Appendix G-2

NMFS Biological Assessment

SEQUOIA
Ecological Consulting, Inc.

Biological Assessment
Proposed Shiloh Resort and Casino Project
Sonoma County, California

National Marine Fisheries Service Biological Assessment for Listed Pacific Salmonids
Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation

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1.0 INTRODUCTION

Sequoia Ecological Consulting, Inc. (Sequoia) has prepared this Biological Assessment (BA) and Essential Fish Habitat (EFH) Assessment on behalf of Acorn Environmental for the proposed Shiloh Resort and Casino Project (hereafter "the Project") located in the Larkfield-Wikiup area of unincorporated Sonoma County, California. The Koi Nation, owner of the Project site and one of California's Federally recognized Native American tribes, has applied to the U.S. Bureau of Indian Affairs (BIA) for a fee-to-trust land acquisition. The BIA's Proposed Action is to place approximately 68 acres of land into Federal trust.

This BA has been prepared to facilitate consultation between BIA and the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Federal Endangered Species Act (FESA; 16 U.S.C. 1536 [c]) and Section 305(b) of the Magnuson-Stevens Act (MSA; 16 U.S.C. 1855[B]). As this Project may affect Federally listed species, consultation with the NMFS pursuant to Section 7 of the FESA is required.

This BA discusses the physical impacts from construction of the proposed Project and the effects of these impacts on Federally listed species protected pursuant to the FESA as well as effects on EFH protected by the Magnuson-Stevens Fisheries Conservation Act. As detailed herein, the proposed Project would likely be regarded as a project that "may affect, but is not likely to adversely affect" the Federally threatened Chinook salmon (*Oncorhynchus tshawytcha*), California Coastal (CC) Evolutionarily Significant Unit (ESU); the Federally endangered coho salmon (*Oncorhynchus kisutch*), Central California Coast (CCC) ESU; and the Federally threatened steelhead (*Oncorhynchus mykiss irideus*), CCC Distinct Population Segment (DPS), the NMFS-designated Critical Habitat for steelhead CCC DPS, and EFH for Pacific Salmonids.

In this BA we provide: 1) a description of the habitats that occur on the Project site, 2) a list of the Federally listed species that have potential to occur on or near the Project site, 3) avoidance and minimization measures (AMMs) for potentially affected listed species that will be implemented to reduce impacts to these species to the greatest extent practicable, and 4) all other necessary information that the NMFS will need to complete FESA Section 7 and Magnuson-Stevens EFH consultations with BIA for the proposed Project.

1.1 Purpose of the Biological Assessment

The purpose of this document is to assess how the Proposed Action may impact listed anadromous fish, NMFS-designated Critical Habitat (National Oceanic and Atmospheric Administration [NOAA] 2005), and EFH. It discusses the physical impacts from construction of the proposed Project and the effects of these impacts on Federally listed species protected pursuant to the FESA. In addition, the information in this report is provided to comply with statutory requirements to use the best scientific and commercial information available when assessing the risks posed to listed and/or proposed species, designated and/or proposed Critical Habitat, and EFH by proposed Federal Actions. This document is prepared in accordance with legal requirements set forth under Section 7 of the FESA (16 U.S.C. 1536 [c]) and is consistent with NMFS requirements. The species, critical habitats, and EFH considered for analysis in this document are discussed below.

1.2 Listed Species, Critical Habitat, and Essential Fish Habitat

1.2.1 National Marine Fisheries Service-Listed Species

Chinook salmon (*Oncorhynchus tshawytcha*), CC ESU, Threatened – **T**

Coho salmon (*Oncorhynchus kisutch*), CCC ESU, Endangered – **E**

Steelhead (*Oncorhynchus mykiss irideus*), CCC DPS, Threatened – **T**

1.2.2 Critical Habitat

The Proposed Action addressed within this document falls within Critical Habitat for steelhead CCC DPS. Critical Habitat for coho salmon CCC ESU and Chinook salmon CC ESU is located near the Proposed Action within the Russian River Basin. Critical Habitat for coho salmon CCC ESU is approximately .85 miles northwest of the Project boundary. Critical Habitat for Chinook salmon CC ESU is approximately 4.35 miles west of the Project boundary.

1.2.3 Essential Fish Habitat

The Proposed Action addressed within this document falls within EFH for Pacific salmon, specifically for Chinook and coho salmon within the Russian River watershed, as described in the 2014 final rule (FR) for EFH (NOAA 2014).

1.3 Consultation History

- December 15, 2023 – BIA provides Biological Assessment to NMFS for preliminary review
- February 9, 2024 – NMFS provides initial comments on Biological Assessment
- February 21, 2024 – NMFS, BIA, Acorn, and Sequoia meet to discuss NMFS comments
- April 13, 2024 – revised Biological Assessment prepared

2.0 PROJECT DESCRIPTION

2.1 Location and Setting

2.1.1 Project Location

The Project is located at 222 East Shiloh Road (Assessor's Parcel Number 059-300-003) in the Larkfield-Wikiup area of unincorporated Sonoma County near Windsor, California (Figures 1 and 2). The Project site is located east of U.S. Highway 101 (US-101) and west of Shiloh Ranch Regional Park at Latitude: 38.52389°, Longitude -122.77362° (Figure 1). The Project site is within the Healdsburg, CA

U.S. Geological Survey (USGS) 7.5-minute quadrangle and is bordered by Shiloh Road on the north, existing vineyards on the east, scattered residences on the south, and Old Redwood Highway on the west. Pruitt Creek, a fourth-order tributary in the Russian River watershed, flows south/southwest through the center of the Project site (Figure 2). The Project site is surrounded by residential development, agricultural fields, and community centers such as a park and a church. Project activities will occur within the approximately 68-acre parcel.

2.1.2 Regulatory Setting

Regulatory authority over biological resources is shared by Federal, state, and local agencies under a variety of laws, ordinances, regulations, and statutes. The Project is unique in that it will be developed on the Koi Nation sovereign land base, pending Federal approval. Land that is held for trust on behalf of tribes is subject to Federal and tribal law exclusively. Therefore, this Project does not fall under State or local jurisdiction. This BA is in support of National Environmental Policy Act (NEPA) compliance documentation for this Project.

2.2 Project Purpose and Background

The Koi Nation purchased a 68-acre parcel at 222 East Shiloh Road in September 2021 and seeks approval from the BIA to take this land into trust. Following the trust acquisition of the Project site, the Koi Nation proposes to develop a resort facility on the 68-acre parcel that includes a casino, hotel, ballroom/meeting space, event center, spa, and associated parking and infrastructure on the Project Site (Project). The resort would be open 24 hours a day, 7 days a week. It is anticipated that the event center would host concerts and performances while the ballrooms/meeting space would host banquets, conferences, or other special events. The Koi Nation will build and operate the resort and casino under authority of the U.S. Indian Gaming Regulatory Act (IGRA).

The parcel is approximately 12 miles from the Koi Nation tribal headquarters located in Santa Rosa, California. Development of this Project will promote the general welfare of the Koi Nation and raise governmental revenues. The Project will create jobs for members of the Koi Nation and the greater Sonoma County community.

2.3 Work Description

2.3.1 Project Footprint

The Project would develop a resort facility within the western portion of a 68-acre property boundary, and it would include a three-story casino (538,137 square feet), a parking area (1,689,380 square feet), and a five-story hotel (268,930 square feet) with spa and pool area, ballrooms/meeting space, and event center. The main facility, including the casino, hotel, and event center, would have a maximum height of approximately 65 feet above ground level. The architecture of the facility would incorporate natural materials and colors to integrate the buildings with the natural characteristics of the site and surrounding areas, including living rooftops landscaped with fire-resistant plants on both the casino-resort and parking structures. A five-foot non-combustible zone would be maintained around each structure that would remain void of vegetation and landscaping.

Parking for the resort facility would be provided on the ground floor of the casino, as well as in a four-story parking garage and a parking lot on the eastern side of Pruitt Creek. The parking garage would have a maximum height of approximately 60 feet above ground level. The exterior lighting would be integrated into components of the architecture and would be strategically positioned to minimize off-site lighting and any direct site lines to the public. No lighting would be directed toward Pruitt Creek. The portions of the Project Site outside of the riparian area and building footprint would be landscaped with fire resistant plants, with existing vineyard areas maintained around the perimeter of the site.

An enclosed clear-span pedestrian bridge would connect the parking garage with the casino approximately 12 feet above Pruitt Creek. The pedestrian bridge would be constructed without disturbing the bed and bank of Pruitt Creek, and impacts to the riparian area will be minimized. A clear-span creek crossing over Pruitt Creek for vehicular access is proposed as part of the Project. Outfall structures for treated effluent discharge would be developed within the bed, bank, and riparian corridor of Pruitt Creek. Pipeline crossings between the water and wastewater treatment area and the casino will either be suspended from the proposed pedestrian bridge or vehicle bridge, or installed beneath the creek using horizontal directional drilling or other trenchless techniques. As currently designed, the proposed Project will result in ground disturbance to approximately 4,200 square feet within the riparian corridor of Pruitt Creek (Appendix A).

