-12-001930). The other resource, P-12-002444, is located in the Segment 2 APE.

Yurok Cultural Resource Database Record Search: The Yurok Tribe conducted a records search for the portion of the KRRBI project within the reservation boundary using the confidential Yurok Tribe files. This search indicates that 86 previous surveys have been conducted within the vicinity of the Segment 2 APE. No specific tribal cultural resource sites are known to exist in the area of direct impacts for the proposed project that require further tribal disclosure (Personal Communication, Frankie Joe Meyers, Yurok Tribe THPO, November 15, 2017).

Segment 3

NWIC Search: The NWIC records search revealed 23 technical studies on file that have been conducted within the Segment 3 Study Area from the 1950s to the present. Of those studies, 13 include a portion of the APE, however, none was conducted in the last five years. The NWIC also found seven archaeological sites located within the Segment 3 Study Area. Four of these sites (P-12-000626, P-12-001638, P-12-002329 and P-12-002591) are located within the APE. Of the four sites previously documented, one is a contributor to a Historic District nominated to the NRHP in 2002, one was recommended eligible as a contributor to an Archaeological District and two have been recommended individually eligible through preliminary survey evaluation.

NPS-REDW Record Search: Segment 3 passes through Redwood National Park, along Bald Hills Road, between the park boundary at Schoolhouse Peak (southeast) and Elk Camp (northwest). The Segment 3 record search at NPS-REDW shows that 30 technical studies have been conducted within the Segment 3 Study Area from the 1950s to the present. Of those studies, 21 included a portion of the Segment 3 APE, three of which were conducted in the last five years. Additionally, an historic district, archaeological district, ethnographic landscape, 41 archaeological sites, 47 isolated artifacts and features, and 13 ethnographic resources are located within the Segment 3 Study Area.

The three districts (Lyons Ranches Historic District, Bald Hills Archaeological District, and Bald Hills Ethnographic Landscape) encompass portions of the Segment 3 APE, and 10 of the previously identified sites are located within the APE (P-12-002329, CA-HUM-0442, CA-HUM-0443, CA-HUM-0448, CA-HUM-0452, CA-HUM-0446/H, P-12-000626 (CA-HUM-0625), REDW-2004-06, REDW-2004-07, and P-12-002323 (REDW-2005-02)). Additionally, five of the

ethnographic resources are located within the Segment 3 APE (Childs Hill Area 6; Coyote Peak Area 17; Elk Camp & Logging Community Area 9; Tomlinson Area 11,12,14,23; Women's Rock & Flower Dance Place on Bald Hills). All other resources are located outside of the APE.

Yurok Cultural Resource Database Record Search: The search results of the Yurok Cultural Resource Database included a list of 12 archaeological sites documented within the vicinity of Segment 3. Seven of these sites are located within the Segment 3 APE (CA-HUM-0442, CA-HUM-0443, CA-HUM-0446/H, CA-HUM-448, CA-HUM-0452, CA-HUM-0625 (P-12-000626), and REDW-2004-06).

Segment 4

NWIC Search: The NWIC records search revealed 16 technical studies on file that have been conducted within the Segment 4 Study Area from the 1950s to the present. Of those studies, 11 include a portion of the APE, however, none was conducted in the last five years. The NWIC also found five archaeological sites located within the Segment 4 Study Area. One of these sites (P-12-000255) is located within the APE on both sides of US Highway 101, approximately one mile north of Orick, California.

NPS-REDW Record Search: Segment 4 passes through Redwood National Park along the western portion of Bald Hills Road (between Elk Camp and US Highway 101), and along US Highway 101 from the town of Orick, north approximately 6 miles to Boyes Creek. The Segment 4 record search at REDW, shows that 25 REDW technical studies have been conducted within the Segment 4 Study Area from the 1950s to the present. Of those studies, four include a portion of the Segment 4 APE, however, none were conducted in the last five years.

Redwood National Park also found that one historic district, one archaeological district, one ethnographic landscape, 41 archaeological sites, 47 isolated artifacts and features, and 13 ethnographic resources are located within the Segment 4 Study Area. The three districts (Lyons Ranches Historic District, the Bald Hills Archeological District and the Bald Hills Ethnographic Landscape) encompass portions of the Segment 4 APE, and six of the previously identified sites (CA-HUM-0668, CA-HUM-0669, CRF-BHR-06 (P-12-002329), CRF-BHR-09, Trinidad Trail and Old Redwood Highway) are located within the APE. Additionally, two of the ethnographic resources are located within the Segment 3 APE (Elk Camp & Logging Community Area 9, Gans Area 15).

Of the 11 resources located within the APE, the two districts have been nominated to the NRHP. One of the sites within the APE is listed as an eligible contributor, and another was recommended as a potential contributor through preliminary survey evaluation. The Ethnographic Landscape has been recommended potentially eligible for the NRHP through a preliminary survey evaluation and both of the listed ethnographic resources are considered contributing elements. Lastly, one of the previously identified sites was recommended eligible through a preliminary survey evaluation and three of the sites have not been evaluated.

Segment 5

NWIC Record Search: The NWIC records search revealed 134 technical studies on file that have been conducted within the Segment 5 Study Area from the 1950s to the present. Of those studies, 43 include a portion of the APE, of which ten were conducted in the last five years. The NWIC also found 27 sites and four isolated artifacts and features located within the Study Area. Four of these sites (P-12-001627, P-12-001847, P-12-002189 and P-12-003601) are located within the APE. All are railroad lines from the historic-era and none has been evaluated for NRHP eligibility.

NPS-REDW Record Search: Segment 5 passes through Redwood National Park along Hilton Road, from 0.9 miles southwest of Orick, to McDonald Creek, approximately two miles east of Big Lagoon. The Segment 5 record search at REDW shows that 13 technical studies have been conducted within the Segment 5 Study Area from the 1950s to the present. Of those studies, seven include a portion of the Segment 5 APE, however, none were conducted in the last five years. Four resources are located within the Segment 5 Study Area. Two of these resources (Trinidad Trail (Tall Trees Trail) and Trinidad-Klamath Trail (Yurok Coastal Trail)) are located within the APE. Of the two resources located within the APE, one has been recommended eligible for the NRHP, and one has not been evaluated.

Alternative 5A

NWIC Record Search: The NWIC records search of Alternative 5A lists 194 technical studies on file that have been conducted within the Alternative 5A Study Area from the 1950s to the present. Of those studies, 26 include a portion of the APE, one of which was conducted in the last five years. The NWIC also found 40 resources and 13 isolated artifacts and features located within the Alternative 5A Study Area. Two of these sites (P-12-001278 and P-12-001627) are located within the APE, however neither has been evaluated for NRHP eligibility.

NPS-REDW Record Search: Alternative 5A passes through Redwood National Park along U.S. Highway 101 between Orick CA, and Big Lagoon. The Alternative 5A record search at REDW shows that 12 technical studies have been conducted within the Alternative 5A Study Area from the 1950s to the present. Of those studies, five include a portion of the Alternative 5A APE; however, none were conducted in the last five years. REDW also found five cultural resources located within the Alternative 5A Study Area. Three of these resources (Trinidad Trail (Tall Trees Trail), Trinidad-Klamath Trail (Yurok Coastal Trail) and Redwood Highway) are located within the APE. Of the three resources located within the APE, one has been recommended eligible for the NRHP, and two have not been evaluated.

3.5.2.4 General Prehistory and Ethnohistorical Setting

Karuk

The Karuk Tribe has over 3,000 members currently; and according to Kroeber's estimates in 1925, the population was also over 3,000 when Euro-Americans first arrived in numbers in 1850.

Although removals and massacres followed, Kroeber estimated that nevertheless, the population never fell below 775, the figure in 1910. The Karuk are aboriginal, and have always lived in this land. It is to be expected that there is much evidence of their habitation and lifeways within this territory. L. L. Kidder wrote a diary of his arrival in this land in March 1850 (excerpted in *Siskiyou Pioneer 2* (1979)) and described his experience with the Native people:

"Up to the time we arrived at the Klamath River [along a mountain trail from Trinidad towards mine works on the Salmon River] we had not seen any Indians, but now they were very numerous and there was a large village of them at the ferry. They were the best looking and most intelligent looking Indians we had met in the state, and, the whites having never mingled with them, they seemed very friendly and came around and endeavored to learn our language. … They lived in quite good houses, which we had never seen Indians do before, they having so much beautiful and free splitting timber that they could split out planks nearly as nicely as they could be sawed."

The Karuk at that time lived in more than a hundred villages sited along the Klamath River and tributaries. Of these, twelve (Bright villages #106-117) lie close to the river between Orleans and Aikens Creek. Of these, three have been surveyed thoroughly: at Aikens Creek, Red Cap Bar, and opposite Savorum Mountain. The exact locations of these and other Tribal resources are confidential, and kept at the Karuk THPO office. In general, a village site would be likely to contain house pits, with middens, burials and other features within the vicinity. Furthermore, these villages form a nexus for trails, gathering areas, and spiritual areas.

Table 3.5-1, below, shows the names of some of the Karuk villages in the project area.

Table 3.5-1. Karuk Village sites (related 1959 by Lottie Beck) -downriver from Panamnik

Village Number (Beck / Bright)	Village name	Name translation (Ferrara)
102	**panámni'ik**	"the flat place"? (Orleans)
103	**chiivníshshukach**	"little peeking out"
104	**káttiphirak**	"mugwort plant place"? (Ferris Ranch)
105	**ukram'íppan**	"pond end"
106	**tishánni'ik**	(none) (@Camp Creek)
107	**kusripish'amáyav**	"delicious madrone berries"
108	**afchúufich**	"little shit creek" (Crawford Creek)
109	**tûuyvuk**	(uncertain) (@ Ullathorne Creek)
110	**sahvúrum**	"toward the river" + ? (@ Boyce Creek)
111	**vuunvárak**	"flowing down from upriver" (Nancy's Elbow)
112	**ikchúnna'am**	"grinding place"
113	**ahcha'íppanach**	? + "little top"
114	**vúppam**	(none) (opposite mouth of Red Cap Creek)
115	**ishrámma'an**	"behind a deer-lick" (@ Slate Creek)
116	**iníinach**	"little crossing" (@ old mouth of Bluff Creek)
117	**ishpúutach**	(none) (Old Bluff Creek campground)

Yurok

Yurok people have lived in Northwestern California along the Redwood Coast and the Klamath River since Noohl Hee-Kon (time immemorial). Traditionally Yurok people living on the upper region of the Klamath River are Pe-cheek-lah, lower region of the Klamath River Puelik-lah, and the coast, Ner-er-ner. Oohl, translates to mean Indian people, describes Yurok people together. The name Yurok comes from the Karuk word for "downriver", which is the most widely used word to describe the Tribe and people.

There are more than 70 known villages within the ancestral territory, most of which are situated along the Klamath River and along the Pacific Coast[21]. Table 3.5-2, below, shows the names of the Yurok villages in the Project Area based on Waterman (1920) and on Gates[22].

Table 3.5-2. Yurok Village Locations

Waterman survey		Thomas Gates Survey	
Village Name	**Location**	**Village Name**	**Location**
Weitspus	the village that preceded the modern-day community of Weitchpec (Waterman 1993:Rectangle G)	Wecpus	at the later site of Weitchpec
			A river trail crossing from the northeast side of the Klamath to the southwest side about 0.4 mile downriver from the mouth of Pine Creek
Wahsek	located on the northeast side of the Klamath about 0.5 mile downriver from Martin's Ferry and shown as having no trail connection (Waterman 1993: Rectangle F).	Wahsek^{w}	reached by the northeast side trail, which stops here
		Tsetskwi	on the northeast side of the river just above Rube Creek, reached by the downriver trail, which recrossed the Klamath here
Aukweya	about 2.0 miles downriver from Otsap	Okweya	between Rube Creek and Miner's Creek
Merip	about 2.0 miles downriver from Aukweya	Merip	between Chqui Creek and Mawah Creek
Waase	about 0.8 mile downriver from Merip	Wa?aey	just downriver from Mareep Creek
Murek	about 2.5 miles downriver from Waase	Murek	0.3 mile downriver from Cappel Creek
Himel	about 0.6 mile downriver from Murek (Waterman 1993: Rectangle E)	Himet	about 0.6 mile downstream from Murek
		Wr?rgr	about 3 miles downriver from Himet
		Sregon	about halfway between Tsokik Creek and Knulthkarn Creek
Pekwan	just downriver from the mouth of Pekwan Creek	Pek^{w}on	just downstream from Pecwan Creek
Qootep	about 0.5 mile downriver from Pekwan	Kotep	about 0.5 mile downstream from Pekwon
Woxtek	about 0.5 mile downriver from Quootep		

[21] T.T. Waterman 1993 [1920] Yurok Geography. Trinidad, CA: Trinidad Museum Society.
[22] Thomas Gates. 1993. Ph.D. Dissertation, Humboldt State University.

Woxhkero	about 0.2 mile downstream from Woxtek (Waterman 1993: Rectangle D).		

Within each village, houses were constructed primarily of redwood and each house had a name. Families and descendants are associated with these specific house names (Waterman 1920: 208). Families and/or houses within villages owned specific resource gathering areas such as fishing holes, acorn-gathering spots, trapping areas, and hunting locations. Glen Moore Sr. who was from the village of Srey-gon explained in an interview in 1996 that, "most Indian people had fishing spots, they have the right to fish. Sometimes its [fishing hole] is handed down through relations. You can give a fishing place to someone else". The sweathouse is another structure found within each village. Men typically did not spend the night in family houses; instead they stayed in the sweathouse. The sweathouse was also used for ceremonial purposes such as purification before hunting or ceremonies.

Yurok villages situated along river and coastal lines tend to be located near resource gathering areas such as good fishing access or coastal gathering sites. River villages tend to be on ancient river terraces and decrease in elevation the further down river they are, providing easy access to fishing holes along the Klamath. Coastal villages are situated along lagoons or mouths of rivers, adding additional food resources to ones provided by the ocean. The mountain areas above the water areas were mostly used for gathering and hunting (Waterman 1920: 183, Bearss 1969[23]).

An elaborate trail system exists connecting villages, prayer sites and gathering areas (Waterman 1920). Trails were to be treated with respect and travelers are to stay within the trail (Waterman 1920:185). Many of the traditional trail systems are still in use today as many of our current Highways and arterial routes lay on top of the old trails including Hwy 169 and Bald Hills Road.

The river is vital part of Yurok life providing food resources such as salmon, sturgeon, eel and other fish. Gill nets, dip nets, weirs, basket traps, and hooks are used to obtain fish from the River. On the coast, many species are harvested for consumption including mussels, clams, seaweed, and many other resources. The primary game for hunting is deer and elk, but other smaller animals are also eaten. The other primary food source for the Yurok is acorns. Acorn gathering grounds and camps are found throughout the mountains and prairies in Yurok territory. Acorns are processed into a mush, which is cooked in large baskets with hot stones.

3.5.2.5 General Post-Contact History of the Project Area

While the first Europeans arrived by boat along the coast starting as early as the late 1700s in the fur trade, the explosion of Euro-American settlers started with the discovery of gold in 1849

[23] Bearss, Edwin C. *History Basic Data: Redwood National Park, Del Norte and Humboldt Counties, California*. US Department of the Interior, National Park Service, Division of History, Office of Archeology and Historic Preservation, 1969.

and the invasion of gold miners starting in 1850. Gold miners made their way into the project area in the early 1850s.

The early settlers of Orleans had a complicated relationship with the local Karuk population. As miners and other settlers moved into the region, the riverine ecology that the Karuk depended on became impacted by over hunting, build-up of sediments in the water, and marked increase of human population. Early settlers like William Reece, John Pearch, Grant Hillman, and Alma Allen took Native American wives. Their children were prominent members of the community of Orleans that grew around these early miners and farmers; their descendants became prominent members of the Karuk tribe in the area. Local Karuk are often listed on the early census sheets as laborers, miners, and fishermen (North State Resources 2013).

Yurok did not experience non-Indian exploration until much later than other tribal groups in California and the United States. One of the first documented visits in the local area was by the Spanish in the 1500s. When Spanish explorers Don Bruno de Heceta and Juan Francisco de la Bodega y Cuadra arrived in the early 1700s, they intruded upon the people of *Chue-rey village*, which is now considered the City of Trinidad. This visit resulted in Bodega laying claim by mounting a cross at Trinidad Head.

In the early 1800s, the first American ship visited the area of Trinidad and Big Lagoon. Initially, the Americans traded for sea otter fur with the coastal people. However, for unknown reasons tensions grew and the American expedition was cut short. The expeditions increased over the next few years and resulted in a dramatic decrease of otters in the area.

By 1828, the area was gaining attention because of the reports back from the American expeditions, despite the news that the local terrain was rough. The most well-known trapping expedition of this era was led by Jedediah Smith. Smith guided a team of trappers through the local area, coming down through the Yurok village of *Kep'-el*, crossing over Bald Hills and eventually making their way to the villages of *O men* and *O men hee-puer* on the coast. Smith's expedition, though brief, was influential to all other trappers and explorers. The reports from Smith's expedition resulted in more trappers exploring the area and eventually leading to an increase in non-Indian settlement.

By 1849, settlers were quickly moving into Northern California because of the discovery of gold at Gold Bluffs near present day Orick and Orleans on the Klamath River. Yurok and settlers traded goods and Yurok assisted with transporting items via dugout canoe. However, this relationship quickly changed as more settlers moved into the area and demonstrated hostility toward Indian people. With the surge of settlers, moving in the government was pressured to change laws to better protect the Yurok from loss of land and assault. The rough terrain of the local area did not deter settlers in their pursuit of gold. They moved through the area and encountered camps of Indian people. Hostility from both sides caused much bloodshed and loss of life.

The gold mining expeditions resulted in the destruction of villages, loss of life and a culture severely fragmented. By the end of the gold rush era at least 75% of the Yurok people died due to massacres and disease, while other tribes in California saw a 95% loss of life. While miners established camps along the Klamath and Trinity Rivers, the federal government worked toward finding a solution to the conflicts, which dramatically increased as each new settlement was established.

The government sent Indian agent Redick McKee to initiate treaty negotiations. Initially, local tribes were resistant to come together, some outright opposed meeting with the agent. The treaties negotiated by McKee were sent to Congress, which was inundated with complaints from settlers claiming the Indians were receiving an excess of valuable land and resources. The Congress rejected the treaties and failed to notify the tribes of this decision. In 1855, a group of "vigilante" Indians (who were known as Red Cap Indians) initiated a revolt against settlers.

The Federal Government established the Yurok Reservation in 1855 and immediately Yurok people were confined to the area. The Reservation was considerably smaller than the Yurok original ancestral territory. This presented a hardship for Yurok families who traditionally lived in villages along the Klamath River and northern Pacific coastline. When Fort Terwer was established many Yurok families were relocated and forced to learn farming and the English language.

In January 1862, the Fort was washed away by flood waters, along with the Indian agency at *Wau-kell flat*. Several Yurok people were relocated to the newly established Reservation in Smith River that same year. However, the Smith River Reservation was closed in July 1867. Once the Hoopa Valley Reservation was established many Yurok people were sent to live there, as were the Mad River, Eel River and Tolowa Indians.

In the years following the opening of the Hoopa Valley Reservation, several squatters on the Yurok Reservation continued to farm and fish in the Klamath River. The government's response was to use military force in order to try to evict squatters. Many squatters did not vacate and waited for military intervention, which was slow to come. In the interim, the squatters pursued other avenues to acquire land.

The Fort and Agency were built from redwood, which was an abundant resource and culturally significant to Yurok. Non-Indians pursued the timber industry and hired local Indian men to work in the up and coming mills on the Reservation. This industry went through cycles of success, and was largely dependent on the needs of the nation. At the time, logging practices were unregulated and resulted in the contamination of the Klamath River, depletion of the salmon population and destruction of Yurok village sites and sacred areas.

Western education was imposed on Yurok children beginning in the late 1850s at Fort Terwer and at the Agency Office at *Wauk-ell.* This form of education continued until the 1860s when the Fort and Agency were washed away. Yurok children, sent to live at the Hoopa Valley

Reservation, continued to be taught by missionaries. The goal of the missionary style of teaching was to eliminate the continued use of cultural and religious teachings that Indian children's families taught. Children were abused by missionaries for using the Yurok language and observing cultural and ceremonial traditions.

In the late 1800s children were removed from the Reservation to Chemawa in Oregon and Sherman Institute in Riverside, California. Today, many elders look back on this period in time as a horrifying experience because they lost their connection to their families, and their culture.

Many were not able to learn the Yurok language and did not participate in ceremonies for fear of violence being brought against them by non-Indians. Some elders went to great lengths to escape from the schools, traveling hundreds of miles to return home to their families. They lived with the constant fear of being caught and returned to the school. Families often hid their children when they saw government officials.

Humboldt County, organized in 1853, was named after Baron Alexander von Humboldt, scientist and traveler. The community of Orleans is located in a portion of Humboldt County that was a part of the disestablished Klamath County, formed in 1851 and later disbanded in 1874 (Hoover et al 2002:101). Eureka was granted a town charter in 1856 and has been the county seat since then.

Many miners of both Euro-American and Chinese ancestry located and mined in Orleans. Commercial activity promptly developed around the mining activity, including stores, pack trains, restaurants, bars, and at least one hotel in the Project Area, principally in Orleans and Weitchpec. The Bald Hills route was used extensively for packtrains as was the route that has become Highway 96 from Willow Creek to Orleans.

As gold mining died out in the early 1900s in the Project Area, there was limited commercial extraction of timber outside of the redwood zone, though redwood logging had started in the 1850s in the Eureka area and continues to the present. Redwood logging continues near Segments 3, 4 and 5 and Alternative 5A. Douglas-fir logging became prevalent with the improvement of saws and the invention of plywood during and after WWII. Non-redwood logging, managed by the USDA Forest Service on National Forest System lands, was big business in the Project Area, including Segments 1-3, from 1950s to the mid-1990s. As during the mining boom, commercial businesses supporting the logging industry were established in the Project Area, including logging companies, trucking companies, and various sawmills large and small. A veneer mill, producing the veneer needed to make plywood, was active in Orleans from 1955 to 1974.

Logging continues on private lands in and near the Project Area, but has been largely curtailed on National Forest since the 1990s. Beginning in the 1960s in small, hidden patches, often on National Forest, marijuana (cannabis) cultivation and sale became an increasingly large part of the informal economy in the area.

3.5.2.6 Roads and Highway Development

Highway 96 (Segments 1 and 2)

Highway 96, originally designated Highway 46 from Weitchpec to Orleans, was developed following ancient trails that ran up the Klamath River from Weitchpec. The Orleans section of the highway was graded, oiled, and paved in 1933. In the 1950s, the Division of Highways partnered for funds with the Forest Service and the Department of Interior to improve and straighten roads: the first of these contracts in the State was the straight section of highway to the north of Hoopa. Likewise, the section from Weitchpec to the Fish Lake Road was completed in 1952. Curve corrections were completed in 1954. For the most part, the alignment of Highway 96 today between Weitchpec and Orleans represents this same alignment established in 1954.

Following the 1955 flood, repair work was required. The Aikens Creek, Bluff Creek, and Slate Creek bridges were replaced in 1960-1962 using emergency and partnership funds and the road was largely widened to two lanes at that time. The 1964 flood event, which caused widespread devastation across Humboldt County and in particular to Orleans, took out the section of highway north of Slate Creek, past Big Bar to the "gorge" section, damaged a portion of the road from Ullathorne to Camp Creek, and eliminated the bridge over the Klamath River at Weitchpec and at Orleans. Work to replace and improve the highway was completed in 1967.

Caltrans provides a full-time crew and maintenance yard in Orleans and also conducts contract work annually on Highway 96 from Orleans to Weitchpec on upgrading guardrails, replacing culverts, and other ground-disturbing activities. In 2017, for example, segments of guardrail were replaced and several culverts were replaced in the project area by cutting across the highway, digging up the old culverts, and placing new culverts.

Highway 169 (Segment 2)

Like Highway 96, this highway follows ancient trails along the Klamath River. As means of transportation changed in the 1800s, the trail from Weitchpec to the coast gradually changed to a wagon road and then to an automobile road. Today the highway officially travels from its intersection with Highway 96 southwest and dead-ends at Wautec (known as Johnsons on the highway map) but it was originally planned to connect to the coast through Klamath Glen, where there is still a stub of Highway 169. The Weitchpec-Wautec stretch of Highway 169 is paved and single-lane most of the distance with variably spaced turnouts and wider stretches.

Highway 101 (Segments 4 and 5 and Alternative 5A)

Highway 101 has followed various alignments, all very near the coast, in the Project Area, from its initial construction as a wagon road roughly following ancient Yurok coastal trails in the late 1800s to its current configuration as a 2 to 4-lane paved highway with portions of restricted access (freeway). It is designated as the Redwood Highway from Marin County north to the state line. In the project area, its alignment was changed from the east side of Freshwater

Lagoon (now a county road called Old State Highway) to its current alignment between the lagoon and the Pacific Ocean.

3.5.3 CEQA Checklist Criteria for Potential Impacts

V. 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 as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	☒
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
d) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☐	☐	☒
Tribal Cultural Resources: Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☐	☐	☒
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	☒

3.5.4 Analysis of Potential Impact

Further Section 106 compliance efforts, including evaluation, assessment of Project effects, and incorporation of mitigation, will be undertaken concurrently with the review of this document and the completion of the NEPA/CEQA analysis. The Karuk Tribe anticipates that micro-siting and change of project design can successfully avoid impacts to cultural resources from the construction and operation of the KRRBI project. The Project will take several measures as part of the Project to avoid impacts to cultural resources, including but not limited to historic properties.

Qualified archeologists will perform all cultural resources work with trained assistants (EPM CR-1).

An Inadvertent Discovery Plan will be prepared. This plan will specify what steps will be taken if a subsurface cultural resource is discovered during construction, including stopping construction in the vicinity of the find, notification of the appropriate land management agency,

identification of a qualified archaeologist to conduct an evaluation of the find, and the development of an approved data recovery program or other mitigation measures (EPM CR-2).

Avoidance areas will be flagged or otherwise marked prior to construction activities. Flagging or other marking will be removed once construction is completed in an area (EPM CR-3).

To minimize unauthorized collecting of archaeological material or vandalism to known archaeological sites, all workers will attend mandatory training on the significance of cultural resources and the relevant federal regulations intended to protect these resources (EPM CR-4).

If human remains are discovered, construction will be halted, and the coroner will be notified. Measures specified in the Native American Graves Protection and Repatriation Act (NAGPRA) regulations will be followed on federal lands (EPM CR-5).

The Karuk Tribe will supply Native American Monitors in the Karuk Ancestral Territory, and the Yurok Tribe will supply Native American Monitors in the Yurok Ancestral Territory. Where ancestral territories are mapped as overlapping, monitors from both tribes will work in tandem (EPM CR-6).

Where depth of archaeological resources in highly sensitive areas can be known or assumed, directional drilling may be required by land managing agencies to avoid cultural resources. Directional drilling depths should be two feet below known maximum depth of cultural resources. If fractured bedrock must be drilled, preventing the inadvertent release of drilling fluids (inert clays and water) cannot be guaranteed. (EPM CR-7).

3.6 Geology, Soils, Minerals, and Energy Resources

3.6.1 Regulatory Setting

The Alquist-Priolo Earthquake Fault zoning Act (1972) and the Seismic Hazards Mapping Act (1990) direct the State Geologist to delineate regulatory "Zones of Required Investigation" to reduce the threat to public health and safety and to minimize the loss of life and property posed by earthquake-triggered ground failures. Cities and counties affected by the zones must regulate certain development "Projects" within them.

3.6.2 Environmental Setting

3.6.2.1 Geologic Structure

The Project follows the Klamath River through the Klamath Mountains along Segments 1 and 2, then leaves the Klamath River and crosses over the Coast Range along Segments 3 and 4. Segment 5 proceeds south along the Coastal Plain and into the foothills of the Coast Range before emerging again onto the Coastal Plain north of McKinleyville.

From a geologic perspective, the Project route begins by crossing the Jurassic, largely metamorphic, rock formations of the Western Klamath Terrane in Segment 1 and proceeds westward across the Jurassic and Cretaceous rocks of the Franciscan Complex and related

formations of the Coast Ranges province in Segments 2 through 5. Orleans Mountain is located on diorite/granitic diorite, while Antenna Ridge is formed of metamorphosed sedimentary rocks.

3.6.2.2 Seismicity

Humboldt County contains some areas of seismic activity. One Alquist-Priolo-mapped fault is found along Interstate 5 near the interchange with Main Street in Trinidad. Alternative 5A would cross 0.85 miles of the Trinidad Fault Zone. No other Alquist-Priolo fault zones are found in the Project area and the Project as proposed crosses no Alquist-Priolo fault zone.

Earthquakes over magnitude 3.0 on the Richter scale have occurred near the Project from time to time since 1977[24]. The largest earthquake (5.6 magnitude) occurred 1.7 miles southeast of Segment 3 in 2012. No damage to the Bald Hills Road where the fiber optic cable is proposed was noted at that time,. Several smaller quakes occurred in that same vicinity. The nearest earthquakes to the Project occurred 0.8 miles from Segment 3 (4.9 magnitude in 1990) and 0.8 miles from Segment 1 (3.2 magnitude in 1993).

3.6.2.3 Soils

Locally, the presence of serpentinite and similar rocks and derived soils are an indication of potential instability. The Project follows existing roads and is constrained in its location to the road location. In several places, the roads cross serpentinic features and may exhibit instability.

The Project does not cross areas of expansive soils. The roads followed by the Project cross areas that have been subject to landslides in the past, including road base failures due to land movement. These areas are typically associated with serpentinic soils.

There are no soils present on Orleans Mountain and Antenna Ridge—both are listed as "rock outcrop" in the soils maps and reports.

3.6.2.4 Minerals

The Project area was once a major gold-mining area, but the era of large-scale hydraulic gold mining is gone, leaving areas stripped of topsoil and river bar material and large piles of rock as byproducts of that era. The existing Orleans tower, for example, is located on a bedrock terrace from which over 100 feet of "overburden" was removed in the early 1900s, leaving the bedrock. There is no active commercial mineral extraction in the Project area with the exception of the existing Mercer Fraser gravel quarry east of Trinidad.

[24] USGS. 2016. Earthquake map and database on-line at http://earthquake.usgs.gov/earthquakes . Last accessed 5/21/2016.

3.6.3 CEQA Checklist Criteria for Potential Impacts

GEOLOGY AND SOILS: Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42?	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial 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?	☐	☐	☐	☒
MINERAL RESOURCES: Would the Project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
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?	☐	☐	☐	☒

3.6.4 Analysis of Potential Impact

3.6.4.1 Fiber Optic Cable

No geotechnical study was conducted for the fiber optic cable portion of the project. The Project would not expose people or structures to potential substantial adverse effects from geologic hazards, soil hazards, or interfere with mineral resource availability. Where the fiber optic cable, following existing road alignments, must cross an area that has exhibited instability in the past, a vault will be placed on either side of the instability and additional cable placed in each vault to allow for land movement without a break in the cable and therefore in the service provided. This will minimize the risk of a loss of service due to land movement.

Given the installation types for this Project, little or no soil erosion is anticipated. Overhead installation has virtually no ground disturbance. If an additional guy wire is needed, typically it is placed on an existing anchor with no ground disturbance. If an additional guy wire anchor is needed, the anchor is typically installed by hand, again with no need to remove vegetation or

disturb the soil surface. Underground installation is planned for roadside ditches, with no impacts to adjacent vegetation or soil surfaces. No topsoil disturbance is likely during any aspect of construction.

3.6.4.2 Orick Tower

The Orick Tower will be located on Mad River soil type, very deep, moderately well drained soils on the flat alluvial plain in Orick. There is no risk of erosion or other soil-related failures, as this is not an expansive soil type. Humboldt County will likely require an R-1 Soils Report (which includes a geotechnical study) and stamped, sealed engineering drawings showing how the foundations will be constructed to safely support the proposed structure given the soils type and earthquake potential.

3.6.4.3 Yurok Signal Connection

The proposed installation at Antenna Ridge will be located on rock. There is no risk of erosion.

3.7 Hazards and Hazardous Materials

3.7.1 Regulatory Setting

State and local laws and ordinances control the use and disposal of hazardous materials. The California EPA's Department of Toxic Substances Control requires that a list be compiled and maintained of areas with previous or active hazardous materials problems, called the "Cortese List", under California Government Code Section 65962.5. CDF annually issues or suspends burning permits to help control wildfires in the area.

3.7.2 Environmental Setting

The KRRBI Project is located in a remote rural area and will be located in road shoulders, either overhead on existing poles or underground. These roads traverse forested areas and areas with intermixed residences and forests.

Segment 1 crosses within 0.4 miles of a private airport owned by Thomas Aviation in Orleans. Segment 5 terminates on Dows Prairie Road about 0.8 miles from the public Eureka-Arcata airport. The project does not cross any known active "Cortese list" properties.

Wildland fires are common in the Project area, particularly in Segments 1 and 2. They are started each summer by lightning in "dry" thunderstorms in mid to late summer, and by arson, typically along Highways 96 and 169 but also along county and tribal roads. Table 3.7-1, below, shows the fire hazard ratings by segment for the entire project[25].

[25] California Department of Forestry and Fire Protection. 2007. Humboldt County Fire Hazard Severity Zone Map. Available online at http://www.fire.ca.gov/fire_prevention/fhsz_maps_humboldt. Last accessed 11/29/16.

Table 3.7-1. Fire Danger Rating by Segment

Segment	Miles Crossed by Fire Danger Rating			
	Non-Wildland, Non-Urban	Moderate	High	Very High
1	0.4	0	3.7	9.9
2	0.1	0.1	9.0	14.3
3	0	0	10.5	11.2
4	0	3.3	7.3	0.9
5	0	16.4	16.3	0

The results were obtained by overlaying the segment map on the GIS data supplied by CDF. The data show that about 80 percent of the project area is in high or very high fire danger zones and that virtually all of the moderate rating is found on or near the coast along Segments 4 and 5. Fire danger zones are not mapped for National Forest, where the Yurok Signal Connection is located, but adjacent forests are similar to those mapped as very high fire severity.

3.7.3 CEQA Checklist Criteria for Potential Impacts

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 one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard for people residing or working in the Project area?	☐	☐	☐	☒
f) For a Project within the vicinity of a private airstrip, would the Project result in a safety hazard for people residing or working in the Project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

3.7.4 Analysis of Potential Impact

3.7.4.1 Hazardous Materials

During construction, gasoline and diesel fuels and hydraulic fluid used in construction equipment will be present in the construction activity area. No other hazardous materials will be used or present in the construction activity area. EPM WATER-1 specifies that BMPs will be used to prevent and contain spills. Therefore there will be no adverse impact from the use of fuels and hydraulic fluid in the Project area during construction.

There is a low possibility, in the remote rural areas of the project, that pre-existing hazardous materials may be present underground where trenching or directional drilling is proposed. If, in the process of underground installation, a suspicious material is exposed, construction will be stopped in that area and a specialist trained in detection and management of existing hazardous materials will be called to manage the situation. Material would be tested, removed from the project area, and disposed of in accordance with California law depending on the contaminant found. EPM HAZ-1 specifies that the contractor will provide a Hazardous Substance Control and Emergency Response Plan for review and approval prior to construction.

The KRRBI Project, when operating, will not routinely transport, use, or dispose of hazardous materials nor emit hazardous materials. The generator for emergency power backup at the Orick Tower will use propane, but will not operate routinely. Propane will be delivered by a commercial entity responsible for determining the safety of the tank at each fill.

3.7.4.2 Airports

The fiber optic cable will be installed underground or beneath existing distribution and/or communications lines on existing overhead poles and will not provide any new hazard to either the private or the public airport in the vicinity. The Orick tower is not in the vicinity of any airports.

3.7.4.3 Emergency Evacuation Plan

The Project will be installed underground or beneath existing distribution and/or communications lines on existing overhead poles and will not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

3.7.4.4 Wildfire Hazard

The KRRBI Project will be located in road shoulders, either overhead on existing poles or underground and will not expose people or structures to a significant risk of loss, injury or death involving wildland fires. High-speed broadband can be used for telephone service and will increase communication capabilities in these remote rural areas, allowing residents better knowledge of possible wildfire hazards. EPMs FIRE-1 and FIRE-2 specify worker training and

the availability of basic firefighting equipment, respectively, to reduce the chance that construction activities would provide an ignition source for wildfires. Also the availability of tools and training means that if the construction crew comes upon a wildfire that they could help to control or extinguish it.

3.8 Hydrology and Water Quality

3.8.1 Regulatory Setting

3.8.1.1 Water Quality

Section 303(d) of the federal Clean Water Act and 40 CFR §130.7 require states to identify waterbodies that do not meet water quality standards and are not supporting their beneficial uses. These waters are placed on the Section 303(d) List of Water Quality Limited Segments (List), also known as the 303(d) List of Impaired Waterbodies. The List identifies the pollutant or stressor causing impairment and establishes a schedule for developing a control plan to address the impairment. Placement on this list generally triggers development of a pollution control plan called a Total Maximum Daily Load for each waterbody and associated pollutant/stressor on the list[26].

The State of California has listed the middle reaches of the Klamath River (from the confluence with the Scott River to the confluence with the Trinity River, covering Segment 1 of the KRRBI Project) as a 303(d) listed water for cyanobacteria hepatotoxic microcystins, nutrients, organic enrichment, sediment, and water temperature. Total Maximum Daily Loads have been established for the last two and were published in a plan in 2010[27]. The lower reaches of the Klamath River, from the confluence of the Trinity to the mouth (including Segment 2 and a portion of Segment 3), are also listed for nutrients, organic enrichment, sediment, and water temperature.

3.8.1.2 Wetlands

USACE has the responsibility for regulating the placement of dredged or fill materials in waters of the US as part of Section 404 of the federal Clean Water Act. We anticipate that if waters of the US were determined to be impacted by this Project, the USACE would allow Project activities under a Nationwide Permit for utility installation, likely a Nationwide 12 Permit. There is a Joint Aquatic Resources Permit Application (JARPA) that covers the requirements for the USACE and for the various State of California agencies, certifications, and permits as detailed below. Though the JARPA was originally designed for the Bay Area counties, it can be used anywhere in California with minor adjustments.

The State of California has reserved to its State Water Resources Control Board the authority to grant or withhold a Clean Water Act Section 401 certification based on the USACE proposed

[26] From http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/index.shtml accessed 3/6/16

[27] http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/klamath_river/100927/03_BasinPlanLanugage_Klamath_Lost.pdf

allowance of the use of the Nationwide 12 permit for utility installation. The Project will apply for a 401 certification from California if a Nationwide 12 permit is necessary as part of the JARPA process.

3.8.1.3 1600 Program

The State of California regulates any changes in the bed and bank of a State waterbody through the 1600 Program administered by the California Department of Fish and Wildlife. The JARPA process also covers this permit.

3.8.1.4 Construction Stormwater

The State of California also regulates construction stormwater discharge through its Clean Water Act Section 402 permit system called the National Pollutant Discharge Elimination System. The North Coast Regional Water Quality Control Board will be responsible for reviewing the application and issuing the permit. Linear Projects disturbing 1 or more acres of land must apply for a Construction General Permit.[28] The construction contractor will be responsible for applying for, obtaining, and abiding by the conditions of the Construction General Permit.

3.8.1.5 Flood and Tsunami Hazard

The Federal Emergency Management Administration provides maps of areas subject to flooding as a basis for local planning and zoning as well as in support of the National Flood Insurance Program. California Office of Emergency Services and the California Geological Survey produce tsunami hazard maps for use by the counties in planning and zoning.

3.8.2 Environmental Setting

3.8.2.1 Watersheds

The Project parallels the Klamath River from Orleans to Weitchpec in Segment 1 and from Weitchpec to Wautec in a portion of Segment 2. It runs along the watershed divide between Redwood Creek to the south and west and the Klamath River and Prairie Creek to the east and north in Segments 3 and 4, and it parallels the Pacific Coast in Segment 5. Table 3.8-1 summarizes the number of miles the Project crosses a series of watersheds as specified by the US Geologic Survey.[29] The USGS uses the "Hydrologic Unit Code" (HUC) system to provide a unique identifier for each watershed in the US. The system starts with the region, then the sub-region, accounting unit, and cataloging unit. The Project is entirely within Region 18, which covers most of California as well as the Klamath Basin in Oregon and within Subregion 01

[28] http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml

[29] Seaber, Paul R., Kapinos, F.P., and Knapp, G.L. 1987. Hydrologic Unit Maps. USGS Water Supply Paper 2294. Data from USGS Watersheds Dataset, found online at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/water/watersheds/dataset/

(Klamath Northern California Coastal). 55.5 miles of the Project are within the Accounting Unit Lower Klamath while 50.6 miles are within the Mad-Redwood.