The Project Site currently contains approximately 59.3 acres of vineyards and development of the proposed Project would impact between approximately 42 and 53 acres of vineyards depending on the size and type of seasonal storage selected for treated effluent. Other supporting infrastructure, including the proposed water treatment and wastewater treatment facilities, would be located on the southeastern portion of the Project Site.

2.3.2 Site Preparation and Construction

Project construction will include installation of underground utilities and vertical construction of a five-story hotel and casino and a four-story parking garage, as well as the construction of concrete access roads, additional parking lots, and a swimming pool (Appendix A). To prepare the Project site for development, staging areas will be designated and appropriate best management practices (BMPs) installed for avoidance and minimization of Project-related impacts to sensitive resources (e.g., Pruitt Creek). The property will then be cleared, grubbed, and graded.

Work within and adjacent to the riparian area and Pruitt Creek will be limited to the two clear-span bridge crossings (one pedestrian, one vehicular), pipeline installation (either by directional drilling or other trenchless, or suspended from bridges), installation of an outfall to Pruitt Creek from the water treatment plant, and installation of a gauge in Pruitt Creek to calibrate allowable discharge flows. All specifics on these construction features are subject to final design and permitting.

To prevent contaminants from being discharged to Pruitt Creek, best management practices would include regular sweeping on streets and parking areas. Sweeping would occur weekly at a minimum during the operational phase. Bioswales will be created to treat 10-year storm events, including along Pruitt Creek near the south end of the Project site. A basin will be designed to detain differential at a 100-year storm volume. Landscaping and riparian planting will occur once construction is complete.

The Project Proponent considered phasing in of the surface parking lot; however, it is currently anticipated to be needed and development of the surface parking area provides a conservative assumption for assessing potential environmental impacts. During the preliminary design phase, engineering considered the option to direct more runoff to infiltration galleries or bioswales, as well as the use of permeable pavement. These options were not viable for the Project site due to a high groundwater table and poorly drained soils in portions of the site. These options would increase surface flow volumes and could result in localized ponding or flooding during storm events. The preliminary drainage plan as designed is consistent with County methodologies to treat/detain the differential in pre- and post- development flows.

2.3.3 Architecture, Signage, Lighting, and Landscaping

The architecture of the facility would incorporate natural materials and colors to integrate the buildings with the natural characteristics of the site and surrounding areas, including living rooftops landscaped with fire-resistant plants on both the casino-resort and parking structures. The main facility, including the casino, hotel, and event center, would have a maximum height of approximately 65 feet above ground level. The parking garage would have a maximum height of approximately 60 to 65 feet above ground level and would include a decorative, perforated metal screen around the exterior to provide shade to the interior of the parking garage and visual screening.

The portions of the Project Site outside of the riparian area and building footprint would be landscaped with fire resistant plants, with existing vineyard areas maintained around the perimeter of the site. The Project Site currently contains approximately 59.3 acres of vineyards and development of the Project would retain between approximately 12.4 and 17.4 acres of vineyards depending on the size and type of seasonal storage selected for treated effluent. A five-foot non-combustible zone would be maintained around each structure that would remain void of vegetation and landscaping. A short decorative rock wall would be installed along the northern and western perimeter of the Project Site to separate the vineyards from the roadways. Architectural renderings of this Project are provided in the EIS (Figures 2.1-2a and 2.1-2b).

A decorative ground-level sign would be incorporated into the rock wall at the northwestern corner of the Project Site near the intersection of Shiloh Road and Old Redwood Highway. Decorative ground-level monument/directional signs would be located at the entryways to the Project Site.

Exterior lighting of the proposed Project would be designed to be consistent with the Dark-Sky Association Model Lighting Ordinance, and internal lightening would be designed to be minimize interior spill light (see EIS: Appendix C and Table 2.1-3 for details). The exterior lighting of the proposed Project would be integrated into components of the architecture and strategically positioned to minimize off-site lighting and any direct site lines to the public. No illumination would be directed towards Pruitt Creek or beyond the Project Site boundaries with the exception of the three access points, where light may extend to the mid-center of the adjacent roadways, Shiloh Road and Old Redwood Highway. The porte-cochere canopy will be made of a solid material to prevent upward illumination and help capture ground-reflected light. Lighting for the signs would be integrated into components of the sign or landscaping and would be strategically positioned to minimize off-site lighting and any direct site lines to the public. A “no lighting” buffer zone will be established around the Project Site perimeter, including the vineyard areas and Pruitt Creek.

2.3.4 Grading and Drainage

The existing topography of the Project Site is relatively flat, ranging in elevation from 135 feet to 160 feet above mean sea level, and generally slopes toward Pruitt Creek, which runs through the site. Construction would involve grading and excavation for building pads and parking lots. A Site Grading and Hydrology Study is included in Appendix D-3 of the EIS. As described therein, building finish floors were chosen approximately 1-2 feet above existing 500-year floodplain elevations associated with the creek. These range from 142 feet in elevation for the conference center, to 144 feet for the casino and parking structure, and 146 feet for the hotel. Although some vineyard areas would remain undisturbed, the roadway-adjacent vineyards are intended as decorative landscape areas. These areas are to be graded with slopes not to exceed 4:1. Parking lot and roadways are to be designed between 1 and 5% slope. The proposed grading concept accomplishes a near balanced site with less than 10,000 cubic yards of fill required to be imported. Cut areas include the WWTP and foundations of the structures. Fill would primarily be placed on the southwesterly portion of the Project Site near, and outside of, the 100-year and 500-year floodplain. Earthwork within the 100-year and 500-year floodplain would be balanced. Fill would be transported in accordance with applicable requirements from a source within 20 miles during normal construction hours (7 a.m. to 5 p.m.), and dust suppression BMPs would be used for roadways and trucks as discussed in Appendix E.

Although not required for tribal trust lands, the Sonoma County Water Agency Flood Management Design Manual (FMDM) was used for the design of the stormwater drainage system. Per FMDM standards, the stormwater drainage system under Alternative A would limit the post-development peak flow and stormwater volume to pre-development levels during a 100-year probability, 24-hour duration storm event. As shown on Figure 2.1-3 of the EIS, the proposed grading for the portion of the Project Site west of Pruitt Creek consists of three different sub-area watersheds.

The largest shed, Sub Area A (Figure 2.1-3 of the EIS), would collect runoff from vineyards, roadways, and building roof drainage and convey the flows to the decorative bioswale in the front entrance of the casino and then to a detention basin on the southwestern portion of the Project Site prior to discharging to Pruitt Creek. Sub Area B would collect runoff from roof drainage and some landscape/vineyards into a bioswale adjacent to Pruitt Creek. Sub Area C would also collect runoff from roof drainage and the loading dock area and convey the flows through a bioswale and then discharge into the creek. The bioswale for Sub Area C is located within the flood zone of Pruitt Creek and therefore would be designed with an elevation at or above the floodplain elevation to allow for treatment of pollutants from the roof drains and service yard during a storm event. The proposed grading for the portion of the Project Site east of Pruitt Creek consists of four different sub-area watersheds. Sub Area D, E, and F would convey all drainage runoff from the parking, roadways, and landscape areas into bioswales and then discharge into the creek.

The bioswales would be sized per Sonoma County low impact development (LID) requirements for pollutant reduction. Storm drain outfalls to the creek would be designed with rock slope protection to prevent erosion of the natural creek banks and erosion downstream. Sub Area WWTP is the fourth sub area of the easterly watershed. Due to potential for sanitary sewer spill contamination of potential overflows, runoff in this area would be captured and conveyed to the WWTP for treatment and disposal as described in Section 2.3.6.

2.3.5 Groundwater and Water Quality

The estimated average daily water usage for the proposed Project is approximately 170,000 gallons per day (gpd) of potable water and 108,000 gpd of recycled water. Potable water supply would be provided via on-site wells, and recycled water (tertiary treated effluent) would be provided from the on-site wastewater treatment facilities. Recycled water would be used for toilet and urinal flushing, on-site landscape irrigation, on-site vineyard irrigation, and cooling tower makeup. Fire flow requirements for the proposed Project are anticipated to be 2,000 gallons per minute for 4 hours assuming the use of automatic fire sprinklers consistent with applicable requirements of the Tribe's Building and Safety Code of 2023, which are consistent with the California Building Code (CBC).

Water supply for the existing vineyards and residence on the Project Site is currently provided through four on-site wells; however, additional investigation is needed to determine if the existing wells would be suitable for use as potable water supply sources. Consistent with the CBC, the proposed water supply system for the proposed Project would consist of the following components:

- Water production wells: Up to two water supply wells would be established onsite, drilled to a depth of approximately 700 feet below ground.
- Water treatment plant: A water treatment plant would be located within an enclosed building. See Figures 5-1 and 5-2 of Appendix D.
- Storage tank: The tank would have an approximate diameter of 75 feet and height of 32 feet.
- Pump station: A potable water pump station would be used to convey potable water from the storage tank to the resort facilities.