Table 3.8-1. HUC 8 and HUC 12 Watersheds Crossed

Segment	HUC 12 Watershed	HUC 8 Watershed	Miles Crossed
1	Lower Klamath	Boise Creek-Klamath River	3.3
		Camp Creek	0.4
		Slate Creek-Klamath River	12.3
		Bluff Creek	0.1
2		Mettah Creek-Klamath River	8.1
		Pecwan Creek	0.1
		Ah Pah Creek-Klamath River	1.6
2 and 3		Tully Creek-Klamath River	20.7
3		Pine Creek	6.1
	Mad-Redwood	Bridge Creek-Redwood Creek	5.1
	L-Klamath	Roach Creek	2.8
3,4, and 5	Mad-Redwood	McArthur Creek-Redwood Creek	14.4
4	L-Klamath	Tectah Creek	1.6
	Mad-Redwood	Prairie Creek	2.4
4 and 5		Lufenholtz Creek-Frontal Pacific Ocean	18.0
5		Maple Creek	4.1
		Little River	5.1
TOTAL MILES			**106.1**

Waterbody crossings are detailed by segment below.

All waterbodies crossed in Segment 1 are tributary to the Klamath River. Segment 1 will cross over the Klamath River in the spur to DNR in an overhead installation. It will cross over Camp and Crawford Creeks, both perennial, in an overhead installation. It will cross Ullathorne Creek, Little Red Cap Gulch, and Red Cap Gulch (all perennial) either by installation over the culvert (trenching or saw cutting) or by directional drilling beneath the culvert. It will cross Slate Creek, Bluff Creek, and Aikens Creek by hanging a single conduit from the existing bridge structure. It will then cross the intermittent creeks Joe Marine, Cavenaugh, Saints Rest, and Muddy Creeks by directional drilling beneath the culvert.

All waterbodies crossed in Segment 2 are tributary to the Klamath River, and Segment 2 itself crosses the Klamath River at Martins Ferry in an overhead crossing, immediately adjacent to the existing copper telephone line overhead crossing (now Frontier Communications). Segment 2 will cross over many perennial and intermittent streams in overhead installation, and will cross Pecwan Creek in an existing culvert on the bridge.

Segment 3 will cross fewer creeks than Segment 2 because much of the installation is on or near ridgelines. Where creeks are crossed, they are in culverts and the Project will use directional drilling to cross beneath those culverts.

Segment 4 parallels, then crosses Redwood Creek in the town of Orick using an overhead crossing just west of the Highway 101 crossing.

Segment 5 crosses many perennial and intermittent streams where it crosses Green Diamond lands, including one that is the municipal water supply for the town of Trinidad, Luffenholtz Creek. Where those streams are contained in culverts, the Project will use directional drilling to install the fiber optic cable beneath the culverts. Where those streams are crossed by bridges, the Project will either use a bridge hang to install the fiber optic cable or will install a two-pole overhead crossing for the fiber optic cable. Directional drilling will not be used directly beneath the bed of perennial streams.

The Orick Tower is located in a flat area away from perennial or intermittent streams. Antenna Ridge (Yurok Signal Connection) is located on a ridge between watersheds and away from perennial or intermittent streams.

3.8.2.2 Flood Hazard

Much of the Project area is mapped as "D", or "possible but undetermined flood hazards." All of Segments 1, 2 and 3 have been mapped as "D" or as ANI (area not included because lands are federally managed and not permanently occupied). The only place FEMA has conducted flood mapping is along the Pacific Coast. Table 3.8-2 shows the number of miles the Project would cross the "A" or high-risk flood zone in the town of Orick, across Big Lagoon, and along Crannell Road across the Little River floodplain:

Table 3.8-2. Miles Crossing Flood Zone A

Installation Method	Segment 4	Segment 5
Over Head	0.1	1.2
Directional Drill	0.0	0.3
Trench	0.3	0.6
TOTAL	0.4	2.1

The Orick Tower would not be located in a flood zone.

3.8.2.3 Tsunami Hazard

Humboldt County provides mapping of the tsunami risk along the Pacific Coast. Table 3.8-3 shows the miles the Project would cross the tsunami hazard zone, mostly in the vicinity of the town of Orick but also a small amount at the crossing of Big Lagoon.

Table 3.8-3. Miles Crossing Tsunami Hazard Zone

Installation Method	Segment 4	Segment 5
Overhead	1.1	2.2
Directional Drill	0.0	0.1
Trench	0.2	0.0
TOTAL	1.3	2.3

The Orick Tower would be located in a tsunami hazard zone.

3.8.3 CEQA Checklist Criteria for Potential Impacts

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?	☐	☐	☐	☒
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☐	☒
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
f) Otherwise substantially degrade water quality?	☐	☐	☐	☒
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow	☐	☐	☒	☐

3.8.4 Analysis of Potential Impact

3.8.4.1 Water Quality

The Project will not violate any water quality standards. The construction contractor will be required to develop a SWPPP as part of the application for a permit under Section 402 of the Clean Water Act. The construction process will adhere to the SWPPP and will have BMPs in place to avoid any violation of water quality standards.

The EPM WATER-1 specifies that the construction contractor will be required to develop and file a SWPPP and to comply with the permit conditions as issued by the State Water Resources Control Board, Region 1. The EPM WATER-2 specifies that construction industry standard practices and BMPs will be used for spill prevention and containment.

The SWPPP will specify measures needed to control erosion and limit sedimentation outside the construction footprint. One of the best sources for industry-standard practices, particularly

for a project like this that is located along roads, is the Caltrans BMP manual.[30] While the SWPPP is the responsibility of the construction contractor, the Karuk Tribe will review the SWPPP prior to allowing the construction contractor to apply for the Section 402 permit from the State Water Resources Control Board. Further, the Karuk Tribe will employ an inspector during construction to be sure that the construction contractor is complying with the terms of the SWPPP.

The Project will not use groundwater during operation. The only water use will be during construction and will be used for dust control where needed. Water will be obtained from allowable drafting locations. See Section 2.4.8.5 for estimated total water use.

3.8.4.2 Watersheds

The Project will not alter the drainage pattern anywhere. The existing roads have drainage ditches and the Project may be installed in those ditches. The construction contractor is responsible for restoring the ditches to full function after the fiber optic cable is installed. The Project will not create or contribute runoff water different from the roads themselves where the fiber optic cable will be installed.

3.8.4.3 Flood Hazard

The fiber optic cable will be installed within the 100-year flood zone for 0.4 miles (0.3 miles underground) in Segment 4 (along Highway 101 just south of the Bald Hills Road intersection), 1.2 miles underground and overhead on new poles in Segment 5 across Big Lagoon, and 1.0 miles overhead on existing poles along Little River on Crannell Road, also in Segment 5. Much of the remaining area of the Project has not been mapped for flood hazard but flood hazard may exist. The fiber optic cable, where installed underground in known flood hazard areas, will be specifically engineered to resist periodic flooding and remain buried in its trench. Engineering will likely include encapsulating concrete anchors at set distances that assure the conduits will remain buried in flood conditions. Final engineering, including distances and sizes of concrete anchors, will be completed prior to construction based on soil types and agency requirements.

3.8.4.4 Tsunami Hazard

Most of the fiber optic cable installation within the tsunami zone (88%) is planned for attachment to existing poles. The poles are the property of PG&E or the incumbent landline provider (Frontier), but the KRRBI Project will provide additional guy wires where indicated to accommodate the additional load from the fiber optic cable. Engineering for the small underground portion will likely include encapsulating concrete anchors at set distances that assure the conduits will remain buried in tsunami conditions. Final engineering, including

[30] California Department of Transportation. 2017. Construction Site Best Management Practices (BMP) Manual. Available online at http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm

distances and sizes of concrete anchors, will be completed prior to construction based on soil types and agency requirements.

The Orick tower will be located within the tsunami zone though not in a mapped flood zone. The tower foundations will be designed to resist a tsunami run-up. Those practices will likely include providing oversized foundations, reinforced structure components, and higher rated and possibly additional hardware, anchors, and mounts to withstand extreme catastrophic conditions. Antenna mounting heights will be designed to be above the inundation height of a reasonably foreseeable tsunami wave. The Humboldt County building permit will specify standards to be met and will not be issued until the engineering drawings reflect those standards.

3.9 Land Use, Recreation, and Planning

3.9.1 Regulatory Setting

Each of the three federal agencies (NPS, USFS and BLM) with land management responsibility has developed a land management plan for their lands. Lands within the Yurok Reservation are managed by the Yurok Land Use Plan. Private lands outside the Yurok Reservation are regulated by Humboldt County's General Plan[31], currently under revision, that regulates land use within the county on private lands. GDR has several important agreements with state and federal agencies regarding its timber harvest and road maintenance programs.

3.9.1.1 RNP

The RNP was designated in 1968 and expanded in 1978. Redwood National Park was established "to preserve significant examples of the primeval coastal redwood (*Sequoia sempervirens*) forests and the streams and seashores with which they are associated, for purposes of public inspiration, enjoyment, and scientific study, there is hereby established a Redwood National Park in Del Norte and Humboldt Counties, California." (Public Law 90-545, October 2, 1968.)

"[I]n order to protect existing irreplaceable Redwood National Park resources from damaging upslope and upstream land uses, to provide a land base sufficient to insure preservation of significant examples of the coastal redwood in accordance with the original intent of Congress, and to establish a more meaningful Redwood National Park for the use and enjoyment of visitors (PL 95-250, March 27, 1978)."

CFR 36 §14.2 provides for the issuance of rights of way for linear facilities and is the guidance for the NPS in consideration of the application from the Karuk Tribe.

[31] Humboldt County. 1984. Humboldt County General Plan. Available online at http://www.humboldtgov.org/205/Plans last accessed 6/26/16.

3.9.1.2 USFS Six Rivers National Forest

The KRRBI Project will pass through 12 miles of National Forest System (NFS) land managed by the USFS as part of the Six Rivers National Forest along Highway 96. USFS published the Six Rivers National Forest Land and Resource Management Plan in 1995. It specified the management of the Klamath River as a Wild and Scenic River, recreational designation, in the area of the Project. Of the 9.3 miles within NFS lands, 7.8 miles are within the Wild and Scenic River corridor, all within the CalTrans Highway 96 road prism. The Yurok Signal Connection facilities will be located on NFS lands.

The section of the 1995 plan dealing with special uses, including Projects such as KRRBI, states, "15-2 Special uses should be allowed on National Forest System land when these uses will not conflict with National Forest programs or objectives, cannot be reasonably developed on private land, and are in the public's interest (p IV-122, in Lands section)."

3.9.1.3 BLM

The KRRBI Project will pass through two "scattered tracts" managed by the BLM on Highway 96.

BLM Arcata Resource Area Resource Management Plan (1992) provides general guidance for areas of BLM lands, including a management area called "scattered tracts" to which the parcels crossed by the KRRBI Project pertain. The plan states "Rights-of-way determinations cannot be made at this planning level with any degree of credibility. Federal tracts do not control rights-of-way such as highways or utility corridors. Proposals will be addressed on a site-specific basis (page 9)."

3.9.1.4 Humboldt County

Humboldt County's General Plan's intent is to be "a long range statement of public policy for the use of public and private lands within the unincorporated areas of Humboldt County. These public policies establish a generalized pattern of land use for a twenty year period which is the foundation of more detailed implementation. The pattern of land use as represented in this General Plan attempts to balance economic and social needs of the public with inherent characteristics of the land, plant and animal life, and air and water conditions (General Plan, Section 1200)." The General Plan is complemented by the North Coast Coastal Plan and the Orick Community Plan in the Project area[32]. These plans are largely implemented through the zoning ordinances, most recently amended in 2009. These plans include planning for the coastal zone, which is also regulated in California by the California Coastal Commission and the California Coastal Act (Public Resources Code Section 30000, and following).

[32] All Humboldt county planning documents can be found at http://www.humboldtgov.org/205/Plans

3.9.1.5 Green Diamond Resource Company

GDR lands are managed through a Forest Management Plan, a series of Timber Harvest Plans (THP), regulated by the California Department of Forestry, and through a series of agreements with federal and state wildlife management agencies called Habitat Conservation Plans (HCP)[33]. The THPs and HCPs specify when and where timber harvest, roadbuilding, road maintenance, and other activities may take place and under what conditions. The Aquatic Species HCP specified a series of road reconstructions that modified stream crossings and reduced the potential for sediment deposition into those streams.

3.9.2 Environmental Setting

3.9.2.1 Land Use and Management

Table 2.4-3, above, shows the miles crossed by land manager or owner, for the Project.

NFS lands are largely managed for "ecological restoration" and for "sustainable recreation", according to the Six Rivers National Forest website.[34] The Segment 1 route passes the Ullathorne, Big Bar, and Aikens Creek River Access areas and the E-Ne-Nuk campground. During the summer, kayak and raft trips are scheduled for many portions of the river on NFS lands adjacent to the Project area.

BLM scattered tracts are managed to "Enhance natural values and provide opportunities for environmental education.[35]" In particular, any tracts with old-growth timber, including the parcel crossed by the Project, are managed for old-growth forest habitat. These parcels in particular have been part of a discussion with the Yurok Tribe for transfer to Trust status for the Tribe. Recreation is also an important part of BLM land management, and the Klamath River crosses these parcels and is used for fishing and water-based recreation.

Segments 3, 4, and 5 cross through RNP. Segments 3 and 4 will be installed in Bald Hills Road, which is an important access road for recreational use and for park activities including restoration and management of the fire-dependent meadows that make up the Bald Hills. Segment 5 will be installed underground in the portion of Hiltons Road that adjoins or crosses RNP lands as well as underground in the Westside Access Road on the western edge of the park's 1978 expansion. Westside Access Road is gated and locked to vehicular traffic and travels through young redwood and hardwood stands.

GDR lands are managed for timber production, watershed protection, and wildlife habitat conservation. The young redwood and Douglas-fir GDR forest lands crossed by Segments 3 and 4 border the RNP along the Bald Hills Road and are actively managed for timber production. Segment 5 crosses young redwood stands that are also managed actively for

[33] These documents can be found at https://greendiamond.com/responsible-forestry/california/
[34] http://www.fs.usda.gov/land/srnf/landmanagement
[35] BLM. 1992. Arcata Resource Area Resource Management Plan, page 44. Available on-line at http://www.blm.gov/ca/st/en/fo/arcata/planning.html. Last accessed 6/26/16.

timber. Segment 5 will be installed in the road shoulder or on bridges through GDR lands, and its installation will be as required by the GDR easement document.

Other private lands crossed by the roads used by the Project are managed for a wide variety of uses, including residences, schools, farms, working forests, and some light industrial and commercial properties along Highway 101.

3.9.2.2 Recreation

Recreation in the Project Area is largely water-related in Segment 1, with most visitors coming to fish or float the Klamath River. Use of the road that accesses Orleans Mountain is typically limited to locals. There are no trailheads for hiking along that road. Segment 2 recreational opportunities are limited to those provided by Yurok guide services and those enjoyed by tribal members on the reservation. Segment 3 recreational opportunities include using Bald Hills Road to access hunting areas and to access the RNP. Segment 4 recreational opportunities are focused on the RNP and its hiking, photography, and camping options along Redwood Creek and up on the ridges and within the important stands of old-growth redwoods. Recreational opportunities in Segment 5 are largely focused in the small town of Orick, where there are stores, motels, cafes, and a gas station that serve RNP visitors.

3.9.3 CEQA Checklist Criteria for Potential Impacts

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) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒
RECREATION:				
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?	☐	☐	☐	☒

3.9.4 Analysis of Potential Impact

The KRRBI Project will have no impact on land use in the Project area. It will not divide an established community. It will not conflict with any land use plan, policy, or regulation of the various agencies with jurisdiction over the Project. In order to go to construction, the KRRBI Project will need permits from the various regulating agencies. These permits are only issued to a Project that is in conformance with the land use planning and specify conditions under which

it may be installed and operated. EPMs G-2, G-3, and G-4 specify compliance with the various management plans to avoid any conflict.

The KRRBI Project will not adversely affect the use and operation of state and county roads. CalTrans will specify the terms under which this broadband Project may be installed underground in the shoulder and also overhead on Highways 96, 101, and 169. The MOA between the Karuk Tribe and Humboldt County specifies the terms and conditions under which the Tribe may install broadband fiber optic cable in county roads.

The KRRBI Project will have no adverse effect on recreation. During construction there will be minor traffic delays to accommodate equipment on the road shoulder, but they will be no longer than those routinely used by CalTrans and Humboldt County during road maintenance activities. Once the Project is in operation, it will provide additional communication opportunities to subscribers to the KRRBI broadband, including fishing, hunting, and float trip guides. This will likely improve the range of recreational opportunities and the availability of up-to-date information regarding private guided tours.

3.10 Noise and Radio Frequency

3.10.1 Regulatory Setting

Federal land managing agencies, including NPS, USFS, and BLM, have land management plans that sometimes explicitly address noise levels, particularly with regards to limited operating season for construction equipment. The NPS has specified limited operating seasons within areas it has mapped as old growth, including portions of Segments 3, 4, and 5 where they cross RNP lands. Humboldt County has noise ordinances to protect human health.

3.10.2 Environmental Setting

The Project crosses remote rural areas with low ambient noise levels. The highways and county roads in which the fiber optic cable will be installed are often the primary sources of noise for adjacent residences, businesses, and habitats. Traffic levels are low compared to more urban areas, but road maintenance activities are more frequent due to inherent geologic instability, landslides, and weather-related problems like heavy rainfall, snowfall, blowdown of trees across the road, and vegetation management for safety.

3.10.3 CEQA Checklist Criteria for Potential Impacts

NOISE: Would the Project result in:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☒
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c) A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project?	☐	☐	☒	☐
e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?	☐	☐	☐	☒
f) For a Project within the vicinity of a private airstrip, would the Project expose people residing or working in the Project area to excessive noise levels?	☐	☐	☐	☒

3.10.4 Analysis of Potential Impact

During construction of the fiber optic cable element, the noise of the bucket truck and other truck-mounted equipment used would be noticeable to adjacent residences, though would last generally an hour or less at any pole and would occur over only one day for any given location. Underground installation will have a noise pattern similar to road maintenance activities. For example, pavement cutting is similar to the routine dig-outs conducted by maintenance crews to replace portions of damaged pavement. Installation in road shoulders and ditches is similar in noise and duration to ditch cleaning activities.

During installation of the Orick tower, construction noise might be audible from the highway or from the nearest residence. Construction noise for tower installation is estimated to last less than three weeks. The Humboldt County building permit will have specific conditions for construction work hours that will limit impacts. Adverse impacts from noise would be negligible.

During operation, the propane-powered generator, used in case of power failure at the Orick Tower, would be operated once a week and also during power failure. Its specifications show its noise level to be 63 dB(A) at 23' from the generator. Given atmospheric attenuation and noise buffering from intervening trees and vegetation, no adverse impact from generator noise would occur at the nearest residence.

A study was conducted to meet Humboldt County requirements of the radio frequency emissions from the antennae on the 90-foot tower in Orleans. Radio frequency emissions will

be similar at the Orick tower. Emissions are well below federal and state standards at ground level (See Appendix D, Radio Frequency Study for the Orleans Tower).

3.11 Population, Housing, Utilities, and Public Services

3.11.1 Regulatory Setting

Humboldt County's General Plan regulates housing, utilities, and public services.

3.11.2 Environmental Setting

The KRRBI Project will be installed along roads that for the most part travel through unpopulated or lightly populated areas. The Project intends to serve remote rural individual homes and small villages along Highway 96 and 169 as well as the slightly larger towns of Orleans (population 605), Weitchpec (population 150), and Orick (population 357).

Public electric service, provided by PG&E, is available to some residents along Segment 1 and 5 and in portions of Segments 2-4. Landline telephone is provided by Frontier Communications and is available to a portion of residents in Segments 1, 2, and 4, available to residents in Segment 5, and not available in Segment 3.

Humboldt County Sheriff's office and the California State Highway Patrol provide law enforcement. There is a resident sheriff's deputy assigned to the Orleans, Weitchpec, and Wautec areas, but he is often required to provide backup in Hoopa and Willow Creek and is routinely reassigned out of the area to cover vacancies. Response times are often upwards of an hour or two. On the Yurok Reservation, Yurok Tribal Police enforce tribal law and work with the Sheriff for state law enforcement.

Federal law enforcement officers are occasionally present on NFS lands, and NPS rangers are charged with enforcing park laws and regulations.

Fire protection for structures is provided by local volunteer fire departments in Orleans and Orick and on the Yurok Reservation. None of the volunteer fire departments is staffed full-time and volunteers respond to emergencies from home or work. Wildland fire protection is provided by the USFS on NFS lands, by NPS on RNP, and by CDF on other lands and by mutual aid agreement on federal lands as well. The Karuk Tribe has developed wildland fire response capability and is available to assist in its ancestral territory from Orleans to Weitchpec in the Project area. The Yurok Tribe maintains a staffed wildland fire station and responds to fires within the reservation as well as providing mutual support for other wildland fire agencies.

There are public elementary schools, part of the Klamath-Trinity Unified School District, in Orleans, Weitchpec, and Wautec, and a public elementary school in Orick. Children who graduate from these schools must travel to Hoopa or to McKinleyville for high school as there are no high schools in the Project area. There are active preschool Head Start programs in Orleans, Weitchpec, and Ka'Pel that serve all community members.

3.11.3 CEQA Checklist Criteria for Potential Impacts

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
POPULATION AND HOUSING: Would the Project:				
a) Induce substantial 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 housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
PUBLIC SERVICES: Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒
UTILITIES AND SERVICE SYSTEMS: Would the Project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the Project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) 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?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

3.11.4 Analysis of Potential Impact

The Project will provide a new broadband utility service and will improve delivery of emergency services, including police, fire, and emergency medical response, by increasing access to Internet services including Voice Over Internet Protocol service.

The Project will not increase population in the Project area by providing this new infrastructure. Population in the Project area is limited by lack of private land available for development and the lack of water, sewer, and electric power in much of the area. One of the goals of the Project is to give existing residents new business opportunities in their home communities to reduce the exodus of the young people and help to support the traditions of the communities. No housing or people will be displaced by this Project. The Project will not require or adversely affect utilities and service systems such as wastewater treatment or water facilities.

3.12 Socioeconomics and Environmental Justice

The section analyzes the potential impacts the Project's activities could have on population, economic conditions, housing, property values, education, public services, and tax revenue. It also determines if there are minority and/or low-income communities, and if there are, if there is the potential for Project activities to have disproportionately high or adverse human health or environmental effects on minority and/or low-income populations in accordance with Executive Order 12898.

3.12.1 Regulatory Setting

Executive Order 12898 of 1994 required the federal government to analyze its actions to determine if they have the potential to have disproportionately high or adverse human health or environmental effects on minority and/or low-income populations.

3.12.2 Environmental Setting

The Project crosses and is within northeastern Humboldt County, California. Humboldt County (Population 134,623) represents 0.4% of the population of California (2010 Census). Median income in Humboldt County, at $42,153, is 68.6% that of California as a whole. Humboldt County population is concentrated in and around Humboldt Bay in central Humboldt County and in and around Garberville in Southern Humboldt County. The population of the census block groups crossed by the Project is 4.3% of the population of Humboldt County as a whole.

This remote rural region is characterized by large tracts of public land (RNP, managed by the NPS, and Six Rivers National Forest, managed by the USFS), two large Reservations (Hoopa Valley and Yurok), and large tracts of forested land owned by GDR and a few other large landowners. Population is scattered into remote homesteads and small villages, with slightly larger population areas along the rivers and near the coast.

Full-time employment is limited to tribal, federal, state, and local government jobs and a very few service jobs. Most employment is part-time and related to forestry, fishing, agriculture, or transportation of products. [36] Unemployment and poverty rates are high. Median income in the Yurok Reservation, for example, is 29 percent of the median income for Humboldt County.

[36] American FactFinder 2016. 2010 Census.

The Project crosses three census tracts (101.02, 102.00, and 104.00). Three percent of the Project (the southernmost portion of Segment 5) crosses Tract 104.00, which covers the northern part of the Eureka-Arcata-McKinleyville urban area. About 44 percent of the Project crosses tract 102.00, which covers the area from Bald Hills road to the southwest and out to the coast, including the town of Orick (population 357) including the western portion of Segment 4 and Segment 5. The remaining 53 percent of the Project crosses tract 101.02, which roughly covers the area to the northeast of the Bald Hills Road, north of the Hoopa Reservation, and includes Orleans (population 605), Weitchpec (population 150), Wautec, and Segments 1 and 2. Segment 3 is mostly within tract 101.02, but follows the boundary between that tract and 102 through a largely unpopulated area. Segment 4 likewise follows the dividing line between Tracts 101.02 and 102.00 until it descends off the ridge through the Redwood National Park to Highway 101 and into Orick, entirely within Tract 102.00.

The population of portions of these three census tracts, together with median income information, is found in Table 3.12-1, below. Note that median household income was not available by block group for all of Census Tract 101.02 or for 102 and is therefore shown as provided for the Tract only.

Table 3.12-1. Census Tract Information for Blocks Crossed by KRRBI

Census Tract	Block Group	Total Population[37]	Median Household Income	Percent Native American	General Location
101.02	1	1,180	$32,589	26.1%	Northeast of Bald Hills
	2	293		81.9%	Yurok Reservation downriver of Weitchpec
	3	692		33.5%	Orleans-Weitchpec
102.00	1	1,002	$48,490	5.8%	Orick and Big Lagoon
	2	625		20.2%	Trinidad/Westhaven[a]
	3	805		6.3%	Crannell[a]
104.00	2	1,466	$63,313	7.1%	Dows Prairie[a]
Subtotal, Project Block Groups		5,808			
Humboldt County		135,034	$42,197	8.1%	
California		38,421,464	$61,818	1.6%	

[a] *Not in service area but in connection portion of Project to larger fiber optic grid*

Table 3.12-2, below, shows the unemployment rate for the general population and for the Native American segment of the population for the tracts the Project serves:

[37] American FactFinder. 2017. Population is ACS 2016 estimates; % Native American is ACS 2016 estimates for Native American and includes Natives answering two races); median income is from ACS 2016 estimates. http://factfinder.census.gov/, last accessed 12/4/2017

Table 2.12-2. Unemployment Statistics, 2015 [38]

Census Tract	101.02	102
Population 16+	2,061	2,197
Labor Force Participation Rate	53.9%	51.0%
Unemployment Rate, 16+	13.2%	10.9%
Unemployment Rate, 16+ American Indian	48.7%	24.4%
Population 20-64	1,716	1,525
% Pop. 20-64 unemployed and below poverty level	38.2%	18.9%

Table 3.12-3, below, shows number of housing units and occupancy rates for the tracts the Project serves:

Table 3.12-3. Housing and Occupancy Characteristics[39]

Census Tract	101.02	102
Total Housing Units	1,744	1,732
Occupied Housing Units	1,310	1,410
Homeowner Vacancy Rate	0.0%	1.6%
Rental Vacancy Rate	0.6%	3.2%

3.12.3 Analysis of Potential Impact

The purpose of this Project is to bring high-speed broadband Internet service to people living in the ancestral territories of the Karuk and Yurok Tribes, including tribal and non-tribal community members, who are presently unserved or underserved by current broadband providers. The Project will contribute to better education, health care, and business opportunities available through access to broadband Internet facilities, thereby developing economic opportunities in the communities themselves.

During construction of the Project, there will be short-term adverse impacts, including traffic delays and increased noise levels during the weeks of construction in any given area. These impacts will be greater where underground construction is needed and much less where the only impacts are related to placing fiber optic cable on existing joint use poles overhead.

The Project will have no permanent adverse affect on the minority and low-income populations in the area and will have a permanent positive impact on these same populations. The project will have no impact on the number or availability of housing units. Non-local project construction workers will be housed in nearby motels and will not affect the availability of rental housing. The impact of the Project on income in the Project Area is unknown at this time but is expected to be positive.

[38] American FactFinder. 2017. Employment Status (S2301). 2011-2015 American Community Survey 5-year estimates. http://factfinder.census.gov/, last accessed 12/2/2017

[39] American FactFinder. 2017. Selected Housing Characteristics (DP04). 2011-2015 American Community Survey 5-year estimates. http://factfinder.census.gov/, last accessed 12/2/2017

3.13 Traffic and Transportation

3.13.1 Regulatory Setting

CalTrans and Humboldt County Public Works control access to and use of public roads in their respective networks. They both require encroachment permits for installation, operation, and maintenance of the fiber optic cable, whether overhead or underground. Key requirements of their regulations include notification, conformance with the Manual of Uniform Traffic Control Devices, and as-built drawing submittal.

The RNP plan states, "Depend on Del Norte and Humboldt Counties to manage and maintain county roads within the parks that provide access to nonpark lands that serve the general public in addition to RNSP visitors."

3.13.2 Environmental Setting

The KRRBI Project will make use of State Highway and Humboldt County road easements, and will request easements from the NPS and from GDR for the use of roads managed by those two entities.

Highway 96, Highway 101, Dredge Road, Crannell Road, and Dows Prairie Road are two-lane paved roads in the Project area, while Highway 169, Tulley Creek Road, Weitchpec Road, parts of Bald Hills Road, and Hilton Road are paved or surfaced one-lane roads with wider portions allowing for passing. Upper and Lower Capell Roads, the middle 7 miles of Bald Hills Road, McKinnon Hill Road, the NPS West Side Access Road, and all the GDR roads are graveled one-lane roads with periodic wider areas for passing. The access roads to Antenna Ridge and Orleans Mountain are Forest Service unpaved single-lane roads with occasional turnouts. The last ¾ mile of the road to Orleans Mountain is 4WD only and generally accessible only in summer without specialized off-road snow equipment.

Current traffic levels (2014 data[40]) on state highways in the Project area are light, ranging from an annual average daily traffic of 200 vehicles per day at Wautec at the end of Highway 169 to 3,850 vehicles per day at the south limit of Orick on Highway 101. As a comparison, the average annual daily traffic for Highway 101 at Indianola near Eureka is 37,000 and for Interstate 5 in Sacramento at P/Q Street is 174,000. There are no data for Humboldt County road traffic counts.

[40] Caltrans Data http://traffic-counts.dot.ca.gov last accessed 3/27/2016

3.13.3 CEQA Checklist Criteria for Potential Impacts

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

3.13.4 Analysis of Potential Impact

The installation of the fiber optic cable, either overhead or underground, will have no impact on traffic or transportation except during construction, when there may be brief periods of one-way controlled traffic, as is the case for all routine maintenance on any of these roads. The construction contractor will be required to follow the regulations found in the Manual of Uniform Traffic Control Devices and provide standard signage, flaggers, and pilot cars where indicated on state and county roadways. On the NPS road, NPS requirements will be followed. On GDR roads, the GDR standards will be followed and the normal course of GDR business will not be adversely affected by construction. This will be accomplished by timing construction to avoid traffic problems. In all cases emergency vehicles will be given priority to cross the construction area. EPMs TRANS-1 and TRANS-2 specify compliance with permit conditions for traffic control. If roads are damaged due to KRRBI construction, they will be restored as specified in EPM TRANS-3.

During operation and routine maintenance there will be no impact at all. If there is damage to a stretch of fiber optic cable, emergency repairs may be managed as for construction with one-way controlled traffic.

4 Analysis of Alternatives

4.1 Fiber Optic Cable Routes

No alternatives were considered for Segments 1, 2 and 4 because there were no reasonable alternative routes that could still connect the segments and provide the required service in Orleans, Weitchpec, Wautec, and Elk Camp. Segment 3 could technically connect with Segment 2 at either of its ends as long as it also connected with Segment 4 at Elk Camp, and an alternative was examined. When initial review of the originally-proposed coastal route for Segment 5 showed some serious environmental issues, an alternative was proposed that became the Proponent's Proposed action after preliminary review. See Figure 4.1-1, below, for a map of the alternatives considered.

4.1.1 Segment 3

An alternative was considered for Segment 3 but was removed from full consideration due to potential cultural resource impacts. Initially the Project had considered connecting Segment 2 to Segment 4 by running a fiber optic cable overhead across the Klamath River in the vicinity of Wautec and then installing underground in Johnsons Road to Elk Camp and joining there with Segment 4. This alternative would have avoided the Lyons Ranch area in RNP along the Bald Hills Road. However, after discussion with Yurok Tribal cultural resources staff, the alternative was dropped as there were no locations near the west end of Segment 2 where an overhead crossing could be allowed as there are multiple sensitive cultural areas along the river in that vicinity.

4.1.2 Segment 5

When the KRRBI Project was first proposed, the "meet-me" point with Suddenlink was located at the base of the southbound off-ramp from Highway 101 to Patrick's Point Drive north of the town of Trinidad. Based on concerns for maintenance and reliability of that point, Suddenlink suggested that the Project consider an alternative meet-me point on Dows Prairie Road. This added 20 miles to the fiber optic installation portion of the Project but did not add service area. The Project had originally planned to travel from Orick to the meet-me point off Highway 101 by installing underground along Highway 101. After a reconnaissance review of that route, numerous problems were evident and the Karuk Tribe looked for a better route with fewer environmental impacts and fewer conflicts with existing utilities.

Segment 5 represents the route the Karuk Tribe has selected as its proposed route. During conversation with the NPS staff and in a formal comment letter, NPS staff asked that the alternative along Highway 101 be fully considered in the Proponent's Environmental Assessment. What follows is an analysis of the important differences between Segment 5 and Alternative 5A in terms of environmental impact. Figure 4.1-2 shows the proposed and alternative routes for this segment.

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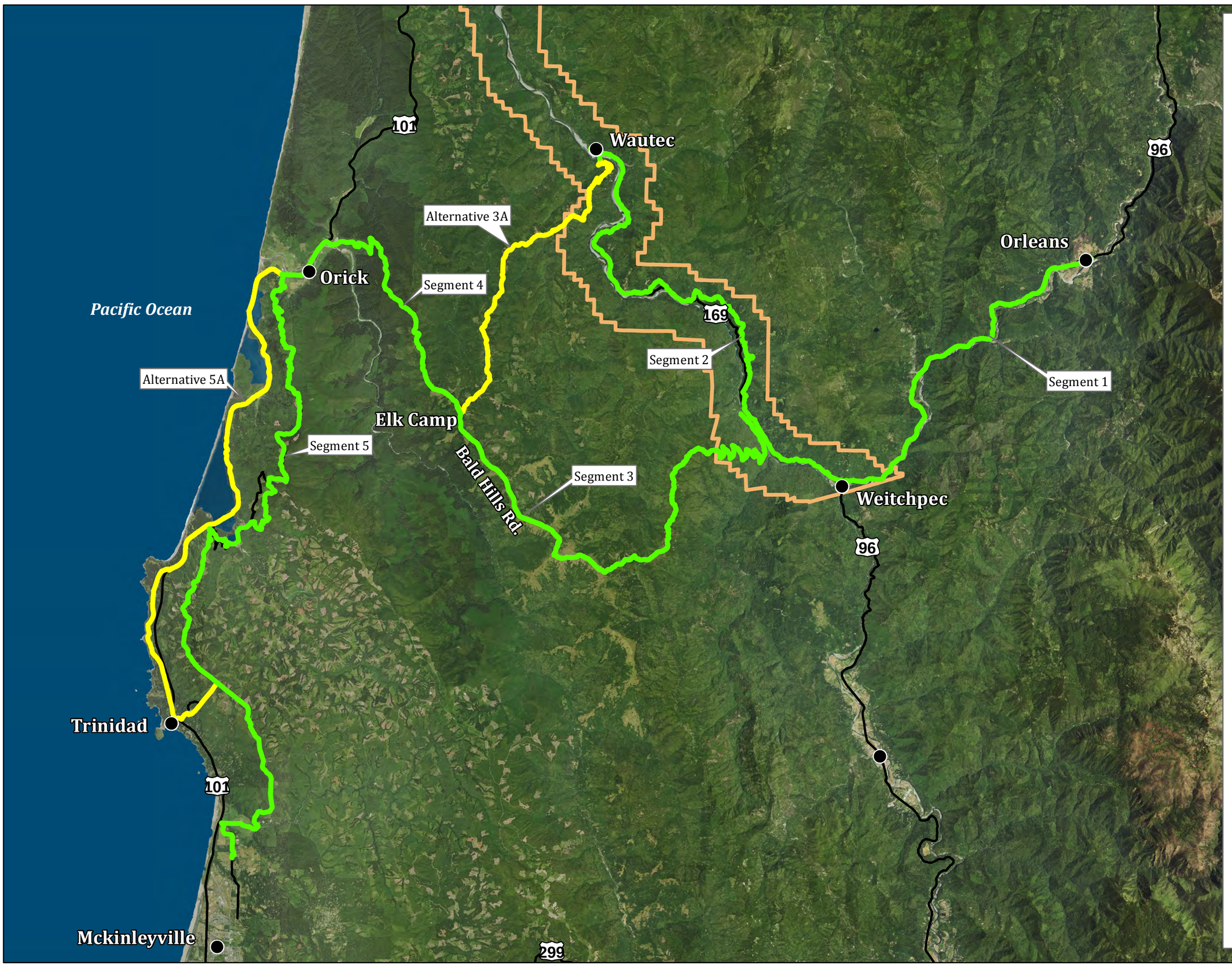
Klamath River Rural Broadband Initiative

Figure 4.1-1

Alternative Routes



Legend

Fiber Install Route Type

- Alternative
- Proposed
- Yurok Reservation Boundary

N
W E
S

0 65 130 Miles

This map is for information and reference purposes only. The Yurok Tribe assumes no liability or responsibility in the use or misuse of this map and the information within. Fiber optic install method data was collected using mapping grade GPS.

Yurok Tribe GIS Program
March 16, 2016

Klamath River Rural Broadband Initiative

Figure 4.1-2
Segment 5 and Alternative 5A
Orick to Mckinleyville

Legend

- Meet Me Points

Fiber Install Route

- Segment 5-1
- Segment 5-2
- Segment 5-3
- Segment 5 Alternate

N E S W

0 1.25 2.5 Miles

This map is for information and reference purposes only. The Yurok Tribe assumes no liability or responsibility in the use or misuse of this map and the information within. Fiber optic install method data was collected using mapping grade GPS.

Yurok Tribe GIS Program
July 25, 2016

Segment 5 and Alternative 5A both start at the Orick tower and continue down Highway 101 for a short distance. Segment 5 turns south up Hiltons Road while Alternative 5A would cross the creek just west of Hiltons Road in an overhead crossing and then go to underground installation in the road ditch or at the edge of the Highway 101 ROW where that is accessible to equipment from that point to the northbound on-ramp from Patrick's Point Drive. At that point Alternative 5A would be installed underground along Patrick's Point Drive, since there is not consistent availability of overhead structures for installation (already overloaded with existing infrastructure). Alternative 5A would cross on Patrick's Point Drive into Trinidad, then turn south on Trinidad's Main Street, go under the freeway, and continue along county roads to the PG&E substation, then be installed underground northeast along the access road that serves the "Trinidad tap" line that carries power from the 69kV transmission line crossing GDR lands to that substation. When Alternative 5A reached the main GDR haul road, it would then follow the same route as Segment 5 to Crannell Road and to the Dows Prairie Road meet-me, for a total distance of 31.3 miles.

For the purposes of this analysis, Segment 5 is broken into three sub-segments. Segment 5 and Alternative 5A share 5-1 (0.6 miles from Orick Tower to Hiltons Road) and 5-3 (9.3 miles from the Trinidad Tap road intersection with the main GDR haul roads to Dows Prairie meet-me). Segment 5-2 is the portion that is directly comparable to the unique portion of Alternative 5A.

Table 4.1-1, below, shows a comparison across several important environmental resource variables for Segment 5-2 and the unique portion of Alternative 5A.