The water treatment plant, storage tank, and pump station would be located within the "treatment area" designated in the eastern portion of the Project Site (Figure 2.1-1). The location of the four existing wells and potential location of a new well is shown on Figure 2-3 of Appendix D.

2.3.6 Wastewater Treatment

The regulatory, technical, and engineering issues associated with supplying water and handling wastewater have been evaluated for four different buildout alternatives. Impacts to federally listed species have been analyzed with respect to the most feasible alternative.

An on-site Wastewater Treatment Plant (WWTP) would treat wastewater from the resort and casino to a tertiary level, as defined by Title 22 of the California Code of Regulations. It would comply with the effluent quality requirements of the National Pollution Discharge Elimination System (NPDES) discharge permit issued by the U.S. Environmental Protection Agency (USEPA). Wastewater from the resort facilities would flow through sewer lines by gravity to a lift station. The gravity sewer main would be laid along planned roadways within the Project Site to facilitate access and maintenance. The gravity sewer main would be installed either beneath Pruitt Creek by horizontal directional drilling or other trenchless construction methods or over Pruitt Creek by attaching it to either the proposed pedestrian or vehicle bridge to avoid impacts to the creek and riparian corridor. Wastewater would then be pumped from the lift station wet well through a sewer pipeline to the headworks of the WWTP. The lift station wet well would also be used to collect surface water runoff from the treatment site. The WWTP would include a course screening facility, headworks, immersed membrane bioreactor (MBR) system, ultraviolet (UV) disinfection, chlorine disinfection, effluent pump station, equalization tank, emergency storage tank, and associated operations and storage buildings. Any water discharged to surface waters would be non-chlorinated or fully de-chlorinated prior to discharge. Excess effluent from the system that cannot be recycled for toilet flushing, cooling tower makeup, or vineyard irrigation would be disposed directly into Pruitt Creek and permitted by the NPDES. The water quality of the discharge will follow the requirements of the NPDES permit, the California Regional Water Quality Control Board's Water Quality Control Plan for the North Coast Region (Basin Plan; NCRWQCB 2018), and State Water Resources Control Board's Title 22 of California's Code of Regulations Related to Recycled Water (Title 22; SWRCB 2018). The EPA issued NPDES for the proposed Project would follow Clean Water Act (CWA) standards and comply with the effluent limitations adopted for the receiving water. The Receiving Water standards are based on the requirements per the NCRWQCB Basin Plan.

The nearest U.S. Geological Survey (USGS) gauging station #11466800 is located 5.5 miles downstream from the proposed Project. This gauge measures a contributing watershed area of 251 square miles while Pruitt Creek at the Old Redwood Highway contributes 2.1 square miles of flow, which is approximately 120 times smaller than the entire watershed area measured by the gauge. To account for this difference in expected stream flows, a gauge will be installed near the point of discharge in Pruitt Creek to measure discharge. For the purpose of this Biological Assessment and associated impact analysis, it is assumed as an Avoidance and Minimization Measure that no more than 1% of Pruitt Creek flow will be discharged to be consistent with NCRWQCB Basin Plan standards for receiving waters. The applicant assumes that they may be required to prepare a written proposal for monitoring flow in Pruitt Creek for the purpose of determining the effluent discharge rate allowable by the NPDES permit.

Recycled water from the on-site WWTP would be utilized for toilet/urinal flushing, landscape irrigation, vineyard irrigation, cooling tower make-up and other approved non-potable uses consistent with EPA and California Title 22 regulations. Additionally, recycled water could be utilized to supply water for fire protection, such as the sprinkler systems and fire hydrants. Water would be pumped from the recycled water storage tank to the recycled water distribution system and seasonal storage reservoir/tank. The on-site recycled water reuse facilities would be designed to comply with California State Water Resources Control Board standards including, but not limited to, marking irrigation facilities in a purple color and installing recycled water pipelines in separate trenches away from other water pipelines. Recycled water would be pumped out of the seasonal storage ponds/tanks to the irrigated areas for re-use. These pumps would operate seasonally, typically between April and October, and would be sized to convey the entire volume of recycled water stored in the seasonal storage ponds/tanks plus a portion of the daily summertime wastewater flows. The brine generated as a byproduct of the recycled water treatment would be periodically hauled offsite to a facility which accepts and treats such wastes, such as the East Bay Municipal Utility District WWTP. Under the maximum scenario for recycled water use, where no effluent is discharged to the creek, up to 44.8 acres of turf, or 406 acres of vineyards could be irrigated with recycled water produced as a result of the proposed Project; this level of irrigation would be achieved through both on and off-site irrigation. Treated effluent could also be disposed off-site consistent with existing Title 22 regulations for groundwater replenishment and surface water augmentation, and pending Title 22 regulations for potable reuse.

Discharge to Pruitt Creek during the wet season (approximately October 1 to May 14) would be subject to the requirements of an NPDES discharge permit issued by the USEPA, which would allow discharges to surface water in accordance with the federal Clean Water Act (CWA) and applicable provisions of the Water Quality Control Plan for the North Coast Region (Basin Plan). Facilities associated with the seasonal surface water discharge would include a new discharge pipeline and outfall structure. The outfall structure would be designed to prevent erosion of the natural creek banks and erosion downstream. The outfall pipe outlet would include a duckbill check valve or similar component to protect against settlement/silting inside the pipe or nesting of small animals or rodents. The area around the outfall pipe would be covered with riprap or similar material to prevent natural erosion around the pipe from occurring and to protect the banks during periods of discharge. The pipe material would be suitable for permanent exposure to sunlight and creek water quality conditions.

Seasonal storage ponds or tanks would be used to seasonally store treated effluent until it can be reused on-site or discharged to Pruitt Creek. The size of the storage facilities would vary depending on the availability of recycled water use areas. Seasonal storage pond(s) would be constructed using semi-buried ponds and berms and would be lined with an impermeable material, such as clay or concrete, to minimize percolation into the groundwater. Seasonal storage ponds would be located outside of the 100-year and 500-year floodplain and downgradient from any water supply well used for the proposed Project. Seasonal storage ponds would be sized according to the volume of disposal via irrigation and surface water discharge, as well as the remaining carry-over volume required from month to month.

2.4 Conservation Measures and Best Management Practices

Implementation of conservation measures and installation and maintenance of BMPs limit potential impacts of the proposed Project on Pacific salmonids, Critical Habitat, and EFH. These measures have been designed to help avoid and to minimize effects to listed species and their habitat while also addressing the purpose and need of the Project. Individual Pacific salmonids are not likely to be directly impacted by physical construction methods but may be indirectly affected if Project activities modify water quality parameters (e.g., increased temperature or turbidity, lowered dissolved oxygen) within Pruitt Creek.

Potential Project activities that could contribute to indirect effects include removal of riparian vegetation resulting in increased sun exposure, grading, and sediment transport from uplands to the waterway, and unintentional releases (spills) of hazardous materials to surface waters. BMPs employed before, during, and after construction will ensure that ground disturbance, alterations to vegetation, and unintentional spills from the development of this Project do not impact the quality of the aquatic habitat in Pruitt Creek. These Project-related impacts cannot be fully avoided; however, conservation measures listed in Appendix E of this document aim to directly reduce these impacts.

Once all potential effects to an individual, population, and/or Critical Habitat have been identified, additional conservation measures can be logically developed (Section 7: Avoidance and Minimization Measures). Most conservation measures are standard measures consistently requested by NMFS.

3.0 ANALYSIS METHODS

3.1 Background Research

Prior to preparation of this BA, Sequoia researched the U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Conservation (IPaC) database (USFWS 2022), the CalFish website (2022), the NMFS website (2022), and the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB 2022) for all recorded occurrences of Federally listed species known from the region of the proposed Project. The potential for species occurrence was determined based on the results of literature reviews, field-based habitat assessments, and GIS-based remote sensing.

Based upon queries of NMFS resources and the CNDDB (2022), three Federally listed fish species were identified to have the potential to occur within the vicinity of the proposed Project and are within the North-CCC Recovery Domain (Appendix B).

All Federally listed species records are compiled and discussed in Table 1. Sequoia examined all known record locations for special-status species to determine if Federally listed species could occur on the Project site or within an area of affect.

3.2 Site Assessment

Sequoia fisheries biologist Claire Buchanan conducted a survey on the Project site on February 23, 2022, to record biological resources and to assess the limits of areas potentially regulated by resource agencies. The survey involved assessing habitat within Pruitt Creek on the Project site and visual survey for Federally listed fish species. The habitat assessment was guided by the habitat requirements defined by EFH (Section 9.1) and the habitat features known to be used by the listed Pacific salmonids expected to occur on the Project site. This assessment informed the analysis of the direct and indirect effects of the proposed Project on listed Pacific salmonids and their habitat. Any special-status fish or suitable habitat was documented.

3.3 Wetland Delineation

A complete formal aquatic resources delineation was performed on the proposed Project site on February 23 and 24, 2022, by Ari Rogers of Sequoia. The purpose of the aquatic resource delineation was to determine the location and extent of potential state and/or federally jurisdictional aquatic resources on the Project site. All features exhibiting wetland characteristics were mapped within the Project site. The wetland delineation was conducted according to the U.S. Army Corps of Engineers' (USACE) Wetlands Delineation Manual (USACE 1987) in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008) and the State Water Resources Control Board's *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (2019). A separate stand-alone report will be provided to water resource agencies for this aquatic resource delineation, as necessary. The current version of the aquatic resource delineation map of the Project site (dated October 31, 2023) is provided in Appendix C.

4.0 ENVIRONMENTAL BASELINE

4.1 Russian River Watershed

The Russian River Basin is rated as "poor" through NOAA's Conservation Action Plan process for the following conditions: habitat complexity, riparian vegetation, passage/migration, estuary/lagoon, velocity refugia, sediment transport, and water quality (turbidity). The watershed's measurements of sediment, temperature, and viability were identified as impaired. These conditions will need to be addressed to allow for the full recovery of anadromous fish species (NOAA 2016a). Historically, anadromous fish in the Russian River watershed have been declining due to a variety of natural and anthropogenic factors.

4.1.1 Geography and Climate

The Russian River is located in a tectonically active area, which occasionally causes unstable landscapes, landslides, and increased sediment into waterways. Additionally, the soil type is typically Franciscan Geologic Complex and alluvium, which naturally produces copious sand and gravel. Sedimentation is further compounded by high annual rainfalls following hot summers, which produce more unstable soils. Recently, extreme wildland fires have occurred in the watershed, which potentially removed stabilizing vegetation and increased soil erosion, as well as increased sediment production via ash and debris. Oscillation in weather patterns such as El Niño locally affect ocean productivity, which may influence the size and health of salmonids returning inland to spawn. Variable weather conditions can also influence the creation and breakdown of sandbars, sometimes providing a physical barrier to migration and spawning.

4.1.2 Existing Terrestrial Habitat

Vineyards

The Project Site is predominately an active vineyard with ruderal (weedy) vegetation growing in between the grape rows. Vineyard infrastructure is also present including dirt roads, piping, propane tanks, a wash station, and electrical power poles. While the grape rows themselves are weeded and maintained, ruderal and annual vegetation grows between rows and around the vineyard perimeter; ruderal species are adapted to endure intense and/or long-term disturbance. Ruderal species observed within the Project Site include non-native annual grasses such as slender wild oat (*Avena barbata*), ripgut brome (*Bromus diandrus*), and soft chess (*Bromus hordeaceous*), as well as stinking chamomile (*Anthemis cotula*), English plantain (*Plantago lanceolata*), California burclover (*Medicago polymorpha*), common vetch (*Vicia sativa*), and filaree species (*Erodium botrys, E. cicutarium*). This habitat type occupies approximately 59.3 acres of the Project Site.

Ornamental Landscaping

Landscaped vegetation consisting of ornamental trees and shrubs surround the private residence and other structures on the Project Site. There are olive trees and a variety of fruit trees on the north side of the private residence. Ruderal species occur between the landscape and orchard plantings. Large trees (primarily valley oaks [*Quercus lobata*]) line the property boundary. This habitat type occupies approximately 6.9 acres of the Project Site.

Riparian Corridor

The extent of the riparian corridor along Pruitt Creek is shown in Appendix C (see "Riparian Dripline") and averages approximately 150 feet wide. The riparian corridor ranges from approximately 100 feet wide to 180 feet wide nearly continuously throughout the Project area. Valley oaks dominate the riparian corridor with some smaller eucalyptus (*Eucalyptus* sp.) trees also present. Understory vegetation is composed of both native and non-native species of grasses and shrubs. The understory communities observed had distinct segments heavily dominated by native species alternating with areas dominated by non-native species. Some native species observed include California buckeye (*Aesculus californica*), California bay laurel (*Umbellularia californica*), willow (*Salix* sp.), poison oak (*Toxicodendron diversilobum*), valley oak, and coast live oak (*Quercus agrifolia*). Non-native species observed include Himalayan blackberry (*Rubus armeniacus*), eucalyptus, and black mustard (*Brassica nigra*), among others. There is a narrow buffer of non-native annual grassland between the riparian corridor and the vineyards. This Riparian Corridor has the potential to serve as a wildlife corridor to species in the area. This habitat type occupies approximately 5.2 acres of the Project Site.

4.1.3 Existing Aquatic Habitat

Roadside Drainage Ditches

Roadside drainage ditches are man-made features that catch sheet flow or convey stormwater flows. Two Roadside drainage ditches were delineated on the western edge of the Project Site, along Old Redwood Highway (Appendix C). The northern roadside drainage ditch (RD-01) is approximately 1,305 feet long and the southern roadside drainage ditch (RD-02) is approximately 444 feet long. These ditches appeared to be excavated in uplands (rather than wetlands) and are not replacing any natural drainages or wetlands, nor did they appear to be fed by seeps or hydrologic sources other than direct precipitation and runoff from the roadside and Seasonal Wetlands. Based on conditions observed in the field and a review of the NWI, NHD, and USGS topographic maps, and other sources, the ditches are not natural tributaries to downstream traditionally navigable waters. The roadside drainage ditches were dry during the delineation and support a marginal bed and bank in some areas but are generally swale-like, as well as OHWM, including presence of leaf litter, matted or absent vegetation, and scour. Vegetation found in the ditches were characterized by a mix of hydrophytic species and ruderal and non-native annual species consistent with the adjacent uplands. These features are unlikely to be considered waters of the U.S. as they appear to fall within the category of “Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water,” which are specifically excluded from USACE jurisdiction under current guidance.

Seasonal Wetlands

Seasonal wetlands are habitats that dry down in the summer and fall months, but generally in the rainy, winter months become saturated and inundated for several weeks to months. These areas often become dominated by hydrophytic plant species that are reliant and/or dependent on regular saturation or inundation. Four seasonal wetlands were delineated on the western edge of the Project Site, between the perimeter fencing along Old Redwood Highway and the grape arbors (Appendix C). While cover within these seasonal wetlands was dominated by bare ground and algal matting, the vegetation present consisted almost exclusively of hydrophytic species. Topographical trends and patterns in the land cover/vegetation indicate the seasonal wetlands are hydrologically connected to, if not a direct water source for the RD02 that flows along Old Redwood Highway into Pruitt Creek. Additionally, evaluation of upland soils indicates that the hydrology of the seasonal wetlands is at least partially influenced by irrigation associated with agricultural activities.

Based on current guidance and an analysis of field and background data, the seasonal wetlands do not directly abut “non-navigable tributaries of traditional navigable waters that are relatively permanent” but are hydrologically connected to such tributaries via the Roadside Drainage Ditches and may qualify as “wetlands adjacent to non-navigable tributaries that are not relatively permanent.” Conversely, pursuant to CWA 33 CFR § 328.3 “artificially irrigated areas, including fields flooded for agricultural production, that would revert to upland should application of irrigation water to that area cease" are considered non-jurisdictional. Furthermore, the effect of agricultural activities on the jurisdictional status of the seasonal wetlands may also be influenced by CWA 33 CFR § 323.4, which exempts "normal and established farming, silviculture and ranching activities such as plowing, seeding, cultivating, minor drainage, and harvesting for the production of food, fiber, and forest products, or upland soil and water conservation practices" from USACE regulations and permitting. While these exemptions appear to be applicable to the seasonal wetlands, only the USACE can determine their pertinence and jurisdiction.

4.1.4 Disease and Predation

Anadromous fish in the Russian River Basin are threatened by diseases associated with diminished water quality, diseases brought by introduced non-native fish, and diseases concentrated in hatchery conditions. Predation is most impactful in degraded habitat, especially areas lacking deep pools, quality estuaries, and emergent vegetation. Invasive and native aquatic species including smallmouth bass (*Micropterus dolomieu*), striped bass (*Morone saxatilis*), channel catfish (*Ictalurus punctatus*), and the Sacramento pikeminnow (*Ptychocheilus grandis*) predate on young Chinook salmon in the Russian River Basin. Once in the ocean, salmon species are predated by marine mammals (NOAA 2016a).

While hatchery efforts have shown marked success in boosting steelhead and Chinook salmon populations, coho salmon populations may have been negatively impacted by hatchery efforts. Early hatchery operations in the Russian River propagated coho salmon fry from far northern populations that were adapted to cooler temperatures and less variable habitat conditions (NOAA 2016b, Brown et al. 1994). The subsequent hybrid population may have been less well-adapted to local conditions than the native coho salmon genetic stock. The effect on today's coho salmon is difficult to measure, but compared with other salmonids, coho salmon have overall low genetic variability (Brown et al. 1994).

In addition, hatchery practices may introduce and encourage growth of disease. Coho salmon stock brought from Oregon and Washington may have greater resistance to different diseases than the native population, and they may introduce parasites or viruses from these distant waterways. Diseases may transmit between hatchery and native stocks, causing a net loss in population.