Table 4.1-1. Summary Comparison of Segment 5 and Alternative 5A

Environmental Element	Segment 5-2	Unique Portion of Alternative 5A
Total Length	22.9	21.4
Prime Agricultural Land	0.1	1.1
TPZ Lands	19.0	3.8
Redwood National Park	7.2	2.8
State Parks	0.0	8.1
Coastal Zone, total	13.7	19.5
Coastal Zone, state jurisdiction	0.07	3.8
100-year Flood (A) Zone	1.0	2.5
Tsunami Zone	0.3	3.6
Alquist-Priolo Hazard Zone	0.0	0.9
CalTrans limited access (freeway)	0.0	0.5

The Proposed Route is 1.5 miles longer, which means more ground disturbance. It also crosses much more land zoned TPZ than does Alternative 5A and crosses more lands within RNP than Alternative 5A. Alternative 5A, however, crosses more prime agricultural land, 8 miles of state parks, 5.8 miles more coastal zone, 1.5 more miles in the 100-year flood zone, and 3.3 miles more in the tsunami hazard zone. While Segment 5 avoids Alquist-Priolo zones altogether, Alternative 5A passes through 0.9 miles of the Alquist-Priolo zone in Trinidad. Segment 5

avoids active mines, while Alternative 5A would pass near the active Trinidad quarry on existing overhead joint use poles. Segment 5 avoids the limited-access portion of Highway 101 while Alternative 5A crosses about half a mile, requiring special permission from the CalTrans State office to consider installation in that portion.

In summary, Segment 5-2 avoids or minimizes impacts to important coastal resources, including state parks, and avoids more flood, tsunami, and earthquake hazard zones than does Alternative 5A. The Karuk Tribe, therefore, proposes that Segment 5 be the only route considered in the NEPA/CEQA document.

4.2 Orick Tower

The KRRBI Project includes the installation of a 90-foot tall tower in the town of Orick to provide robust wireless broadband service to the residences and businesses in Orick. The tower needs to be located near the intersection of Lundblade Road and Highway 96 to best serve all the residences and businesses from one location. There are 3 properties, including the unstaffed CalTrans maintenance storage yard, that are under active consideration for locating the tower. Two of the properties are private and landowners have indicated an initial willingness to discuss sale of all or a portion of their property to the Karuk Tribe for the KRRBI Project, or to consider an easement on their property. The Karuk Tribe has initiated conversations with CalTrans for the use of the maintenance storage yard through an easement agreement. The Karuk Tribe does not consider these alternatives, but options to be pursued. When a final arrangement is negotiated with one of the three properties, the Karuk Tribe will modify its Project description to specify the tower location.

4.3 Yurok Signal Connection

No alternatives were considered for the Yurok Signal Connection. The extremely steep and rugged terrain necessarily limits the connection facilities to isolated high points in the mountains. The Karuk Tribe limited its consideration of mountaintops to those that had line of sight to the Yurok Wiregrass Tower and that were outside wilderness and without tribal spiritual or traditional cultural significance. These conditions limited the potential location to the Orleans Mountain area. The Karuk Tribe also wanted to take advantage of the existing infrastructure on Orleans Mountain and the previously disturbed nature of Antenna Ridge to minimize new impacts in sensitive areas.

5 Applicant Proposed Measures

Measures are typically proposed to avoid, minimize, rectify, or compensate for unavoidable adverse impacts to the environment. The first step of any effort to mitigate for a Project is to avoid impacts.

5.1 Avoidance

The KRRBI Project has been designed to avoid environmental impact to the greatest extent feasible. Initial routing for the Project was designed to follow previously disturbed areas, including state highways, county roads, previous logging haul roads now part of the NPS road system, and active logging roads. The Project proposes installation on existing utility poles where they can be used to avoid ground-disturbing activities. Any overhead installation carries a higher maintenance cost in the future due to weather-related hazards, vehicle crashes into poles, and trees and limbs falling on the lines and bringing them all to the ground. But the installation is of negligible impact, since the poles are already in place and the additional impact to the aesthetics is virtually unnoticeable. Overhead installation on existing poles generally carries the least environmental impact.

Where existing overhead poles are not available or are already overloaded, the KRRBI Project proposes to install on new poles or within the road prism or in the road ditch where the road manager will allow. This keeps the disturbance from the Project to areas already disturbed (road ditches, road shoulders, etc.). Directional drilling has been proposed to avoid damage to paved road surfaces and to install the fiber optic cable beneath conduits and other infrastructure, and will be used also to avoid small wetlands that have formed in roadside ditches where permissible.

5.2 Minimization

Where the KRRBI Project could not entirely avoid impacts to the environment through design, it provides EPMs below to minimize impact. For example, the management of fugitive dust reduces air quality problems during construction, while the imposition of BMPs to manage construction Stormwater runoff minimizes the chances for erosion or sedimentation. The Karuk Tribe has also committed to limiting adverse affects on wildlife species within the mapped old-growth areas of the RNP by obeying the limited operating season restrictions imposed by the NPS for installation in those areas. These measures further reduce the small impact of the project.

At this time, the Karuk Tribe believes that residual impacts from the KRRBI Project are not likely to require compensatory mitigation measures. The Tribe has proposed monitoring and reporting measures (EPM G-1) to assure that the proposed Project, including Applicant-Proposed measures, does not have a substantial adverse effect on the environment while

providing a much-needed service to remote rural lands, serving tribal and non-tribal community members with high-speed broadband.

5.3 Proponent-Proposed Environmental Protection Measures

This section lists common-sense environmental protection measures and best management practices that the Karuk Tribe includes as part of the Project. Other measures may be developed during the NEPA/CEQA analysis, including mitigation measures imposed by various agencies, and may be included in this section in later editions.

Table 5-1. Environmental Protection Measures

EPM	Measure Description
G-1	Environmental Compliance Monitors hired by the Tribe will monitor construction activities and will report to the Tribe and to the agencies regarding construction compliance with permit terms and conditions. Monitoring activities will be structured in accordance with an Environmental Compliance Management Plan, developed by the Tribe and approved by the lead state and federal agencies prior to construction.
G-2	Forest Plan Standards and Guidelines (as amended) will apply on NFS lands. Ground-disturbing activities will comply with all Agency-wide, regional, and state BMPs.
G-3	RNP policies and regulations will apply within the RNP. Ground-disturbing activities will comply with listed seasonal constraints and other requirements.
G-4	As part of the Karuk Tribe's environmental compliance commitment, the Construction Contractor(s) will be contractually bound to comply with all laws, regulations, and permit requirements, including the mitigation measures and other specific stipulations and methods that are developed as part of the NEPA/CEQA process.
G-5	Directional drilling will be used where needed and approved to avoid impacts to water, biological, and cultural resources.
G-6	Workers will be encouraged to carpool from housing to the work site each day.
G-7	A list and map of available and analyzed laydown and staging areas was provided in this document. If the construction contractor wishes to utilize other laydown areas or staging areas, it is up to the contractor to show to the satisfaction of agencies with jurisdiction prior to their use during construction that those areas provide similar or less disturbance than those shown in this document.
G-8	The Construction Contractor will be required to develop and implement a Health and Safety Plan
G-9	The Construction Contractor will be required to develop and implement a Worker Environmental Awareness Program (WEAP)
SOIL-1	Disturbance of soils and vegetation removal will be limited to the minimum area necessary for access and construction.
WEED-1	Project personnel and their contractors will be trained on noxious and invasive weed identification to facilitate avoidance of infestations where possible or identification of new infestations.
WEED-2	Gravel and other materials used during fiber optic cable installation on federally managed lands will come from certified weed-free sources.
WEED-3	Project vehicles will arrive at the job site clean of all soil and herbaceous material. The Construction Contractor will ensure vehicles and equipment are free of soil and debris capable of transporting noxious weed seeds, roots, or rhizomes before the vehicles and equipment access the Project.
REC-1	Final Cleanup: Final cleanup will ensure that all construction areas are free of any construction debris including, but not limited to: assembly scrap metals, oil or other petroleum-based liquids, construction wood debris, and worker-generated litter. Permanent erosion control devices will be left in place.

Table 5-1. Environmental Protection Measures

EPM	Measure Description
WET-1	Wetland delineations will be performed prior to construction to support CWA Section 404 permitting and to minimize Project impacts. The delineation will identify both wetland and non-wetland waters of the United States that would be affected by the Project.
WET-2	Where impacts on wetlands are not avoidable, site-specific crossing plans and measures to mitigate impacts will be submitted to the appropriate regulatory agency, as well as the land managing agency. The Karuk Tribe will obtain all necessary permits prior to discharging dredged or fill material to waters of the U.S. and state.
WET-3	If trench dewatering is needed, it will be completed per the Caltrans BMP NS-2 specifications and Field Guide to Construction Site Dewatering
BIO-1	If construction will occur during nesting season for migratory birds (typically March – July each year), a qualified biologist will conduct a preconstruction survey for nesting birds where vegetation removal is planned (e.g. plowing, trenching, establishment of directional drilling entry and exit pits, and new pole installation). If no nests are encountered, vegetation removal may proceed. If a nest is found, that vegetation may not be removed until a biologist has determined that the nest is unoccupied, has failed, or the young have fledged.
BIO-2	Seasonal restrictions for construction in old-growth forests in RNP, as specified by NPS regulations and policy, will be followed. Seasonal restrictions for construction in GDR lands will follow GDR policies and agreements.
BIO-3	2015 data show that there are no active NSO nests within ½ mile of the Project centerline. Data from the breeding season prior to construction will be reviewed to assure that there are no new NSO nests within ¼ mile of the Project centerline. If a new NSO nest is found within ¼ mile of the Project centerline, no construction will be allowed within ¼ mile until August 1, or until a qualified biologist has determined that the young are fledged, the nest abandoned, or the nest failed.
BIO-4	Directional drilling will be used in areas of old-growth redwood roots (Segment 4, Bald Hills Road) to avoid impacts to the trees.
BIO-5	Where bridge hangs are planned, a preconstruction survey for listed species of bats will occur. If a maternal colony of a listed bat is found, construction will be deferred until the young have been weaned.
CR-1	Qualified archeologists will perform all cultural resources work with trained assistants.
CR-2	An Inadvertent Discovery Plan will be prepared. This plan will specify what steps will be taken if a subsurface cultural resource is discovered during construction, including stopping construction in the vicinity of the find, notification of the appropriate land management agency, identification of a qualified archaeologist to conduct an evaluation of the find, and the development of an approved data recovery program or other mitigation measures.
CR-3	Avoidance areas will be flagged or otherwise marked prior to construction activities. Flagging or other marking will be removed once construction is completed in an area.
CR-4	To minimize unauthorized collecting of archaeological material or vandalism to known archaeological sites, all workers will attend mandatory training on the significance of cultural resources and the relevant federal regulations intended to protect these resources.
CR-5	If human remains are discovered, construction will be halted, and the coroner will be notified. Measures specified in NAGPRA regulations will be followed on federal lands.
CR-6	The Karuk Tribe will supply Native American Monitors in the Karuk Ancestral Territory, and the Yurok Tribe will supply Native American Monitors in the Yurok Ancestral Territory. Where ancestral territories are mapped as overlapping, monitors from both tribes will work in tandem.
CR-7	Where depth of archaeological resources in highly sensitive areas can be known or assumed, directional drilling may be required by land managing agencies to avoid cultural resources. Directional drilling depths should be two feet below known maximum depth of cultural resources. If fractured bedrock must be drilled, preventing the inadvertent release of drilling fluids (inert clays and water) cannot be guaranteed.

Table 5-1. Environmental Protection Measures

EPM	Measure Description
AIR-1	Fugitive dust produced during construction will be controlled with watering as needed. Watering will only settle the dust and will not create runoff.
AIR-2	Trucks and heavy equipment used during construction of this Project will meet California Air Resources Board standards for air pollution control for their model year.
WATER-1	The construction contractor will be required to develop and file a SWPPP and to comply with the permit conditions as issued by the State Water Resources Control Board, Region 1.
WATER-2	Construction industry standard practices and BMPs will be used for spill prevention and containment.
VIS-1	In areas with high scenic sensitivity, such as RNP, markers indicating underground fiber optic cable will be 2' tall 4 x 4" treated wooden posts with attached dulled metal signs that are legible but not visually intrusive, or as specified by the land managing agency.
VIS-2	Where required by the land managing agency or landowner, safety markers indicating the presence of underground utilities can be omitted. Additional detection systems will be installed in the vaults and along the fiber optic cable lines.
TRANS-1	Traffic control measures such as traffic control personnel, warning signs, lights, and barriers will be used during construction as specified in the encroachment permits from road managers to ensure safety and to minimize traffic congestion.
TRANS-2	Emergency vehicle access to private property will be maintained during construction.
TRANS-3	Roads negatively affected by construction and as identified by the agencies will be returned to preconstruction condition.
FIRE-1	Construction Contractor will provide a Fire Plan. This plan will include a training program for all personnel about the measures to take in the event of a fire including; fire dangers, locations of extinguishers and equipment, emergency response, and individual responsibilities for fire prevention and suppression. The plan will also require all motor vehicles and equipment to carry, and individuals using handheld power equipment to have, specified fire prevention equipment. Carry shovels, water, and fire extinguishers on all equipment and vehicles.
HAZ-1	Construction Contractor will provide a Hazardous Substance Control and Emergency Response Plan for review and approval prior to construction
OM-1	Before beginning an operations or maintenance project, KRRBI contractors or their subcontractors will clean all equipment that will operate off-road or disturb the ground. The entire vehicle or equipment will be cleaned at an off-site location.
OM-2	The Tribe will provide crews and contractors with maps showing environmentally sensitive areas; these maps will include work zones as well as ROW areas where ground disturbance will be avoided.

6 List of Preparers

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Appendix A
Air Quality Report

KRRBI AIR QUALITY TECHNICAL REPORT

This section evaluates the potential air quality impacts of the proposed KRRBI project, considering both operational and construction effects. The primary focus of the air quality analysis was to evaluate project-related construction and operational emissions on regional air quality. This analysis was conducted following the available guidance provided by the North Coast Unified Air Quality Management District (NCUAQMD).

1. Setting

The following discussion provides an overview of existing air quality conditions in Humboldt County along the KRRBI Fiber Optic construction route. Ambient standards and the regulation framework relating to air quality are described. The proposed KRRBI project route lies solely within the boundaries of Humboldt County. The Proponent's Environmental Assessment (PEA) provides detailed descriptions of the route, route segments, tower sites, existing infrastructure, construction schedule, manpower requirements, etc.

a. Local Climate

The ambient air quality in a given area depends on the quantities of pollutants emitted within the area, transport of pollutants to and from surrounding areas, local and regional meteorological conditions, as well as the surrounding topography of the air basin. Air quality is described by the concentration of various pollutants in the atmosphere. Units of concentration are generally expressed in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The significance of a pollutant concentration is determined by comparing the concentration to an appropriate ambient air quality standard. The standards represent the allowable pollutant concentrations designed to ensure that the public health and welfare are protected, while including a reasonable margin of safety to protect the more sensitive individuals in the population.

In general, the climate of the north coastal area of California is characterized by cool summers and mild winters with frequent fog and significant amounts of rain. In the coastal areas, the Pacific Ocean helps to moderate temperatures year-round. Average temperatures on the coast range from the low 60s in the summer to the low 40s in the winter. Inland areas, such as the KRRBI route will experience a different range of summer and wintertime temperatures. Average annual rainfall in the coastal areas ranges from 38 inches in Eureka to 141 inches in Honeydew. Winds across Humboldt County are primarily out of the northwest to north-northwest in the spring and summer months, out of the southeast during the winter months, and predominantly out of the north, with a slight component from the southeast during the fall months. The Humboldt County General Plan contains a detailed description of climate in Section 3.12 (Air Quality and GHG Emissions). *Humboldt County General Plan Update, Draft Environmental Impact Report, SCH #2007012089, April 2012.*

b. Existing Air Quality Conditions

(1) Criteria Air Pollutants and Effect

Air quality studies generally focus on five pollutants that are most commonly measured and regulated: carbon monoxide (CO), ground level ozone (0_3) formed through reactions of nitrogen

oxides and reactive organic gases, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and suspended particulate matter, i.e., PM_{10} and $PM_{2.5}$. In the NCUAQMD particulate matter (PM_{10}) is the pollutant of greatest concern since measured air pollutant levels have exceeded the state ambient air quality standards.

Ozone

While ozone (O_3)serves a beneficial purpose in the upper atmosphere (stratosphere) by reducing ultraviolet radiation potentially harmful to humans, when it reaches elevated concentrations in the lower atmosphere it can be harmful to the human respiratory system and to sensitive species of plants. Ozone concentrations build to peak levels during periods of light winds, bright sunshine, and high temperatures. Short-term ozone exposure can reduce lung function in children, make persons susceptible to respiratory infection, and produce symptoms that cause people to seek medical treatment for respiratory distress. Long-term exposure can impair lung defense mechanisms and lead to emphysema and chronic bronchitis. Sensitivity to ozone varies among individuals, but about 20 percent of the population is sensitive to ozone, with exercising children being particularly vulnerable. Ozone is formed in the atmosphere by a complex series of photochemical reactions that involve “ozone precursors” that are two families of pollutants: oxides of nitrogen (NOx) and reactive organic gases (ROG). NOx and ROG are emitted from a variety of stationary and mobile sources.

PM_{10} and $PM_{2.5}$

Particulate matter pollution consists of very small particles suspended in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when industry and gaseous pollutant undergo chemical reactions in the atmosphere. Respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$) represent fractions of particulate matter. PM_{10} refers to particulate matter less than 10 microns in diameter and $PM_{2.5}$ refers to particulate matter that is 2.5 microns or less in diameter. Major sources of $PM_{2.5}$ results primarily from fuel combustion, which includes motor vehicles, power generation facilities, industrial facilities, residential fireplaces, and wood stoves. PM_{10} include all $PM_{2.5}$ sources as well as emissions from dust generated by construction, landfills, and agriculture; wildfires and brush/waste burning, industrial sources, windblown dust from open lands, and atmospheric chemical and photochemical reactions. PM_{10} and $PM_{2.5}$ pose a greater health risk than larger-size particles because these tiny particles can penetrate the human respiratory system’s natural defenses and damage the respiratory tract, increasing the number and severity of asthma attacks, causing or aggravating bronchitis and other lung diseases, and reducing the body’s ability to fight infections. Whereas larger particles tend to collect in the upper portion of the respiratory system, $PM_{2.5}$ are miniscule and can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility.

Carbon Monoxide

Since the primary source of carbon monoxide in is automobiles, highest concentrations would be found near congested roadways that carry large volumes of traffic. Carbon monoxide is a non-reactive pollutant that is a product of incomplete combustion. Ambient carbon monoxide concentrations generally follow the spatial and temporal distributions of vehicular traffic and are also influenced by meteorological factors such as wind speed and atmospheric mixing.

Under inversion conditions, carbon monoxide concentrations may be distributed more uniformly over an area out to some distance from vehicular sources. When inhaled at high concentrations, carbon monoxide combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease or anemia, as well as fetuses.

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is a reddish-brown gas that can cause breathing difficulties at high concentrations. Like ozone, NO_2 is not directly emitted, but is formed through a reaction between nitrogen oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as nitrogen oxides (NO_x) and are major contributors to ozone formation. NO_2 also contributes to the formation of PM_{10} (see discussion of PM_{10} below).

Sulfur Oxides

Sulfur oxides, primarily sulfur dioxide (SO_2), are a product of high-sulfur fuel combustion. The main sources of SO_2 are coal and oil used in power stations, in industries, and for domestic heating. SO_2 is an irritant gas that attacks the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children. SO_2 concentrations have been reduced to levels well below the state and national standards, but further reductions in emissions are needed to attain compliance with standards for PM_{10}, of which SO_2 is a contributor.

(2) Toxic Air Contaminants (TAC)

Toxic air contaminants (TACs) are a broad class of compounds known to cause morbidity or mortality, usually because they cause cancer. They include, but are not limited to, the criteria air pollutants listed above. TACs are found in ambient air, especially in urban areas, and can be caused by industry, agriculture, fuel combustion, and commercial operations. TACs are typically found in low concentrations, even near their source; for example, while diesel particulate matter and benzene may be present near a freeway, the concentration of these materials in the air is typically low. However, chronic exposure to these low levels can result in adverse health effects. As a result, TACs are regulated at the regional, State, and federal level.

Smoke from residential wood combustion can also be a source of TACs. Wood smoke is typically emitted during wintertime when dispersion conditions are poor. Localized high TAC concentrations can result when cold stagnant air traps smoke near the ground and, with no wind, the pollution can persist for many hours, especially in sheltered valleys during winter. Wood smoke also contains a significant amount of PM_{10} and $PM_{2.5}$. Wood smoke is an irritant and is implicated in worsening asthma and other chronic lung problems.

(3) Air Quality

Air quality in the region is controlled by the rate of pollutant emissions and meteorological conditions. Meteorological conditions such as wind speed, atmospheric stability, and mixing height may all affect the atmosphere's ability to mix and disperse pollutants. Long-term variations in air quality typically result from changes in air pollutant emissions, while frequent, short-term variations result from changes in atmospheric conditions.

(4) Attainment Status

The EPA administers the National Ambient Air Quality Standards (NAAQS) under the Federal Clean Air Act. EPA sets the NAAQS and determines if areas meet those standards. Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. Areas that do not violate ambient air quality standards are considered to have attained the standard. EPA has classified the region as an attainment area for all the current national ambient air quality standards. At the State level, the NCUAQMD is classified as nonattainment for PM_{10} only. (http://www.ncuaqmd.org/index.php?page=air.quality)

(5) Sensitive Receptors

There are groups of people more affected by air pollution than others. CARB has identified the following who are most likely to be affected by air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks. The project site is located in a rural portion of Humboldt County, where population density is very low, and the area is devoid of significant sensitive receptors. The EA provides a list of identified sensitive receptors along the proposed corridor route.

c. Regulatory Setting

The Federal Clean Air Act (CAA) is the primary federal law regulating air quality in the United States. In addition to being subject to federal requirements, air quality in California is also governed by more stringent regulations under the California Clean Air Act. At the federal level, the U.S. Environmental Protection Agency (US EPA) administers the CAA. The California Clean Air Act is administered by the California Air Resources Board (CARB) at the state level and by the appropriate air quality management district at the regional and local levels. The NCUAQMD regulates air quality at the regional level, which includes the three-county region composed of Humboldt, Trinity and Del Norte counties. Following is a discussion of regulation programs and policies.

(1) United States Environmental Protection Agency

The US EPA is responsible for enforcing the CAA. The US EPA is also responsible for establishing the National Ambient Air Quality Standards (NAAQS). NAAQS are required under the CAA. The US EPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain types of locomotives. The agency has jurisdiction over emission sources outside state waters (e.g., beyond the outer continental shelf) and establishes various emission standards, including those for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission standards established by CARB.

(2) California Air Resources Board

In California, CARB, which is part of the California Environmental Protection Agency, is responsible for meeting the state requirements of the CAA, administering the California Clean Air Act (CCAA), and establishing the California Ambient Air Quality Standards (CAAQS). The

CCAA requires all air districts in the state to endeavor to achieve and maintain CAAQS. CARB regulates mobile air pollution sources, such as motor vehicles. The agency is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. CARB has established passenger vehicle fuel specifications and oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level. CARB also conducts or supports research into the effects of air pollution on the public and develops innovative approaches to reducing air pollutant emissions.

(3) North Coast Unified Air Quality Management District

NCUAQMD is primarily responsible for assuring that the national and state ambient air quality standards are attained and maintained in the region. NCUAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle emissions, conducting public education campaigns, as well as many other activities. NCUAQMD has jurisdiction over the three-county region. (http://www.ncuaqmd.org/index.php?page=district.info)

(4) National and State Ambient Air Quality Standards

As required by the Federal Clean Air Act, NAAQS have been established for seven major air pollutants: carbon monoxide, nitrogen oxides, ozone, respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), sulfur oxides, and lead. Pursuant to the CCAA, the State of California has also established ambient air quality standards. These standards are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles. Both state and federal standards are summarized in Table 1. The “primary” standards have been established to protect the public health. The “secondary” standards are intended to protect the nation’s welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation and other aspects of the general welfare. CAAQS are more stringent than NAAQS. Thus, CAAQS are used as the equal to or standard in this analysis.

(5) NCUAQMD Regulations and Plans

To protect public health, NCUAQMD has adopted regulations and plans to achieve ambient air quality standards. The NCUAQMD must continuously monitor its progress in implementing attainment plans and must periodically report to CARB and the EPA. It must also periodically revise its attainment plans to reflect new conditions and requirements.

In 1995, the NCUAQMD, prepared the initial attainment plan for PM_{10}. This air quality plan addresses the California Clean Air Act. Updates are developed approximately every three years. The current plan addresses PM10 emissions, air quality, and the steps necessary to achieve attainment of the state PM10 standards. *North Coast Unified Air Quality Management District Particulate Matter (PM_{10}) Attainment Plan, NCUAQMD, May 1995.*

TABLE 1 AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	National Standards
Ozone	8-hour	0.070 ppm	0.070 ppm
	1-hour	0.09 ppm	—
Carbon monoxide	8-hour	9 ppm	9 ppm
	1-hour	20 ppm	35 ppm
Nitrogen dioxide	Annual	0.030 ppm	0.053 ppm
	1-hour	0.18 ppm	100 ppb
Sulfur dioxide [e]	Annual	—	0.030 ppm
	24-hour	0.04 ppm	0.14 ppm
	1-hour	0.25 ppm	75 ppb
PM_{10}	Annual	20 µg/m^3	--
	24-hour	50 µg/m^3	150 µg/m^3
$PM_{2.5}$	Annual	12 µg/m^3	15 µg/m^3
	24-hour	—	35 µg/m^3 [f]

Source: CARB 12/16, https://www.arb.ca.gov/research/aaqs/aaqs2.pdf

In addition, California's Senate Bill 656 (SB 656, Sher, 2003) that amended Section 39614 of the Health and Safety Code, required further action by CARB and air districts to reduce public exposure to PM_{10} and $PM_{2.5}$. Efforts identified by a variety of California air districts, in response to SB 656, are primarily targeting reductions in wood smoke emissions; adoption of new rules to further reduce NO_X and particulate matter from internal combustion engines; and reductions in particulate matter from commercial charbroiling activities.

2. Impacts and Mitigations

This section discusses potential impacts to air quality that could result from implementation of the project. The section begins with the significance criteria, which establish the thresholds used to determine whether an impact is significant. The latter part of this section presents the impacts associated with the project and identifies mitigation measures, as appropriate.

a. Significance Criteria

The NCUAQMD has not, to date, adopted CEQA significance thresholds. A review of the County General Plan also did not reveal any established significance thresholds. The significance thresholds identified by NCUAQMD for stationary sources, pursuant to the New Source Review (NSR) rules and used in this analysis for operations are summarized in Table 2.

Table 2 AIR QUALITY SIGNIFICANCE THRESHOLDS

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs./day)	Maximum Daily Emissions (lbs/day)	Annual Maximum Emissions (tons/year)
ROC	not set	50	40
NO_x	not set	50	40
PM_{10}	not set	80	15
$PM_{2.5}$	not set	50	10
CO	not set	500	100
SO_x	not set	80	40

Note: ROC = reactive organic compounds, NOx = nitrogen oxides, PM_{10} = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (μm) or less, and $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5μm or less.
Source: NCUAQMD Rule 110, http://www.ncuaqmd.org/index.php?page=rules.regulations

As noted above, neither the NCUAQMD nor the county planning department have adopted significance thresholds applicable to construction projects. The South Coast AQMD, with much greater air quality problems, has developed significance thresholds, and we used them to compare the construction emissions for the KRRBI project to the South Coast AQMD significance thresholds in order to show the insignificance of the projects emissions, shown below Table 3 (*SCAQMD Air Quality Significance Thresholds, SCAQMD, Revision March 2015)*. Operational emissions from the one stationary source proposed are compared to the above noted NSR thresholds.

b. Less-Than-Significant Air Quality Impacts

A discussion of less-than-significant impacts of the proposed project is provided below.

Construction emissions were estimated using proprietary calculation spreadsheets that utilize existing methods and factors found in EPA AP-42 (*Compilation of Air Pollutant Emissions Factors, Volume 1, Stationary and Point Sources, 5th Ed., January 1995)*, CalEEMod (*California Emissions Estimator Model, CAPCOA, Trinity Consultants, Ver 2016.3.1, September 2016)*, etc. These calculation procedures have been used on numerous large CEQA related construction projects across the state, as well as for construction emissions calculations for projects subject to the California Energy Commission CEQA equivalent process. Data supplied by the applicant was used and supplemented by data from other similar projects and the use of "best estimates" in cases where actual data was not available.

Construction Period Emissions

Construction of the entire project, i.e., Segments 1 through 5, and the Orick tower site, will take place over a combined period of approximately 19 months. Table 3 presents the summary of estimated construction emissions for the KRRBI project.

TABLE 3 CONSTRUCTION PERIOD EMISSIONS (TONS/PERIOD)

Description	ROC (VOC)	NOx	PM_{10}	$PM_{2.5}$	CO	SOx	CO2e
Const Equipment Exhaust	.291	1.865	.124	.123	1.542	.003	268.3
Const Fugitive Dust	0	0	.689	.145	0	0	0
Const Support Vehicle Exhaust	.052	.369	.015	.012	.344	.001	98.2
Site Support Vehicle Exhaust	.009	.008	.001	.001	.084	.0001	17.4
Worker Commute Exhaust	.036	.031	.006	.004	.325	.001	67.2
Paved Road Fugitive Dust	0	0	.175	.043	0	0	0
Wind Blown Dust	0	0	.0001	0	0	0	0
Project Totals							
Tons per Period	.371	2.273	1.01	.327	2.296	.005	451.1
Lbs per Month	39.1	239.3	106.32	34.42	241.68	.53	NA
Lbs per Day	1.78	10.88	4.83	1.56	10.99	.024	NA
NCUAQMD Thresholds	NA	NA	NA	NA	NA	NA	NA
Exceed Threshold?	No	No	No	No	No	No	No

Monthly emissions normalized based on a 19 month construction period.
Daily emissions normalized based on 22 days per month.

In an effort to show that the project construction emissions are insignificant, we have compared them to the South Coast AQMD significance thresholds for construction. These levels are as follows:

NOx 100 lbs/day
VOC 75 lbs/day
CO 550 lbs/day
SOx 150 lbs/day
PM10 150 lbs/day
PM2.5 55 lbs/day

The KRRBI project construction emissions are significantly below these threshold values.

Operational Period Emissions

The project operational emissions are derived from the single stationary source proposed for the project, i.e., a single propane emergency electricity generator. The generator is rated at approximately 11 Kw, and will fire propane as the only fuel. The generator will operate 12 minutes per week, or 10.4 hrs per year for maintenance purposes.

TABLE 4 OPERATIONAL PERIOD EMISSIONS

Description	ROC	NOx	PM_{10}	$PM_{2.5}$	CO	SOx	CO2e
Lbs/day							
Generator	.01	.14	<.0001	<.0001	.02	<.0001	na
NCUAQMD NSR Thresholds	50	50	80	50	500	80	na
Exceed Threshold?	No	No	No	No	No	No	na

Source: Applicant data, 2016. NCUAQMD Rule 110, http://www.ncuaqmd.org/index.php?page=rules.regulations

The generator emissions were compared to the NCUAQMD NSR significance thresholds. This comparison indicates that the emissions are insignificant. Although these emissions are well below the NSR thresholds, we note that the proposed generator will be required to obtain a construction and operating permit from NCUAQMD. In addition, the proposed propane generator will emit approximately 0.0236 tons of CO2e per year. This value is also insignificant.

(1) Objectionable Odors

During construction, the various diesel powered vehicles and equipment in use on the construction route would create localized odors. These odors would be temporary and not likely to be noticeable for extended periods of time much beyond the project route corridor.

(2) Substantial Pollutant Concentrations

Operational TACs are discussed below and TACs from construction are discussed further in this section.

Operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. In addition, the proposed project does not involve locating new residences near local roadways with average annual daily traffic (AADT) above 10,000 vehicles per day. Proximity to major roadways with a traffic volume of at least 10,000 AADT is associated with exposure to TACs or $PM_{2.5}$. (*Bay Area Air Quality Management District, CEQA Guidelines, May 2010*)

(3) Greenhouse Gases

This report indicates that GHG emissions from operations will be less than 0.03 tons/yr. The BAAQMD has set an operational-related GHG threshold of 1100 metric tons of CO2e/year (equivalent to 1213 short tons/yr). The analysis concludes that the project will result in a potential operational increase of GHGs, which is well below the BAAQMD significance threshold value (*Bay Area Air Quality Management District, CEQA Guidelines, Table 2-1, May 2010*).

(4) Cumulative Air Quality Impacts

The NCUAQMD NSR significance thresholds applicable to operational aspects of the project represent the levels at which a project's individual emissions of criteria pollutants and precursors would result in a cumulatively considerable contribution to the region's air quality conditions as determined by NCUAQMD. As discussed above, the proposed project's

operational emissions are well below these significance thresholds, therefore cumulative impacts relative to operational emissions would be less than significant.

c. Significant Air Quality Impacts

A determination of significant impacts of the proposed project is provided below.

Based on the data provided by the project proponent, and this support analysis, the following significance criteria are evaluated as follows:

a. Conflict with or obstruct implementation of the applicable air quality plan?
   NO

b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?
   NO

c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?
   NO

d. Expose sensitive receptors to substantial pollutant concentrations?
   NO

e. Create objectionable odors affecting a substantial number of people?
   NO

As such the proposed project will have no significant impacts on air quality for either the construction or operations phases.

Additional References:

Draft Proponent's Environmental Assessment-Klamath River Rural Broadband Initiative, prepared for the CPUC and BIA, Karuk Tribe, October 2016.

Initial Study and Draft Mitigated Negative Declaration for the Karuk Tribe's Orleans Broadband Project Tower Special Permit, Case # SP-13-005, June 2013.

Rinconada Waste Treatment Plant Upgrade Project, City of San Jose, CA., Air Quality Technical Report, Atmospheric Dynamics, Inc., for Denise Duffy and Associates, July 2014.

Cannery Park Planned Development Project, Air Quality Technical Report, Atmospheric Dynamics, Inc., for Denise Duffy and Associates, December 2014.

Harker School Planned Development Project, Air Quality Technical Report, Atmospheric Dynamics, Inc., for Denise Duffy and Associates, October 2015.

Appendix B
Biology Report

LBJ ENTERPRISES, EUREKA, CA

Biological Assessment for the Klamath River Rural Broadband Initiative

Fiber Optic Cable Project – Proponent's Environmental Assessment

Robert W Hewitt
7/6/2016
revised January 2017

Biological Report

Fiber Optic Cable Project – Proponent's Environmental Assessment

SECTION I SUMMARY OF FINDINGS AND CONCLUSIONS

The focus of this assessment was on special status animals and plants within Humboldt County, CA. The study for wildlife began with the list published periodically by the California Department of Fish and Wildlife, the Special Animals List. This list of species was reviewed and species outside the influence area of the project, or with no habitat in the project area, were eliminated from consideration. This resulted in a list of special status species with suitable habitat potentially present in the Biological Assessment Area (BAA). The definition of "special status species" is found in the California Natural Diversity Database (CNDDB) publications above-referenced, in used as specified in those publications, and is incorporated herein by reference. The definitions of the various rankings are found On June 8, 2016, the CNDDB was queried for recorded instances of special status animal and plant species on quadrant maps that are crossed by this project.

The following report is for the Proponent's Environmental Assessment (PEA) for the Klamath River Rural Broadband Initiative (KRRBI). After a detailed review of the available fish, wildlife, and plant databases and relevant literature 111 sensitive species were identified as potentially within the assessment area (see Table 1.). An overview of potentially impacted sensitive species is provided here as a summary of our findings. Most will not likely be impacted by the proposed construction activity. There are a few species that will require attention to avoid potential impacts. Impacts to the majority of these species requiring attention can be achieved using seasonal restrictions to avoid sensitive periods of the year when most of them reproduce. Northern Spotted Owl (*Strix occindentalis*) activity centers will have to be avoided within ¼ mile if currently active, but there are no known activity centers within ¼ mile of the Project route. This species is well surveyed and careful monitoring is possible. Marbled Murrelet (*Brachyramphus marmoratus*) habitat is present in places and should be avoided with seasonal restrictions. Most of the habitat is where restricted operations are planned on the Redwood National and State Parks (RNP) lands. Willow Flycatcher (*Empidonax trailli*) habitat is present along much of the route. Two California Species of Special Concern (CSSC): Yellow Warbler (*Setophaga petechia*) and Yellow-breasted Chat (*Ictera virens*) may nest or attempt to nest in the suitable alder and willow riparian habitat adjacent to the project area along the Klamath River and Redwood Creek. No riparian or other habitat will be removed during construction activities and the physical footprint of disturbance from construction activities will be confined to the immediate road shoulder. Throughout much of the proposed project route, construction activities will not significantly add to the current level of disturbance (e.g. high traffic areas of highway 101 and highway 96). The nature of the proposed construction activities, confined to the existing road and road shoulder, brief time of activity in any one location, and presence of pre-existing human and vehicle disturbance, make the likelihood of significant impacts to any sensitive species very low.

SECTION II (2.0) INTRODUCTION, BACKGROUND, AND PROJECT UNDERSTANDING

Background

The purpose of this study is to determine which special status species may be of concern for the KRRBI Project and where along the project route they may be found. The intent of this study is to take all known species in the area, then review the list for those for which habitat is present, then to further narrow that list to those species that could be adversely affected by the construction or operation of this project. The Direct Impact Area (DIA) is an area 10 feet on either side of the proposed centerline for the project, as there will be no ground or vegetation disturbance further away from the line than that distance. Where underground installation is planned, disturbance will be limited to the ditch area along the side of a paved or graveled road for over 95 percent of the project area, probably 3 to 4 feet on either side of the proposed centerline. The Indirect Impact Area (IIA) varies by species (depending on the species' sensitivity to construction noise, light, dust, etc.) and may be as large as one half mile on either side of the centerline. Because there are species that may be disturbed by construction even if the species is located well away from the DIA, the full study area, or BAA was defined as an area one half mile on either side of the proposed centerline for the KRRBI fiber optic line, plus an area one half mile on either side of Alternative 5A.

This biological assessment was prepared to meet the required environmental documentation for construction of a new fiber optic cable route into the less populated portions of rural Humboldt County. The KRRBI Project will pass through many habitat types and possibly encounter sensitive plant, fish and wildlife species. The goal of the KRRBI fiber optic cable project is to provide internet access to the rural community along the proposed route. This biological assessment is to determine the potential impact of construction activities on the surrounding sensitive plants and animals. Full construction details of the proposed project are provided in the PEA. To provide an initial list of sensitive species for the BAA, California Department of Fish and Wildlife's (CDFW) CNDDB was queried to identify species with records of occurrence within the BAA.

The CNDDB provides "location and natural history information on special status plants, animals, and natural communities to the public, other agencies, and conservation organizations "Records in the database exist only where species were detected. This means there is a bias in the database towards locations that have had more development pressures, and thus more survey work. Results are returned from the CNDDB by 24,000-scale topographic quadrant maps, as refined by the BAA. Quadrants returning results were:

Segment 1	Orleans, Weitchpec, Hopkins Butte, and Fish Lake
Segment 2	Weitchpec, Johnsons, and French Camp Ridge
Segment 3	Weitchpec, French Camp Ridge, and Bald Hills
Segment 4	Bald Hills, Johnsons, Orick, Holter Ridge, and Rodgers Peak
Segment 5 and Alternative 5A	Orick, Rodgers Peak, Bald Hills, Crannell, Trinidad, Arcata North, and Fern Canyon

The query is conducted by overlaying the BAA on the CNDDB's Geographic Information System (GIS). That database represents species presence by polygons of varying sizes, depending on the reliability of the data and the species. A species presence is returned if its polygon is overlapped by the BAA, even though the species sighting might have been outside the BAA. The results from the CNDDB search, results from other searches known to the author from the general area, and the refined list from the initial CDFW lists were all reviewed. Species without suitable habitat along the proposed project route were dismissed.

Species were also eliminated if they occupy a habitat type that is technically within the BAA but not at all impacted by the project. For example, Alternative 5A travels along Highway 101 and Patrick's Point Drive. Within half a mile of the centerline of that alternative there are rocky coastline or outer dune habitats, but the project will not have any impact on those habitats and species using those habitats were eliminated from consideration.