Hatchery fish may also outcompete native wild-born coho salmon; hatchery fish enter the habitat larger than wild juveniles, and territorial behavior may prevent wild-born fish from using prime juvenile rearing habitat. These hatchery-born coho salmon may exhibit a larger body size, even as spawning adults, and they may outcompete native fish for prime spawning habitat (Brown et al. 1994).

4.1.5 Land Use

Agricultural practices frequently divert and channelize naturally occurring tributaries, which results in removing or severely altering salmonid spawning habitat. Even when channels are not altered, riparian vegetation is often removed to maximize agricultural output. This practice increases water temperatures, exacerbates bank erosion, encourages the invasion of non-native plants, decreases the recruitment of large woody debris into watercourses, lowers the water table, reduces habitat diversity, and ultimately can lead to the drying of tributaries.

Grazing livestock may increase bank erosion due to trampling of the existing banks, which can also inhibit riparian vegetation. The presence of livestock near tributaries also increases animal waste into the streams, which in turn increases the level of nutrient loading and can cause algae growth and eutrophication. The subsequent decrease in dissolved oxygen levels in waterways makes streams unsuitable for salmonid use.

Historic floodplains and estuaries would have provided ideal juvenile rearing habitat for salmonids. Years of waters management, including diverting/straightening, and embanking of waterways for development and agriculture, have damaged or removed areas of prime habitat. Inundated floodplains are the most productive salmonid habitats because of plentiful prey (NOAA 2016a).

Early logging starting in the 1860s was characterized by intense timber harvest and milling activities. These early timber harvests clear-cut trees along slopes and delivered logs to mills by either dragging them downslope using oxen or floating the logs down larger streams. This practice cleared stabilizing vegetation from the slopes above waterways, causing massive erosion and subsequent sedimentation into streams. In addition, sawmills were built throughout California to process this timber. Sawmills often dumped sawdust and other material directly into adjacent waterways for disposal. From the 1870s through the 1920s, these practices were gradually outlawed or limited to control pollution. Unfortunately, early logging increased bank erosion and sedimentation in streams and the loss of riparian shade. Despite efforts to control these effects, the damage to anadromous fish spawning, rearing, and migration habitat was already done. In the 1950s, logging practices entered a new phase of destruction with the increased use of heavy machinery. The use of this machinery required the creation of roads throughout forests, and many of these roads were built without regard to their impacts on riparian resources, fish migration or erosion (NMFS 2012). These early practices contributed to the historic decline of salmonid species.

Today, large tree removal on slopes and banks above waterways can increase soil erosion by decreasing stabilizing vegetation and can cause direct input of sediment into watercourses. Removal of trees that provide riparian canopy cover can cause increased temperatures in streams. The natural level of large woody debris recruitment may also be reduced by logging practices, further reducing the quality of habitat for salmonids. Timber harvest typically involves heavy machinery and large-scale road construction. Poorly designed logging roads cause increased channel erosion and sedimentation into waterways as a result of inadequate culverts, poorly designed road edges, and plugged ditches. The resulting high sediment yields have impacted sediment transport and resulted in stream substrates unsuitable for salmonid spawning (NOAA 2016a).

4.1.6 Overharvesting

Historically, anadromous fish were commercially overharvested in the Russian River Basin beginning in the 1850s. In the early days of western fishing in the region, techniques were used that are now recognized as encouraging overharvesting of a population, including netting migrating salmon, using salmon pitchforks, guiding migrating fish into fish wheels, and even using explosives. Many of these techniques had the potential to eliminate a significant portion of the breeding population in a single waterway (NMFS 2012).

Laws governing seasonal closures, area and gear restrictions, and bag limits attempt to address this impact today. However, indirect mortality from catch-and-release of undersized salmonids and bycatch is difficult to prevent. Data on incidental capture is not easily collected, and the degree to which current harvesting practices impact the species is not well known (NOAA 2016a).

4.1.7 Dams and Flood Control Measures

Dams dramatically alter the natural flow of water. Upstream side channels that naturally provide salmonid rearing habitat are lost when water flow is increased. Erosion control measures and stream diversions related to dam construction often involve covering slopes with rip rap rock material, which inhibits the natural meandering ability of the stream. This subsequently reduces the formation of off-channel sloughs and marshes; it also increases channel scour and inhibits growth of riparian successional vegetation.

4.1.8 Rural and Residential Development

Residential developments often introduce exotic plants that overtake native riparian vegetation. This can choke riparian corridors and reduce the natural recruitment of large woody debris into the waterways. Human development also increases the intensity of other impacts due to a greater need for land use. For example, increased development fuels an increase in demand for timber products and logging practices. As residences are established, the use of flood control measures becomes increasingly necessary for human safety. As a result, developed areas have increased levels of levee construction and channel diversions, which change the natural hydrologic processes that are essential for quality salmonid habitat.

Development is typically associated with paving of large swaths of land for parking lots, subdivisions, and shopping areas. This decreases infiltration—the absorption of rainfall into the ground—which may concentrate flows and increase downcutting in small tributaries and could wash away substrate in spawning streams.

4.2 Pruitt Creek

4.2.1 Topography and Climate

The Project site is located on a relatively flat parcel of agriculturally developed land. Elevation within the project area varies slightly and ranges from a high of 190 feet above mean sea level (MSL) to 125 feet MSL at the lowest point. The climate is temperate. Summers are warm and dry with average highs around 27.7 degrees Celsius (°C). Winters are mild with average highs ranging from 13.3 to 17.2°C and lows ranging from 2.7 to 7.2°C. The average annual precipitation is approximately 36.28 inches falling primarily between November and March (U.S. Climate Data 2022).

4.2.2 Land Use

Regular use for agricultural and residential activities has established a 30-year disturbance regime for Pruitt Creek. Based on aerial imagery, the property was first developed for agriculture starting in 1993 (Google Earth Pro 2022). Before that, it was undeveloped, despite the presence of residential development along all of its edges with the exception of the property directly to the east which was developed for agriculture. By 2003, approximately one-third of the 68-acre parcel was developed into vineyards and in 2004 the remaining portions of the property were planted with vineyards. A private residence was constructed on the parcel, and associated roadways built. An in-creek road crossing was also constructed in 2004 as well as two pipes embedded in the creek banks that span the length of Pruitt Creek immediately upstream of the road crossing (Google Earth Pro 2022). The results of these disturbances include a washed-out portion of the creek at the legacy road crossing, litter within the riparian zone, and areas of trampling from vehicles and heavy foot traffic. The at grade legacy road crossing will not be utilized once the proposed Project is implemented.

4.2.3 Hydrology

Pruitt Creek enters the Project Site from the north via a box culvert underneath East Shiloh Road and flows approximately 1,790 feet to the southwest through the center of the Project Site, where it is bisected by a dirt low flow crossing (Appendix C). The creek encompasses approximately 0.644 acres of the Project Site. Pruitt Creek continues to the southwestern corner of the Project Site where it flows offsite through an adjacent property to the south and into a box culvert below Old Redwood Highway. Once offsite, Pruitt Creek eventually drains into Pool Creek, which flows into Windsor Creek, then into Mark West Creek, and finally into the Russian River. Pruitt Creek is mapped as “Riverine, Intermittent, Streambed, Seasonally Flooded (R4SBC)” and “Palustrine, Forested, Emergent, Persistent, Seasonally Flooded (PFO/EM1C) Freshwater Forested/Shrub Wetland” in the NWI.

Pruitt Creek flows southwesterly through the Project site and is a fourth-order tributary to the Russian River. Pruitt Creek terminates at Pool Creek which flows into Windsor Creek, then into Mark West Creek and finally into the Russian River. At the time of the February 2022 site visit, the creek was wetted throughout with connected, flowing water. Some areas along the banks were saturated but no defined drainages or inlets injecting water into the system were observed. Flow was minimal, less than 1 cubic foot per second, with indicators of a recent high flow event (leaf litter and riparian vegetation scattered throughout). The average width was 15 feet. The average depth was 8 inches with a maximum depth of approximately 16 inches and a minimum depth of less than 1 inch. Some of the deeper pools may hold water longer than the rest of the creek during dryer months but are likely to fully dry out by the end of the summer. Water temperature was 11.1°C. Water temperature was measured at 1,000 hours at a depth of approximately 5 inches and in the shade.

Pruitt Creek is mapped as "Riverine, Intermittent, Streambed, Seasonally Flooded (R4SBC)" and "Palustrine, Forested, Emergent, Persistent, Seasonally Flooded (PFO/EM1C) Freshwater Forested/Shrub Wetland" in the NWI (USFWS 2022; Figure 3). Intermittent drainages are natural tributaries to downstream traditional navigable water (either through direct discharge or culvert/storm drain networks) and support a bed, bank, and ordinary high-water mark (OHWM) but lack one or more wetland parameters. The ARD delineated Pruitt Creek as an intermittent drainage because: (1) the channel had pooled and flowing water that appeared to be the result of seasonal and recent rains and not perennial hydrology; (2) the channel had significant OHWM indicators such as natural line impressed on the bank, shelving, changes in soil character, presence of litter and debris, and matted and bent vegetation to indicate seasonal flow; and/or (3) background sources (the NWI, NHD, USGS topographic maps, and other sources) indicated seasonal flow. Environmental Science Associates (ESA) visited the Project site in May of 2021, during an extraordinary drought period, and found Pruitt Creek was entirely dry. Based on this observation and observations from Sequoia's February 2022 visit, it was confirmed that Pruitt Creek is an intermittent stream that likely flows from late fall to spring and begins to dry up by early summer and remains dry through the fall.

Although the aquatic resources delineation was performed during an extraordinary drought period, climatic fluctuations such as droughts are not uncommon in the Arid West, and the USACE "Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)" addresses such issues in Chapter 5. Extended droughts (lasting more than one year) can impact vegetative characteristics observed and evidence of wetland hydrology while conducting a wetland delineation. Under extended drought conditions, broader ecological conditions must be taken into account through the investigation of previous documentation of the site during normal rainfall years and/or a comparison to a confirmed wetland reference location in the general area for presence of hydrophytic vegetation. During extended droughts, a common complication is identifying wetland hydrology indicators. Generally, if hydrophytic vegetation and hydric soils are confirmed but wetland hydrology indicators are not detected, the region is experiencing an extended drought, and there is no evidence of human water diversion activity (e.g., drainage ditches, dams, levees, water diversions, etc.), then the area may be identified as a wetland.

The hydrological patterns of Pruitt Creek can be further defined by analyzing the USGS Streamflow Data from the gauge at Mark West Creek near Mirabel Heights and just downstream from the confluence with Windsor Creek. This stream gauge is downstream of the Project site and hydrologically connected to Pruitt Creek. It can be inferred that Pruitt Creek has experienced flows historically similar to or less than Mark West Creek, as it is a third-order tributary. For example, on February 23, 2022, when the biologist was onsite, the Mark West Creek gauge registered at approximately 27.5 cubic feet per second (cfs); however, discharge on Pruitt Creek was estimated to be closer to 1 cfs.

Annual trends from streamflow data logged on Mark West Creek from 2012 to 2022 show that flow drops off significantly in June, hovers around 0 cfs for most of July, August, and September, and remains below 5 cfs until the end of October when it increases above 50 cfs following the initiation of seasonal rains. There is some variability of flow between the months of October and May, but generally flows stay above 75 cfs in the late fall and winter. There are some indications of large, flash flow events; most notably in February of 2016 when flow reached 15,000 cfs.

This USGS data indicates that Pruitt Creek has a very low flow or is likely dry for almost six months of each year, and that it has the highest potential for connectivity from November to April (USGS 2022). Connectivity does not ensure that salmonids can access the creek as they have depth and flow thresholds that limit migration and movement within streams.

Incidentally, from December 2001 through July 2016, Sonoma County Water Agency (SCWA) monitored water temperature and presence of steelhead salmon in a section of Pruitt Creek which included the portion crossing the Project footprint (Church 2023). The monitoring site was located in a reach of Pruitt Creek that crosses Faught Road, southeast of Windsor California. They made observations on the upstream and downstream sides of Faught Road, including upstream to the creek culvert at Shiloh Ridge Road (approximately 450 linear feet of stream length). SCWA determined that Pruitt Creek is perennial in pools immediately downstream of Faught Road and upstream of Faught Road approximately 0.5 miles as observed. Pruitt Creek transitions to an intermittent and ephemeral stream approximately 100 feet downstream of Faught Road during the dry season. Based on SCWA's assessment, Pruitt Creek transitions from intermittent to perennial less than one mile from the proposed Project's northern boundary.

Based on current guidance, Pruitt Creek would presumably qualify as "non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (typically three months)" and therefore fall under USACE jurisdiction.

4.2.3.1 Drainage and Flooding

The Project Site is divided into a western and eastern drainage shed by Pruitt Creek. Surface drainage in both sheds and Pruitt Creek generally sheet flows to the south-southwest. The western shed flows south-southwest toward Old Redwood Highway where roadside channels carry stormwater back southeast to meet Pruitt Creek at the southern boundary of the Project Site. The eastern shed also flows south-southwest toward Pruitt Creek at the southern boundary of the Project Site. Once offsite it drains through an adjacent property to the south and into a box culvert below Old Redwood Highway. Pruitt Creek drains to Pool Creek, which flows into Windsor Creek, then into Mark West Creek, and finally into the Russian River.

4.2.3.2 Groundwater

The following groundwater information is summarized from the Water and Wastewater Feasibility Study (Appendix D).

The Project Site overlies the Windsor Basin, which is part of the Santa Rosa Plain sub-basin, which is part of the larger Santa Rosa Valley Basin. The Santa Rosa Plain sub-basin covers approximately 800,000 acres and underlies the most populated areas of the County. The Windsor Basin is located in the northern part of the Santa Rosa Plain sub-basin and is centered near the Town of Windsor. Additional information regarding the geologic units associated with aquifers in the groundwater basin is included in Appendix D.

The Santa Rosa Plain groundwater basin is monitored by the Groundwater Sustainability Agency, which recently updated its GSP in January of 2022 (Sonoma County Groundwater Sustainability Agency, 2022). The GSP indicates groundwater is typically a primary source for water supply for irrigated agriculture and a secondary source of supply for many municipal water purveyors (except California American Water Company's Larkfield District). As discussed in the GSP, long-term monitoring of the Santa Rosa Plain sub-basin since the 1970s and 1980s indicates relatively stable groundwater-level conditions over time in the northern portion of the sub-basin. The Project Site is not located in an area designated as critically overdrafted, overdrafted, or in an adjudicated area (Department of Water Resources, 2023; City of Santa Rosa, 2021).

Historically, groundwater has been used at the Project Site to support agricultural uses since the 1950s including orchards and cattle grazing. Based on historical aerial photographs, present-day vineyards appear to have been planted around the late 1990s. There are four existing on-site wells (shown on Figure 1-2 of Appendix D) with capacities ranging to over 600 gpm which provide groundwater to vineyards and the single-family residence on the Project Site. Well completion reports confirm that three of the existing wells were drilled between 1996 and 2002 (State of California, 1996; 1998; 2002).

The nearest, recent groundwater investigations have occurred at Esposti Park, just north of the Project Site. The Town of Windsor has an existing irrigation well and an inactive standby potable water supply well at Esposti Park. The wells are located approximately 250 feet north of the Project Site boundary. The Town is in the process of developing the inactive standby well into a potable water source. There are three wells serving mobile home development to the southwest of the Project. There are shallow, individual wells serving some of the residences north of the Project Site. Local domestic wells located within the vicinity of the Project Site are generally shallow with average depths of between 100 and 200 feet below ground surface (bgs).

There are several shallow wells located within the vicinity of the Project Site. It was noted during the pumping tests at the Esposti well that there was no decline in groundwater levels in the shallow zone (Esposti irrigation well and Mobile Home Estates well) indicating that pumping from the intermediate zone (greater than 380 feet bgs) does not generally affect water levels of wells in the shallow zone. Water level elevations in three shallow wells located south of the Project Site are monitored by the California Department of Water Resources and have been historically stable.

Groundwater quality in wells neighboring the Project Site commonly includes higher levels of iron, manganese, and arsenic requiring treatment for elevated levels. Each of these constituents is found in higher-than-normal concentrations in certain areas of Sonoma County.

4.2.4 Habitat Features

4.2.4.1 Habitat Type

Approximately 1,800 feet of Pruitt Creek flows through the Project site. The upstream and downstream extents of this stretch of creek are marked by road crossings with culverts. Along the 1,800 feet of habitat assessed, some pool habitat was observed, comprising less than 15 percent. The remaining majority, 85 percent, was flat water (as defined by the *California Salmonid Stream Habitat Restoration Manual* [Flosi et al. 2010]). Pool depth and size were not sufficient holding habitat for adult salmonids. Flat water was less than 6 inches deep in most areas and was not conducive to salmonid movement or migration. Abundant shallow (depth less than 4 inches), slower-moving areas of refugia were present which could potentially accommodate juvenile salmonids.

4.2.4.2 Substrate

The substrate size classes present within Pruitt Creek are as follows: organics, silt or fine sediment, sand, gravel (0.8 to 2.5 inches), and cobble (2.5 to 10 inches). Silts and organics dominated the bottom cover of Pruitt Creek. Although some gravel and cobbles were present, it was almost entirely covered with silt and organics, especially when fully submerged in the creek. Where there are exposed or distinct creek banks, the sides of the creek channel are lined with sand. Cobbles are more common than gravel throughout.

4.2.4.3 Cover and Riparian Vegetation

Some large woody debris, root wads, and overhanging vegetation create instream cover within Pruitt Creek. Pool depths and water velocity were not large enough to provide sufficient cover for salmonids.