Wildlife and plant species were considered for inclusion in the environmental analysis based on the following three criteria:

> **Species range includes BAA**—Species is known to or likely to occur in the area of the BAA. The species listed on the CDFW Special Animals and Plants List April 2016 was the initial source used for species to consider and both CNDDB and published accounts of species occurrence (e.g., Hunter et al. 2005) were used to identify species' ranges. Species with ranges overlapping the BAA but clearly outside the influence of the proposed project, such as occurring at elevations or under other conditions not encountered by the proposed project route, were dismissed at this point.
>
> **Suitable habitat potentially present in BAA**—Species with range overlapping the BAA and with suitable habitat likely present in the BAA met this criterion. Both the CNDDB records and all other published and unpublished records for species occurrence and for identifying characteristics of suitable habitat we used for this phase of assessment. Species whose ranges overlapped the BAA but the proposed project route did not include potentially suitable habitat were dismissed based on this criterion. In addition, species were also dismissed if suitable habitat within the BAA was separated from the proposed project route, such as rocky coastline or the wave slope of outer dune habitats, and therefore are unlikely to be impacted by either ground disturbing activities or noise from the proposed construction activities.
>
> **Suitable habitat present that *may be impacted* within the BAA**— Species in this category are considered for potential impacts and Project-wide mitigation measures are identified to avoid or minimize potential impacts from the proposed construction activities. All species meeting this criterion are presented in the species accounts to follow.

SECTION III (3.0) METHODS

A. 3.1 Field Observation and Studies

An initial review of possible biological impacts was based on a query of CDFW's sensitive species inventory the CNDDB. This helped to identify species of concern potentially present in the project area. For each species of concern potentially present in the project area, an assessment of whether suitable habitat is present was conducted. An excellent working knowledge of the ecology of the various forest habitats along the route has been established over many years with the cooperation of many biologists. Consideration of suitable habit was possible as the author is very familiar with the habitat along the route, which because it is adjacent to the roads is easily seen. The project covers a wide range of habitat types found in Humboldt County. These habitats include dry inland mixed-conifer forest habitats around Orleans, riparian and riverine habitats along the Klamath River and Redwood Creek, oak woodland habitat along the Bald Hills road in RNP, and redwood-dominated forest and lacustrine habitats along highway 101 south to Mckinleyville. In addition, biological information from public land management agencies, tribes, and willing private landowners adjacent to the project area was included in this assessment.

The information described above was synthesized to produce a list of species of potential concern. Based on the geographic location of the project within Humboldt County any sensitive species whose range, may overlap the project area was initially considered. In Section 4.1.3 the Federal and State Protected Endangered, Threatened, and Sensitive (PETS) species potentially present in the project area are reviewed. All possible PETS species whose ranges overlapped the project area in Humboldt County were considered. However, lack of suitable habitat in in the project area eliminated many from further evaluation for potential impacts from the proposed project.

The initial assessment relied on the CNDDB and a working knowledge of the wildlife habitats traversed by the proposed project area. Table 3.4-2 shows the results of the CNDDB search with additional species known to the author with presence in the BAA. The table provides the species common and scientific names, global and state ranking for imperilment, and listing where appropriate as federally or state-listed species under the respective endangered species acts. Designations from the California Native Plant Society (CNPS) are listed in addition for native plants. Past survey efforts by land managers and landowners along the proposed project area have included those typical for Federal and State Threatened and Endangered (T&E) species in Humboldt County. Previous and some ongoing surveys have been conducted for: Northern Spotted Owls (NSO), Marbled Murrelets, Pacific Fishers, Humboldt marten (*Martes caurina humboldtensis*), small mammals including white-footed (*Arborimus albipes*) and Sonoma tree (*Arborimus pomo*) voles, Willow Flycatcher, and raptors including Golden Eagles (*Aquila cryseotas*), Northern goshawks (*Accipiter gentilis*), Bald eagle (*Haliaeetus leucocephalus*), Peregrine falcon (*Falco pergrinus*), and Osprey (*Pandion haleaitus*) . Community-level surveys have been conducted for both listed and non-listed species including annual breeding bird survey routes (USGS 2012), bird point counts, and the Humboldt Breeding Bird Atlas (HBBA), a 5-year assessment of the distribution of breeding birds (Hunter et al. 2005). In particular such combined survey efforts across the landscape has provided details of nesting/roosting locations (activity centers) for NSO an important Federal and State T&E species for timber management. Within this broader landscape of survey effort, many locations of numerous other sensitive fish, plant, and wildlife species have been identified. In addition, scientific studies have been conducted in Humboldt County on numerous PETS plant and wildlife species by local scientists that provide a broader understanding of each species' local ecology.

B. 3.2 Trustee and Other Agency Consultation

Consultation History There are no known formal consultations at this time.

C. 3.3 Document and Report Review

The assessment area for the CNDDB query included 0.5 miles on either side of the proposed project area. The following resources were reviewed and synthesized: published scientific literature from professional journals, biological reviews and assessments, unpublished scientific reports, Habitat Conservation Plans (HCP), documents unpublished reports prepared for regulatory and land management agencies, Humboldt breeding bird atlas distribution maps (Hunter et al. 2005), e-Bird species locations and breeding bird survey data (USGS 2012).

D 3.4 Cumulative Biological and Watershed Effects

Cumulative effects were evaluated primarily by using knowledge of the ecology of sensitive species, and the management guidelines used for on public and private lands within the broader project area over the past 25 years. There have been repeated surveys and assessment of impacts by multiple agencies, private

landowners, and tribes for much of the proposed project area. Wildlife surveys, habitat management and timber harvest have all been the goals of the various land users along the route. For such activities to move forward a consideration of potential biological impacts is required. This has been conducted by many landowners for the various natural resources regulatory agencies. Larger landowners along the route include: the Yurok Tribe (YT), the US Forest Service (USFS), RNP and Green Diamond Resource Company (GDRC). This pooled information, the CNDDB and an adaptive management approach to wildlife since the 1990's has created the basis for sound habitat management in the assessment area. A very thorough coverage of the forested habitats, riverine corridors and open oak savannah habitats has been possible. Familiarity with similar species, habitats and circumstances throughout Humboldt County further assisted in any wider impact determination.

SECTION IV 4.0 RESULTS AND DISCUSSION

A. 4.1 (A) Existing Conditions

The project area overlaps portions of the mid- and lower-Klamath River watershed, lower-Redwood Creek watershed, several lagoons (i.e., Freshwater, Stone, Big), and the lower Little River watershed. The topography is highly diverse and the overall landscape is dominated by coniferous forest. The forest distribution is described as being, Douglas-fir mixed hardwood forest, with redwood and oak woodlands. There are small portions of annual grasses and pines. The rivers flow through confined topography, aligned along a northwestern trend. The mid- and lower-Klamath River and lower Redwood Creek watersheds, lagoons, and Little River watersheds are located in Humboldt County, entirely north of Highway 299, approximately 350 miles northwest of San Francisco. The overall climate of the project area is typical of north coastal California, with and is characterized by dry summers and cool wet winters with heavy annual rainfall. Summer fog mediates the hot summer temperatures where it occurs in the western portion of the project area and provides a important source of moisture during the driest portion of the year which influences vegetation density and diversity.

4.1.1 Terrestrial Habitats

The surrounding landscape is primarily early to mid-seral upland second- or third-growth forest habitat. Substantial amounts of late-seral and old growth forest remain in the RNP complex and on the Six Rivers National Forest (SRNF). Riparian forest habitat, dominated by red alder (*Alnus rubra*), willow (*Salix* spp.) and black cottonwood (*Poplus spp.*) in the overstory and thimbleberry (*Rubrus parviflorus*), elderberry (*Sambucus* spp.), Himalayan blackberry (*Rubrus armeniacus*). Early seral , smaller, shrubby willows in the understory, occur along the Klamath and Little River, and lower portions of Redwood Creek.

The majority of the proposed project area is flanked by conifer dominated forests. A strong west-east gradient in summer moisture, provided by fog drip, provides moist conditions supporting largely redwood-dominated forest types west of Weitchpec and more xeric mixed conifer forest dominated by Douglas fir (*Pseudotsuga menzezeii*) east of Weitchpec to Orleans. In these forested habitats, dominant forest habitat types include: coast redwood (*Sequoia sempervirens*), Douglas-fir, Sitka Spruce (*Picea sitchensis*). Montane hardwood-conifer forest habitat also includes significant hardwood components, including tanoak (*Notholithocarpous densiflorus*), black oak (*Quercus kellogii*), and Pacific madrone (*Arbutus menzesii*). More than 70% of the broader project area has been harvested for timber. Areas with the majority of the uncut late-seral and old growth forest habitat occur on SRNF and RNP lands. Previous harvested forest habitat varies in its values for wildlife and some areas of harvested forest retain

large-diameter legacy structures including live trees and snags important for some sensitive species. The Bald Hills portion of the project area includes oak woodland and oak prairie habitats, dominated by black oaks, that are regionally uncommon in northern Humboldt County.

Riparian habitat types along the route of the KRRBI project can be described as: upland forest and scrub with coast redwood, Douglas-fir, red alder and big-leaved maple (*Acer macrophylum*), coyote brush (*Baccharis pilularis*), thimbleberry (*Rubus parviflorus*), Himalayan blackberry (*Rubus armeniacus*), willow scrub/shrub, palustrine scrub coyote brush, and poison hemlock (*Conium maculatum*), all within the assessment area. Characteristic species of forested areas of the Pacific Northwest are relatively abundant.

These include black bear (*Ursus americanus*), black-tailed deer (*Odocoileus hemionus*), Northern Flicker (*Colaptes auritus*) and other woodpeckers, songbirds, western fence lizards (*Sceloporus occidentalis),* and salamanders. The CNDDB has locations for numerous species with special status which inhabit the varied Klamath River/Redwood Creek watershed. The CDFW database for the NSO provides information on several known territories for the species in the BAA, and the wider area. The NSO is a well-studied and annually surveyed species throughout Humboldt County. This endangered species is documented in forest habitat throughout the region. All three North American accipiter species Cooper's Hawk (*Accipiter cooperi*), Sharp-shinned Hawk (*Accipiter stiatius)* and Northern Goshawk occur in the watershed. Pacific giant salamanders (*Dicamtodon tenebrosus*) and Pacific tailed frogs (*Ascephus truei*) are found in the forested streams and seeps. Riparian-associated wildlife species also exhibit a high degree of diversity and density. Wildlife species richness is high compared to other riparian locations in the west. Species sighted in the watershed during surveys include several special status species such as the Willow Flycatcher, Yellow-breasted Chat and Yellow Warbler. Willow Flycatcher is well documented to have juvenile migrants utilizing the river corridor in the fall as well as occasional adult occurrences that have been recorded in the riparian habitat during the summer breeding season. Rare raptors present, include: Bald Eagle, Peregrine Falcon, Osprey, and Merlin (*Falco columbarius*). A few shorebirds and waterfowl inhabit the BAA they include herons, egrets, sandpipers, Wood Duck (*Aix sponsa*), and Common Mergansers (*Mergus merganser*). Some common breeding species are found along roadsides in vegetation provided by gardens, verges, embankments and cuts. These would be the most likely species encountered or impacted along the majority of the proposed route. Small changes in availability of habitat may result in increases and decreases in understory vegetation during operations. This would cause subtle shifts in the bird community, but not cause any significant impacts. There would be potential impacts to sensitive plant species. Those species that use roadside habitats, openings and disturbed areas are the most likely to be impacted. The Western lily (*Lilium occidentale*) for example is a T&E species that will use roadsides on occasion. The checkerblooms and a few other species are also regularly found along roadsides.

Terrestrial portions of the project area can be considered to be environmentally sensitive habitats (ESHAs). Terrestrial ESHAs can be classified as follows:

1) Douglas-fir Mixed Hardwood: This is the dominant interior forest habitat type along the survey route. Douglas-fir, tanoak, and dry conditions reflect the species composition and environment. A variety of seral stages are present. Stand disturbance includes both timber harvest and wildfire.

2) Oak Savannah Grassland/Prairie: This habitat type is present in Segment 3 and Segment 4. Open grasslands with scattered oak trees, sometimes as larger stands, with the Douglas-fir in-growth around the boundaries.

3) Coast Redwood: This habitat covers the west portion of Segment 3 and Segment 4 and Segment 5. A variety of seral stages are found throughout this route Segment. The Redwood Creek watershed has a concentration of larger mature and Wildlife Habitat Relationship (WHR) size class 6 (multilayered old-growth) trees associated with the RNP. Marbled Murrelets are known to occupy and nest in these stands. The route south through GDRC traverses managed timberlands with a patchwork of mostly early and mid-seral second- or third-growth redwood stands.

4) Coastal Dunes: This habitat is restricted to the outer coast along Alternative 5A. Although within 0.5 miles, with associated species records in the CNDDB, this habitat is distinctly removed from the proposed operations along the route. Habitat areas are located on the dune spits west of the lagoons and Hwy. 101. The closest location of DUNE is adjacent to Freshwater Lagoon. Here the lagoon is to the east and Hwy101 passes along the spit immediately adjacent to the beach and limited strip of vegetated back-dune.

5) The riparian scrub habitat (Palustrine Scrub-Shrub Wetland; broad-leaved deciduous) occurs on "islands" next to the low flow channels and is the most extensive plant community within the active channel. Portions of this habitat are inundated every winter during high river flows. The Mixed Willow Series dominates the vegetation growing within the riparian scrub habitat. The understory is minimal and is comprised of weedy annual grasses and forbs. Only a sparse covering (40%) of shrubs is found in this community. This includes deciduous wetland species: narrow-leaved willow (*Salix exigua*), Pacific or shiny willow (*S. lucida*), red willow (*S. laevigata*) with the occurrence of red alder and black cottonwood in varying densities. The riparian scrub habitat with coyote brush, willows and annual vegetation supports a variety of wildlife species. The following are some of the species that use the areas for foraging, nesting and cover. Mesocarnivores such as raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), gray fox (*Urocyon cinereoargenteus*), prey species including rodents and brush rabbits (*Sylvilagus bachmani*) and many other wildlife can be found.

6) Mature Willow/Cottonwood Gallery Forest (WCGF). This habitat is uncommon in the project area. Occasionally the riparian habitat is mature enough to have developed the multi-layered canopy and large cottonwood trees that are characteristic of WCGF. The lower reaches of Redwood Creek, near the junction of Segments 4 and 5, encompass some of this habitat type.

Two additional types of general habitat can be found along the proposed route in addition to those described above. There is the open recently planted early seral stage clear-cut conifer stands scattered within the Klamath River and Redwood Creek watersheds as a result of recent logging activity. The agricultural-orchard-rural residential areas on surrounding lands that are more populated is the other habitat along the route. Mammals typical to these areas include black-tailed deer, raccoon, Virginia opossum (*Didelphis virginiana*), American mink (*Neovison vison*), stiped skunk, North American porcupine (*Erethizon dorsatum*), pocket gophers, Dusky-footed wood rats (*Neotomoa fuscipes*), and deer mice. Representative reptiles and amphibians include the foothill yellow-legged frogs (*Rana boylei*) and northern red-legged frogs (*Rana aurora*), Pacific giant salamanders, rough-skinned newts (*Taricha granulosa*), and common garter snakes: Oregon garter snake (*Thamnophis atratus hydrophilus*), Coast garter snake (*Thamnophis elegans terrestris*) and red-sided garter snake (*Thamnophus sirtalis infernis*).

4.1.2 Aquatic Habitats

Aquatic habitats include riverine, lacustrine (coastal lagoons), wetlands, and ocean shorelines. The mid- and lower-Klamath River and Redwood Creek watersheds drain >100 mi^2 in Humboldt County, respectively. The Klamath River enters the Pacific Ocean at the town of Klamath (21 miles south of Orick) and Redwood Creek enters the Pacific Ocean 2 miles south of the town of Orick. These and other large rivers in the Pacific Northwest support some of the largest populations of T&E salmonid species on the west coast. The gravel bars along the course of these rivers are, for the most part, un-vegetated due to high flows and annual bar scour. There are deciduous riparian trees (alder, willow and cottonwood) along the edge of the channel anchored into fissures in bedrock substrate both within and outside the bank-full channel. Conifer forests flank the rivers and their vegetated slopes provide cooling canopy cover for the tributary creeks and streams flowing into the main channels. This provides critical cold water during the stressful summer months for salmon fry development. Willow scrub is located in isolated patches on both shorelines, and out on the open bars. The main river channels provide migratory passage to T&E Pacific salmonids, on their way to spawning gravel where they excavate redds in their tributary natal spawning grounds.

Aquatic portions of the project area can be considered to be ESHAs can be classified as follows:

1) Riverine aquatic habitats include river channels and lower reaches of major creeks (e.g., Redwood Creek) and the occasional off-channel ponds that form under summer low water conditions. These habitats support invertebrates, fish including >5 species of Pacific salmonids, amphibians, aquatic birds (e.g., American dipper (*Cinclus mexicanus*), Common Merganser, piscivorous birds (e.g., Bald Eagle, Osprey, Belted Kingfisher (*Megaceryle alcyon*), aquatic and semi-aquatic mammals including North American river otter (*Lutra canadensis*), American beaver (*Castor canidaensis*), American mink, and raccoon. Riverine habitats provide important resources, including water and vegetation, used by many species during the driest periods of the year.

2) The exposed cobble in the gravel bars adjacent to the low-flow channels provides roosting/nesting habitats for some avian species: Killdeer, (*Charadrius vociferous*) and Spotted Sandpiper (*Calidris aethene*), but otherwise represents one of the sparsest habitats in terms of wildlife diversity and numbers. Adult foothill yellow-legged frogs bask on the cobble river edges and immediately disperse into the river when disturbed.

3) Outer Coastal Rocky Shoreline: This habitat type is located around the town of Trinidad. Such wave washed locations, although within 0.5 miles, support several PETS species. All of which, however, will not be impacted by the proposed project and OCRS is not further discussed in this report.

4.1.3 Special Animal and Plant Species

The special animal (CDFW and NDD 2016a) and plant (CDWF and NDD 2016b) species considered here are formally identified by one or more federal or California state statutes or identified by CDFW or public regulatory or land management agency included in the biological assessment area as species that must be considered for minimizing adverse impacts to from management actions. Federal statutes applicable here include: Endangered Species Act (ESA), and Bald and Golden Eagle Act. Note that the Migratory Bird Treaty Act (MBTA) protects native birds in the BAA, regardless of their listing status, from direct take as well as from take of eggs or nests, which includes disturbance at a level that causes nest abandonment. State statutes include the California Endangered Species Act (CESA). CDFW has identified California Species of Special Concern (CSSC) that are also protected. CSSC are defined as those species,

subspecies, or distinct populations of native animals, plants, and invertebrates that currently satisfy one or more of the following (not necessarily mutually exclusive) criteria:

1) Are extirpated from the state totally or in their primary seasonal or breeding role and were never listed as state threatened or endangered.

2) Are listed as federally, but not state, threatened or endangered.

3) Meet the state definition of threatened or endangered but have not formally been listed.

4) Are experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify them for state threatened or endangered status.

5) Have naturally small populations exhibiting high susceptibility to risk from any factor(s) that if realized could lead to declines that would qualify them for state threatened or endangered status.

All CSSC are considered here except any meeting only criterion1. These PETS no longer occur in the assessment area.

In addition, for plants and animals we used the global and state rankings from the CNDDB. Additionally for plants the California Rare Plant Ranking (CRPR), which originates from the former California Native Plant Society's (CNPS) classification of California rare plants, was used. The following are the official categories for ranking the concern for plant species at the global and state level.

GLOBAL RANKING--The Global rank (G-rank) is a reflection of the overall status of a plant throughout its known range. Both Global and State ranks represent a letter and number score that reflects a combination of Rarity, Threat and Trend factors, with weighting being heavier on Rarity than the other two. Global ranks range from G1 to G5 and are defined as:

G1 **Critically Imperiled**. At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors

G2 **Imperiled**. At risk because of rarity due to the very restricted range, very few populations, (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province

G3 **Vulnerable**. At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent widespread declines, or other factors

G4 **Apparently Secure**. Uncommon but not rare; some cause for long-term concern due to declines or other factors

G5 **Secure** – Common; widespread and abundant

Subspecies receive a T-rank attached to the G-rank. With the *subspecies*, the G-rank reflects the condition of the entire species, whereas the T-rank reflects the global situation of just the *subspecies* or *variety*.

STATE RANKING-- The S-rank is assigned much the same way as the G-rank, but only for within state boundaries. S-rankings range from S1 – S5: Critically Imperiled, Imperiled, Vulnerable, Apparently Secure, and Secure, respectively. Each rank is defined as follows:

S1 = Critically Imperiled—Critically imperiled in the state because of extreme rarity (often 5 or fewer populations) or because of factor(s) such as very steep declines making it especially vulnerable to extirpation from the state.

S2 = Imperiled—Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state.

S3 = Vulnerable—Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.

S4 = Apparently Secure—Uncommon but not rare in the state; some cause for long-term concern due to declines or other factors.

S5 = Secure—Common, widespread, and abundant in the state.

CALIFORNIA RARE PLANT RANKS—The following alphanumeric codes are the CNPS List, California Rare Plant Ranks (CRPR):

1A	Presumed extirpated in California and either rare or extinct elsewhere
1B	Rare or Endangered in California and elsewhere
2A	Presumed extirpated in California, but more common elsewhere
2B	Rare or endangered in California, but more common elsewhere
3	Plants for which more information is needed – Review List
4	Plants of limited distribution – Watch List

The CRPR use a decimal-style threat rank. The threat rank is an extension added onto the CRPR and designates the level of threats by a 1 to 3 ranking with 1 being the most threatened and 3 being the least threatened. Most CRPRs read as 1B.1, 1B.2, 1B.3, etc. Note that some Rank 3 plants do not have a threat code extension due to difficulty in ascertaining threats. Rank 1A and 2A plants also do not have threat code extensions since there are no known extant populations in California. Threat Code extensions and their meanings are as follows:

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

2) Moderately threatened in California (20-80% of occurrences threatened / moderate degree and of threat)

3) Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

To identify a list of PETS species using the CNDDB query, the proposed route for the fiber optic cable was buffered on each side by 0.5 mi. This buffer area defines the boundary of the biological assessment area (BAA) for this assessment. Using this buffer to define the BAA, the CNDDB species query, and other sources identified 111 PETS species in the project. The following species accounts for each of the PETS identified in the BAA are based on the synthesis of historical and contemporary information gathered to address their specific distribution relative to the BAA, habitat needs, and potential impacts from the proposed project. Table 2 provides an annotated list of the species considered for this assessment.

The majority of PETS species were considered within this report for offsite, indirect impacts to individuals or habitat. The individual PETS species accounts address the wildlife, fish and plant species with suitable habitat considered potentially present in the wider project area. Initial screening considered all possible species within their respective range for Humboldt County. Species distribution and lack of suitable habitat in most cases eliminated further concern. The following species were dismissed from further consideration due to either the absence of suitable breeding habitat in the BAA or suitable habitat being seperated from areas of the BAA likely to be impacted by construction activities: Fork-tailed Storm Petrel (*Oceanodroma furcata*), Brown Pelican (*Pelecanus occidentalis*), Western Snowy Plover (*Charadrius nivosus nivosus*), Black Oystercatcher (*Haematopus bachmani*), Rhinocerous Auklet (*Cerorhinca monocerata*), Tufted Puffin (*Fratercula cirrhata*), Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*), Short-eared Owl (*Asio flammeus*), Long-eared Owl (*Asio otus*), Burrowing Owl (*Athene cunicularia*), Black Swift (*Cypseloides niger*), Merlin (*Falco columbaris*), American badger (*Taxidea taxus*), longfin smelt (*Spirincus thaleicthyus*) tidewater goby (*Eucyclogobius newberryi*), pink sand verbena (*Abronia umbellata*), Humboldt Bay owl's clover (*Castilleja ambigua*), lagoon sedge (*Carex-lenticularis*-var. *limnophila*), Oregon coast paintbrush (*Castilleja affinis*), dark-eyed gilia (*Gilia millefoliata*), beach layia (*Layia carnosa*), seaside pea (*Lathyrus japonicus*), and Tracy's mistmaiden (*Romanzoffia tracyi*),

In comparison to the surrounding landscape, the proposed project area follows an existing road corridor with light (e.g., the Bald Hills road) to heavy (e.g., Highway 101) human use. This existing level of disturbance already influences local wildlife species and their habitat. No vegetation will be removed, apart from the immediate roadside. The ½ mile wide buffer for the BAA extends the assessment area well beyond the likely extent of potential habitat disturbance. Species with large home ranges would be expected to experience minimal impacts compared to those with small home ranges where higher proportions of their home ranges could be potentially impacted. The pre-existing disturbance from the existing road and existing levels of human use have to be considered for assessing potential impacts for each PETS species in the BAA. Potential impacts from the proposed project therefore should be assessed as one cumulative effect in conjunction with the pre-existing effects from the road and its current level of use. The following individual PETS species accounts are listed in order of priority for protection.

Birds

Golden Eagle (*Aquila chrysaetos*)
Legal Status: Golden Eagles (GOEA) are a federally protected under the Bald and Golden Eagle Act.

Species Description and Habitat Needs: GOEA are a rare to uncommon resident and a locally rare breeder in Humboldt County (Harris 2005). When present, they are often located near open grasslands for

hunting and within dense forest for nesting (Hunter et al. 2005). Rolling terrain with good thermal lift, and nest sites that are secluded from disturbances are favored by GOEA.

Status in the Assessment Area: Suitable habitat is available along Segment 3, and GOEA are expected to forage or potentially nest along this portion of the proposed route. Currently GOEA numbers seem to be stable in Humboldt County. Large platform trees used to support possible nest structures were present on the hillslopes. This species may not currently nest within 0.25 miles of the proposed route, but GOEA do have a very large home range which may incorporate part of the proposed route. GOEA was not recorded on the CNDDB enquiry. It is included as a PETS species because suitable habitat along the Bald Hills Road is available and they would be likely to occur inside the BAA. Personal knowledge of the avifauna of Humboldt County and its distribution, with the breeding records of the HBBA (1995-1999), provided the basis for this species' inclusion. The HBBA recorded GOEA as present and possibly breeding along the proposed route. This species is unlikely to be affected by construction activities associated with the proposed project.

Bald Eagle (*Haliaeetus leucocephalus*)

Legal Status: The Bald Eagle (BAEA) is a federally protected under the Bald and Golden Eagle Act and listed as state endangered under the CESA. The BAEA was formerly listed under the ESA but was delisted in 2007.

Species Description and Habitat Needs: In Humboldt County, BAEA are a rare to uncommon resident and a locally rare breeder (Harris 2005). Suitable habitat includes open water, such as rivers, large creeks, lakes, coastal lagoons, where they can capture fish, their most typical prey. BAEA typically nest in undisturbed shorelines or forested areas in close proximity to foraging habitat (Hunter et al. 2005). Tall perches with long sight lines that are secluded from human disturbances are favored for nesting sites.

Status in Assessment Area: Fish bearing waters are available and BAEA are expected to forage or potentially nest along the major river portions of the proposed route. Currently BAEA seem to be increasing in Humboldt County due to both the increase in sightings along the coast and of new nest locations in the past decade. Large platform trees used to support possible nest structures were present on the hillslopes. No large nest structures are known in the BAA. This species may not currently nest within 0.25 miles of the proposed route, but BAEA do nest within the greater Klamath River/Redwood Creek watershed. They have been confirmed as historically nesting along the proposed route. There was a record near Orleans in Segment 1 from the CNDDB report of the BAA. This species is unlikely to be affected by construction activities associated with the proposed project.

Marbled Murrelet ***(****Brachyramphus marmoratus*)

Legal Status: Marbled Murrelet (MAMU) is listed as threatened under the ESA and endangered under the CESA.

Species Description and Habitat Needs: This nearshore pelagic alcid uses the wide limbs on "Old-growth" trees for nesting platforms. Coast redwood is the most typical habitat choice, but mature moist forests along the coast including Douglas-fir also support MAMU.

Status in the Assessment Areas: Suitable old-growth habitat is present along the proposed route, much of it within RNP. MAMU are known sporadically from other isolated patches within the Klamath River drainage. One such single detection was heard near Johnson's in 2014 from an old-growth mixed redwood/Douglas-fir stand. Cappel Creek on Hwy 169 is another suitable habitat location inside the BAA. MAMU were recorded by the CNDDB on western portion of the proposed route in Segment 3, Segment 4, Segment 5 and Alternative 5A. The majority of known MAMU locations are within RNP, this portion of the route will have special seasonal restrictions as specified by the RNP for "old-growth" habitat. This will ensure no impact on this portion of the MAMU population. This species will not likely be affected in the few other mature stands along the route by construction activities associated with the proposed project**.**

Northern Spotted Owl (*Strix occidentalis occidentalis*)

Legal Status: The Northern spotted owl (NSO) is listed as threatened under the ESA. It is a candidate for threatened listing under the CESA, and is a CSSC.

Species Description and Habitat Needs: Humboldt County supports a substantial number of breeding pairs of NSO (Hunter et al. 2005) and they are considered an uncommon resident and breeder (Harris 2005). They are often associated with old growth forests but in northwestern California they also occur in second growth redwood-tanoak stands that support high densities of their preferred prey dusky-footed woodrats and that retain suitable trees for nests. (Hunter et al. 2005).

Status in the Assessment Areas: This species is known to occur within the broader area around the BAA on USFS lands, tribal lands, and commercial timberlands. Suitable foraging habitat and potential nesting habitat is present in large portions of the BAA, but NSO likely avoid using habitat in close proximity to high use roads. They may use habitat along lower use roads where activity, especially at night, is minimal. NSO were recorded by the CNDDB on all segments of the proposed route. Only NSO and OSPR are this widely documented by the CNDDB. There are no known nests or activity centers within ¼ mile of the Project centerline. No suitable NSO foraging habitat will be removed. This species is carefully monitored throughout Humboldt County timberlands and on-going surveys will determine or confirm where the current NSO activity centers are located. This species will not be significantly affected by construction activities associated with the proposed project**.**

<u>California State Protected Species</u>

White-tailed Kite (*Elanus leucurus*)

Legal Status: White-tailed Kite (WTKI) is a Fully Protected species by CDFW.

Species Description and Habitat Needs: The WTKI is a common breeding resident of coastal plains of Humboldt County. Habitat preferred by the WTKI support California Vole (*Microtus californicus*) populations, their primary prey, that are characterized by grasses 1 to 4 feet in height with a layer of decadent thatch beneath (Hunter et al 2005). Furthermore, typical sites that support kites tend occur in networks of interconnected grassland patches. Nesting sites have been reported in the sub-canopies of deciduous or conifer trees and can often be located ≥0.5 mi from foraging areas (Harris 2005).

Status in the Assessment Area: Suitable habitat for WTKI along the proposed project route is limited to the Bald Hills oak woodlands and the grassland and dune habitats along lower Redwood creek and Little River. WTKI may nest in either the open areas or in forest habitat with a suitable nesting structure in close proximity (<0.5 mi) to foraging habitat in the BAA. WTKI was not recorded on the CNDDB

enquiry. It is included as a PETS species because suitable habitat is available and they would be likely to occur inside the BAA. Personal knowledge of the avifauna of Humboldt County and its distribution, with the breeding records of the HBBA (1995-1999), provided the basis for this species' inclusion. The HBBA recorded WTKI as present and possibly breeding along the proposed route. This species will not likely be affected by construction activities associated with the proposed project**.**

American Peregrine Falcon (*Falco peregrinus anatum*)

Legal Status: The American Peregrine Falcon (PEFA) is currently a CDFW Fully Protected species CSSC. The PEFA was delisted from both the ESA and CESA in the 1990s.

Species Description and Habitat Needs: PEFA is a common migrant and wintering bird, but a rare breeding species in Humboldt County (Harris 2005). Breeding sites are limited to nesting in coastal and inland cliffs, and occasionally bridges or platforms in the broken tops of large conifer trees, often near bodies of water (Grinnell 1944).

Status inside the Assessment Area: Foraging habitat is widespread along the proposed project route, however suitable nesting habitat is limited. Known nesting locations of PEFA in the BAA is limited to a site along highway 96 at near the mouth of Bluff Creek. PEFA was not recorded on the CNDDB enquiry. It is included as a PETS species because suitable habitat is available and they would be likely to occur. Personal knowledge of the avifauna of Humboldt County and its distribution, with the breeding records of the HBBA (1995-1999), provided the basis for this species' inclusion. The HBBA recorded PEFA as present and possibly breeding near Segment 1. This species will not likely be affected by construction activities associated with the proposed project**.**

Little Willow Flycatcher (*Empidonax traillii brewsteri*)

Legal Status: The Willow Flycatcher (WIFL) is listed as an Endangered under the CESA.

Species Description and Habitat Needs: Detections of WIFL in Humboldt County can be relatively common during spring and fall migrants. Only three pairs have been confirmed breeding in Humboldt County since 1930 (Hunter et al. 2005, Hewitt 2009). One on the lower Klamath River area and one each on the lower Eel and lower Mad Rivers in the vicinity of the towns of Fortuna and Blue Lake, respectively. Other possible or probable breeding observations of WIFL have been located just inland along the North Coast. Although very rare in Northern California, WIFL regularly breed in 10-20 year old re-generating clear-cuts in the Coast Ranges of Oregon and Washington. These habitats are typically 1000-3000 feet in elevation and contain young conifers along with willow and alder and other mesic broad-leaved shrubs and only 1 location of confirm WILF nesting has been found in this habitat type (lower Klamath River). In contrast to this nesting habitat type, the other known nesting locations along the Eel and Mad Rivers have been located in more classical nesting habitat conditions for WIFL. In these nesting locations the habitat is composed of large stands of dense willow/cottonwood dominated riparian habitat in close proximity to surface waters. Unconfirmed potential nesting locations, based on the detection of WIFL during the breeding period, have recently occurred along the mid- and lower-Klamath River and lower Redwood Creek.

Status inside the Assessment Area: No confirmed nests have been reported in the BAA, however potential nesting locations based on recent detections of WIFL during the breeding period occur along the lower portion of Bald Hills road adjacent to Redwood creek riparian habitat (Segment 4). In addition,

suitable nesting habitat is present in along the Klamath River and the lower portion of Little River. WIFL was not recorded on the CNDDB enquiry. It is included as a PETS species because suitable habitat is available and they would be likely to occur. Personal knowledge of the avifauna of Humboldt County and its distribution, with the breeding records of the HBBA (1995-1999), provided the basis for this species' inclusion. The HBBA recorded WIFL as present and possibly breeding along the proposed route. This species will not likely be affected by construction activities associated with the proposed project**.**

California Species of Special Concern

Northern Harrier (*Circus cyaneus*)

Legal Status: The Northern Harrier (NOHA) is a CSSC Priority 3 species.

Species Description and Habitat Needs: The NOHA is a resident but uncommon breeding species in Humboldt County (Harris 2005). Breeding harriers occur most frequently in coastal lowland open areas composed of contiguous marsh, tall grasslands, coastal dunes, and overgrown pastures. Nests are placed on the ground under tall grass or bushes (Harris 2005).

Status in the Assessment Area: Suitable foraging and nesting habitat in the BAA occurs along the Bald Hills road, and dune and pasture habitats along the lower Redwood Creek and lower Little River. These open habitats along the proposed project route are large enough to support nesting NOHA, but due to the current levels of human disturbance along the existing travel corridors it is unlikely they would nest in close proximity to the roads along the proposed route. NOHA was not recorded on the CNDDB enquiry. It is included as a PETS species because suitable habitat is available and they would be likely to occur. Personal knowledge of the avifauna of Humboldt County and its distribution, with the breeding records of the HBBA (1995-1999), provided the basis for this species' inclusion. The HBBA recorded NOHA as present and possibly breeding along the proposed route. NOHA will not likely be affected by construction activities associated with the proposed project.

Northern Goshawk (*Accipiter gentilis*)

Legal Status: The Northern Goshawk (NOGO) has a Natural Heritage rank of G5/S3. Nesting NOGO are a CSSC, and a Sensitive species with the USFS, CDF and BLM.

Species Description and Habitat Needs: A long-lived species, NOGO is a forest hawk that uses mature conifer habitat at higher elevations of the interior of Humboldt County. An open understory is preferred for hunting and large mature conifers are needed for the multiple nest sites within its territory.

Status in the Assessment Area: This species is a very rare breeding bird in Humboldt County. The NOGO is documented as present within the BAA. It was recorded by the CNDDB enquiry as located near Orleans in Segment 1 of the proposed project route. The HBBA also documented a nesting goshawk during the late 1990's in the Orleans vicinity. This species is quite sensitive to human disturbance and would be very unlikely to nest within 0.5 miles of the project area. The proposed construction activities along the KRRBI fiber optic project route will not have an additional significant impact on this species.

Vaux's Swift (*Chaetura vauxi***)**

Legal Status: The Vaux's Swift (VASW) is a CSSC Priority 2 species.

Species Description and Habitat Needs: The VASWs is a common migrant and breeding species in Humboldt County (Harris 2005). They occur in most habitats in the county but are more abundant in the redwood zone of Humboldt County. VASW are aerial insectivores and most often forage over the canopies of forest and other habitats. VASW nest in the cavities of large diameter tree and snags, most often with broken tops providing access to the cavity. VASW also use human structures, such as chimneys in buildings for nesting and communal roosting.

Status in the Assessment Area: Suitable habitat for VASW occurs throughout the BAA, but suitable nesting locations are likely to uncommon to rare. VASW was not recorded on the CNDDB enquiry. It is included as a PETS species because suitable habitat is available and they would be likely to occur inside the BAA. Due to their aerial foraging activity, they are unlikely to be disturbed while foraging. Due to their use of internal cavities for nesting they are only likely to be impacted by construction activities if nests sites are in the immediate vicinity (100m). Structures typically used by this species such as redwood "goose-pens" are not usually right beside the road. Personal knowledge of the avifauna of Humboldt County and its distribution, with the breeding records of the HBBA (1995-1999), provided the basis for this species' inclusion. The HBBA recorded VASW as present and possibly breeding along the proposed route. VASW will not likely be affected by construction activities associated with the proposed project.

Olive-sided Flycatcher (*Contopus cooperi***)**

Legal Status: The Olive-sided Flycatcher (OSFL) is a CSSC Priority 2 species .

Species Description and Habitat Needs: The OSFL is a common migrant and breeding species in Humboldt County (Harris 2005). These flycatchers are found throughout the county and are typically associated with conifer forests that have ample openings between stands. They are mostly vacant in the more oak-dominated landscapes of interior sites of Humboldt County (Hunter et al. 2005). Olive-sided Flycatchers will be recorded along the majority of the cable route, however it is an abundant species in our area. OSFL nest in cavities in snags, usually at mid to upper canopy height.

Status in the Assessment Area: The OSFL is a common and widespread species throughout Humboldt County. It was recorded on 34% of the HBBA survey blocks, several of which show confirmed breeding. It was one of the 50 most widespread species (rank = 37) of all (n = 181) breeding species documented between 1995 and 1999. OSFL was not recorded on the CNDDB enquiry. It is included as a PETS species because suitable habitat is available and they would be likely to occur inside the BAA. The BAA may include habitat for this species and it was recorded as a breeding species in 33, of the 41, 5km "blocks" traversed by the proposed project route. OSFL will not likely be affected by construction activities associated with the proposed project.

Purple Martin (*Pogne subis***)**

Legal Status: The Purple Martin (PUMA) is a CSSC Priority 2 species.

Species Description and Habitat Needs: The PUMA is an uncommon migrant and breeding species in Humboldt County (Harris 2005). Most documented nesting sites for PUMA occur in the redwood zone and along the major rivers of Humboldt County. PUMA are obligate cavity nesters and use primarily large diameter conifer snags for nesting as well as some human structures such as cavities in old buildings or telephone poles (Hunter et al. 2005).

Status in the Assessment Area: PUMA may also forage over the route, especially during migratory periods. Large conifer snags for nesting will remain and this species will not be impacted by proposed operations. PUMA was not recorded on the CNDDB enquiry. It is included as a PETS species because suitable habitat is available and they would be likely to occur inside the BAA. Personal knowledge of the avifauna of Humboldt County and its distribution, with the breeding records of the HBBA (1995-1999), provided the basis for this species' inclusion. The HBBA recorded PUMA as present and confirmed as breeding along the proposed route. Given their nesting location well above ground in large snags, PUMA will not likely be affected by construction activities associated with the proposed project.