The variety of riparian vegetation along Pruitt Creek creates canopy cover and bank stabilization along the creek. The riparian vegetation consists of grasses, annual and perennial forbs, vines, shrubs, and trees. Valley oaks (*Quercus lobata*) dominate the overstory with some smaller eucalyptus (*Eucalyptus* sp.) trees; both provide canopy cover. Canopy cover was over 75 percent of the creek when the sun was overhead. The understory communities observed had distinct segments dominated heavily by native species alternating with areas dominated by non-native species.

4.2.4.4 Spawning and Rearing

Rearing habitat is limited on Pruitt Creek. Although some refugia existed in the creek in February, it is unlikely that this ideal rearing habitat exists during the late spring and summer when juvenile salmonids emerge. Characteristic spawning habitat preferred by CCC coho salmon, steelhead, and CC Chinook salmon is lacking. Riffles and more gravel-sized substrate as well as lower levels of sedimentation would make the habitat more ideal for spawning. Access to spawning habitat is also extremely limited by the hydrological period of Pruitt Creek coupled with the migration timing of Pacific salmonids.

4.2.4.5 Predation and Competition

Multiple Sierran treefrogs (*Pseudacris sierra*) were observed near the creek whose eggs and tadpoles could provide food for adult salmonids. Also, some benthic macroinvertebrates were observed in the organic substrate, but generally food availability and abundance were sparse. The limited access and likely utilization of this habitat reach greatly reduces the risk of overabundance and reduces the opportunity for competition. Based on the size and condition of Pruitt Creek and its potentially limited food sources, it likely has very low carrying capacity for Pacific salmonids.

5.0 STATUS OF SPECIES AND CRITICAL HABITAT

5.1 Steelhead – CCC; DPS

5.1.1 Status of the Species and Critical Habitat

Critical Habitat for CCC steelhead was first proposed in 1996, during a comprehensive status review of West Coast steelhead. On July 298, 1997, this ESU was listed as threatened. In 2004, resident (non-anadromous) populations of steelhead that were found in the same watersheds were included in the protected population group, because there is significant gene transfer between resident and anadromous populations (NOAA 2016c). At this time, the CCC steelhead was described as an ESU, under the definition that this population is substantially reproductively isolated from other populations, and it provides a significant component of the evolutionary legacy of the species. However, under the ESU definition, the stable resident rainbow trout and the declining anadromous steelhead trout were categorized as the same ESU, as the two populations interbreed. The population was recategorized using a different system of population designations to protect the anadromous portion of the population. The new DPS determination allowed NOAA to describe and protect geographically distinct populations of anadromous fish, without requiring the protection of resident rainbow trout populations. Thus, in 2006 the population of steelhead once described as the CCC steelhead ESU was recategorized as the CCC steelhead DPS (NOAA 2006, NOAA 2022).

The description and range of the CCC steelhead DPS is defined as "Naturally spawned anadromous *O. mykiss* (steelhead) originating below natural and manmade impassable barriers from the Russian River to and including Aptos Creek, and all drainages of San Francisco and San Pablo Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers. Also, steelhead from two artificial propagation programs: the Don Clausen Fish Hatchery Program, and the Kingfisher Flat Hatchery Program (Monterey Bay Salmon and Trout Project)" (NOAA 2006).

The Critical Habitat for all steelhead DPS were revised by NOAA on January 5, 2006 (NOAA 2006, Figure 4). The CCC steelhead DPS has mapped Critical Habitat along perennial waterways in Sonoma, Marin, Napa, San Francisco, San Mateo, Santa Cruz, Santa Clara, Alameda, Contra Costa, and Solano counties (NOAA 2006; NOAA 2016c). Critical Habitat overlaps the Project footprint in Pruitt Creek.

5.1.1.1 Species Description

Steelhead are not genetically distinct from rainbow trout; it is anadromy that differentiates them from rainbow trout. Rainbow trout remain in freshwater their entire lives while steelhead are born in freshwater rivers and migrate to the ocean to grow and only return to freshwater to spawn (CalFish 2022). The CCC DPS steelhead is divided into the same subspecies as the Klamath Mountains Province, South-Central California DPS, and Southern California DPS (*O. mykiss irideus*). However, the CCC DPS is differentiated by geographic range (CNDDB 2022).

Steelhead are generally silver in color, with pink cheek marks, green coloration on their backs, and light silver or yellow to white bellies. They have black spots on their adipose fin, dorsal fin, and back. The black spots on their tail often appear in radiating lines. Steelhead have an iridescent pink to red lateral line. Their teeth are well-developed, and the mouth is noticeably large with a powerful maxillary bone that extends to behind the eye. Individuals that spend more time in freshwater typically display a darker silver coloration and more closely resemble resident rainbow trout individuals. Juveniles exhibit similar coloration to adults, with the addition of 5 to 13 ovular par marks along their sides that are interspaced at a greater distance than the width of the par marks. Juveniles also have white to orange tips on the dorsal and anal fins, and exhibit few to no black spots on the tail (CalFish 2022). Adults can reach 55 pounds in weight and 45 inches in length (NOAA 2016d), although typical adults are 8 to 11 pounds and 14 to 25 inches in length (CalFish 2022).

5.1.1.2 Life History

Steelhead sexually mature from two to five years of age. Most adults spend about two years maturing in freshwater, and another two years maturing in the ocean. They spawn from December through April. While other anadromous fish often die after spawning, steelhead can survive spawning and can spawn repeatedly. Each female typically deposits 2,000 eggs per kilogram of body weight—up to 50,000 eggs for a larger female (CalFish 2022). Steelhead fry emerge from the gravel in the summer. The steep areas surrounding the flat spawning regions of rivers provide ideal juvenile rearing habitat when eggs hatch. Steelhead eat aquatic insects, crustaceans, zooplankton, fish, fish eggs, and amphibian eggs (NOAA 2016d).

Steelhead are divided into two categories based on their spawning strategies: summer-run and winter-run. Summer-run steelhead return from the ocean before they have reached sexual maturity and begin heading upstream to their spawning grounds. They travel far upstream, arriving at their spawning grounds to breed the following spring. Winter-run steelhead mature sexually while still in the ocean and head upstream to their spawning grounds in the winter. Winter-run steelhead have a much shorter migration from the ocean to their spawning grounds than summer-run steelhead (CalFish 2022).

5.1.1.3 Habitat Use

Steelhead require a minimum depth of 7 inches of water for adult migration from ocean to spawning habitat. Steelhead have been observed to be unable to traverse water at velocities exceeding 10 feet per second. Ideal water temperatures for migration range between 7.7 and 11.1°C.

The preferred spawning habitat for steelhead is cool, oxygenated water in small- to medium-sized rivers, and their medium-sized perennial tributaries. Spawning typically occurs at flat stretches of water from 6 to 24 inches in depth, where water velocities average 2 feet per second. Females choose spawning locations where stream substrate is composed of gravel that is small enough that they can bury their eggs, but large enough that the eggs remain oxygenated. Once the eggs are deposited, a male fertilizes them, and they are buried. Spawning water temperatures fluctuate from 3.9 to 11.1°C.

Fry and parr stay in waters less than 20 inches in depth, ranging in temperature from 7.2 to 15.6°C. Juvenile rearing habitat is composed of larger cobble substrate at a depth of 10 to 20 inches, typically in estuaries or at stream edges (CalFish 2022). Steelhead have the highest degree of variability in freshwater rearing of all Pacific salmonids—the juvenile freshwater rearing period for steelhead ranges from 1 to 4 years, and as parr grow, microhabitat use changes. Smaller fish occupy riffles, medium fish occupy runs, and larger fish occupy pools.

5.1.1.4 Range, Distribution, and Population Status

Steelhead are found from the California coast to the Kamchatka Peninsula in Russia and have been introduced worldwide (NOAA 2016d). While population trends have increased elsewhere, steelhead have consistently declined in the western United States: Of the 14 identified steelhead ESUs found in the western United States, 11 are listed as threatened or endangered (Garza et al. 2004).

Historically, nine separate populations of steelhead across two diversity strata have been present in the Russian River. These populations represented one of the most productive regions in the ESU, along with the San Francisco Bay tributaries (Bjorkstedt et al. 2005). Steelhead population levels in the eighteenth and early nineteenth centuries were not well documented, but for the first half of the twentieth century, the Russian River was known as the third most productive steelhead river in California. Despite the lack of historic data, the available information consistently suggests that steelhead abundance in the Russian River Basin has declined considerably from historic levels.

As far back as the 1800s, the Russian River Basin steelhead stock originated from a wide variety of sources and exhibited a naturally high degree of genetic diversity (Steiner Environmental Consulting 1996). Subsequent large-scale transfer of hatchery steelhead within the basin has since dramatically increased genetic diversity, and the degree to which this influence has altered the DPS is unclear (Bjorkstedt et al. 2005).