Yellow-breasted Chat (*Icteria virens*)

Legal Status: The Yellow-breasted Chat (YBCH) is a CSSC Priority 2 species.

Species Description and Habitat Needs: The YBCH is a rare migrant and a locally uncommon breeding species (Harris 2005). YBCHs are variable in their nesting habitat preferences, but in general occur in riparian and riparian scrub habitat with dense understory or low vegetative cover. These habitats occur most often along rivers and lower reaches of large creeks (Hunter et al. 2005). In addition, YBCHs can occur in mesic shrub-dominated habitats or recently disturbed areas regenerating with dense low vegetation away from riparian areas.

Status in the Assessment Area: YBCHs regularly occur in the BAA along the Klamath River, lower Redwood Creek, and in the vicinity of the Little River. This species was not recorded on the CNDDB enquiry. It is included here because suitable habitat is abundant and they are widespread inside the BAA. Personal knowledge of the avifauna of Humboldt County and its distribution, with the breeding records of the HBBA (1995-1999), provided the basis for this species' inclusion. The HBBA recorded YBCH as present and confirmed as breeding along the proposed route. Additional significant impacts to YBCH from construction activities are minimized due to existing regular human disturbance along the proposed project route. However areas of proposed roadside vegetation removal for the project route will encounter YBCH nesting in the immediate vicinity. Disturbance of breeding YBCH is possible as they use low scrub habitat that might be adjacent to the road, at ground level. Given the proximity of the proposed route to its preferred habitat YBCH could be affected by construction activities associated with the proposed project. Mitigation measure BIO-1 will avoid disturbance of YBCH and other migratory bird nests.

Yellow Warbler ***(****Setophaga petechial*)

Legal Status: The Yellow Warbler (YEWA) is a CSSC Priority 2 species .

Species Description and Habitat Needs: The YEWA is a locally common migrant and breeding species (Harris 2005). YEWA typically occur in mature riparian areas with stands of black cottonwood, willow, and alder (Hunter et al. 2005). Most of the suitable riparian habitat throughout Humboldt County is occupied by breeding YEWA.

Status in the Assessment Area: Suitable habitat for YEWA in the BAA occurs throughout the proposed route where riparian habitat occurs, such as along the Klamath River, lower Redwood Creek, and Little River. This species was not recorded on the CNDDB enquiry. It is included here because suitable habitat is available and it is expected to occur inside the BAA. Personal knowledge of the avifauna of Humboldt County and its distribution, with the breeding records of the HBBA (1995-1999), provided the basis for this species' inclusion. The HBBA recorded YEWA as present and confirmed breeding along the proposed route. YEWA will also occur during migratory period, spring and fall, in the most minimal riparian habitat. Additional significant impacts to this species are unlikely due to existing human disturbance along the proposed project route. As a canopy nesting neo-tropical migrant, this species may be far enough away from significant disturbance due to the construction activities on the ground.

Grasshopper Sparrow (*Ammodramus savannarum*)

Legal Status: The Grasshopper Sparrow (GRSP) is a CSSC Priority #2.

Species Description and Habitat Needs: The GRSP is a locally uncommon migrant and breeding species (Harris 2005). These birds are closely associated with grassland habitats that receive little disturbance from humans (Hunter et al. 2005, Irvin et al. 2013). These habitats exist both coastally and well inland in Humboldt County.

Status in the Assessment Area: Suitable occupied habitat for GRSP occurs along the proposed route in the Bald Hills area (Segment 3). GRSP was not recorded on the CNDDB enquiry. It is included as a PETS species because suitable habitat is available and they are expected to be present. Personal knowledge of the avifauna of Humboldt County and its distribution, with the breeding records of the HBBA (1995-1999), provided the basis for this species' inclusion. The HBBA recorded GRSP as present and confirmed as breeding along the proposed route. Historical GRSP territories are known to occur in close proximity to the proposed route in this area, based on the presence of singing males on top of fence posts within 30m of the road during the nesting season. They will be protected through mitigation measure BIO-1.

<u>California Watch List Species</u>

Ruffed Grouse (*Bonasa umbellus*)

Legal Status: The Ruffed Grouse (RUGR) is on the CDFW Watch List.

Species Description and Habitat Needs: RUGR inhabit the moist lower slopes of the redwood valleys in this region. It is thought RUGR feed on alder buds which are often concentrated along roadsides in riparian habitat. It is one of the expected game bird of the redwood region, but it is found nowhere else in the state. It is much more widespread outside of California.

Status in the Assessment Area: This species is a regular breeding bird across the NW portion of the Cascadia bio-region. It is on the watch list due to its restricted range within the state. This species is documented as present within the BAA. It was recorded by the CNDDB enquiry as located in Segment 2 of the proposed project route. Construction activities along the proposed KRRBI fiber optic project route will not have a significant impact on this species.

Double-crested Cormorant (*Phalacrocorax auritus*)

Legal Status: Double-crested Cormorant (DCCO) nesting colonies are specifically protected as a CSSC, and the species is on the Watch List.

Species Description and Habitat Needs: The DCCO is a long-lived colonial nesting waterbird that occurs in freshwater and near-coast saltwater habitats that support their primary prey, small fish populations. They breed along the coast as well as on large inland lakes and can fly up to forty miles from nesting areas to foraging areas. In addition to foraging habitat, cormorants need perching areas for resting which most often include large rocks or large trees.

Status in the Assessment Area: The DCCO occurs along the mid- and lower- Klamath River, lower Redwood Creek, and along the entire coastline from Orick to McKinleyville. No nesting locations are known to occur within the BAA and therefore potential disturbance from construction activities for foraging birds at a distance is unlikely. They will be observed flying up and down the rivers of the BAA for foraging. DCCO were recorded by the CNDDB on Alternative 5A of the proposed route. The HBBA recorded that DCCO only nested along the outer coast, or in Humboldt Bay. They will not nest within the immediate vicinity of the project area. DCCO will not be affected by the KRRBI project.

Great Blue Heron (*Ardea Herodias*)

Legal Status: Great Blue Heron (GBHE) nesting colonies are fully protected by CDFW.

Species Description and Habitat Needs: The GBHE is a widespread and common wader that typically nests in well-established rookeries closely associated with wetland habitats. Rookeries are usually a single or small number of large trees where multiple nests are constructed in close proximity to each other. These communal nesting sites are vulnerable to disturbance and represent a critical element of their life history.

Status in the Assessment Area: Current colony locations are known from Indian Island and Hookton Road based on a recent statewide inventory. A small colony is also present along the Klamath River between Orleans and Happy Camp across the river from Highway 96, well north of the BAA. This species is documented as present within the BAA. It was recorded by the CNDDB enquiry as located in Segment 1of the proposed project route. Currently there are no known nesting colonies, or individual nests along the proposed route. The proposed construction activities along the KRRBI fiber optic project route will not have a significant impact on this species.

Black-crowned Night Heron (*Nycticorax nycticorax*)

Legal Status: Black-crowned Night Heron (BCNH) nesting colonies are protected. This species is on the CDFW Special Animals List where it is ranked G5/S4.

Species Description and Habitat Needs: The BCNH is a colonial nesting heron. It roosts during the day and leaves at dusk to forage for amphibians and other food items. BCNH are often found in small numbers within a larger heron rookery. They do also nest in smaller monotypic groups.

Status in the Assessment Area: There are several known BCNH colonies in Humboldt County. Current colony locations are known from Indian Island, Blue Lake, and Hookton Road based on a recent statewide inventory. This species is documented as present within the BAA. It was recorded by the CNDDB enquiry as located in Segment 4 of the proposed project route. The proposed construction activities along the KRRBI fiber optic project route will not have a significant impact on this species.

Cooper's Hawk (*Accipiter cooperii*)

Legal Status: The Cooper's Hawk (COHA) is a CSSC Watch List species .

Species Description and Habitat Needs: COHA are common migrants and winter visitors but an uncommon breeding species in Humboldt County (Harris 2005). However, COHA are much less dependent on contiguous tracts of forest than other accipiters and prefer areas with broken forest cover for foraging and nesting (Hunter et al. 2005). Preferred nesting habitats include riparian and lowland woodland settings as well as mixed conifer forest. COHA have developed a tolerance for human disturbances which has allowed for their increase in some residential areas, especially in winter.

Status in the Assessment Area: Suitable forested nesting habitat for COHA occurs throughout the BAA. This species would be expected to use the BAA for hunting, and probable nesting. COHA was not recorded on the CNDDB enquiry. It is included as a PETS species because forest cover is abundant and they would be likely to occur inside the BAA. Personal knowledge of the avifauna of Humboldt County and its distribution, with the breeding records of the HBBA (1995-1999), provided the basis for this species' inclusion. The HBBA recorded COHA as present and possibly breeding along the proposed route. The existing level of human disturbance probably eliminates concerns for this species as it would be very unlikely to nest close to the proposed project route. COHA will not likely be affected by construction activities associated with the proposed project.

Sharp-shinned Hawk (*Accipiter striatus*)

Legal Status: The Sharp-shinned Hawk (SSHA) is a CSSC Watch List species .

Species Description and Habitat Needs: SSHA are common migrants and winter visitors but an uncommon breeding species in Humboldt County (Harris 2005). Preferred nesting habitats include dense stands of young to mid-seral conifer habitat.

Status in the Assessment Area: Suitable forested nesting habitat for SSHA occurs throughout the BAA. This species would be expected to use the BAA for hunting, and probable nesting. SSHA was not recorded on the CNDDB enquiry. It is included as a PETS species because forest cover is abundant and they would be likely to occur inside the BAA. Personal knowledge of the avifauna of Humboldt County and its distribution, with the breeding records of the HBBA (1995-1999), provided the basis for this species' inclusion. The HBBA recorded SSHA as present and possibly breeding along the proposed route. The existing level of human disturbance probably eliminates concerns for this species as it would be very unlikely to nest close to the proposed project route. SSHA will not likely be affected by construction activities associated with the proposed project.

Osprey (*Pandion haliaetus*)

Legal Status: The Osprey (OSPR) is a CSSC Watch List species .

Species Description and Habitat Needs: The OSPR is a common resident and breeder in Humboldt County. Breeding OSPR primarily occupy habitat within a few miles of fish-bearing water bodies (Harris 2005). They almost always nest in the flat or broken tops of native conifer trees or snags (Hunter et al. 2005) Nesting locations vary from near water's edge to well upslope of water's edge. This species regularly nests along the Klamath River/Redwood Creek. The immediate vicinity of the proposed route may not have any particularly suitable nesting sites and may have more human activity than would be tolerated by this species. OSPR can adjust to various habitats, nesting in any location that can provide them with a sufficient food supply. They will live by saltmarshes, river, ponds and estuaries. They are found on all continents except Antarctica, and only appear in South America as non-breeding migrants. Live fish make up 99% of the OSPR diet. OSPR require nesting areas that are in open areas that are easy to approach and Nest are often constructed in large-diameter snags, live trees, cliffs, or human-built platforms (Poole et al. 2002).

Status in the Assessment Area: OSPR are regular nesting birds along the rivers in the BAA. Several records were reported from the CNDDB. OSPR was documented in all Segments of the project area in the CNDDB report. It and NSO were the only species to be recorded in all segments of the proposed route. Many known and historical nests are monitored annually by the various land managers within the BAA. Certain nest locations in busy areas demonstrate that this species can become habituated to human activity. OSPR will not be affected by construction activities associated with the KRRBI.

MAMMALS

Sensitive mammal species have been detected in the survey area, and would be expected to occur within the BAA. Riparian mammals occurring along the main-stem Klamath River/Redwood Creek include numerous rodent species, whose distributions are linked to the distribution of riparian vegetation. Evidence and occasional sightings of larger, semi-aquatic species, such as beaver and river otter, is often seen. A variety of bat species can be widely distributed within the BAA, but they are rarely seen. Larger mammals such as bear and deer are present along the river travel corridors.

Pallid bat (*Antrozous pallidus*)

Legal Status: The pallid bat (PABA) is a CSSC with a Natural Heritage ranking of G5/S3

Species Description and Habitat Needs: The PABA is found throughout California, except at high elevations, and while is best known from arid desert habitats (Hermanson and O'shea 1983) it also occurs in mixed conifer forest habitats in northern California (Baker et al. 2008). PABA most often use rock crevices or human structures that provide crevice-like features for day and night roosting (Hermanson and O'Shea 1983), however in mixed conifer forest habitats in northern California they utilize large diameter (>100 cm DBH) live trees and snags as well as rock crevices and human-made structures with crevices (Baker et al. 2008). Roosting sites in trees and snags are most often in cavities, including basal hollows, and less commonly in external cervices or underneath exfoliating bark. Bridges may be used as night roosts and individual bats typically exhibit high fidelity to particular night roosts (Lewis 1994, Hayes 2003).

Status in the Assessment Area: Concrete bridges for PABA can be used as either day or night roosts (Lewis 1994). PABA was recorded by the CNDDB on Segment 3 and Segment 4 of the proposed fiber

optic cable route. No new bridge hangs are proposed for concrete bridges for installation of the KRRBI Project. No impact to this species is expected.

Townsend's big-eared Bat (*Corynorhinus townsendii*)

Legal Status: The Townsend's big-eared bat (TBEB) is a candidate threatened CESA species and a CSSC. It is ranked as G3G4/S2.

Species Description and Habitat Needs: The TBEB occurs throughout California, but complete details of its distribution are unclear, and it occurs in both forested and non-forested habitats (Hayes 2003). TBEB appears to use bridges for night roosts less often than more common bat species in the Oregon coast range (Adam and Hayes 2000) and elsewhere (Sherwin et al. 2000).

Status in the Assessment Area: TBEB was not recorded on the CNDDB enquiry. It is included as a PETS species because suitable habitat is available and they are expected to be present.. If present, bats would already be habituated to traffic noise and vibration. No new bridge hangs are proposed for concrete bridges for installation of the KRRBI Project. No impact to this species is expected.

Silver-haired bat *Lasionycteris noctivagens*
Legal Status: The Silver-haired bat (SHBA) is on the CDFW Special Animals List (2016) and is ranked G5/S3S4

Species Description and Habitat Needs: The SHBA is a forest dwelling species that is regarded as a solitary tree-roosting species that roosts in cavities or bark crevices (Kunz 1982). SHBAs forage in or near coniferous or mixed conifer-hardwood forests and often near bodies of water, such as streams and ponds, associated with these forest habitats (Kunz 1982).

Status in the Assessment Area: This species is documented as present within the BAA. It was recorded by the CNDDB enquiry as located in Segments 3 and 4 of the proposed project route. Impacts to bat species would be minimal considering their arboreal roosting locations and aerial foraging activity. Nocturnal foraging activity will avoid the majority of the construction disturbance.

Yuma myotis *Myotis yumanensis*

Legal Status: The Yuma myotis (YUMY) is ranked G5/S4, it is BLM Sensitive

Species Description: The YUMY is found in a variety of western lowland habitats, from arid thorn scrub to coniferous forest, but always close to standing water such as lakes and ponds (Duff 2007). Their natural roosts include caves, rock crevices, and hollow trees, they are more commonly found today in artificial structures close to water. In suitable locations, they have been reported to establish colonies with as many as 10,000 members. They are relatively inactive during the winter and spend some time in torpor, but probably do not migrate away any significant distance.

Status in the Assessment Area: The YUMY is a colonial-roosting species that occurs in a variety of habitat types, including mixed conifer-hardwood forests and oak woodlands (O'Farrell, 1980). Roost sites are typically in caves and human-created structures such as mine shafts and buildings. This species

is documented as present within the BAA. It was recorded by the CNDDB enquiry as located in Segment 4 of the proposed project route. Impacts to bat species would be minimal considering their cave/structure, roosting locations and aerial foraging activity. Nocturnal feeding activity will avoid the majority of construction period. If present, bats would already be habituated to traffic noise and vibration. No new bridge hangs are proposed for concrete bridges for installation of the KRRBI Project. There will be no significant impacts to YUMY as a result of the proposed project.

White-footed vole (*Alborimus albipes*)

Legal Status: The white-footed vole (WFVO) is a CSSC.

Species Description and Habitat Needs: The WFVO is a nocturnal species WFVO has an elevational range of 0-1000m. They are most abundant in deciduous forests, although they have been observed in WFVO all types of forest throughout their range. Their main habitat requirement is the presence of hazel and density of alder. WFVO eat a variety of herbaceous plants, roots, mosses and pollen (Weinstein 1999). Due to their preference for mesic plant as their primary food, WFVO often occurs close to streams and near fallen trees.

Status in Assessment Area: WFVO were only recorded by the CNDDB along the coast in Alternative 5A of the proposed fiber optic cable route. This species can use a wide variety of habitats and would be unlikely to use poor quality roadside vegetation. None required. There will be no significant impacts on WFTV as a result of the proposed KRRBI project.

Sonoma tree vole (*Arborimus pomo*)

Legal Status: The Sonoma tree vole (STVO) is a CSSC.

Species Description and Habitat Needs: The STVO is found chiefly within coniferous forest within the fog belt in northwestern California. The range of the STVO occurs from Freestone, Sonoma County, north through Mendocino, Humboldt, and western Trinity Counties to the South Fork of the Smith River, Del Norte County where it is replaced further northward in Del Norte County and into coastal Oregon by the Red Tree Vole (*Arborimus longicaudus*). There is some disagreement over the specific identity (*pomo* versus *longicaudus*) of tree voles at the northern extent of the range in northern California (Blois 2015). STVO builds their nests within the canopies of trees and feeds almost exclusively on Douglas-fir needles. The species' habitat consists of mixed evergreen forests; optimum habitat appears to be wet and mesic old-growth Douglas-fir forest, but this species also occurs in younger forests (e.g., Douglas-fir 47 years old). This vole is primarily arboreal but exhibits some terrestrial activity. It nests in trees, 2-50 m above ground; it may use old nests of birds, squirrels, or woodrats. Nests usually are in Douglas-fir trees but sometimes may be in other conifer or in Pacific madrone (Meiselman, 1996, Vrieze, 1998). STVO nests were most abundant in old-growth forests; the species was associated with large-diameter Douglas-fir, high percentage canopy cover, high stump density, low snag density, shorter snags and logs, and lower elevation; all nests were in Douglas-fir, mostly adjacent to the trunk on the south side (Meiselman, 1996). The SOTV feeds primarily on Douglas-fir needles. It also eats needles of Grand or Lowland White Fir, Sitka Spruce, and Western Hemlock. It may eat inner bark of twigs as well (Benson and Borell 1931). An individual vole may eat an average of 2,400 needles per day, taking the young shoots and eating everything but the center resin duct, which it used to construct their nests. The STVO usually feeds inside or on top of its nest. STVO nest very high in trees, so high that finding them is very difficult and many records come from individuals that were found after a tree had been cut down.

Status in the Assessment Area: Suitable habitat occurs throughout most of the BAA where mature and old growth Douglas fir trees are present. STVO were recorded by the CNDDB on the wetter western portion of the BAA in Segment 3, Segment 4 and Segment 5 of the proposed fiber optic cable route. Due to the highly arboreal habits of the SOTV and because no large Douglas-fir trees will be removed during construction activities for the proposed project, there will be no significant impacts to this species.

Humboldt marten (*Martes caurina humboldtensis*)

Legal Status: The Humboldt marten (HUMA) is a candidate Endangered species under CESA and a CSSC.

Species Description and Habitat Needs: The HUMA historically occurred chiefly within the fog-influenced conifer forests <20km from the coast from northwestern Sonoma county to coastal Oregon (Zielinski et al. 2001). They are currently known from 2 small remnant populations in California, the largest of which occurs in northern Humboldt, southern Del Norte, and the western edge of Siskiyou counties. The smaller population occurs between highway 199 and the Siskiyou Wilderness in northeastern Del Norte County (Slauson et al. in press). The HUMA primarily occurs in late successional and old growth conifer-dominated forests with dense spatially-extensive ericaceous shrub cover, but does also occur in forest habitats on serpentine forest habitat with dense shrub cover (Slauson et al. 2007).

Status in the Assessment Area: Although HUMA occur just to the north of highway 96 and immediately to the east of highway 169 near the town of Johnson's, HUMAs are only known to occur within the BAA in a single location near Johnson's but >500 feet upslope from the proposed project route in that location. HUMA was not recorded on the CNDDB enquiry. It is included as a PETS species because suitable habitat is available and they might be present. Due to the existing human disturbance associated with the road near Johnson's and presence of HUMAs several hundred feet above the proposed project route, no impacts to this species are likely. There will be no significant impacts on HUMA as a result of the proposed project.

Pacific fisher (*Pekania pennanti*)

Legal Status: The Pacific fisher (PAFI) is a candidate Threatened species under the CESA and a CSSC. The PAFI was recently removed as a candidate Threatened species under the ESA.

Species Description and Habitat Needs: In California, the PAFI occurs in mature mixed conifer hardwood forests of the northern coast range, Klamath, Siskiyou, and Sierra Nevada mountain ranges. PAFIs can be found in forest habitats from near sea level on the coast up to 6,000 feet in interior mountain ranges (Lofroth et al. 2010).

Status in the Assessment Area: Detections, sightings, and road kills of PAFIs have occurred throughout much of the BAA. Although considered a CSSC this species has a wide distribution and reasonable population, as shown in the database report. The CNDDB reported PAFI from Segment 2, Segment 3, Segment 4 and Segment 5 of the proposed fiber optic cable route. PAFI was one of only seven species in the suite of 111 considered that had a distribution over 4, or in all 5, Segments of the proposed route. PAFI likely occur in numerous locations along the proposed route, with the highest frequency of habitat use likely along portions of the route with little human disturbance with adjacent suitable forest habitat. Fishers have large home ranges that typically exceed several square miles (Lofroth et al. 2010). Potential

disturbances from project activity will likely only impact very small portions of any individual fisher's home range, leaving the majority of any home range overlapping the project route not impacted. There will be no significant impacts on PAFI as a result of the proposed project.

4.2.2 Aquatic Habitats

AMPHIBIANS AND REPTILES

Sensitive amphibian species include the Pacific tailed frog (*Ascaphus truei*), the Del Norte Salamander (*Plethodon elongatus*) and the southern seep salamander, aka. Southern torrent salamander (*Rhycotriton varigatus*). Based upon their habitat requirement for, fast moving forest streams and seeps, it is assumed that the tailed frog and southern torrent salamander could occur within the project area. Excellent amphibian habitat is present throughout the BAA.

Southern torrent salamander (*Rhycotriton varigatus*)

Legal Status: The southern torrent salamander (STSA) is a CSSC and a USFS Sensitive species.

Species Description and Habitat Needs: Southern Torrent Salamanders (STSA) are mainly aquatic, but capable of terrestrial activity, living primarily in seeps and headwater streams where the water remains cold year round (Tait and Diller 2006). Aquatic larvae live in clear shallow water and still murky creeks with accumulated leaves. These salamanders are typically found in disjointed populations on north-facing slopes and relatively high elevations or in mature to old-growth forests. STSA is the smallest salamander endemic to the Pacific Northwest, ranging from Northern California to Northern Oregon. STSA lives in aquatic environments from egg through metamorphic stages. Their preferred habitat is cool seeps and mountain brooks that are high in oxygen and have course gravel beds. Southern torrent salamanders can travel away from the stream, but only do so when ground moisture content is high.

Status in Assessment Area: Threats to this species includes urbanization, logging, road building, and climate change. As the temperature warms (exceeding the stress threshold of 63 degrees F) the salamanders will have to adapt to the warmer climate or face extinction. Although considered a CSSC this species has a wide distribution and relatively large population as seen in the database report. The CNDDB reported STSA from Segment 2, Segment 3, Segment 4 and Segment 5 of the proposed fiber optic cable route. STSA was one of only seven species in the suite of 111 considered that had a distribution over 4 or all 5 Segments of the proposed route. There may be pockets of suitable habitat at the mouths of small creeks that empty into the Klamath River that support this species. Mitigation measure WATER-1 will result in BMPs for sediment control that will benefit STSA that are very dependent on clean, cold running water.

Del Norte salamander (*Plethodon elongatus*)

Legal Status: The Del Norte Salamander (DNSA) is a G3/S3 CSSC and a USFS Sensitive species.

Species Description and Habitat Needs: Del Norte salamander (DNSA) are mainly terrestrial and bury themselves deep into talus slopes. The species occurs in areas of moist talus and rocky substrates in redwood or Douglas fir forests. It is typically encountered among moss-covered rocks or under bark and other forest litter, usually avoiding very wet areas. Del Norte salamander is locally abundant in suitable habitat. It is threatened by habitat loss caused by logging.

Status in Assessment Area: Threats to this species includes urbanization, logging, road building, and climate change. As the temperature warms (exceeding the stress threshold of 63 degrees F) the salamanders will have to adapt to the warmer climate or face extinction. Although considered a CSSC this species has a wide distribution and relatively large population and can often be found in road cuts in moist forested areas. The CNDDB reported DNSA from Segment 1 of the proposed fiber optic cable route. There is suitable habitat present. Mitigation measure WATER-1 will result in BMPs for sediment control that will benefit DNSA that are very dependent on clean, cold water in the interstitial spaces of the talus. This species with its habit of using cut banks is unlikely to have any cumulative impacts. Underground for much of the time DNSA would not be significantly disturbed.

Foothill yellow-legged frog (*Rana boylii*)

Legal Status: The foothill yellow-legged frog (FYLF) is a CSSC and a USFS Sensitive species.

Species Description and Habitat Needs: FYLF are fairly common on the rocky perennial river tributaries within the forest and are fairly common along rivers throughout the north coast. The have been detected regularly along the Klamath River/Redwood Creek including along the margins adjacent to the river. The adults and sub-adults prefer river bars along both riffles and pools, with some shade. Occasionally, FYLF are found in other riparian habitats such as backwater, isolated pools, or slow moving water with mud substrate. In the spring, adult frogs congregate along gravel/cobble river bars, where breeding occurs in shallow, slow flowing water. Previous literature reports breeding to occur from late March through May. Growth to maturity is also temperature dependent; some individuals may reproduce as early as 6 months after metamorphosis (Jennings 1988, as cited by Ashton et al. 1997). The FYLF is a small frog (3.7- 8.2 cm) that can be found from northern Oregon, through California's coast and into Baja Mexico. FYLF are fairly common on the rocky perennial river tributaries within the forest and are fairly common along rivers throughout the north coast. Forty percent of streams in the Pacific Northwest support these frogs. While literature lends overall evidence that they prefer higher gradient, shallower streams with more canopy cover and less vegetative streamside cover than do the Northern Red-Legged Frog (NRLF) the overwhelming observations established over the years depicts this species preferring open canopy cover along gravel banks for thermoregulation. If water is too fast-flowing the frogs will refuse to mate, and will wait until conditions are ideal. Females will lay anywhere from 100 to 1000 eggs which can hatch in 5 days or up to 30, depending on the surrounding water temperature

Status in the Assessment Area: The CNDDB reported FYLF from Segment 1 and Segment 4 of the proposed fiber optic cable route. Threats to this species include predation by garter snakes, rough skinned newts, bullfrogs and toads. In addition, habitat loss, pesticide use, competition, logging, water impoundment and grazing in riparian zones are factors in their decline. The FYLF population is considered stable within the lower Klamath River/Redwood Creek, and the frog has available dispersal habitat into the river if potentially disturbed. No significant impacts are expected to FYLF.

Northern red-legged frog (*Rana aurora*)

Legal Status: The northern red-legged frog (NRLF) is a G4/S3 CSSC, a BLM and a USFS Sensitive species.

Species Description and Habitat Needs: NRLF require freshwater ponds, pools in slow streams, marshes, or reservoirs with submerged vegetation for egg attachment and emergent vegetation for cover.

They are sometimes found in damp woods and meadows away from water bodies, especially during wet weather (Geoffrey 2008). This species requires the still waters of ponds, marshes or streams for mating and laying eggs. NRLF is highly aquatic for breeding early in the year, preferring thickly vegetated shorelines. By March or April most have matured and dispersed in the moist forest uplands. NRLF return to their breeding sites in October, and sometimes as late as January. This depends on latitude, cumulative rainfall for the season, and average temperature. Oviposition generally takes place in densely vegetated, shallow portions of wetlands with little current. Breeding sites can be either permanent or temporary, with inundation usually necessary into June for successful metamorphosis. Adults leave the breeding pond soon after the breeding activity is concluded, and may migrate about one half kilometer to their summer locations, which are likely to be riparian zones. Juveniles disperse in a similar manner, but are slower to leave the breeding ponds. Breeding NRLF are found in many of the freshwater marshes and ponds in the lower Klamath River/Redwood Creek area.

Status in the Assessment Area: Although considered a CSSC this species has a wide distribution and relatively large population as seen in the database report. The CNDDB reported NRFR from Segment 2, Segment 3, Segment 4 and Segment 5 of the proposed fiber optic cable route. NRLF was one of only seven species in the suite of 111 considered that had a distribution across 4, or all 5, Segments of the proposed fiber optic cable route. NRLF will use ponds, marshes and the moist forest floor debris throughout the BAA as habitat. Threats to this species include: fragmentation, alteration, or loss of habitat resulting in increased water temperatures, decreased pool depth, or decreased riparian vegetation; and introduction of exotic fishes and/or bullfrogs; wetland destruction, urbanization, reservoir construction, off-road vehicle activity. NRLF habitat is present in the BAA and this species will likely be present. However, this locally common species will remain in the moist shaded forested areas away from the dry exposed construction activities. No impacts to any amphibian species are expected as a result of the proposed operations.

Pacific tailed Frog (*Ascephus truei*)

Legal Status: The Pacific tailed frog (PTFR) is a G4/S3S4 CSSC.

Species Description and Habitat Needs: PTFR is one of the two species of frogs found in the genus Ascaphus. They are found from British Columbia to northern California and from elevations of 0- 8400 ft. PTFR habitat includes cold, clear streams in mature forests. All life stages are adapted for life in fast flowing streams. Eggs in strings of 40-80 are attached to the underside of rocks to keep them from floating away. Eggs take 3-6 weeks to hatch, usually in August and September. Metamorphosis takes from one to four years, and after that the young may disperse into the forest.

Status in Assessment Area: Threats to this species include deforestation, sedimentation and rise of water temperature in their cold, fast flowing streams, due to timber harvesting, road building and other activities. The CNDDB reported PTFR from Segment 5 of the proposed fiber optic cable route. There may be pockets of suitable habitat at the mouths of small creeks that empty into the Klamath River that support this species. Mitigation Measure WATER-1 will result in BMPs that will benefit PTFR that are very dependent on clean, cold running water.

Northwestern Pond Turtle (*Clemmys marmorata*)

Legal Status: The northwestern pond turtle (NPTU) is a G3/S4S3 CSSC, a BLM and a USFS Sensitive species.

Species Description and Habitat Needs: The NPTU is found in the Klamath River/Redwood Creek watershed. In northern California, it basks intermittently in the morning, and then in late afternoon or early evening they begin foraging. In one population in a northern California stream, a male home range was estimated to be 2.4 acres; the female's range was much smaller (0.6 acres). It can be found in a wide variety of wetland habitats including rivers and streams (both permanent and intermittent), lakes, ponds, reservoirs, permanent and ephemeral shallow wetlands, abandoned gravel pits, stock ponds, and sewage treatment lagoons (Holland 1994, as cited by Lovich Undated). It is active from February to November, and is often observed basking on surfaces above water. During summer droughts, it can bury itself in soft bottom mud. Breeding occurs between April and August, when females climb onto stream or pond margins, to dig a nest. In northern California and Oregon, hatchlings remain in the nest through the winter (Holland 1994, as cited by Lovich Undated). Federal agencies have designated this species as a sensitive species. Wetland habitat destruction is their single greatest threat; predation by bullfrogs is also noted (Lovich Undated). This species can evade activities and retreat into the river. NPTU will not be significantly impacted by construction operations.

Status in Assessment Area: NPTU was not recorded on the CNDDB enquiry. It is included as a PETS species because suitable habitat is available and they are expected to be present. This species is regularly seen basking on the banks or logs in the river channel of the Klamath River. They have been personally observed at several locations along the Klamath River in Segment 1. This species can easily avoid disturbance and move away into the main river channel. There will be no significant impacts to this species.

FISH

The following anadromous species utilizing the Klamath River/Redwood Creek are Federally listed species (herein referred to as Pacific salmonids), and their designated critical habitat were considered for this assessment: Southern Oregon/Northern California Coasts (SONCC) coho salmon (*Oncorhynchus kisutch*) is listed under the ESA as threatened. California Coastal (CC) chinook salmon (*O. tshawytscha*) is listed under the ESA as threatened, and Northern California (NC) steelhead (*0. mykiss*) is listed under the ESA as threatened, In general the lower Klamath River/Redwood Creek provides summer rearing habitat for juvenile salmonids, late summer/fall holding areas for adults, smolt and pre-smolt outmigration habitat and is a fall/winter migration route for adult salmonids. Designated SONCC coho salmon critical habitat encompasses accessible reaches of all rivers (including estuarine areas and tributaries) between the Mattole River in California and the Elk River in Oregon. Designated CC chinook salmon critical habitat includes all river reaches and estuarine areas accessible to listed Chinook salmon from Redwood Creek (Humboldt County, California) to the Russian River (Sonoma County, California). In addition to critical habitat designations for listed Pacific salmonids, Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Act (MSA) require this heightened consideration of habitat for commercial species in resource management decisions, including EFH for SONCC coho salmon and CC chinook salmon, and their designated critical habitats are currently Federally listed as Threatened under ESA.

Coast cutthroat trout (*Oncorhynchus clarkii clarkia*)

Legal Status: The coast cutthroat trout (CCTR) is a CSSC and a USFS Sensitive species.

Species Description and Habitat needs: CCTR also known as the sea run cutthroat, or harvest trout is one of the several subspecies of cutthroat trout found in Western North America. The CCTR occurs in

four distinct forms. A semi-anadromous or sea-run form is the most well-known. The native range of the coastal cutthroat trout extends south from the southern coastline of the Kenai Peninsula in Alaska to the Eel River in Northern California. CCTR are resident in tributary streams and rivers of the Pacific basin and are rarely found more than 100 miles (160 km) from the ocean. Adults migrate from the ocean to spawn in fresh water. Juveniles migrate to the sea where they feed and become sexually mature before returning to fresh water to overwinter and spawn. Unlike steelhead and Pacific salmon, CCTR do not make lengthy migrations out to sea. Generally speaking, CCTR will remain in or near estuarine waters, usually within 5–10 mi (10–15 km) of their natal stream. Sea-run forms while in salt water and shortly after returning to fresh water are silvery with a bluish back, yellowish lower flanks and fins, and display sparse spots. Cutthroats usually display distinctive red, pink, or orange linear marks along the undersides of their mandibles in the lower folds of the gill plates. CCTR usually inhabit and spawn in small to moderately large, clear, well-oxygenated, shallow rivers with gravel bottoms. They typically spawn from December through June, with peak spawning in February. Eggs begin to hatch within six to seven weeks of spawning. Spawning begins when water temperatures reach 43 to 46°F (6 to 8°C). Depending on temperature, alevins emerge as fry between March and June, with peak emergence in mid-April. CCTR use a large variety of habitat types, including lower and upper reaches of both large and small river systems, estuaries, sloughs, ponds, lakes, and near shore ocean waters. They spend more time in fresh water environments than other anadromous Pacific salmonids. In fresh water they prefer deeper pool habitat and cover, such as that formed by woody debris. The semi-anadromous forms of CCTR do not overwinter in saltwater and rarely make extended migrations across large bodies of water. Semi-anadromous CCTR typically spend two to five years rearing in fresh water before making their initial migration into saltwater. Semi-anadromous CCTR spend short periods offshore during summer months and return to estuaries and fresh water by fall or winter.

Status in Assessment Area: Threats to this species include forest management such as logging, agriculture, dams, industrial development, habitat degradation as well as competition with rainbow trout and other species. Although considered a CSSC this species has a wide distribution within the BAA, as shown in the database report. The CNDDB reported CCTR from Segment 2, Segment 3, Segment 4 and Segment 5 of the proposed fiber optic cable route. CCTR was one of only seven species in the suite of many considered that had a distribution over 4, or in all 5, Segments of the proposed route. It was the most widely reported PETS fish species. Mitigation Measure WATER-1 will result in BMPs that avoid sedimentation of watercourses. The will be no significant impacts to CCTR as a result of the proposed KRRBI project.

Southern Oregon, North Coast California (SONCC) coho salmon *Oncorhynchus kisutch*

Legal Status: The Southern Oregon/Northern California Coasts (SONCC coho salmon is federally listed as threatened.

Species Description and Habitat Needs: SONCC coho salmon life history is typified by four life stages (CDFW Undated). Adult SONCC coho salmon enter fresh water from September through January to spawn. They move upstream after heavy rains have opened the sand bars that form at the mouths of many California coastal streams, but may enter larger rivers earlier. In the upper reaches of these streams, spawning generally peaks in November and December, but timing varies by stream and/or flow (CDFW Undated). In California, spawning occurs mainly from November to January, although it can extend into February or March if drought conditions are present. Females usually choose spawning sites near the head of a riffle, just below a pool, where the water changes from laminar to turbulent flow and there is a medium to small gravel substrate. The redd flow characteristics usually provides good aeration of eggs

and embryos, and the flushing of waste. Fry emerge from the gravel between March and July, with peak emergence occurring from March to May. They seek out shallow water, usually moving to the stream margins, where they form schools. As the fish feed heavily and grow, the schools generally break up and individual fish set up territories. At this stage, the fish are termed parr (juveniles). As the parr continue to grow and expand their territories, they move progressively into deeper water until July and August, when they inhabit the deepest pools. This is the period when water temperatures are highest, and growth slows. Rearing areas used by juvenile SONCC coho salmon are low-gradient coastal streams, lakes, sloughs, side channels, estuaries, low-gradient tributaries to large rivers, beaver ponds, and large slack water portions of the river. The most productive juvenile habitats are found in smaller streams with low-gradient alluvial channels containing abundant pools formed by large woody debris. Adequate winter rearing habitat is important to successful completion of coho salmon life history (CDFW Undated). After one year in fresh water, smolts begin migrating downstream to the ocean in late March or early April. In some years, outmigration can begin prior to March and can persist into July. Peak downstream migration in California generally occurs from April to early June.

Status in Assessment Area: After hatching, the alevins are translucent in color. This is the SONCC coho salmon's most vulnerable life stage, during which they are susceptible to siltation, freezing, gravel scouring and shifting, desiccation, and predation, and remain in the interstices of the gravel for 2 to 10 weeks until their yolk sacs have been absorbed. Factors that affect the onset of outmigration include the size of the fish, flow conditions, water temperature, dissolved oxygen levels, day length, and the availability of food. Low stream productivity, due to low nutrient levels or cold water temperatures, can contribute to slow growth, potentially causing SONCC coho salmon to postpone outmigration. Threats to this species include forest management such as logging, agriculture, dams, industrial development, habitat degradation as well as competition with rainbow trout and other species. Although this species does not have federal or state status it is a CSSC because of declining populations. Mitigation Measure WATER-1 will result in BMPs that avoid sedimentation of watercourses. The will be no significant impacts to SONCC coho salmon as a result of the proposed KRRBI project.

Northern California (NC) steelhead (O*ncorhynchus mykiss irridius*)

Legal Status: Northern California steelhead (NC steelhead) is federally protected as a threatened species under the ESA. It has a Natural Heritage ranking of G5T2T3Q/S2S3.

Species Description and Habitat needs: NC steelhead is reported to exhibit the most complex and variable life history of the Pacific salmonids. They can be freshwater resident or anadromous; the anadromous NC steelhead can spend up to 7 years in fresh water before reaching the smolt stage, and then up to 3 years in the ocean before first spawning (NOAA 1996). Further, they are classified into two types, the summer NC steelhead (that matures in freshwater, requiring several months to mature and spawn), and the winter NC steelhead (that matures in the ocean, entering fresh water ready to spawn). The Klamath River supports both summer and winter steelhead. NC steelhead can spawn more than once before dying, unlike Pacific salmon. Intermittent streams may be used for spawning, and cover is important because they can enter streams weeks before they spawn. Summer NC steelhead utilize habitat that is not fully utilized by winter NC steelhead, and often spawn farther upstream than winter steelhead (NMFS 2004a). Their egg incubation time is dependent on water temperature, varying from 1.5 to 4 months, generally between February and June. Fry inhabit shallow water along banks of perennial streams. Summer rearing occurs in faster parts of pools (NMFS 2004a). Winter rearing occurs across a wide range of fast and slow velocity habitats, but is characterized primarily by complexity such as large in-stream wood. Larger and older juveniles will move downstream to rear in larger tributaries and the main river channel. Rearing is usually 2 years in California ESUs (NMFS 2004a).

Status in Assessment Area: NC steelhead is not reported on the CNDDB enquiry of the BAA. They are known from the three main rivers inside the BAA and given suitable habitat and known presence it is included in the PETS list. Threats to this species include forest management such as logging, agriculture, dams, industrial development, habitat degradation as well as competition with rainbow trout and other species. Although this species does not have federal or state status it is a species of concern because of declining populations. Mitigation Measure WATER-1 will result in BMPs that avoid sedimentation of watercourses. The will be no significant impacts to NC steelhead as a result of the proposed KRRBI project.

California Coastal (CC) chinook salmon (*Oncorhynchus tshawytscha*)

Legal Status: California Coast Chinook Salmon (CC) chinook salmon is Federally listed as threatened.

Species Description and Habitat needs: The CC chinook salmon runs are designated by adult upstream migration timing. Spring-run CC chinook can now only be found on the Rogue, Klamath, and Trinity rivers. In the larger river systems (Rogue, Upper Klamath, and Eel), fall-run CC chinook return to fresh water in August and September. In coastal rivers the fall-run begins in late October. On the larger river systems, spawning occurs in late October and early November. Eggs resulting from the fall run spawning incubate and emerge from December into mid-April. Fry use woody debris and cobble interstitial spaces as cover, but as they grow their habitat preferences change to deeper water with slightly higher velocity.

Status in Assessment Area: The CC chinook salmon was recorded in Segment 1 by the CNDDB. The Pacific salmonid fishery, for the Klamath River in particular is very thoroughly studied. The status still appears to be one of decline. There are many reasons for this, cumulative off-shore impacts, and spawning ground impacts are the primary factors. Mitigation Measure WATER-1 will result in BMPs that avoid sedimentation of watercourses. There will be no additional significant impacts to CC chinook salmon as a result of the proposed construction activities.

Longfin Smelt (*Spirinchus thaleichthys*)

Legal Status: The Longfin Smelt (LOSM), is CESA listed as Threatened, and has a Natural Heritage ranking of G5/ S1.

Species Description and Habitat needs: LOSM is an anadromous smelt (family Osmeridae) found in California's bay, estuary, and nearshore coastal environments from San Francisco Bay north to Lake Earl, near the Oregon border. The San Francisco Estuary and the Sacramento-San Joaquin Delta supports the largest longfin smelt population in California, and Humboldt Bay likely ranks second in longfin smelt abundance. Most descriptions of longfin smelt life history in California focus on San Francisco Bay populations. Relatively little is known about North Coast longfin smelt or specifics about their life history.

Status in Assessment Area: The CNDDB reported LOSM from Alternative 5A of the proposed fiber optic cable route. Human threats include overfishing from commercial and subsistence fisheries as well as bycatch of ground fish and shrimp fishing. Forestry practices such as logging, road construction and dredging may also affect the smelt due to concern about sediment and storm-water run-off. Mitigation Measure WATER-1 will result in BMPs that avoid sedimentation of watercourses. LOSM will not be significant impacted by the proposed KRRBI project.

Eulachon (*Thaleicthys pacificus*)

Legal Status: The Eulachon, southern DPS (Distinct Population Segment) was federally listed as Threatened in 2010 and has a Natural Heritage ranking of G5/ S3.

Species Description and Habitat needs: EULA, sometimes called smelt or candlefish is an anadromous fish that is found along the Pacific coast from California to Alaska. Relatively small they can weigh up to 2.5 ounces and be as long as 8.5 inches. Smelt occur in nearshore ocean waters up to 1,000 feet in depth, except for when they return to their natal streams to spawn. EULA usually spend 3 to 5 years in saltwater before returning to freshwater and spawn from late winter through mid-spring in their natal areas. Eggs are fertilized in the water column and sink to the river bottom, adhering to the gravel and coarse sand. Most smelt will die after spawning, but not always. Eggs hatch in 20 to 40 days and the larvae are then carried downstream and dispersed by the currents. Juvenile smelt will move towards shallow or mid-depth areas near the shore. Eulachon abundance changes considerably from year to year. However, it has been noticed that all spawning runs from California to southern Alaska have been declining for the past 20 years. Commercial catches of eulachon in the middle to late 1900's were around 2 million pounds. From 1993 to 2006 the catches have only been around 43,000 pounds, showing a 97% reduction.

Status in Assessment Area: The CNDDB reported EULA from Segment 5 of the proposed fiber optic cable route. Segment 5 is the closest to the coast, and river estuaries which the EUCH prefers. Populations in the Klamath, Mad and Sacramento rivers are said to be nearly extirpated. EULA abundance changes considerably from year to year. However, it has been noticed that all spawning runs from California to southern Alaska have been declining for the past 20 years. Commercial catches of EULA in the middle to late 1900's were around 2 million pounds. From 1993 to 2006 the catches show a 97% reduction. Threats to this species include habitat loss and degradation. Hydroelectric dams often block access to historical spawning grounds as well as affect the quality of the spawning substrate, mainly causing siltation. Global climate change may also affect the EULA significantly as the ocean warms, affecting prey species, spawning and rearing success. EULA have been shown to carry high levels of chemical pollutants, and although it may not directly lead to their immediate mortality, it may cause them to have lower fitness as well as affect their reproductive success. Human threats include overfishing from commercial and subsistence fisheries as well as bycatch of ground fish and shrimp fishing. Forestry practices such as logging, road construction and dredging may also affect the smelt due to concern about sediment and storm-water run-off. Mitigation Measure WATER-1 will result in BMPs that avoid sedimentation of watercourses. EULA will not be significant impacted by the proposed KRRBI project.

INVERTEBRATES

MOLLUSCS

Oregon shoulderband (*Helminthoglypta hurtleini*)

Legal Status: The Oregon shoulderband (ORSH) is G1S1 critically imperiled in California

Species Description and Habitat needs: The ORSH is endemic to northern California and southwest Oregon. It has a G1 ranking as the most sensitive mollusk in the suite of species reviewed. There is a geographically defined population of ORSH found from southern Douglas County, OR, south into Northern CA. Generally associated with, though not restricted to talus and other rocky substrates. It is suspected to be found within its range wherever permanent ground cover and/or moisture is available

(BLM 2016). This may include rock fissures or large woody debris sites. This species is also adapted to somewhat dry conditions during a portion of the year. Seasonal deep refugia include talus deposits and outcrops, which contain stable interstitial spaces large enough for snails to enter. These seasonal refugia also provide protection from fire and predation during inactive periods. Within rocky habitat, the species is also associated with subsurface water, herbaceous vegetation and deciduous leaf litter, generally within 30m. of stable talus deposits or rocky inclusions. Vegetation types where the species has been located include dry conifer and mixed conifer/hardwood forest communities as well as oak communities. Forest canopy cover moderates the extremes in environmental conditions and may provide additional moisture to the site in the form of condensation drip. Woody debris and deciduous leaf litter is often used as daily refugia during foraging and dispersal in the moist seasons.

Status in Assessment Area: ORSH was reported as present within the BAA. It is located in Segment 1 along the Klamath River portion of the proposed route, as recorded on the CNDDB enquiry. Habitat alteration and fragmentation leading to isolated populations is considered to be the major threat to the species. The species is vulnerable to activities which increase temperature, decrease moisture, or decrease food supplies available in populated sites. Habitat changes that likely impact this species include quarry development, road construction, mining, fire, herbicide use, recreation development, and timber harvest. In general, land snails cannot tolerate extremely dry (xeric) conditions, have restricted ranges, and are slow to disperse. Maintaining environmental conditions in these habitats is especially critical to survival of local populations. Project construction will not disturb talus and adjacent forested areas with vegetative cover sufficient to maintain suitable environmental conditions. There will be no impact to this species.

Trinity shoulderband (*Helminthoglypta talmadgei*)

Legal Status: The Trinity shoulderband (TRSH) is not federally or state listed but it is Natural Heritage ranked as G2/S2 and is a BLM sensitive species.

Species Description and Habitat Needs: The TRSH is a terrestrial land snail with presumably similar habitat needs to the Oregon shoulderband.

Status in Assessment Area: This species was reported as present within the BAA. It is located in the BAA of Segment 1 as recorded on the CNDDB enquiry. Project construction will not disturb talus and adjacent forested areas with vegetative cover sufficient to maintain suitable environmental conditions. There will be no impact to this species.

Redwood Juga (*Juga orickensis*)

Legal Status: The redwood juga (JUOR) is not federally or state listed, but is ranked as G2/S1S2.

Species Description and Habitat Needs: JUOR aquatic gastropod mollusk from a genus of freshwater snails with a gill and an operculum, in the family Semisulcospiridae. Juga are native to the rivers of the northwestern United States and adjacent British Columbia. Little information is available for this species and more research is required.

Status in Assessment Area: JUOR was reported as present within the BAA. It is located in Segment 4 and Segment 5 along the western portion of the proposed route, as recorded on the CNDDB enquiry.

The adjacent waterways provide an easily accessible dispersal route for this aquatic invertebrate. Mitigation Measure WATER-1 will result in BMPs that avoid sedimentation of watercourses. Significant negative impacts to JUOR are not expected as a result of the proposed construction activities.

Western pearlshell

Legal Status: The Western pearlshell (WEPE) is not federally or state listed, but is State ranked as S1S2.

Species Description and Habitat Needs: Freshwater mussels, including WEPS require a host fish to reproduce and disperse. Because freshwater mussels are not able to move far on their own, their association with fish allows them to colonize new areas, or repopulate areas from which mussels have been extirpated. WEPE inhabit perennial rivers, streams and creeks at depths of 1.5 to 5 feet, and they tend to congregate in areas with boulders and gravel substrate, with some sand, silt and clay (Roscoe 1964).

Status in Assessment Area: The CNDDB reported this species from Segment 1 in the upper portion of the Klamath River near Orleans. Sedimentation and nutrient enrichment may affect the status of this species because freshwater mussels are filter feeders, they generally cannot handle high levels of siltation that come from agricultural runoff, silvicultural operations and clearcutting (Bogan 1993). WEPE in particular, appear to require fast-flowing, clean water for survival. The EPA considers fifty percent of the rivers and streams in the U.S. that were assessed to be impaired, primarily due to sedimentation, nutrient enrichment, contamination with pathogens and habitat alterations (U.S. EPA 2010). Freshwater mussels can be valuable indicators of pollutants, since they are sedentary, occupy a low position on the food chain, frequently bio-accumulate heavy metals, pesticides, and other contaminants, and, especially in the case of WEPE, are long-lived. Mitigation Measure WATER-1 will result in BMPs that avoid sedimentation of watercourses. There will be no significant impacts to WEPE as a result of the proposed KRRBI construction activities.

INSECTS

Behren's silverspot butterfly *Speyeria zerene behrensii:*

Legal Status: The Behren's silverspot butterfly (BSBU) federally listed as an endangered species and has a Natural Heritage rank of G5T1/S1

Species Description and Habitat Needs: BSBU is in the family Nymphalidae, or brush-footed butterflies. It is a medium sized butterfly with a wingspan of 2.2 in. with dorsal wings that are golden brown with black spots and lines. The underside of their wings has either silvered or un-silvered marginal spots that are more triangular than those of the closely related *Speyeria coronis*. These butterflies can be found in early successional coastal terrace prairie habitat that contains *Viola adunca* (early blue violet) which is the larval host plant as well as the adult nectar source and adult courtship area. Several populations have been extirpated and the species is only likely to be remaining at one location near Point Arena in Mendocino County, California. BSBU males will spend all day patrolling for females. Females may delay laying their eggs until late summer. Eggs are laid on leaf litter near violets. Unfed first-stage caterpillars are fed on violet leaves. The caterpillars will go through metamorphosis and take flight from mid-June to early September.

Status in Assessment Area: BSBU was reported as present within the BAA. It is located in the coastal portion of the proposed route in Alternative 5A, as recorded on the CNDDB enquiry. Threats to this species include invasion by exotic species, natural land succession, fire suppression regimes, residential development and collection of the butterflies for specimens (fed). Roadside vegetation removal will impact potential food plants of many nectar feeding invertebrates. The global population is considered secure, but the *behrensii* sub species has the highest possible Heritage ranking of T1. However, the CNDDB comments state that it is extirpated from Humboldt County and as such will be very unlikely to be detected or impacted. Vegetation removal will be kept to a minimum (Mitigation Measure SOIL-1) and there should be available food plants nearby. Considering the greater impact to this species from vehicle strikes, significant impacts to BSBU are not expected.

Obscure bumble bee- *Bombus caliginosus*

Legal Status: The obscure bumble bee (OBBE) is on the CDFW Special Animals List, it has a Natural Heritage ranking of G4(?) S1S2.

Species Description and Habitat Needs: The distribution of the OBBE ranges from Washington through Oregon and all the way to southern California. OBBE inhabits open grassy coastal prairies and Coast Range meadows. Nesting occurs underground as well as above ground in abandoned bird nests. Males patrol circuits in search of mates. Bumble bees are eusocial insects that live in colonies composed of a queen, workers, and reproductive individuals (males and new queens). Colonies are annual and only the new, mated queens overwinter. Nests are often located underground in abandoned rodent nests, or above ground in tufts of grass, old bird nests, rock piles, or cavities in dead trees. Initially, the queen does all of the foraging and care for the colony until the first workers emerge and assist with these duties. Bumble bees collect both nectar and pollen of the plants that they pollinate. In general, bumble bees forage from a diversity of plants, although individual species can vary greatly in their plant preferences. OBBE has been noted on 19 families of plants. The queens emerge from hibernation in late January, the first workers appear in early March, and the males follow by the end of April. The colony dissolves in late October, when all the inhabitants die except the new queens.

Status in Assessment Area: OBBE was reported as present within the BAA. It is located in the BAA in Segment 4 and Segment 5 of the proposed route, based on the CNDDB enquiry. Threats to this species include climate change and extensive development. This species does not appear to do well in heavy agricultural or urban areas where they get outcompeted by yellow faced bumble bees. Habitat loss seems to be their most serious threat. The minimal removal of road ditch vegetation prior to construction may impact potential food plants of many nectar feeding invertebrates. The work will be completed quickly and the suitable habitat is in a relatively small area, and impacted for a relatively short period. The additional cumulative impact as a result of the project on OBBE will be minimal and not a significant effect, the mobile foraging bumble bees can avoid potential impacts from the construction activities. Considering the greater impact to this species from vehicle strikes, increased significant impacts to obscure bumble bee are not expected due to construction activities.

Suckley's cuckoo bumble bee *Bombus sucklei*

Legal Status: Suckley's cuckoo bumble bee (SCBB) is on the CDFW Special Animals List with a ranking of GU and S1.

Species Description and Habitat Needs: The SCBB requires a variety of nectar bearing plants, such as sweet pea, lupine and or clovers.

Status in the Assessment Area: This species was reported as present within the BAA. It is located along the Klamath River in Segment 1, based on the CNDDB enquiry for the proposed route. The removal of road ditch vegetation may impact potential food plants of many nectar feeding invertebrates. The work will be completed quickly and the suitable habitat is in a relatively small area, and impacted for a relatively short period. The additional cumulative impact, as a result of the project on OBBE, will be minimal and not a significant effect. Considering the greater impact to this species from vehicle strikes, additional significant impacts to SCBB are not expected.

Western bumble bee *Bombus occindentalis*

Legal Status: Western bumble bee (WBBE) is not federally or state listed, but is ranked as G2G3 and S1.

Species Description and Habitat Needs: For the WBBE a new colony typically starts in the early spring with a solitary queen. The queen finds a suitable nest site, which like other bumble bees, WBBE nests underground in cavities or random burrows left behind by rodents or other animals. The queen must then construct a wax structure and collect pollen to create a mass to lay eggs on.

Status in the Assessment Area: WBBE was once one of the most common bee species in the North West America. They have been found from the Mediterranean habitats of California all the way up to the tundra region of Alaska, making them one of the bees with the widest range geographic range (Hattfield 2015). However, recently there has been a noticeable decline in population (Colla and Ratti 2010). In the past decade, the population of WBBE has dropped by around 40.32%. The disappearance of these bees has been especially significant in CA, western OR, and western WA. This species was reported as present within the BAA. It is located along the Klamath River in Segment 1, based on the CNDDB enquiry for the proposed route. The minimal removal of road ditch vegetation may impact potential food plants of many nectar feeding invertebrates. The work will be completed quickly and the suitable habitat is in a relatively small area, and impacted for a relatively short period. The mobile foraging bumble bees can avoid potential impacts from the construction activities. Considering the greater impact to this species from vehicle strikes significant impacts to WBBE are not expected.

PLANTS

Pink sand verbena- *Abronia umbellate* var. *breviflora*

Legal Status: Pink sand verbena (ABUM) does not have federal or state status but is state ranked G4G5T2/S1and in California has a CRPR of 1B.1.

Species Description and habitat Needs: ABUM is classified as a forb/herb that inhabits the coastal dunes of WA, OR and CA. It occurs at elevations 0-10 m and blooms June-October. Although it once persisted along the entire Pacific coast there are now only a few populations due to ecological limiting factors and human-caused habitat degradation. This species is an obligate out-crosser, using native insects and wind to propagate. Ripe fruit falls off when touched and seeds are dispersed by strong winds and waves. Since populations are typically found at or below zone of driftwood accumulation, they are often obliterated by winter storms. Each spring, the population re-establishes from seeds that persist in the sand. In protected sandy areas, 3% of population over-winters and flowers the next year (Kaye et al., 1998).

Status in the Assessment Area: This species was reported as present within the BAA. The CNDDB reported ABUM from the coastal portion of the BAA, along Alternative 5A of the proposed fiber optic cable route. Natural population sizes vary widely over time and space, ABUM grows in a dynamic habitat characterized by winter storms that destroy old plants, but also create new habitat and disperse seeds. Threats to this species include trampling by vehicle and foot traffic as well as invasion of beach grass. Potential impacts to this species are considered very unlikely. It is briefly addressed as there was a reported location from the BAA on the CNDDB enquiry. Any further concerns for this species were dismissed as it was only present in Alternative 5A outside the DIA in coastal dune habitat.

Bald Mountain Vetch (*Astragalus umbraticus*)

Legal Status: The Bald Mountain vetch (ASUM) is recognized as a CNPS listed species with a CRPR of 2B.3. It has a Natural Heritage ranking of G3/S2.

Species Description and Habitat Needs: This vetch is a perennial herb that grows in the woodlands of mountains in the coastal Klamath and Coast ranges of California and Oregon. It favors foothill wetlands, lower montane coniferous forest. Occasionally it is found along roadsides. The elevation range is 150-1,250m and it blooms from May to August.

Status in the Assessment Area: This species was reported as present within the BAA. It is located along Segment 2, Segment 3 and Segment 4 of the proposed route within the BAA on the CNDDB enquiry. There will be no significant impacts to ASUM as a result of the KRRBI project.

Humboldt Bay owl's clover (*Castilleja ambigua* var. *humboldtiensis*)

Legal Status: The Humboldt Bay owl's clover (CAAM) is not a federal or state listed species but has G-4/T-2 and S-2 ranks and has a CRPR of 1B.2.

Species Description and Habitat Needs: CAAM is an annual herb that inhabits coastal marshes and swamps and blooms in April- August and is endemic to California. Its elevational range is very narrow, only 0-3 m and has only been found in three counties in California (Humboldt, Mendocino & Marin)

although it could be present in other suitable habitat areas. Threats to this species include coastal development and non-native plants.

Status in the Assessment Area: CAAM was reported as present within the BAA. This species was only recorded in Alternative 5A according to the CNDDB enquiry. Potential impacts to this species are considered very unlikely. It is briefly addressed as there was a reported location within the BAA on the CNDDB enquiry. Any further concerns for this species were dismissed as it was only present in Alternative 5A in coastal dune habitat.

Northern clustered sedge (*Carex arcta*)

Legal Status: This species is included in the CNPS list of rare and endangered species as CRPR 2B.2

Species Description and Habitat Needs: Northern clustered sedge is native to northern North America including most of Canada and northern parts of the United States. It grows in wet areas, especially in coniferous forests. This sedge produces dense clumps of erect stems up to about 80 cm (31 in) high. The leaves are pale green to grayish, flat, and have reddish or purple-dotted sheaths at the base, and they are sometimes longer than the stems. The inflorescence is a dense, oblong cluster of up to 15 spikes of pointed flowers, each cluster up to 3–4 cm (1.2–1.6 in) long and each individual spike up to 1 cm (0.39 in) long. The fruit is covered in a sac called a perigynium which is greenish and veined with a reddish tip.

Status in the Assessment Area: Suitable habitat is present and this species was recorded in Segment 5 according to the CNDDB enquiry for the proposed project route. The preferred habitat types used by this species are wet areas. The KRRBI project intends to avoid wetlands by overhead installation or directional drilling. No impact to this species is anticipated.

Lagoon sedge (*Carex lenticularis* var. *limnophila*)

Legal Status: Lagoon sedge (CALE [1]) is not a federal or state listed species but has a Natural Heritage rank of G5T5/S-1, and a CRPR of 2B.2.

Species Description and Habitat Needs: The lagoon sedge is a monocot and a perennial herb that is found in California, although there have only been 10 known occurrences, all historical. The lagoon sedge can be found on gravely beaches and shorelines. It will also inhabit bogs, marshes and the north coast coniferous forest. Its elevation range is from 0- 6 m along beaches which is very limited;

Status in Assessment Area: The CNDDB reported CALE [1] from the coastal portion of the BAA, along Alternative 5A of the proposed fiber optic cable route. The extreme rarity of this species, and habitat needs eliminates this species from further concern. It is briefly addressed as there was a reported location from the BAA on the CNDDB enquiry. Any further concerns for this species were dismissed as it was only present in Alternative 5A outside the DIA in coastal dune habitat.

Bristle-stalked sedge (*Carex leptalea*)

Legal Status: Bristle-stalked sedge (CALE[2]) is not a federal or state listed species but is ranked as a G5/ S1, and it is a CRPR 2B.2 species.

Species Description and Habitat Needs: Native to much of North America including most of Canada, the Dominican Republic, the U.S., CALE[2] has the widest geographic range of all North American sedges. It only grows in wetlands. This sedge produces dense clusters of thin stems up to 70 cm tall from a network of branching rhizomes. The thin, deep green leaves are soft, hairless, and sometimes drooping. The inflorescence is up to 16 mm long but only 2 to 3 mm wide, and is yellow-green in color. There are only a few perigynia on each spikelet, and they are green and veined.

Status in Assessment Area: This species was reported as present within the BAA. The CNDDB reported CALE[2] from the coastal portion of the BAA, outside the DIA of Alternative 5A. The preferred habitat types used by this species are wet areas. The KRRBI project intends to avoid wetlands where feasible by overhead installation or directional drilling. No impact to this species is anticipated.

Oregon Coast Paintbrush (*Castilleja litoralis* var. *humboltensis*)

Legal Status: Oregon coast paintbrush (CALI) is not federally or state listed. It has a ranking of G4/S3 and is CRPR 1B.2

Species Description and Habitat Needs: CALI is a dicot perennial herb that is native to California. It inhabits sandy coastal bluff scrub, coastal dunes and coastal scrub at elevations from 15-100 m. It only blooms in June.

Status in the Assessment Area: This species was reported as present within the BAA. CALI is briefly addressed as there was a reported location within the BAA on the CNDDB enquiry. Any further concerns for this species were dismissed as it was only present in Alternative 5A in coastal dune habitat outside the DIA. Threats to this species include development, recreational activity, and erosion. Potential impacts to this species are considered very unlikely. It is briefly addressed as there was a reported location from the BAA on the CNDDB enquiry. Any further concerns for this species were dismissed as the outer coastal dune habitat is not impacted by the project DIA.

Lyngbye's sedge (*Carex lyngbyei*)

Legal Status: Lyngbye's sedge (CALY) is not a federal or state listed species but has rankings of G5/S3, and a CRPR of 2B.2

Species Description: CALY is native to the west coast of North America from Alaska to California, where it is the common sedge of the Pacific coastal salt marshes (FNA 2016). It prefers to grow in silty sediment rather than sand and in habitat with brackish water, such as salt marshes.

Status in the Assessment Area: Suitable habitat is present outside the DIA and this species was recorded in the BAA for Alternative 5A according to the CNDDB enquiry. .The preferred habitat types used by this species are wet areas. The KRRBI project intends to avoid wetlands where feasible by overhead installation or directional drilling. No impact to this species is anticipated.

Mendocino Coast Paintbrush (*Castilleja mendocinensis*)

Legal Status: Oregon coast paintbrush (CAME) is not federally or state listed. It has a ranking of G2/S2 and is CRPR 1B.2

Species Description and Habitat Needs: CAME is a species of Indian paintbrush known by the common name Mendocino Coast Indian paintbrush. It is endemic to the coastline of Mendocino County, California, where it grows in coastal sage scrub habitat. CAME is threatened by coastal development, erosion, recreation, foot traffic, non-native plants, and habitat fragmentation. It is also known from isolated occurrences in Humboldt County.

Status in the Assessment Area: This species was reported as present within the BAA. CAME was reported in the BAA of Alternative 5A by the CNDDB. Threats to this species include development, recreational activity, and erosion. Potential impacts to this species are considered very unlikely. It is briefly addressed as there was a reported location from the BAA on the CNDDB enquiry. Any further concerns for this species were dismissed as it was only present in Alternative 5A in coastal dune habitat.

Northern Meadow sedge (*Carex praticola*)

Legal Status: The northern meadow sedge (CAPR) is not federally or state listed but has ranks of G5/S2, and a CRPR of 2B.2.

Species Description and Habitat Needs: CAPR is found across North America. CAPR grows in many habitat types from wet to dry, including moist mountain meadows and woodlands. This sedge produces dense clumps of stems approaching a meter in maximum height. The inflorescence is an erect or nodding cluster of several flower spikes in color light greenish or brown to white

Status in the Assessment Area: Suitable habitat is present and this plant species was recorded in Segment 4 from the CNDDB enquiry. The preferred habitat types used by this species are wet areas. The KRRBI project intends to avoid wetlands where feasible by overhead installation or directional drilling. No impact to this species is anticipated.

Deceiving Sedge (*Carex saliniformis*)

Legal Status: The deceiving sedge is not federally or state listed but is state and globally ranked as G2/S2 with CRPR 1B.2

Species Description and Habitat Needs: The deceiving sedge is a perennial rhizomatous herb that is in the *Cyperaceae* family that is endemic to California. It can be found in coastal prairies, coastal scrub, meadows, marshes and swamps. The blooming period is June through July, its elevational range is from 3-230 m.

Status in the Assessment Area: This species may only be threatened by grazing and/or competition with invasive species. This species was reported as present within the BAA. Suitable habitat is present and this species was recorded in the BAA of Segment 5 according to the CNDDB enquiry. The preferred habitat types used by this species are wet areas. The KRRBI project intends to avoid wetlands where feasible by overhead installation or directional drilling. No impact to this species is anticipated.

Green yellow sedge (*Carex viridula* ssp. *Viridula*)

Legal Status: The green yellow sedge (CAVI) has no federal or state status but is state ranked as G5T5/S2, and has a CRPR of 2B.3.

Species Description and Habitat Needs: The CAVI is a perennial plant in the Cyperaceae family that favors freshwater swamps and bogs. It grows near rivers and lake shores in tufts. The sedge has hollow stems that are pale brown at the base and straight or slightly wiry. As with other members of the sedge family, the little green sedge has small flowers that are arranged as spikes. Each individual flower may only be either a male or a female, but reproduces asexually from underground rhizomes. It has an elevation range from sea-level to 1,600m. CAVI sedge blooms between May and September and usually lives for around two years.

Status in the Assessment Area: Suitable habitat is present, and this species was recorded in the coastal end of the project area in Segment 5 according to the CNDDB enquiryThe preferred habitat types used by this species are wet areas. The KRRBI project intends to avoid wetlands where feasible by overhead installation or directional drilling. No impact to this species is anticipated.

Oregon goldenthread (*Coptis laciniata*)

Legal Status: The green yellow sedge (COLA) has no federal or state status but is state ranked as G4/S3, and has a CRPR of 2B.3.

Species Description and Habitat Needs: COLA prefers habitats associated with redwoods. It is usually found in wetlands and swamps, but may also be found in other habitats. CAVI sedge blooms between March and April.

Status in the Assessment Area: Suitable habitat is present, and this species was recorded in the coastal end of the project area in Segment 5 according to the CNDDB enquiry. It is unlikely that the KRRBI project will have an adverse impact on this species since no disturbance of its habitat is anticipated.

Naked flag moss (*Discelium nudum*)

Legal Status: Naked flag moss (DINU) has no federal or state status but is very rare throughout its range in California. DINU has a Natural Heritage rank of G5G4/S1 and has a CRPR of 2B.1.

Species Description and Habitat Needs: DINU is an ephemeral moss that grows on coastal bluff scrub (soil, on clay banks). Naked flag moss is a very tiny, brownish-green, budlike plant that arises from a persistent protonemal mat. Leaves are few, 1.3-1.8 mm long, ovate to oblong-lanceolate, tapering to a narrow blunt apex, margins plane, entire or irregularly toothed at the apex, leaf cells are smooth, costa lacking or weak. Sporophytes are brown, with 0.6-1 mm ovoid, horizontal to cernuous urns, occurring on top of a smooth, 6 - 18 mm tall seta that is twisted when dry. Naked flag moss is the only moss in this region that occurs on fine textured mineral soil where the leafy gametophyte is barely visible; the red brown seta and small sporangium make it very distinct. DINU occurs on silt banks along rivers and ditches. Its persistent protonemal mat and tiny reduced budlike plants that form extensive mats appear to be adaptations to the unstable silt bank environment.

Status in the Assessment Area: Found in Humboldt and Del Norte counties- presumed extant in two locations on the coast of Humboldt County. Suitable habitat is present in the BAA of Alternative 5A. Threats to this species include trying to stabilize unsteady ground such as river banks and roadside ditches, as well as competition with vascular plants. There may be an impact on this species but adverse effects are unlikely because construction will not occur on riverbanks or in unstable ground if Alternative 5A is chosen.

Black crowberry (*Empetrum nigrum*)

Legal Status: Black crowberry (EMNI) has no state or federal status, but it has a CRPR of 2B.2 and a global and state ranking of G5/S1?

Species Description and Habitat Needs: EMNI is an evergreen shrub that likes to grow in woodland, rocky bluffs and mossy places. Crowberry foliage is dark green and linear, resembling small fir needles. The leaves are arranged in whorls of four along a prostrate stem and purplish brown flowers occur in leaf axils, followed by dark purple fruit. It is a resilient plant that is not affected by frost. Crowberry flowers from May to June and the seeds ripen in September.

Status in the Assessment Area: Suitable habitat is present and EMNI was reported within the BAA. . It was found in the coastal portion of Alternative 5A near Orick on the CNDDB enquiry. Potential impacts to this species are considered very unlikely. It is briefly addressed as there was a reported location from the BAA on the CNDDB enquiry. Any further concerns for this species were dismissed as it was only present outside the DIA in the BAA of Alternative 5A in coastal dune habitat.

Scabland Fleabane/Waldo Daisy (*Erigon bloomer* var. *nudatus*)

Legal Status: This Scabland Fleabane (ERBL) is not federally or state listed and has a CRPR of 2B.3 and a Natural heritage rank of G5T4/S3 for the particular subspecies.

Species Description and Habitat Needs: ERBL or Waldo daisy is a dicot, a perennial herb that is native to California and Oregon (Calflora). It grows on serpentine slopes, meadows and rocky hillsides of the western U.S. The perennial herb is a little under 8 " tall, forming clumps over a taproot. It has mostly basal leaves several cm long which may have dense hair or be nearly hairless. Atop its short stems are inflorescences consisting of single flower heads. Each head is 1-2 cm wide and is packed with small golden flowers.

Status in the Assessment Area: This species was recorded in the BAA Alternative 5A according to the CNDDB enquiry. A serpentine favoring species, which is lacking in the BAA. Potential impacts to this species are considered very unlikely. It is briefly addressed as there was a reported location from the BAA on the CNDDB enquiry. Any further concerns for this species were dismissed as it was only present in Alternative 5A.

Coast fawn lily (*Erythronium revolutum*)

Legal Status Coast fawn lily (ERRE) is not a federal or state listed species but has ranks of G4G5?/S3, and CRPR 2B.2.

Species Description and Habitat Needs: ERRE is a small pink-flowered bulbiferous member of the Liliaceae which blooms in the spring. The geographical distribution of this species in California encompasses Sonoma, Mendocino, Humboldt, Del Norte, Trinity, Tehama, and Siskiyou counties (CNPS 2014), from near sea level to over 1,600 meters (5,249 feet). It also occurs in western Oregon, Washington and southern British Columbia (Hitchcock 1973). Its preferred habitats are moist Douglas-fir and mixed evergreen forests and woodlands, and it can be found along stream banks and other obviously wet or moist locations as well as places that are well shaded but not otherwise distinctly moist. Based on the limited results of post-impact monitoring, it appears that this species can

tolerate some level of disturbance, but maintaining shaded conditions, and avoiding direct mechanical impact to individual plants is important (HRC 2014).

Status in the Assessment Area: Suitable habitat is present and ERRE was reported as present within the BAA. Suitable habitat is present and this plant species was recorded by the CNDDB in Segment 1, Segment 2 and Segment 3 of the proposed project route. Although it has "coast" in the name, it was located in the eastern portion of the proposed route, in the drier inland areas. The preferred habitat types used by this species are wet areas. The KRRBI project intends to avoid wetlands where feasible by overhead installation or directional drilling. No impact to this species is anticipated.

Pacific gilia *Gilia capitata*

Legal Status: Pacific gilia (GICA) is not federally or state listed and is ranked G5T3/ S2, and is a CRPR 1B.2

Species Description and Habitat Needs: GICA is an annual herb in the Polemoniaceae (Phlox family). The tiny blue-violet flowers, present from April to August, are clustered into heads atop a 25-50 cm stem, with cauline and basal leaves that are twice-pinnate. GICA habitat is coastal bluffs and prairies up to 1330 meters (4,364 feet) according to CNPS (2014). The second edition of the Jepson Manual (Baldwin 2012) notes that the subspecies usually occurs at less than 400 meters (1,312 feet). GICA occurs in Mendocino, Humboldt, and Del Norte counties in California, and extends into Oregon (CNPS 2014, Hickman 1993).

Status in the Assessment Area: Suitable habitat may be present outside the DIA and this plant species was recorded from the CNDDB enquiry once in 1974 without accurate location in the Cranell Quad in the BAA for Alternative 5A, close to the coast,. Construction will not disturb expected habitat types, such as prairies in the coastal mountains. No impact to this species is anticipated.

Dark-eyed gilia (*Gilia millefoliata*)

Legal Status: The dark-eyed gilia (GIMI) is not federally or state listed but has a Natural Heritage rank of G2/S2, and a CRPR of1B.2.

Species Description and Habitat Needs: GIMI is native to the coastline of Oregon and Northern California where it grows in sand dune habitat. GIMI is a species of flowering plant in the phlox family known by the common name many leaf gilia. It is native to the coastline of Oregon and northern California, where it grows in sand dune habitat. This wildflower grows a branching stem reaching maximum heights near 30 cm. The stem is dark green with some red coloration and is covered in abundant glandular hairs. The fleshy leaves are mainly located in a basal rosette at the ground and they are sparsely scattered along the stem as well. The inflorescences at the ends of the stem branches are small clusters of glandular flowers. Each flower is up to 1 cm wide and is mainly lavender to purple with a white or yellowish throat with purple spots. The fruit is a small capsule up to a cm wide.

Status in the Assessment Area: Suitable habitat is present and this plant species was recorded in the BAA of Alternative 5A, close to the coast, from the CNDDB enquiry. Potential impacts to this species are considered very unlikely. It is briefly addressed as there was a reported location from the BAA on the CNDDB enquiry. Any further concerns for this species were dismissed as it was only present in Alternative 5A in coastal dune habitat.

Dudley's rush (*Juncus dudleyii*)

Legal Status: Dudley's rush **(**JUDU) is not federally or state listed but has ranks of G5/S1, and CRPR of 2B.3.

Species Description and Habitat Needs: JUDU Flowers and fruits from spring to early summer. Exposed or shaded sites in sandy to clayey soils, usually moist areas such as along stream banks, ditches, around springs

Status in the Assessment Area: Suitable habitat is present and this plant species was recorded by the CNDDB in the BAA for Segment 1. The preferred habitat types used by this species are wet areas. The KRRBI project intends to avoid wetlands where feasible by overhead installation or directional drilling. No impact to this species is anticipated.

Sierra rush (*Juncus nevadensis* var. *inventus*)

Legal Status: The Sierra rush (JUNE) is not a federal or state listed species but has ranks of G5T3T4/S1, and a CRPR of 2B.2.

Species Description and Habitat Needs: JUNE is native to much of western North America from British Columbia to New Mexico, where it grows in wet areas in many habitat types. This is a rhizomatous perennial herb which varies in appearance.

Status in the Assessment Area: Suitable habitat is present and this plant species was recorded by the CNDDB in Segment 1, and in Alternative 5A at the other end of the proposed route at the coast. The preferred habitat types used by this species are wet areas. The KRRBI project intends to avoid wetlands where feasible by overhead installation or directional drilling. No impact to this species is anticipated.

Small groundcone (*Kopsiopsis hookeri*)

Legal Status: Small groundcone (KOHO) is not a federal or state listed species but has heritage rankings of G5/S?, and a CRPR of 2B.3.

Species Description: KOHO is a species of parasitic plant in the broomrape family native to western North America from British Columbia to northern California, where it grows in North American coniferous forests. It is it is parasitic on *Gaultheria shallon* and *Vaccinium* spp. , which it parasitizes by penetrating them with haustoria to tap nutrients. The groundcone is visible aboveground as a purplish, brown, or yellowish cone-shaped inflorescence 3 to 6 centimeters long. Pale-colored flowers emerge from between the overlapping bracts.

Status in the Assessment Area: This species was reported as present within the BAA for Segment 1 near Weitchpec, according to the CNDDB enquiry. This species is dependent on plant species readily present in the BAA, salal and *Vaccinium* spp. It will not be directly impacted. No significant impacts to KOHO are expected.

Beach layia *Layia camosa*

Legal Status: Beach layia (LACA) is listed as endangered under both the ESA and CESA and has ranks of G2/ S2, and CRPR of 1B.1, No critical habitat has yet been designated.

Species Description and Habitat Needs: LACA is a succulent, annual herb belonging to the sunflower family (Asteraceae). In most of its range the species occurs in the nearshore dunes, in open and low vegetation such as the sand-verbena-beach bursage series described by Sawyer and Keeler-Wolf (1995). LACA also occurs in lower densities along margins of lupine scrub, herbaceous hollows, and open areas with moving sand. The species often occurs in open, semi-disturbed areas adjacent to trails and roads. LACA readily colonizes newly created bare sand areas, and is resilient to disturbance. However, it generally does not establish or survive for long in areas where there is high cover of either native or non-native plants.

Status in the Assessment Area: This species was reported as present within the BAA of Alternative 5A but outside the DIA along the coast on the CNDDB enquiry. The species often occurs in open, semi-disturbed areas adjacent to trails and roads. Threats to this species include loss of habitat due to coastal development, encroachment of non-native species as well as trampling from vehicle and pedestrian traffic, especially in its growing season from mid-winter to late spring. Potential impacts to LACA are considered very unlikely. It is briefly addressed as there was a reported location from the BAA on the CNDDB enquiry. Any further concerns for this species found in coastal dune habitats were dismissed.

Marsh pea (*Lathyrus palustris***)**

Legal Status: The marsh pea (LAPA) is not a federal or state listed species but has ranks of G5/S2, CRPR of 2B.2.

Species Description and Habitat Needs: The LAPA is a perennial herb that is found in wetland habitats including freshwater marshes, bogs, and fens.

Status in the Assessment Area: Suitable habitat is present and LAPA was recorded in Alternative 5A according to the CNDDB enquiry for the proposed project route. It occurs well outside the DIA. Impacts to this species from the KRRBI project are unlikely.

Seaside pea (*Lathyrus japonicas*)

Legal Status: The Seaside pea (LAJA) is not a federal of state listed species but has ranks of G5/S2, and CRPR 2B.1.

Species Description and Habitat Needs: The LAJA is native to temperate parts of Europe, Asia, North and South America. LAJA typical habitat is sandy or stony seashores and other coastal locations. The unusually extensive native range is explained by the ability of the seeds to remain viable while floating in sea water for up to five years, enabling the seeds to drift nearly worldwide. Germination occurs when the hard outer seed coat is abraded by waves on sand and gravel.

Status in the Assessment Area: This species was reported as present within the BAA of Alternative 5A by the CNDDB. Potential impacts to this species are considered very unlikely. It is briefly addressed as there was a reported location from the BAA on the CNDDB enquiry. Any further concerns for this species were dismissed as it was only present outside the DIA but in the BAA for Alternative 5A in coastal dune habitat.

Heckner's lewisia (*Lewisia cotyledon* var. *heckneri*)

Legal Status: Heckner's lewisia (LECO) is not a federal of state listed species but has ranks of G4/T3, S3, and CRPR 1B.2.

Species Description and Habitat Needs: A perennial herb, 10 to 30 cm tall, arising from a thick, short base and taproot LECO grows on outcrops and cliffs of various rock types, often near streams of rivers, in a variety of forest types, at elevations from 1000 to 6000 feet (300 to 1800 meters). Populations grow in part to full shade, usually on north slopes.

Status in the Assessment Area: This species was recorded once in 1942, and not since, near Weitchpec in the BAA for Segments 1 and 2 in the interior portion of the proposed project route according to the CNDDB enquiry. No impact on this species is anticipated.

Western Lily (*Lilium occidentale*)

Legal Status: The Western Lily (LIOC) is listed as endangered under both the ESA and CESA is ranked G1/S1 and has a CRPR of 1B.1

Species Description and Habitat Needs: One of the typical orange lilies of the west coast redwood forest, LIOC prefers open roadside habitats. Botanists from the CNPS wrote "The western lily grows primarily along the coast in boggy areas, wetlands, and coastal prairies. It is threatened by housing development and by competition from the overgrowth of shrubs in bogs and in coastal prairie or coastal scrub..(Fremontia 2003 V31:2 p 21). Known populations of this endangered species are carefully monitored annually.

Status in the Assessment Area: This species was recorded in the BAA for Segment 5 at its southern end according to the CNDDB enquiry. Based on its rarity specific locations are not shown on the quadrant maps. LIOC prefers moist sites and is recorded on the CNDDB as far north as Crescent City indicating its coastal preference. This species was the rarest and most highly ranked at risk species of all the species considered. The KRRBI project, along routinely disturbed road ditches and existing utility rights of way in agricultural and rural residential areas, is not near suitable habitat or known populations. No impact to this species is expected.

California globe mallow (*Iliamna latibracteata*)

Legal Status: The California globe mallow (LLLA) is not a federal or state listed species but has ranks of G2G3/S2, and a CRPR of 1B.2.

Species Description and Habitat Needs: This species is found throughout North coast coniferous forests. It favors seepage areas in silty clay loam above 500m.

Status in the Assessment Area: Suitable habitat is present and this species was recorded in Segment 3 and Segment4 according to the CNDDB enquiry for the proposed project route. The species was identified on either side of Bald Hills Road about three miles east of Schoolhouse Peak. The preferred habitat types used by this species are wet areas. The KRRBI project intends to avoid wetlands where feasible by overhead installation or directional drilling. No impact to this species is anticipated.

Running Pine *Lycopodium clavatum*:

Legal Status: Running pine (LYCL) is not a federal or state listed species but has ranks of G5/S3, and a CRPR of 4.1.

Species Description and Habitat Needs: A spore-bearing vascular plant LYCL is the most widespread species in the genus *Lycopodium* of the clubmoss family. This species grows prostrate along the ground with stems up to 1 m long. The stems have many branches, densely covered with spiraled leaves. The leaves are 3-5 mm long and tapered to a fine hair-like white point. The branches bearing spore cones are more vertical and have fewer leaves than the horizontal stems that produce roots at regular intervals, allowing the stem to grow almost indefinitely along the ground. The stems resemble seedlings of coniferous trees although they are not related. Typically found along forest edges, openings and along wet roadsides, LYCL blooms from June to September.

Status in the Assessment Area: Although this species has a widespread distribution it is confined to undisturbed areas and sites with regular burning. As a result it is endangered in many areas. This species was reported as present within the BAA. The CNDDB report shows LYCL in Segment 4 along Bald Hills Road within RNP about three miles west of Highway 101 and also in Segment 5 off the GDRC roads, and along Alternative 5A off the Trinidad Tap road, all on GDRC lands where GDRC staff have conducted botanical surveys. Roadside ditch construction in disturbed areas is unlikely to disturb this species.

Inundated bog-club moss (*Lycopodiella inundata*)

Legal Status: Inundated bog-club moss (LYIN) is not a federal or state listed species but has ranks of G5/S1?, and a CRPR of 2B.2.

Species Description and Habitat Needs: LYIN occurs throughout the northern hemisphere from the Arctic to montane temperate regions in Eurasia and North America. It grows in wet habitat, such as bogs, ponds, moist spots on the tundra, and longstanding borrow pits. This is a small plant forming patches on the ground,

Status in the Assessment Area: LYIN was reported as located in the BAA but outside the DIA for Alternative 5A in the moist western portion of the proposed route, from the CNDDB enquiry. The KRRBI project intends to avoid wetlands where feasible by overhead installation or directional drilling. No impact to this species is anticipated.

Howell's montia (*Montia howelli*)

Legal Status: Howell's montia (MOHO) is not a federal or state listed species, but has ranks of G3G4/S3, and CRPR of 2B.2

Species Description and Habitat Needs: MOHO is a tiny winter-growing annual recently placed in the family Montiaceae (miner's lettuce family). Germinating when the cold rains arrive in late fall, it grows through the early spring, flowers from March to May, then sets seed and quickly disappears. The current geographical distribution of this species in California includes Humboldt County and the very western edge of Trinity County (CNPS 2014). It has been reported from near sea level to about 835 m (2,740', CNPS 2013). Its preferred habitats are vernally wet, compacted soils (Hickman 1993, Baldwin 2012), meadows and seeps, vernal pools, and vernally mesic areas in the North Coast coniferous forest (CNPS 2014). This is the most widely distributed PETS plant species for this assessment. It is found on roads, roadsides, skid trails, turnouts, landings, grazed meadows, and other areas where compacted soils

maintain a vernally wet area and competing vegetation is minimal during its growing season. It is always associated with disturbance (Renner 2012).

Status in the Assessment Area: MOHO was identified on the CNDDB query west of Martins Ferry, north and outside of the DIA but within the BAA for Segments 2 and 3. It was also identified within the BAA but outside the DIA in Segment 5. MOHO is adapted to disturbance. They will not be affected by the roadside vegetation removal. There will be no impacts in the DIA.

Wood Nymph (*Moneses uniflora*)

Legal Status: Wood Nymph (MOUN [1]) is not federally or state listed as threatened or endangered but is ranked as G5/S3, and CRPR 2B.2.

Species Description and Habitat Needs: MOUN [1] or oneflower, wintergreen is a perennial herb in the Ericaceae family. This perennial herb is present in the western half of the U.S. as well as in all of Canada. This flower is associated with damp mountain forests. It is characterized by a single white flower about two inches across with 5 thick petals, yellow stamens, and a bright green style and ovary. The whole plant is no more than 4 or six inches tall. The wood nymph pollinates using bumble bees to disperse pollen to other plants.

Status in the Assessment Area: MOUN [1] was reported in the CNDDB as present within the BAA fbut outside the DIA for Alternative 5A within the Harry Mello State Recreation Area. This species is threatened by forestry practices, as well as any kind of terrain disturbance. Road ditch construction will avoid this plant's habitat and there will be no impact on this species.

Ghost Pipe (*Monotropa uniflora*)

Legal Status: Ghost pipe (MOUN [2]) is not a federal or state listed species but has ranks of G5/S2, CRPR 2B.2,

Species Description and Habitat Needs: This native plant species is found throughout the majority of the United States in humus in deep, shady woods at low to moderate elevations. MOUN [2] is included within the Ericaceae. It is generally scarce or rare in occurrence and found in broadleaved upland forest. Unlike most plants, it is white and does not contain chlorophyll. Instead of generating energy from sunlight, it is parasitic, more specifically a myco-heterotroph. Its hosts are certain fungi that are mycorrhizal with trees, meaning it ultimately gets its energy from photosynthetic trees. The complex relationship that allows this plant to grow also makes propagation difficult.

Status in the Assessment Area: This species was reported as present within the BAA. The CNDDB reports this species in multiple occurrences near Bald Hills Road in the old-growth redwoods. Road ditch construction will avoid this plant's habitat and there will be no impact on this species.

Wolf's Evening primrose (*Oenothera wolfii*)

Legal Status: Wolf's Evening primrose (OEWO) is not federal or state listed, but is globally and state ranked as G2/S1, and has a CRPR of 1B.1.

Species Description and Habitat Needs: OEWO is a species of primrose in the *Onagraceae* family that grows along the coast of Oregon and northern California. It can be found on coastal prairies, dunes and coastal forest and woodland habitat. Local locations of this plant include Del Norte and Humboldt counties in California and on the southern coast of Oregon. There are only 9 sites in California where this species occurs.

Status in the Assessment Area: OEWO was reported as present within the BAA. It is located in Segment 1 (reported in 1945—possible misidentification) and along Alternative 5A, reported on the Freshwater Lagoon Spit, and in the BAA for Segment 5, near Dows Prairie Road. Threats to this species include habitat loss from expansion, road paving, as well as pesticide use. There will be no effect on this species as a result of the KRRBI construction activities.

Nodding Semaphore Grass (*Pleuropogon refractus*)

Legal Status: Nodding semaphore grass (PLRE) is not federally or state listed but has a CRPR of 4.2 and a Natural Heritage rank of G4/S4.

Species Description and Habitat Needs: The PLRE is generally found within the North Coast Coniferous Forest, within riparian areas, meadows, wetlands, and seeps. The species is almost always found in wetland sites, and is shade tolerant. Light shade provided by the mature red alder canopy, and the prolonged wet soil provide the suitable habitat conditions for PLRE above Freshwater Lagoon.

Status in Assessment Area: This means the species is of limited distribution and fairly threatened within California. Encroachment from a developing understory can threaten the persistence of the species. PLRE was not recorded on the CNDDB enquiry. It was a recent location discovered during a project botanical survey near the BAA for Alternative 5A in 2016. It has yet to be submitted to the CNDDB. It is included as a sensitive plant species because suitable habitat is available and PLRE occurs inside the BAA. It was located on moist slopes above Freshwater Lagoon dominated by red alder. It was located in small openings and along wet roadsides. The preferred habitat types used by this species are wet areas. The KRRBI project intends to avoid wetlands where feasible by overhead installation or directional drilling. No impact to this species is anticipated.

White-flowered rein orchid (*Piperia candida*)

Legal Status: White flowered rein orchid (PICA) is not a federal or state listed species but is ranked G3?/S2, and it has a CRPR of 1B.2.

Species Description and Habitat Needs: PICA is a perennial herb of the Orchidaceae (orchid family). The white flowered rein orchid is 10-60 cm tall with 2-3 basal leaves approximately 3cm by 10 cm, which do not generally persist after anthesis. The inflorescence is typically one-sided and may have as many as 100 flowers. Flowers are predominantly white with a green mid-vein on the upper sepal. Other parts of the flower may have some hints of green also. Coleman (1995) describes the habitat as coniferous and mixed evergreen forest, in dense shade to full sun and from gravel bars to flat terrain or steep hillsides in elevations from near sea level to 1,200 m (3,937 ft). CNPS (2014) has records as high as 1,310 meters (4,298 feet). It occurs in coastal California from the San Francisco Bay Area, northward to Alaska (CNPS 2014, UDSA 2010). surveys conducted for PICA between May and September find PICA in areas that are predominately Douglas-fir forest or mixed Douglas-fir/redwood forest with a strong hardwood component. The sites are xeric to mesic and mostly on or near old skid trails or roads (HRC 2014).

Status in the Assessment Area: PICA was reported as present within the BAA but outside the DIA. The CNDDB shows an occurrence more than ½-mile from the DIA north of Segment 1 along Cavenaugh Creek and another occurrence more than ½-mile east of the DIA of Segment 2 about 2 miles north of Martins Ferry. There is no habitat for this species in the roadsides and ditches proposed for construction. There will be no impact to this species.

Oregon polymonium (*Polynmonium carneum*)

Legal Status: The Oregon polymonium (POCA) is not a federal or state listed species but is ranked G3G4/S2, and CRPR 2B.2.

Species Description and Habitat Needs: POCA grows in the lowlands and in prairies to moderate elevations in the mountains, and inhabits woody thickets, open and moist forests, prairie edges, and roadsides.

Status in the Assessment Area: Suitable habitat is present and the CNDDB shows an occurrence of this species near the south end of Big Lagoon outside the DIA but within the BAA and very near the coast for Alternative 5A according to the CNDDB enquiry. There is no habitat for this species in the roadside ditch of Highway 101. No impact is anticipated to this species.

Columbia yellow cress (Rorippa columbiae)

Legal Status: The Columbia yellow cress (ROCO) is not a federal or state listed species but has ranks of G3/S1, and a CRPR of 1B.2

Species Description and Habitat Needs: It is native to the western United States from central Washington to northeastern California, where it grows in moist to wet, sandy habitat types, such as playas (dry lakes). It is not a common plant; it is known from about fifteen occurrences in the Modoc Plateau region of California.

Status in the Assessment Area: The CNDDB reports an occurrence of this ROCO along Camp Creek west of Orleans in the BAA for Segment 1 dating from 1956. It is not shown as present in the Klamath River watershed in the current best available information in installation for the fiber optic cable is overhead on existing poles in this area. No impact to Camp Creek or this water-dependent species is anticipated.

Tracy's romanzoffia (*Romanziffa tracyi*)

Legal Status: Tracy's romanzoffia (ROTR) or Tracy's mistmaidenis not a federal or state listed species but has ranks of G4/S2, and for the CNPS list a CRPR of 2B.3.

Species Description and Habitat Needs: ROTR is native to the coastline of western North America from far northern California north to the southern tip of Vancouver Island, where it grows among rocks on oceanside bluffs.

Status in the Assessment Area: Suitable habitat is present and this species was recorded in the BAA for Alternative 5A. Potential impacts to this species are considered very unlikely. It is briefly addressed as there was a reported location from the BAA on the CNDDB enquiry. Any further concerns for this

species were dismissed as it was only present in Alternative 5A. No habitat for this species is found in the DIA. No impacts are anticipated due to the project.

Tracy's sanicle (*Saniculare tracyii*)

Legal Status: Tracy's sanicle (SATR) is not a federal or state listed species but has ranks of G4/S4, CRPR 4.1.

Species Description and Habitat Needs: *SATR* is a species of flowering plant in the parsley family. It is endemic to northwestern California, where it is known from woodlands and coniferous forest in hills and mountains.

Status in the Assessment Area: This species was reported as present within the BAA in 1929. The CNDDB reports a single occurrence along Bald Hills Road in the vicinity of Wiregrass Prairie in Segment 3 of the proposed project route. No habitat for this species is found in the DIA and it is unlikely to be present in county- and state-maintained roadsides and roadside ditches. No impacts are anticipated due to the project.

Siskiyou checkerbloom (*Sidalcea malviflora* spp. *patula*)

Legal Status: The Siskiyou checkerbloom (SIMA) is ranked as G5T2/S2 with a CRPR 1B.2.

Species Description and Habitat Needs: SIMA is a perennial rhizotamous herb that is native to California and inhabits road-cuts, grassy slopes, coastal bluff scrub and open forests at 15-880 m elevation. This species blooms May-August and is found only in California and Oregon. SIMA is a perennial herb of the Malvaceae (mallow family). It is 50 to 90 cm tall with long trailing rhizomes and rose-pinkflowers. Lower leaf blades are crenate to shallowly lobed and upper leaf blades are generally deeply lobed.Habitat for the species includes North Coast coniferous forest, coastal prairie (CNPS 2014), open coastal forest generally less than 700 meters (2,300 feet) in elevation (Hickman 1996), broadleaved upland forest (CNDDB Rare Find, November 2014), along the coast on stable dunes and sea bluffs, sunny openings of foothill woodland (Smith and Wheeler 1992), and Redwood Forest plant communities (Munz and Keck 1970). It occurs in Mendocino, Humboldt, and Del Norte counties in California, and north into Oregon (CNPS 2014). It can be found along grassy roadsides, in prairies, and at the prairie interface with redwood or mixed evergreen forests (HRC 2014). Locally it has been found present in meadow habitat, roadsides, or in openings or at the edges of Douglas-fir or mixed evergreen forests (Reagan, 2014). The potential impacts to this plant arise primarily from re-establishment of conifer stands, road building, and road maintenance.

Status in the Assessment Area: Suitable habitat is present and this species is documented in the CNDDB within the BAA for Segment 3, Segment 4 and Segment 5. It was about a mile west of Elk Camp and well outside the BAA of Segment 3 west of Dolason Prairie. It was also documented in the McKinleyville area in 1920 south of the DIA and just inside the BAA of Segment 5. No habitat for this species is found in the DIA and it is unlikely to be present in county- and state-maintained roadsides and roadside ditches. No impacts are anticipated due to the project.

Coast checkerbloom (*Sidalcea oregana ssp. exima*)

Legal Status: The Coast checkerbloom (SIOR) is not a federally or state-listed species and has a CRPR of 1B.2 and an overall ranking of G5T1/S1.

Species Description and Habitat Needs: SIOR is a perennial rhizotamous herb that is native to California-inhabits road-cuts, grassy slopes, coastal bluff scrub and open forests. SIOR is a perennial herb of the Malvaceae (mallow family). Habitat for the species includes North Coast coniferous forest, coastal prairie (CNPS 2014), open coastal forest generally, broadleaved upland forest along the coast on stable dunes and sea bluffs, sunny openings of foothill woodland. Regionally SIOR be found along grassy roadsides, in prairies, and at the prairie interface with redwood or mixed evergreen forests (HRC 2014). This habit, as with other species that favor roadsides will put them particularly at risk and surveys are needed to ensure SIOR avoidance.

Status in the Assessment Area: Suitable habitat is present and this species is documented within the BAA. The CNDDB shows an occurrence in the Lake Prairie area on GDRC lands a mile north of Segment 1. Locally it has been found present in meadow habitat, roadsides, or in openings or at the edges of Douglas-fir or mixed evergreen forests. Potential impacts to this plant arise primarily from re-establishment of conifer stands, road building, and road maintenance. No habitat for this species is found in the DIA and it is unlikely to be present in county- and state-maintained roadsides and roadside ditches. No impacts are anticipated due to the project

Robust false lupine (*Thermopsis robusta*)

Legal Status: The Robust false lupine (THRO) is not a federal of state listed species but has ranks of G2/S2, and a CRPR of 1B.2.

Species Description and Habitat Needs: Species is 0.8-1.8 m tall, green to gray-hairy, stem erect, stout, branches zero-few at base. Leaf: leaflets 6-11 cm, Fruit: curved, spreading, densely hairy. Substrate and preferred habitats are shale, serpentine, open sites, forest at an elevation range of 150--1500m in broad forest types found in the Klamath Region.

Status in the Assessment Area: Suitable habitat is present and this species is documented in the BAA of Segments 1 and 2 in the CNDDB near Orleans in 1931 and in the Yurok Indian Reservation (labeled on quads as the Hoopa Valley Indian reservation) in 1995 south of Capell and south of Segment 2. The dry interior roadsides are a typical location for this species. No habitat for this species is found in the DIA and it is unlikely to be present in county- and state-maintained roadsides and roadside ditches. No impacts are anticipated due to the project

Cylindrical trichodon (*Trichodon cylindricus*)

Legal Status: Cylindrical trichodon (TRCY) is ranked as G4/S2 with a CRPR of 2B.2

Species Description and Habitat Needs: TRCY is a species of moss that inhabits sandy exposed soils, roadbanks, upland forest, meadows and seeps as well as coniferous forests. It can be found at elevations of 50-200m and is visible all year round. The TRCY is a true moss in the family *Ditrichaceae*. It has a separated population in the U.S. where it is more common in the northwest and has only a few scattered locations in the east. This moss grows on sandy exposed soil, on road-banks, broadleaf upland forest, meadows and upper montane coniferous forest. The species is absent of capsules and barely larger than 1

cm. The “leaves” are very narrow, bent, curled and relatively lengthy. If a sporophyte is present it is yellow or reddish with a cylindrical smooth capsule that will appear from late spring to summer.

Status in the Assessment Area: Suitable habitat is present and this species was recorded in 1983 in the State Parks in the BAA of Alternative 5A according to the CNDDB enquiry. Threats to this species include logging and road maintenance. No habitat for this species is found in the DIA and it is unlikely to be present in county- and state-maintained roadsides and roadside ditches. There will be no significant impacts to TRCY as a result of the proposed project.

Alpine Marsh Violet (*Viola palustris*)

Legal Status: Alpine marsh-violet (VIPA) is rare in California and is included in the CNPS list of rare and endangered species with a CRPR of 2B.2

Species Description and Habitat Needs: VIPA is a perennial forb in the genus *Viola*. It grows in wet meadows, marshes and stream banks in the northern parts of North America and Eurasia. Marsh violets have three lavender or pale blue petals that have darker veins. Clusters of upright leaves are supported by underground stolons. Leaves are large and heart shaped, about 2-4” wide. This violet can often grow on coastal bogs 0-15m. Often in patches and will be most noticeable in flowering season from May- June.

Status in the Assessment Area: Suitable habitat is likely not present in the DIA. VIPA was recorded in the BAA for Alternative 5A according to the CNDDB enquiry. The KRRBI project intends to avoid wetlands where feasible by overhead installation or directional drilling. No impact to this species is anticipated.

CONCLUSION

NSO activity centers within ¼ mile of construction will have to be avoided if currently active, but no known activity centers exist within ¼ mile of the centerline of the KRRBI Project. This species is well surveyed and careful monitoring is possible. MAMU habitat is present in places within RNP. Potential indirect effect from construction noise will be avoided by seasonal restrictions imposed by the RNP for those areas. WIFL habitat is present in wetland areas near Segment 4. Two CSSC: Yellow Warbler and Yellow-breasted Chat may nest or attempt to nest in the suitable alder/willow riparian habitat adjacent to the project area along both banks of the Klamath River and Redwood Creek. No riparian habitat will be removed and the construction activities will not significantly add to the current level of disturbance and impacts to species potentially present. The low intensity of the construction activity, brief time of activity and location further ensure that no significant impacts to any sensitive wildlife species are expected as a result of the proposed activities. Sensitive plant species are unlikely to be present in the annually maintained roadsides and roadside ditches but may be present near the proposed construction. Restricting construction equipment to the road prism wherever possible and limiting vegetation removal (SOIL-1) to a minimum will avoid adverse impact to sensitive plant species. Overall, the KRRBI project will have no significant adverse effect on any sensitive species with the proposed mitigation measures in place.

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Appendix C
Cultural Reports

Table C-1 Results of Site Search Summary (Public)

Table C-2 Results of Study Search (Public)

Karuk Results (Confidential)

Yurok Results (Confidential)

Table C-1 Results of Site Search Summary (Public)

Table C-1 Results of Site Search Summary (Public)

Site #	Alternative Site Reference	In Direct APE	Eligibility for the National Register of Historic Places under NHPA		
			Recommended or Determined Eligible	Determined Ineligible	Assumed Eligible
Segment 1--Karuk					
P-12-000015		yes			x
P-12-000247	CA-HUM-224	yes	x		
P-12-000369	CA-HUM-359H	yes	x		
P-12-000475	CA-HUM-469H				
P-12-001152	CA-HUM-944H				
P-12-001176	CA-HUM-1235H				
P-12-001386	CA-HUM-1042H				
P-12-001390	CA-HUM-1049H				
P-12-002260	FS 05-10-52-37				
P-12-002337					
P-12-002338		yes	x		
P-12-002407		yes			x
P-12-002409		yes			x
P-12-002410					
P-12-002411		yes			x
P-12-002449	CA-HUM-1228				
P-12-000515					
P-12-000605					
P-12-000786	CA-HUM-795H				
P-12-000787	CA-HUM-796H				
P-12-000800	CA-HUM-809H				
P-12-000856	CA-HUM-888				
P-12-000861	CA-HUM-893H				
P-12-001122					
P-12-001123					
P-12-001124					
P-12-001125					
P-12-001126					
P-12-001128					
Segment 1--Yurok					
P-12-001930					
Segment 2					
P-12-001930					
P-12-002444		yes	x		
F-32	T.T. Waterman, 1920 Map 23, Rectangle F	yes			

Table C-1 Results of Site Search Summary (Public)

Site #	Alternative Site Reference	In Direct APE	Eligibility for the National Register of Historic Places under NHPA		
			Recommended or Determined Eligible	Determined Ineligible	Assumed Eligible
F-53	T.T. Waterman, 1920 Map 23, Rectangle F	yes			
G-16	T.T. Waterman, 1920 Map 25, Rectangle G	yes			
G-24	T.T. Waterman, 1920 Map 25, Rectangle G				
G-25	T.T. Waterman, 1920 Map 25, Rectangle G	yes			
Segment 3					
P-12-000626	CA-HUM-625	yes	x		
P-12-001638		yes	x		
P-12-002329	CRF-BHR-06	yes	x		
P-12-002591		yes			x
	CA-HUM-0446 H	yes	x		
	CA-HUM-0442	yes	x		
		yes	x		
	CA-HUM-0442	yes	x		
	CA-HUM-0443	yes	x		
	CA-HUM-0448	yes	x		
	CA-HUM-0452	yes	x		
	CA-HUM-0446/H	yes	x		
	REDW-2004-06	yes	x		
	REDW-2004-07	yes	x		
P-12-002323	REDW-2005-02	yes			x
P-12-000622	CA-HUM-000621				
P-12-001903					
P-12-002293	REDW-2003-02				
	CA-HUM-0439				
	CA-HUM-0441				
	CA-HUM-0449H				
	CA-HUM-0450				
	CA-HUM-0480				
	CA-HUM-0482				
	CA-HUM-0490				
	CA-HUM-0525				
	CA-HUM-0642				
	CA-HUM-0685				

Table C-1 Results of Site Search Summary (Public)

Site #	Alternative Site Reference	In Direct APE	Eligibility for the National Register of Historic Places under NHPA		
			Recommended or Determined Eligible	Determined Ineligible	Assumed Eligible
	CA-HUM-0710/H				
P-12-000622	CA-HUM-0621				
P-12-002293	REDW-2003-02				
P-12-001872	REDW-2001-01				
	REDW-2002-01				
	IF REDW-2003-01				
	IF REDW-2003-03				
	REDW-2004-04				
	REDW-2004-05				
	REDW-2005-01				
	REDW-2005-05				
	REDW-2005-06				
	REDW-2005-08				
	REDW-2012-01				
	REDW-2012-02				
	REDW-2012-03				
	REDW-2013-06				
	Menez Sewing Machine Site				
Ethnographic Resources					
	Childs Hill Area 6	yes	x		
	Coyote Peak Area 17	yes	x		
	Elk Camp and Logging Community Area 9	yes	x		
	Tomlinson Area 11,12,14, 23	yes	x		
	Womans Rock and Flower Dance Place on Bald Hills	yes		x	
	Camus Patch on Williams Ridge				
	Chilula Medince Rock near Childs Hill				
	Dancing Doctor Rock near Kinkyoli				
	Dancing Rock				
	Hazel Patch Northwest of Childs Hill				
	Native Plants North of Elk Camp Barn				
	School House Peak-Area 4,5,10 and 22				

Table C-1 Results of Site Search Summary (Public)

Site #	Alternative Site Reference	In Direct APE	Eligibility for the National Register of Historic Places under NHPA		
			Recommended or Determined Eligible	Determined Ineligible	Assumed Eligible
	Womens Fertility Rocks				
Segment 4					
	CA-HUM-0668	yes			x
	CA-HUM-0669	yes			x
P-12-002329	CRF-BHR-06	yes	x		
	CRF-BHR-09	yes	x		
P-12-002822		yes	x		
		yes			x
	CA-HUM-0446 H	yes	x		
		yes	x		
	CA-HUM-0442	yes	x		
P-12-001372					
P-12-002329	HUM-001212, REDW 2005-03 & 04, CRF-BHR-06				
P-12-002828					
P-12-002830					
	CA-HUM-0441				
	CA-HUM-0525				
	CA-HUM-0665				
	CA-HUM-0710/H				
	REDW-2007-01				
P-12-002830					
	REDW-2002-05				
	REDW-2004-01				
	REDW-2009-01				
	REDW-2009-05				
	REDW-2013-01				
	REDW-2013-02				
	REDW-2013-03				
	REDW-2013-04				
	REDW-2013-05				
1879 GLO					
P-12-002822					
Ethnographic Resources					
	Elk Camp and Logging Community Area 9	yes	x		
	Gans Area 15	yes	x		

Table C-1 Results of Site Search Summary (Public)

Site #	Alternative Site Reference	In Direct APE	Eligibility for the National Register of Historic Places under NHPA		
			Recommended or Determined Eligible	Determined Ineligible	Assumed Eligible
	Iris and Daffodils				
	Native Plants North of Elk Camp Barn				
Segment 5					
P-12-001627		yes			x
P-12-001847		yes			x
P-12-002189		yes			x
P-12-003601		yes			x
P-12-002822		yes	x		
		yes			x
P-12-000188	CA-HUM-0131 (O rekw)-REDW00044				
	REDW-00162				
P-12-002822					
Alternative 5A					
P-12-001278		yes			x
P-12-001627		yes			x
P-12-002822		yes	x		
		yes			x
		yes			x
P-12-000188	CA-HUM-0131 (O rekw)-REDW00044				
	CA-HUM-0132 (Sigwets)				

Table C-2 Results of Study Search (Public)

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
Karuk Segment 1 (NWIC Studies)			
S-1061		Orleans Water System (Panamnik) - Study	
S-6040		Aikens Creek Hydroelectric Project - Study	
S-13124	yes	Red Cap Bridge Project - Study led to listing of Karuk Panamenik World Renewal Historic District	
S-13185		Bluff Creek Fire Station - Study	
S-18731		Mineral Withdrawal Relinquishments - Study	
S-18995		Downs Ranch - Sanders Study	
S-19869		Disposal Sites Comment - Study	
S-33233		Downs Ranch - Praetzellis Study	
S-33234		Orleans Housing Project - Study	
S-33831		Tishawnik - Study	
S-2937		Three Rancherias; including Orleans and Happy Camp (Trust Land) - Study	
S-7232		Bear Timber Sale - Study	
S-7436		Short Ranch Road Sale - Study	
S-12146		Big Rock - Study	
S-13183		Soup Thinning Sale - Study	
S-13187		Short Timber Sale - Study	
S-27167		Hill Ranch - Study	
S-44719		McCovey THP - Study	
S-44640		Red Cap Road Bypass - Study	
NSR51418			
Yurok Segment 1 (NWIC Studies)			
4963		Historic Property Survey Report, proposed installation of a drainage system, 01-HUM-96 MP 23.7-23.9 KP 38.2-38.4	
13024	yes	Proposed Potable Water Systems	1978
15119	yes	Archaeological and Historical Resources Survey and Impact Assessment, Virgo THP Project	1993
19868	yes	Negative Historical Properties Survey Report for Five Storm Damage Repair Locations on State Routes 96 and 169, Humboldt County, California	1997
19869	yes	Negative Historical Properties Survey Report for Four Storm Damage Repair Locations on State Route 96, Humboldt County, California	1997
20126		Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, ARCO Muddy Creek	
20899	yes	Historic Property Survey Report, proposed installation of a drainage system, 01-HUM-96 MP 23.7-23.9 KP 38.2-38.4	1998
21091		Cultural Resources Study for the Year 2000 Timber Sale Planning Area, Hoopa Valley Indian Reservation, Humboldt County, California	
30907		Caltrans Bridge Inventory Update Metal/Movable Bridge# 04-0144	

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
32146		An Archaeological Survey Report for the GDRCO #500 Timber Harvesting Plan, Humboldt County, California, THP # 1-05-171 HUM (California Department of Forestry)	
32690		Archaeological and Historical Resource Survey and Impact Assessment, A Supplemental Report for a Timber Harvest Plan, St. Rest Creek, THP # 1-98-227HUM	
38865	yes	Cultural Resources Inventory of Caltrans District 1 Rural Conventional Highways in Del Norte, Humboldt, Mendocino and Lake Counties, Contract No. 01A1056, Expenditure Authorization No. 01-453608	2011
44586		An Archaeological Survey Report for the GDRCO #504 Timber Harvesting Plan Humboldt County, California; THP 1-05-218 HUM	
44588		An Archaeological Survey Report for the Dunn Prairie Timber Harvest Plan Humboldt County, California; THP 1-08-109 HUM	
44591		A Cultural Resources Investigation of APN 530-082-006 and APN 530-082-008 Kopiej Property Located in Weitchpec, Humboldt County, California	
45585		An Archaeological Survey Report for the SRCO # 449 Timber Harvesting Plan, Humboldt County, California	
46715	yes	Historic Property Survey Report for Metal Beam Guardrail Repair and Replacement Project, Humboldt County, Var, Var 2014, E-FIS Project Number, 0112000274	2014
Yurok Segment 2 (NWIC Studies)			
1007			
4963			
13024	yes	Proposed Potable Water Systems	1978
19868	yes	Negative Historical Properties Survey Report for Five Storm Damage Repair Locations on State Routes 96 and 169, Humboldt County, California	1997
20126			
20899			
21091			
30907			
32146			
44591			
46715			
Yurok Segment 3 (NWIC Studies)			
S-001007		Hoopa Valley Indian Reservation Roads Improvement Project, Archaeological Impact Evaluation Impact Evaluation	
S-001977	yes	Moved to Yurok Tribal Inventory Files	1979
S-002552	yes	A Report on Cultural Resources for the Proposed Relocation of the K&K Road, Redwood National Park, Redwood Creek Basin, Humboldt County, California	1981
S-008061	yes	Archaeological Field Examination, French Camp Ridge, Humboldt County	1983

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
S-008970		Final Report: A Cultural Resources Survey and Evaluation of 7752 Acres on the Hoopa Valley Indian Reservation, Hoopa, Humboldt County, California	
S-013045		An Archaeological Overview of Redwood National Park	
S-013487	yes	Archaeological and Historical Resources Survey and Impact Assessment, Bald Hills (California Department of Forestry)	1992
S-013499	yes	Coyote Creek Lands Redwood National Park	1992
S-014262	yes	Historic Study Coyote Creek Lands Redwood National Park	1992
S-019692		Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, ARCO No. 235 (California Department of Forestry)	
S-020968		Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Little Pine West 98 (California Department of Forestry)	
S-039980		[NCoIC S-25169] Coyote Peak Road Survey	
S-040977		[NCoIC S-23428] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, STCo THP #342, THP #1-00-399 HUM	
S-041226	yes	[NCoIC S-24495] French Camp THP 1-04-063 HUM	2004
S-041234	yes	[NCoIC S-25240] Bald Hills Road Paving Project	2009
S-041341	yes	[NCoIC S-23626] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California STCO, KLA No. 384 THP 1-01-433 HUM	2001
S-042547	yes	[NCoIC S-24725] FY 2005 Repair Rehab Cultural Resources Inventory and Assessment, Redwood National and State Parks for Rock Fork Road	2006
S-042833	yes	[NCoIC S-24938] An Archaeological Survey Report for the 529 Timber Harvesting Plan, Humboldt County, California; THP #1-06-141 HUM	2006
S-042979	yes	[NCoIC S-25023] Archeological Inventory of Fuel Management Projects, 2005 Field Season, Redwood National Park, Humboldt County, California	2005
S-044991		A Cultural Resources Study for the Year 2002 Timber Sale Project Area Hoopa Valley Indian Reservation Humboldt County, California	
S-045318	yes	Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California: Bald Hills 40	2001
S-046163		An Archaeological Survey Report for the Tator Salad Timber Harvesting Plan, Humboldt County, California	
S-046715		Historic Property Survey Report for Metal Beam Guardrail Repair and Replacement Project	
Yurok Segment 3 NPS_REDW Studies)			
REDW-2005		Archeological Inventory of Fuel Management Projects 2005 Field Season Redwood National Park, Humboldt County, California	Svinarich 2005

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
REDW-2012	yes	Archaeological Survey of Fuel Treatment Areas 2012 Field Season Redwood National Park	Svinarich 2012
REDW-2013	yes	Archaeological Survey of Fuel Treatment Areas 2013 Field Season Redwood National Park.	Svinarich 2014
REDW-2012		Archaeological Survey of Fuel Treatment Areas 2012 Field Season Redwood National Park	Svinarich and Vance 2014
	yes	Cultural Resources Inventory Report For Removal of Bald Hills Road UST (PEPC ID No. 34648)	Peterson 2014
REDW-1971A REDW-21.0_R-03		AN ARCHAEOLOGICAL SURVEY OF SELECTED AREAS WITHIN REDWOOD NATIONAL PARK, CALIFORNIA	Moratto 1971
	yes	A STUDY OF CULTURAL RESOURCES IN REDWOOD NATIONAL PARK	Bickel 1979
	yes	Archaeological Survey in Rehabilitation Units In Redwood National Park, California	Salzman and Bickel 1979
	yes	Resource Evaluation of Nine Archaeological Sites, Redwood Creek Basin, Redwood National Park, California.	King and Bickel 1980
	yes	N ARCHAEOLOGICAL SURVEY OF ELEVEN INVENTORY UNITS, REDWOOD NATIONAL PARK, HUMBOLDT COUNTY, CALIFORNIA	Baker 1981
	yes	ARCHAEOLOGICAL TEST EXCAVATION OF CA-HUM-442, RED\□OOO NATIONAL PARK, CALIFORNIA	Benson 1981
		ARCHAEOLOGICAL TEST EXCAVATIONS AT FOUR SITES IN REDWOOD NATIONAL PARK, HUMBOLDT COUNTY, California	Benson 1983
		Archeological Clearance, Williams Ridge and Lyons Prescribed Burns, Redwood National Park, California.	Smith 1990
	yes	AN ARCHEOLOGICAL SURVEY OF THE COYOTE CREEK LANDS REDWOOD NATIONAL PARK HUMBOLDT COUNTY, CALIFORNIA	Fitzgerald and Smith 1992
	yes	Archeological Clearance, Construct Upper Dolason Trail and trailhead, Bald Hills, Redwood Nationa□ Park, California.	Smith 1992
		ARCHEOLOGICAL CLEARANCE SURVEY FORM, Lyons Ranch Parking Lot and Trailhead, Bald Hills, Redwood Creek Basin, Redwood National Park, CA	Smith 1992
		ARCHEOLOGICAL CLEARANCE SURVEY FORM, Lyons Ranch Parking Lot and Trailhead, Bald Hills, Redwood Creek Basin, Redwood National Park, CA	Smith 1992
	yes	ARCHEOLOGICAL CLEARANCE SURVEY FORM Construct Coyote Creek boundary fence, Redwood National Park, CA	Smith 1993
		ARCHEOLOGICAL CLEARANCE SURVEY FORM Conduct Experimental Scotch Broom Removal, Bald Hills, Redwood National Park, CA	Smith 1993

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
		Arcaheological Clearance Survey Form Conduct three prescribed burns, Wooden Gate, Schooolhouse Peak and Elk Camp, Bald Hills, Redwood Creek basin, Redwood National Park, CA	Bickel, Fitzgerals and Smith 1994
	yes	ASSESSMENT OF ACTIONS HAVING AN EFFECT ON HISTORIC PROPERTIES Bald Hills Area, Copper Creek Prescribed Burn	Svinarich 2002
	yes	ASSESSMENT OF ACTIONS HAVING AN EFFECT ON HISTORIC PROPERTIES Bald Hills Area, William's Ridge East and West Prescribed Burn.	Svinarich 2002
		ASSESSMENT OF ACTIONS HAVING AN EFFECT ON HISTORIC PROPERTIES Bald Hills Area, Lower Dolason Prescribed Burn.	Svinarich 2002
		ASSESSMENT OF ACTIONS HAVING AN EFFECT ON HISTORIC PROPERTIES Bald Hills Area, Upper & Lower Elk Camp Prescribed Burn.	Svinarich 2002
		Redwood National Park Project Clearance, 2003 Mechanical Fuel and Prescribed Bum Projects , Bald Hills	Svinarich 2003
		Removal and Upgrade of Roads in Coyote Creek, Redwood National and State Parks, Humboldt County, California Archaeological Clearance Survey Report	Anderson 2004
		ASSESSMENT OF ACTIONS HAVING AN EFFECT ON HISTORIC PROPERTIES, Pig Pen, Lower Lyons, Boyes, Upper Elk, Lower Airstrip, & Eastside Fuel Treatment Units	Svinarich 2004
	yes	FY 2005 REPAIR REHAB CULTURAL RESOURCES INVENTORY AND ASSESSMENT, REDWOOD NATIONAL AND STATE PARKS FOR ROCK FORK ROAD	Sloan 2006
	yes	ARCHEOLOGICAL CLEARANCE SURVEY FORM Installation of Phase II Trailhead Waysides Project	Peterson 2007
		Archaeological Survey of Fuel Treatment Areas 2009 Field Season Redwood National Park	Vance and Svinarich 2012
		2011 Archeological Surveys Letter Report	Svinarich 2012
Yurok Segment 4 (NWIC Studies)			
S-001977	yes	Moved to Yurok Tribal Inventory Files	1979
S-002552	yes	A Report on Cultural Resources for the Proposed Relocation of the K&K Road, Redwood National Park, Redwood Creek Basin, Humboldt County, California	1981
S-005039	yes	An Archaeological Study of Selected Areas Within Redwood National Park, California	1971
S-005042	yes	An Archaeological Survey of Seven Inventory Units, Redwood National Park, Humboldt County, California	1982

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
S-006115	yes	Archaeological Survey Report, proposed replacement of Bridge 4-28 acrossRedwood Creek, 01-HUM-101 P.M. 121.1 01101-197490 Redwood Creek, 01-HUM-101 P.M. 121.1 01101-197490	1983
S-006670		Archaeological Survey Report, proposed addition to the Orick Community Services District Water System District Water System	
S-006762	yes	Archaeological Survey Report, replacement of Bridge No. 4-29 spanning PrairieCreek	1984
S-007124	yes	Archaeological Impact Report, U.S. Highway 101 Bypass: Wetlands and Riparian Habitat Restoration, Fisheries Projects and Southern Interchange, Humboldt	1985
S-009592	yes	Moved to Yurok Tribal Inventory Files	1987
S-013005		Archaeological Clearance Survey Form, Reroute of Horse Trail, Orick Ridge, Redwood National Park, California (Letter Report)	
S-013045	yes	An Archaeological Overview of Redwood National Park	1973
S-038865	yes	Cultural Resources Inventory of Caltrans District 1 Rural Conventional Highways in Del Norte, Humboldt, Mendocino and Lake Counties, Contract No. 01A1056, Expenditure Authorization No. 01-453608	2011
S-042498		[NCoIC S-24682] FY 2005 Repair Rehab Cultural Resources Inventory and Assessment, Redwood National and State Parks, for Orick Horse Trail	
S-044712		Archaeological Survey Report for Relpace Culverts on Redwood Creek Trailhead Road Project (PEPC ID no. 28777)	
S-044964		Guardrail Construction along 101 in Humboldt County	
S-047998	yes	[NCoIC S-22985] Cultural Resources Inventory for the California Department of Forestry and Fire Protection, Elk Camp Fire Station Project, Humboldt County, California Final Report	2000
Yurok Segment 4 (NPS_REDW Studies)			
		072-88.pdf Construct Redwood Creek overlook, Redwood National Park	Smith 1988
		Bald Hills Fuel Break	Svinarich 2014
		Holter Ridge Water Tank- 2012	Svinarich and Vance 2012
		Peterson 2014, REDW Crk Overlook	Peterson 2014
	yes	REDW-1971A_REDW-21.0_R-03 Survey_Moratto (Selected Areas Within RNP).pdf	Moratto 1971
	yes	REDW-1972B_REDW-21.1 Survey_Moratto (RNP Region).pdf	Moratto 1972
	yes	REDW-1973A_REDW-23.0_R-25 Survey_Moratto (RNP Cultural Resources).pdf	Moratto 1973

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
		REDW-1978A_1979_REDW-09.0 Survey_Bickel (A Study of Cultural Resources In Redwood National Park).pdf	Bickel 1979
		REDW-1978B_REDW-1978-112-AC_Survey_Kelly (Bald Hills Picnic Parking Area Construction).pdf	Kelly and Richards 1978
		REDW-1979A_REDW.27.0_R-11 Survey_Salzman and Bickel (Rehab Units).pdf	Salzman and Bickel 1979
		REDW-1980A_REDW-01.0_R-18 Survey_Baker (Arch Survey of Eleven Inventory Units).pdf	Baker 1981
		REDW-1981B_1980B_REDW-1981-006-AC_Survey_Smith (Orick Ridge Horse Trail Development).pdf	Smith and Reuter 1981
		REDW-1982A_REDW.2.0_R-20_Survey_Baker and Salzman (Arch Survey of Seven Inventory Units).pdf	Barker and Salzman 1982
		REDW-1988B_REDW-1988-063-AC_Survey_Smith (Gans Prairie Road Removal).pdf	Smith 1988
		REDW-1993E_REDW-1994-004-AC_Survey_Smith (Bald Hills Experimental Scotch Broom Removal).pdf	Smith 1993
		REDW-2002-AC PGSO02106 XXX_Survey_Svinarich (Gann's Prairie Rx).pdf	Svinarich 2002
		REDW-2002-PGSO02115 XXX_Svinarich (Upper and Lower Elk Rx).pdf	Svinarich 2002
		REDW-2003 TripRpt_Svinarich_20030906 (Redwood Fire Complex).pdf	Svinarich 2003
		REDW-2003 TripRpt_Svinarich_20031028 (XoannutukFire).pdf	Anderson 2003
		REDW-2004-AC-2004-060-PPC XXX_Survey_Svinarich (Pig Pen, Lower Lyons, Upper Elk Fuel, Lower Airstrip, Eastside Fuel Treatment Units).pdf	Svinarich 2004
		REDW-2005_Survey_Sloan An Archeological Clearance Survey for the Repair Rehab of Orick Horse May 2005 Trail.	Sloan 2006
	yes	REDW-2007 Mech-Rx Survey_Svinarich (Arch Inventory Fuel Mgmt Projects 2007)	Svinarich 2007
		REDW-2010-AC PEPC_28777 Survey_Peterson (Replace Culverts on Redwood Creek Trailhead Road).pdf	Peterson 2010
	yes	REDW-2011_Survey_Far Western (Cultural Resource Inventory for Rural Highways in District 1 2009)	Leach-Palm et. al 2011
		REDW-2012_Survey_Svinarich and Vance (Archaeological Survey of Fuel Treatment Areas 2009).pdf	Vance and Svinarich 2012
Yurok Segment 5 (NWIC Studies)			

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
S-000886	yes	Humboldt Bay Wastewater Authority, Regional Water Pollution Control Board Facility, Archaeological Resource Analysis; Archaeological Reconnaissance of the Humboldt Bay Area	1977
S-001714		Nursery Survey and Land Disposal	
S-001761	yes	Redwood National Park, Archaeological Survey of Proposed Rehabilitation Road Route and of Airstrip Creek Rehabilitation Unit with Comments on Survey of Logged Land Areas	1979
S-002937		A Cultural Resources Survey and Evaluation of Big Lagoon Rancheria, Orleans Karok Rancheria, and Happy Camp Rancheria in Northern California.	
S-005039	yes	An Archaeological Study of Selected Areas Within Redwood National Park, California	1971
S-005042		An Archaeological Survey of Seven Inventory Units, Redwood National Park, Humboldt County, California	
S-006115		Archaeological Survey Report, proposed replacement of Bridge 4-28 acrossRedwood Creek, 01-HUM-101 P.M. 121.1 01101-197490 Redwood Creek, 01-HUM-101 P.M. 121.1 01101-197490	
S-006298		Archaeological Survey Report, Potential Land Exchange, Little River State Beach	
S-006670	yes	Archaeological Survey Report, proposed addition to the Orick Community Services District Water System District Water System	1984
S-010364		An Archaeological Investigation of the Proposed Addition to the Big Lagoon Rancheria, Humboldt County, California	
S-012998		Archaeological Clearance Survey Form, Rehabilitation Unit 86-7: A-9-7-3 Roads and Slope, Redwood National Park, California (letter report)	
S-013005		Archaeological Clearance Survey Form, Reroute of Horse Trail, Orick Ridge, Redwood National Park, California (Letter Report)	
S-013024		Proposed Potable Water Systems	
S-013045	yes	An Archaeological Overview of Redwood National Park	1973
S-013896	yes	Archaeological and Historical Resources Survey and Impact Assessment, A-9 Thinning (California Department of Forestry)	1992
S-013926		Archaeological and Historical Resources Survey and Impact Assessment, Windy Pt. THP (California Department of Forestry)	
S-014615		Archaeological and Historical Resources Survey and Impact Assessment, Big Lagoon THP (California Department of Forestry)	
S-014829		Archaeological and Historical Resources Survey and Impact Assessment, A-140 Shelterwood-Prep. (California Department of Forestry)	
S-014846		Archaeological and Historical Resources Survey and Impact Assessment, H-Line/A-550-1 (California Department of Forestry)	

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
S-015251		Archaeological and Historical Resources Survey and Impact Assessment, H-Line/a-550 (California Department of Forestry)	
S-016356		Archaeological and Historical Resources Survey and Impact Assessment, Big Lagoon THP, THP #1-94-255 Hum (California Department of Forestry)	
S-017067		Phase I Archaeological Study, Lindstrom, APN 517-281-04, Proposed Homesite Development, Big Lagoon Park Road, Humboldt County, California	
S-017717		Archaeological and Historical Resources Survey and Impact Assessment, A-line 440-2 1995 (California Department of Forestry)	
S-017994		Archaeological and Historical Resources Survey and Impact Assessment, Windy Point	
S-018223	yes	Archaeological and Historical Resources Survey and Impact Assessment for Timber Harvesting Plan, Freeman Creek THP 1996	1996
S-018224		Archaeological and Historical Resources Survey and Impact Assessment, Water Gulch THP, THP #1-96-177H	
S-018512		Archaeological and Historical Resources Survey and Impact Assessment, A-370 THP, THP #1-96-344 HUM	
S-018526	yes	Archaeological and Historical Resources Survey and Impact Assessment, A-5 THP, THP #1-96-342 HUM	1996
S-019090		Bowlus THP	
S-020744		Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, A-410 THP	
S-020746	yes	Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Tom Cr. THP (California Department of Forestry)	1997
S-020962		1-98-043 HUM	
S-021327		Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Strawberry Rock THP (California Department of Forestry)	
S-021330	yes	Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Penthin THP (California Department of Forestry)	1998
S-021346		THP, 1-97-110 HUM	
S-021347		Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Coon Cr. L-P THP, 1-98-052 HUM (California Department of Forestry)	
S-021352		Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, LP 21 Rock THP	
S-022368		Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Burris Creek THP, THP #1-99-284 HUM	
S-022370		Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, McNeil Creek THP	

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
S-022467	yes	A-530, STCO #47-9903	1999
S-038865	yes	Cultural Resources Inventory of Caltrans District 1 Rural Conventional Highways in Del Norte, Humboldt, Mendocino and Lake Counties, Contract No. 01A1056, Expenditure Authorization No. 01-453608	2011
S-039844		An Archaeological Survey Report for the BL 2221 Timber Harvesting Plan, Humboldt County, California	
S-039925		[NCoIC S-23023] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, A-530, STCO #47-9903, THP #1-99-262 HUM	
S-040153		[NCoIC S-23226] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, A-8-1 Road THP, THP 1-00-056 HUM	
S-040211		[NCoIC S-25019] Extended Archaeological Survey of APN 517-281-04, a Five-Acre Parcel Owned by Big Lagoon Rancheria, Near Big Lagoon in Humboldt County, California.	
S-040549		[NCoIC S-23290] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, A-650/600/520, STCO #47-0004, THP #1-00-179 HUM	
S-040745		An Archaeological Survey Report for the BL2300 Thin '13 Timber Harvesting Plan, Humboldt County, California	
S-040773		[NCoIC S-23482] ""Christie"" THP	
S-040776		[NCoIC S-23624] A 210, Units A, B & C	
S-040778		[NCoIC S-24179] Little River State Beach Habitat Restoration Plan	
S-040782		[NCoIC S-24215] Proposed Pacific Bell Fiber Optics Line Project	
S-040791		[NCoIC S-24785] ""CR1700"" THP	
S-040835	yes	[NCoIC S-24924] CR1012 THP	2005
S-040839		An Archaeological Survey Report for the CR1500 Timber Harvesting Plan, Humboldt County, California	
S-040842		An Archaeological Survey Report for the "CR 1700/1013" Timber Harvesting Plan (GDRC # 47-0705) Humboldt County, California	
S-040845		[NCoIC S-25142] CR1500 THP; Unit A	
S-040849		[NCoIC S-25143] CR1013 THP	
S-040917		[NCoIC S-23421] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, A-8-1 Units (STCO #47-0006), THP #1-00-394 HUM	
S-040955	yes	[NCoIC S-24512] BL3000 '07 THP/Unit C	2006
S-040958		[NCoIC S-24518] Visser-McDonald Creek THP	
S-040959	yes	[NCoIC S-24524] BL1300 THP	2004
S-040961	yes	[NCoIC S-24966] BL3400 THP	2002
S-040962	yes	[NCoIC S-24967] BL 3000/3700 Units A-D THP	2003
S-040963	yes	[NCoIC S-25120] BL 1300 '07 THP/Unit D	2007
S-041005		[NCoIC S-25302] BL 1500/1600 THP	

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
S-041007		[NCoIC S-25304] Lower Maple Creek Riparian Corridor Enhancement Program/ R1-175	
S-041031		[NCoIC S-25317] BL 3910 THP	
S-041048	yes	[NCoIC S-23449] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, A-Line/A-600 THP, THP #1-01-175 HUM	2001
S-041646		[NCoIC S-23895] An Archaeological Survey Report for the CR 1004 Timber Harvesting Plan, Humboldt County, California, THP1-04-051 HUM	
S-041648		[NCoIC S-23897] An Archaeoloical Survey Report for the CR 1013 Timber Harvesting Plan, Humboldt, california, THP1-03-183 HUM	
S-041762		[NCoIC S-23980] An Archaeological Survey Report for the CR 1013 Timber Harvesting Plan, Humboldt County, California THP 1-03-188 HUM	
S-042191		[NCoIC S-24391] A Cultural Resources Investigation of the Maple Creek/Big Lagoon Road Decommissioning and Erosion Prevention Project, Located in Humboldt County, California, CDFG #204-R1	
S-042193	yes	[NCoIC S-24393] An Archaeological Survey Report for the CR 1200 Timber Harvesting Plan, Humboldt County, California	2006
S-042216		[NCoIC S-24357] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California Freshwater Lagoon THP 1-98-232 HUM	
S-042314		[NCoIC S-24514] An Archaeological Survey Report for the BL 2200/3100 Timber Harvesting Plan, Humboldt County, California; THP #1-06-063 HUM	
S-042320		[NCoIC S-24519] An Archaeological Survey Report for the BL1200 A-C SRESCo. 47-0311 Timber Harvesting Plan, Humboldt County, California	
S-042331		[NCoIC S-24490] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, 1500-2260 Tie THP (STCO THP #47-0201), THP #1-02-141 HUM	
S-042493	yes	[NCoIC S-24679] FY 2005 Repair Rehab Cultural Resources Inventory and Assessment, Redwood National and State Parks, for Hilton Road	2006
S-042495	yes	[NCoIC S-24680] A Cultural Resources Investigation of the Strawberry Creek Restoration Project, Located in Humboldt County, California	2006
S-042511		[NCoIC S-24693] An Archaeological Survey Report for the BL-3900 Timber Harvesting Plan, Humboldt County, California; THP #1-04-108 HUM	
S-042512		[NCoIC S-24694] An Archaeological Survey Report for the CR 1800 Timber Harvesting Plan, Humboldt County, California; THP #1-03-029 HUM	

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
S-042513		[NCoIC S-24695] An Archaeological Survey Report for the CR-1750 Timber Harvesting Plan #47-0408, Humboldt County, California; THP #1-04-109 HUM	
S-042623		[NCoIC S-24784] An Archaeological Survey Report for the CR 1000 SRESCo. 47-0302 Timber Harvesting Plan, Humboldt County, California; THP #1-03-011 HUM	
S-042624		[NCoIC S-24786] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, A-Line, A-510, A-520 THP (STCO THP #45-0101), THP #1-01-205 HUM	
S-042822	yes	[NCoIC S-24925] An Archaeological Survey Report for the CR 1000/1900 A-C (GDRCo. 47-0509) Timber Harvesting Plan, Humboldt County, California; THP #1-05-238 HUM	2005
S-042893		[NCoIC S-24968] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Patricks Point THP, THP #1-01-173 HUM	
S-042948		An Archaeological Survey Report BL 3700 '14 (GDRCo #47-1302) Timber Harvesting Plan Humboldt County, California; THP 1-13-051 HUM	
S-043004	yes	An Archaeological Survey Report BL3000-BL3500 '14 (GRDCo #47-1303) Timber Harvesting Plan, Humboldt County, California; THP #1-13-113 HUM	2013
S-043024		[NCoIC S-25062] An Archaeological Survey Report for the CR1012 '08 Timber Harvesting Plan, Humboldt County, California; THP #1-07-173 HUM	
S-043163		Cultural Resources Survey for Erik Nielsen, APN 517-281-002 at 206 Big Lagoon Park Road, near Trinidad, Humboldt County, California	
S-043211		Initial Cultural Resources Study for the Proposed Transfer from Fee to Trust Status of APN 517-131-017, A 12-Acre Parcel at Big Lagoon in Humboldt County for the Big Lagoon Rancheria.	
S-043411		An Archaeological Survey Report for the CR 1900 '15 Timber Harvesting Plan Humboldt, California; THP 1-13-073 HUM	
S-043425		An Archaeological Survey Report for the BL2200 '15' THP Humboldt County, California; THP 1-13-085 HUM	
S-043464	yes	[NCoIC S-25276] A Cultural Resources Investigation of the Strawberry Creek Riparian Restoration Project located in Humboldt County, California, California Department of Fish and Game Project #R1-143	2010
S-043466		[NCoIC S-25279] Collocation ("CO") Submission Packet, New Orick, SF-40927A	
S-044072	yes	An Initial Archaeological Survey and Determination of Eligibility Report for the Strawberry Creek Watershed Restoration Project, Redwood National Park, Humboldt County, CA	2010
S-044095	yes	Two Lousiana-Pacific Corporation Parcels Located at Big Lagoon	1996

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
S-044423		An Archaeological Survey Report CR 1920/1500 '15 (GDRCo #47-1309) Timber Harvesting Plan Humboldt County, California	
S-044594		Final Cultural Resources Inventory for Arra Tribal Wells and Water Projects, Big Lagoon Rancheria, Trinidad Rancheria, and Resighini Rancheria, Humboldt and Del Norte Counties, California	
S-044595	yes	An Archaeological Survey Report for the CR-3300/3360 GDRCo. 47-0507 Timber Harvesting Plan Humboldt County, California	2005
S-044596		An Archaeological Survey Report for the BL3700 Timber Harvesting Plan Humboldt County, California	
S-044597		An Archaeological Survey Report for the BL3700 Timber Harvesting Plan Humboldt County, California; THP 1-08-037	
S-044598	yes	An Archaeological Survey Report for the CR1700 '12 Timber Harvesting Plan Humboldt County, California; THP 1-10-137 HUM	2010
S-044625		An Archaeological Survey Report for the BL1100 Timber Harvesting Plan Humboldt County, California	
S-044626	yes	An Archaeological Survey Report for the BL-3100 / GDRCo # 47-1002 Timber Harvesting Plan Humboldt County, California	2010
S-044627	yes	An Archaeological Survey Report for the"BL1330' 11" Timber Harvesting Plan Humboldt County, California	2010
S-044631	yes	An Archaeological Survey Report for the BL-1000/1200/GDRCo # 47-1024 Timber Harvesting Plan Humboldt County, California	2011
S-044633	yes	An Archaeological Survey Report for the BL1300 '13 Timber Harvesting Plan Humboldt County, California	2012
S-044635		An Archaeological Survey Report for the BL-1500 / GDRCo # 47-1022 Timber Harvesting Plan Humboldt County, California	
S-044645		BL3500 Timber Harvesting Plan Humboldt County, California	
S-044646	yes	CR1500 Timber Harvesting Plan Humboldt County, California	2008
S-044964	yes	Guardrail Construction along 101 in Humboldt County	2008
S-045025	yes	An Archaeological survey Report for the BL 1100/1140 Thin '15 Timber Harvesting Plan, Humboldt County, California	2014
S-045150		An Archaeological Survey Report for the Christie Timber Harvesting Plan Humboldt County, California	
S-045156		An Archaeological Survey Report for the CR 1440 Timber Harvesting Plan Humboldt, California	
S-045158		An Archaeological Survey Report for the CR1630 Timber Harvesting Plan Humboldt County, California	
S-045176		An Archaeological Survey Report for the CR 1950 Timber harvesting Plan Humboldt County, California	
S-045178		An Archaeological Survey Report for the CR1940 Timber Harvesting Plan Humboldt County, California	
S-045181		An Archaeological Suvery Report for the Crannell Thin Timber Harvesting Plan GDRCo#43-1103 Humboldt County, Caliifornia	

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
S-045184		An Archaeological Survey Report for the CR1012 '12' Timber Harvesting Plan Humboldt County, California	
S-045550	yes	An Archaeological Survey Report for the BL1300 '15 Timber Harvesting Plan Humboldt County, California	2014
S-045575	yes	An Archaeological Survey Report for the BL1300/1500 Thin '15 Timber Harvesting Plan Humbolt County, California	2014
S-045915		Confidential Archaeological Addendum For Timber Operations on Non-Federal Lands in California, Harwood Stone Lagoon THP	
S-046165		An Archaeological Survey Report fot he Tom Creek Thin Timber Harvesting Plan, Humboldt County, California	
S-046311	yes	McDonald Creek Combo Timber Harvesting Plan, Humboldt, California, THP 1-14-144 HUM	2014
S-046546		An Archaeological Survey Report, BL 3600 Combo '16 (GDRCo #47-1410) Timber Harvesting Plan, Humboldt County, California, THP 1-15-003 HUM	
S-046570	yes	An Archaeological Survey Report fo the CR 1000 West '16 Timber Harvesting Plan, 1-15-055 HUM, Humboldt County, California	2015
S-046651		An Archaeological Survey Report for the Zuber THP 1-15-061 HUM, Humboldt County, California	
S-046849		An Archaeological Survey Report for the Lower Maple Creek THP 1-15-101 HUM, Humboldt County, California	
S-046852	yes	An Archaeological Survey Report for the BL1380 THIN THP 1-15-078 HUM, Humboldt County, California	2015
S-047040		An Archaeological Survey Report for the M-Line Creek '17 Timber Harvest Plan Humboldt County, California	
S-047062	yes	An Archaeological Survey Report for the Bulwinkle Thin (GDRCo #43-1501) Timber Harvesting Plan Humboldt County, California	2015
S-047209	yes	An Archaeological Survey Report for the BL 2000/3000 Thin '16 Timber Harvesting Plan Humboldt, California	2015
S-047645		Archaeological and Historical Resource Survey and Impact Assessment, A Supplemental Report for a Timber Harvest Plan, Van Eck NTMP, 1-96NTMP-012-HUM, Humboldt County, California	
Yurok Segment 5 (NPS_REDW Studies)			
		Archaeological Clearance Survey Form, South Operations Center Road Widenting	Smith 1987
	yes	An Archaeological Survey and Determination of Eligibility Report for the Strawberry Creek Watershed Restoration Project, located in Humboldt County, California	Cooper, Roscoe and VanKirk 2010
	yes	AN ARCHAEOLOGICAL SURVEY OF SELECTED AREAS WITHIN REDWOOD NATIONAL PARK, CALIFORNIA	Moratto 1971

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
	yes	ARCHAEOLOGICAL INVESTIGATIONS IN THE REDWOOD NATIONAL PARK REGION, CALIFORNIA	Moratto 1972
	yes	A SURVEY OF CULTURAL RESOURCES IN AND NEAR REDWOOD NATIONAL PARK ,CALIFORNIA	Moratto 1973
		ARCHEOLOGICAL CLEARANCF, SURVEY FORM Horse Trail Development, Orick Ridge, Redwood National Park, CA	Smith and Reuter 1981
		ARCHEOLOGICAL CLEARANCE SURVEY FORM Freshwater Lagoon Spit Management, Redwood National Park, California	Moratto and Smith 1973
	yes	Y 2005 REP AIR REHAB CULTURAL RESOURCES INVENTORY AND ASSESSMENT, REDWOOD NATIONAL AND STATE PARKS FOR HILTON ROAD	Sloan 2006
	yes	FY 2007 ARCHEOLOGICAL INVESTIGATIONS FOR FUEL MANAGEMENT PROJECTS, REDWOOD NATIONAL PARK HUMBOLDT COUNTY, CALIFORNIA	Svinarich 2007
	yes	California Department of Transportation Inventory District 1 Humboldt County, California	Leach-Palm et. al 2011
		ARCHEOLOGICAL CLEARANCE SURVEY FORM Redwood Information Center Weather Station	Fitzgerald, smith and Reuter 1992
		ARCHEOLOGICAL CLEARANCE Dismandeling and/ or Moving of Excess Government Quarters	Reuter 1981
	yes	ARCHEOLOGICAL CLEARANCE SURVEY FORM West Side Access Road (Redwood Creek) for rehabilitation project.	Salzman 1979
Yurok Alternative 5A (NWIC Studies)			
S-000192	yes	Archaeological Survey Report for a Minor Highway Realignment on 01-Hum-101, P.M. 115.4/115.8.	1975
S-000312	yes	Archaeological Survey Report for a Highway Widening and Minor Realignment Project on 01-Hum-101, 115.4/116.6 (Stone Lagoon)	1976
S-000662		Trinidad Rancheria	
S-000668	yes	NICPA Field Inspection Reports: St. John, Pedrotti, Bushmin, French, Miller, Hendricks, Honeydew Land Unit #1, Weber, Hennings, Wilkerson, Fortuna Plywood, Reardon, & Kaufman Subdivisions; Vukonich, Medina, Ramey, Blue Lake Fire, Gallachi Drainage Dispos	1976
S-000753	yes	Archaeological Evaluation of a Proposed Disposal Site on State Route 101 P.M.114.2 Humboldt County, California.	1977
S-000890	yes	Archaeological Evaluation of a Proposed Fill Area on State Route 101 (111.76), Humboldt County, California	1978

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
S-001348		Cultural Resources Field Report, Application 25746, Mill Creek, Rudnicki Property (Midway Trailer Park), Trinidad, California (California Division of	
S-001761		Redwood National Park, Archaeological Survey of Proposed Rehabilitation Road Route and of Airstrip Creek Rehabilitation Unit with Comments on Survey of Logged Land Areas	
S-002807	yes	Park and Ride Facility in Trinidad	1981
S-002937		A Cultural Resources Survey and Evaluation of Big Lagoon Rancheria, Orleans Karok Rancheria, and Happy Camp Rancheria in Northern California.	
S-005039	yes	An Archaeological Study of Selected Areas Within Redwood National Park, California	1971
S-005040	yes	Archaeological Investigations in the Redwood National Park Region, California	1972
S-006049		Archaeological Survey Report, Trinidad State Beach	
S-006670	yes	Archaeological Survey Report, proposed addition to the Orick Community Services District Water System District Water System	1984
S-008773	yes	Negative Archaeological Survey Report, proposed realignment tobypass a slide, 01-HUM-101 P.M. 111.4/111.8 203290	1986
S-009763	yes	A Cultural Resource Inventory of Patrick's Point State Park, Humboldt County, California (California Department of Parks and Recreation)	1987
S-009764	yes	A Cultural Resource Inventory of Harry A. Merlo State Recreation Area, Humboldt County, California	1987
S-009765	yes	Humboldt Lagoons State Park	1987
S-013045	yes	An Archaeological Overview of Redwood National Park	1973
S-013775	yes	Supplemental Report for 1-92-076 THP	1992
S-013926		Archaeological and Historical Resources Survey and Impact Assessment, Windy Pt. THP (California Department of Forestry)	
S-014615		Archaeological and Historical Resources Survey and Impact Assessment, Big Lagoon THP (California Department of Forestry)	
S-014837		Supplemental Report for Nelson-Howard Trust, Mill Creek	
S-014846		Archaeological and Historical Resources Survey and Impact Assessment, H-Line/A-550-1 (California Department of Forestry)	
S-015138		Archaeological inspection of the Susan property (letter report)	
S-015251		Archaeological and Historical Resources Survey and Impact Assessment, H-Line/a-550 (California Department of Forestry)	
S-015844	yes	Archaeological and Historical Resources Survey and Impact Assessment, Bott - Quarry THP (California Department of Forestry)	1994
S-016151		CDF Project Review Report for Archaeological and Historical Resources, Haskin CFIP, Project #94/95-I-HUM-922/Haskin	

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Study #	**in direct APE**	**Study Name**	**Author and Date**
S-017994		Archaeological and Historical Resources Survey and Impact Assessment, Windy Point	
S-018526		Archaeological and Historical Resources Survey and Impact Assessment, A-5 THP, THP #1-96-342 HUM	
S-020010	yes	Archaeological Survey Report, proposed replacement of an existing asphalt concrete dike, 01-HUM-101-KP 187.6 (PM 116.59) EA 371404	1997
S-020482		Cultural Resources Study of a Proposed Road Relocation at Redwood Trails Campground Located at Stone Lagoon	
S-020746		Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Tom Cr. THP (California Department of Forestry)	
S-020962		1-98-043 HUM	
S-021327		Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Strawberry Rock THP (California Department of Forestry)	
S-021330		Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Penthin THP (California Department of Forestry)	
S-021346		THP, 1-97-110 HUM	
S-021360	yes	L-P Demonstration Forest THP	1998
S-022368		Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Burris Creek THP, THP #1-99-284 HUM	
S-022467		A-530, STCO #47-9903	
S-038865	yes	Cultural Resources Inventory of Caltrans District 1 Rural Conventional Highways in Del Norte, Humboldt, Mendocino and Lake Counties, Contract No. 01A1056, Expenditure Authorization No. 01-453608	2011
S-039844		An Archaeological Survey Report for the BL 2221 Timber Harvesting Plan, Humboldt County, California	
S-039925		[NCoIC S-23023] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, A-530, STCO #47-9903, THP #1-99-262 HUM	
S-040083		[NCoIC S-23154] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California	
S-040791		[NCoIC S-24785] ""CR1700"" THP	
S-040811		[NCoIC S-23356] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Haskin - McDonald Creek, THP #1-00-206 HUM	
S-040835		[NCoIC S-24924] CR1012 THP	
S-040842		An Archaeological Survey Report for the "CR 1700/1013" Timber Harvesting Plan (GDRC # 47-0705) Humboldt County, California	
S-040849		[NCoIC S-25143] CR1013 THP	
S-040955		[NCoIC S-24512] BL3000 '07 THP/Unit C	

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Study #	**in direct APE**	**Study Name**	**Author and Date**
S-040961		[NCoIC S-24966] BL3400 THP	
S-040962		[NCoIC S-24967] BL 3000/3700 Units A-D THP	
S-041031		[NCoIC S-25317] BL 3910 THP	
S-041256		[NCoIC S-23563] Elk's Head Removal of Heather and Conifers	
S-041257		[NCoIC S-23564] PRC 5024 Project Evaluation, Project Name: Patricks Point New Well, Project No.: 635-01-019, District: North Coast Redwoods, Unit: Patricks's Point State Park	
S-041261		[NCoIC S-23571] PRC 5024 Project Evaluation, Leachfield Investigations for Major Capital Outlay, Project No.: 635-01-012, North Coast Redwoods District, Patrick's Point state Park	
S-041262		[NCoIC S-23572] PRC 5024 Project Evaluation, Uplands Road Streamside Slope Stability Investigation, Project No.: 635-01-008, North Coast Redwoods District, Patrick's Point State Park	
S-041300		[NCoIC S-23565] PCR 5024 Project Evaluation, Project Name: Water tank, Project No. 635-98-306, Unit: Patrick's Point State Park	
S-041304		[NCoIC S-23566] PCR 5024 Project Evaluation Project Name: Abalone Campsite Rehabilitation, Project No. : 635-00-101, Unit: Patrick's Point State Park	
S-041307		[NCoIC S-23567] Trinidad Resource Management Office Expansion Archaeological Review (letter report)	
S-041648		[NCoIC S-23897] An Archaeoloical Survey Report for the CR 1013 Timber Harvesting Plan, Humboldt, california, THP1-03-183 HUM	
S-042121		[NCoIC S-21653] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Moore, Trinidad, THP #1-99-035 HUM	
S-042216		[NCoIC S-24357] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California Freshwater Lagoon THP 1-98-232 HUM	
S-042495	yes	[NCoIC S-24680] A Cultural Resources Investigation of the Strawberry Creek Restoration Project, Located in Humboldt County, California	2006
S-042511		[NCoIC S-24693] An Archaeological Survey Report for the BL-3900 Timber Harvesting Plan, Humboldt County, California; THP #1-04-108 HUM	
S-042513		[NCoIC S-24695] An Archaeological Survey Report for the CR-1750 Timber Harvesting Plan #47-0408, Humboldt County, California; THP #1-04-109 HUM	
S-042514		[NCoIC S-24696] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Kennedy Selection, THP #1-02-151 HUM	
S-042623		[NCoIC S-24784] An Archaeological Survey Report for the CR 1000 SRESCo. 47-0302 Timber Harvesting Plan, Humboldt County, California; THP #1-03-011 HUM	

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
S-042624	yes	[NCoIC S-24786] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, A-Line, A-510, A-520 THP (STCO THP #45-0101), THP #1-01-205 HUM	2001
S-042625	yes	[NCoIC S-24787] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Trinidad LLC, 01-NTMP-054 HUM	2001
S-042893		[NCoIC S-24968] Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Patricks Point THP, THP #1-01-173 HUM	
S-042948		An Archaeological Survey Report BL 3700 '14 (GDRCo #47-1302) Timber Harvesting Plan Humboldt County, California; THP 1-13-051 HUM	
S-043004		An Archaeological Survey Report BL3000-BL3500 '14 (GRDCo #47-1303) Timber Harvesting Plan, Humboldt County, California; THP #1-13-113 HUM	
S-043024		[NCoIC S-25062] An Archaeological Survey Report for the CR1012 '08 Timber Harvesting Plan, Humboldt County, California; THP #1-07-173 HUM	
S-043219		[NCoIC S-25127] An Archaeological Survey Report for the Parker Timber Harvesting Plan, Humboldt County, California; THP #1-07-003 HUM	
S-043411		An Archaeological Survey Report for the CR 1900 '15 Timber Harvesting Plan Humboldt, California; THP 1-13-073 HUM	
S-043419		A Cultural Resource Investigation of fifteen Proposed Cabin Relocation Sites Located at Big Lagoon, Humboldt County, California	
S-043466		[NCoIC S-25279] Collocation ("CO") Submission Packet, New Orick, SF-40927A	
S-044596		An Archaeological Survey Report for the BL3700 Timber Harvesting Plan Humboldt County, California	
S-044597		An Archaeological Survey Report for the BL3700 Timber Harvesting Plan Humboldt County, California; THP 1-08-037	
S-044598		An Archaeological Survey Report for the CR1700 '12 Timber Harvesting Plan Humboldt County, California; THP 1-10-137 HUM	
S-044645		BL3500 Timber Harvesting Plan Humboldt County, California	
S-044646		CR1500 Timber Harvesting Plan Humboldt County, California	
S-044796	yes	A Cultural Resource Investigation of the Proposed Water Main Improvement along Scenic Drive for the Cher-ae Heights Indian Community, Humboldt County, California, Projects CA 07-L96	2011
S-044964	yes	Guardrail Construction along 101 in Humboldt County	2008
S-045025		An Archaeological survey Report for the BL 1100/1140 Thin '15 Timber Harvesting Plan, Humboldt County, California	
S-045184		An Archaeological Survey Report for the CR1012 '12' Timber Harvesting Plan Humboldt County, California	

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
S-045261	yes	A Cultural Resources Investigation for the Rotter/Gavin Property Assessor Parcel Number 517-261-007 Trinidad, Humboldt County, California	2014
S-045281	yes	Archaeological and Historical Resources Survey and Impact Assessment, A Supplemental Report for a Timber Harvesting Plan-Scotty Point; Humboldt County	1994
S-045282		Archaeological and Historical Resources Survey and Impact Assessment, A Supplement Report for a Timber Harvesting Plan-Quality Resorts (McDonald Creek), Humboldt County	
S-045307		Archeological and Historical Resources Survey and Impact Assessment, A Supplemental Report for a Timber Harvesting Plan: Reid-Mill Creek THP	
S-045813		Cultural Resources Records Search and Site Visit Results for T-Mobile West, LLC Candidate SF40923 (Quarry Road), 500 Quarry Road, Trinidad, Humboldt County, California (letter report)	
S-046165		An Archaeological Survey Report fot he Tom Creek Thin Timber Harvesting Plan, Humboldt County, California	
S-046546		An Archaeological Survey Report, BL 3600 Combo '16 (GDRCo #47-1410) Timber Harvesting Plan, Humboldt County, California, THP 1-15-003 HUM	
S-046570		An Archaeological Survey Report fo the CR 1000 West '16 Timber Harvesting Plan, 1-15-055 HUM, Humboldt County, California	
S-046651		An Archaeological Survey Report for the Zuber THP 1-15-061 HUM, Humboldt County, California	
S-047209		An Archaeological Survey Report for the BL 2000/3000 Thin '16 Timber Harvesting Plan Humboldt, California	
Yurok Alternative 5A (NPS_REDW Studies)			
	yes	An Archaeological Survey and Determination of Eligibility Report for the Strawberry Creek Watershed Restoration Project, located in Humboldt County, California	Cooper, Roscoe and VanKirk 2010
	yes	AN ARCHAEOLOGICAL SURVEY OF SELECTED AREAS WITHIN REDWOOD NATIONAL PARK, CALIFORNIA	Moratto 1971
	yes	ARCHAEOLOGICAL INVESTIGATIONS IN THE REDWOOD NATIONAL PARK REGION, CALIFORNIA	Moratto 1972
	yes	A SURVEY OF CULTURAL RESOURCES IN AND NEAR REDWOOD NATIONAL PARK ,CALIFORNIA	Moratto 1973
	yes	ARCHEOLOGICAL CLEARANCE SURVEY FORM Freshwater Lagoon Spit Management, Redwood National Park, California	Moratto and Smith 1973
	SA	ARCHEOLOGICAL CLEARANCE SURVEY FORM Redweood Information Center Interpretive Trail	Smith 1987

Table C-2 Results of Study Search (Public)			
Study #	**in direct APE**	**Study Name**	**Author and Date**
	SA	ARCHEOLOGICAL CLEARANCE SURVEY FORM Redweood Information Center Weather Station	Fitzgerald 1992
	yes	FY 2005 REP AIR REHAB CULTURAL RESOURCES INVENTORY AND ASSESSMENT, REDWOOD NATIONAL AND STATE PARKS FOR HILTON ROAD	Sloan 2006
	SA	CULUTRAL RESOURCES STUDY FOR THE “RELOCATE ENTRANCE SIGN AT FRESHWATER SPIT” PROJECT REDWOOD NATIONAL AND STATE PARKS	Sloan 2005
	yes	California Department of Transportation Inventory District 1 Humboldt County, California	Leach-Palm et. al 2011
	SA	ARCHEOLOGICAL CLEARANCE Dismandeling and/ or Moving of Excess Government Quarters	Reuter 1981
	SA	ARCHEOLOGICAL CLEARANCE SURVEY FORM West Side Access Road (Redwood Creek) for rehabilitation project.	Salzman 1979

Karuk Results (Confidential)

Yurok Results (Confidential)

Appendix D
Radio Frequency Study for Orleans Tower