The Russian River Basin continues to support a widely distributed steelhead population, despite apparent declines in abundance (Bjorkstedt et al. 2005). Within the basin, steelhead have been extirpated in areas with barriers to upstream migration. These include the region upstream of Coyote Valley Dam, constructed in 1958, which blocks approximately 21 percent of the historical habitat of the Upper Russian River population. Additionally, the Warm Springs Dam closed the Dry Creek watershed to migration in 1983; this blocked approximately 56 percent of the Dry Creek population's historical habitat (Spence et al. 1996).

In contrast with other anadromous species in the region, aspects of the steelhead's unique life history have afforded the species resistance to extinction. However, the species' reliance on estuarine habitat for juvenile rearing has hindered its recovery. The portion of the population that rear in estuaries naturally have greater feeding resources and thus greater growth opportunities than their stream-rearing counterparts (Bond 2006; Hayes et al. 2006). Studies in juvenile movement have found that a significant portion of the Russian River steelhead population attempts to migrate toward the estuaries to rear and grow (Chase et al. 2007, Katz et al. 2011); however, rearing conditions in the Russian River estuaries are poor and juveniles have low survivorship in the estuaries. The combination of low quality upstream rearing habitat with poor rearing conditions in estuaries is likely the major cause of depressed population levels in the Russian River Basin.

5.1.2 Environmental Baseline

Steelhead historically ranged along the Pacific basin coastal waters and tributaries, from northern Mexico to the Kamchatka Peninsula in Russia. Pomo and Makahmo Indigenous People historically fished the tributaries of the Russian River and caught copious amounts of salmon and trout of unspecified species (Haran 2008). The area was sparsely settled by westerners until 1857, when the City of Healdsburg was established. Declines in trout and salmon populations were already apparent by the 1850s, and in 1852 California began passing a series of laws regulating the trout and salmon harvest season and harvesting techniques.

The Russian River population of CCC steelhead was historically the primary source for this DPS. However, historical sedimentation and pollution from agricultural runoff, timber harvesting practices, and water diversion projects severely degraded the spawning grounds for steelhead within the Russian River Basin. The basin could potentially provide a healthy source population again, supporting the recovery of the DPS. Additionally, the Russian River Basin is important geographically because it is physically large, it fosters a significant diversity of habitats, and it is the northernmost population of this DPS's range. Extirpation of the DPS in this region would cause a dramatic reduction in the population's known range. The Russian River Basin provides wet coastal as well as interior steelhead habitat, and the continued adaptation of steelhead to a diversity of habitats is vital to the species' survival.

Today, two steelhead hatchery programs are active within the DPS: the Don Clausen Fish Hatchery in Sonoma County, and the Kingfisher Flat Hatchery in Santa Cruz County (NOAA 2016d). Although hatcheries influence the genetics of other salmonids, analysis of steelhead genetics has shown that the population structure of steelhead trout in California has been unaffected by hatcheries and is primarily influenced by migration (Garza et al. 2004).

5.1.2.1 CNDDB Occurrences and Local Records

The nearest CNDDB occurrence for steelhead is outside of the 3-mile radius analyzed (CNDDB 2022, Figure 5. However, Pruitt Creek falls under the extant range determined by expert opinion provided through the PISCES database (2022).

The Sonoma County Water Agency (SCWA) actively monitors salmonids in the Russian River Basin using downstream migrant fish traps on the mainstem of the river and on some of the major tributaries. SCWA operates a fish trap on Mark West Creek located near its confluence with the Russian River. The location of this trap is hydrologically connected to Pruitt Creek which is approximately 9 river miles upstream. This trap is typically operated during salmonid out-migration from April to July or until flow becomes disconnected and is an effort to assess population trends of steelhead and salmon smolts. In 2016, the trap was operated from April 6 to June 23; 141 young-of-the-year (YOY) and parr, and 46 smolts, all CCC steelhead, were captured. The trap was removed in June due to a large drop in the number of fish captured (Martini-Lamb and Manning 2020a). In 2017, the trap was operated from April 28 to June 20; 509 YOY and parr, and 150 smolts, all CCC steelhead, were captured. Operation of the trap ended due to a large drop in the number of fish captured (Martini-Lamb and Manning 2020b). Comparing the number of juvenile steelhead captured in SCWA-operated traps in Mark West Creek from 2012 to 2017, numbers in 2017 were only slightly lower than the average over those six years. In 2021, SCWA reported that due to extreme dry winter conditions, the traps were not operated at all on Mark West Creek because of the lack of sufficient flow during the window they typically monitor migrating smolts (SCWA Technical Advisory Committee meeting June 7, 2021).

Between December 2001 and July 2016, SCWA monitored water temperature and steelhead occurrence within a reach of Pruitt Creek that crosses Faught Road, southeast of Windsor (Church 2023). Monitoring occurred at a minimum monthly and at most daily. Steelhead were observed in all years of monitoring except during the beginning of the effort in December 2001 and winter/spring 2002 due to high turbidity (and low visibility) from a failed culvert and earthen creek crossing upstream of the monitoring location which were subsequently removed. While the majority of observations included resident rainbow trout, adult anadromous steelhead were observed migrating upstream on two different occasions. The first observation occurred on February 3, 2008, and included one adult steelhead (approximately 18-20 inches in length) in a pool upstream of Faught Road but carried downstream to a pool below the Faught Road crossing (Church 2023). The second observation occurred on February 13, 2008, and included one adult steelhead (approximately 24 inches in length) under the Faught Road Bridge that also moved into the pool downstream of the crossing. This observation included a second smaller fish, approximately 10 to 12 inches in length (Church 2023). Adult steelhead were also observed in Pool Creek downstream of the confluence with Pruitt Creek in a pool underneath the pedestrian bridge at Windsor Golf Course. Two separate incidental undocumented observations of adult steelhead were made in the spring in the late 2000s or early 2010s.

5.1.2.2 Site-Specific Conditions

The hydrological period of the Pruitt Creek reach on the Project site is considered intermittent and ephemeral, and it is not ideal for consistent successful migration, spawning, and rearing. However, within a mile of the site Pruitt Creek transitions from an intermittent and ephemeral stream to perennial approximately 100 feet downstream of Faught Road. SCWA observed Pruitt Creek is perennial in pools immediately downstream of Faught Road and upstream of Faught Road for approximately 0.5 miles, which was the area within their monitoring purview (Chase 2023). Within the adjacent perennial reach of Pruitt Creek, SCWA has observed salmon consistently from 2001 to 2016. Thus, the reach of Pruitt Creek on the Project-site likely provides suitable seasonal transitory habitat for salmonids in years with adequate rainfall when the hydrology and associated connectivity of the system align. However, the reach of Pruitt Creek on the Project site is not expected to provide suitable spawning or rearing habitat.

When salmonids are able to access the reach of Pruitt Creek within the Project site, the habitat is suitable but not ideal breeding habitat. There is instream cover and predation opportunities, but the habitat type is not diverse and is dominated by flat water with some pools. When flow is sufficient to sustain fish, the depth of the pools could temporarily accommodate adult salmonids. Temperature could be a limiting factor as the water diminishes and ambient temperatures seasonally increase.

Within the reach of Pruitt Creek that runs through the project area, ideal spawning substrate is minimal and riffle habitat types were not present. Water temperature was measured at the upper end of the salmonid spawning threshold, 11.1°C, although the measurement was taken at the very end of the spawning season for steelhead and just outside spawning season for salmon. Water temperature along with the lack of substrate and preferred habitat type all decrease the potential for spawning to occur in the project reach of Pruitt Creek.

Within a mile of the Project site, where Pruitt Creek is considered to be perennial, SCWA observed adult steelhead regularly during normal rainfall years (2001-2016), and therefore there is potential for steelhead to breed. SCWA's steelhead observations could be coupled with water temperature data to determine if water temperature regimes in Pruitt Creek (and similar sub-watersheds) are suitable for steelhead long-term survivability. However, this perennial portion of Pruitt Creek has not been conclusively assessed for breeding habitat suitability. It is worth noting that SCWA's observations suggest successful rainbow trout breeding in Pruitt Creek based on many sightings of resident rainbow trout of several age classes including fry and young of the year.

During typical rainfall years, the typical hydrological period in Pruitt Creek along the Project site reach could serve as a passage for adult steelhead to reach potentially suitable breeding pools, and/or for overwintering juvenile steelhead to seasonally move downstream during flowing conditions (SCWA, unconfirmed). However, juvenile salmonids cannot rear in the project reach of Pruitt Creek. The creek does not have sufficient flow to sustain incubation and rearing of juvenile populations of salmonids during the late spring and summer months. The portion of the creek within the vicinity of the project area is best classified as seasonally suitable movement habitat.

5.2 Coho Salmon – CCC; ESU

5.2.1 Status of the Species and Critical Habitat

The CCC ESU coho salmon was listed as threatened and Critical Habitat was established on May 5, 1999 (CalFish 2022; Figure 4). The species' Federal listing was changed from threatened to endangered status on June 28, 2005 (Olswang 2017), but the Critical Habitat was not changed. This Critical Habitat is defined as "accessible reaches of all rivers (including estuarine areas and tributaries) between Punta

Gorda and the San Lorenzo River (inclusive) in California, including two streams entering San Francisco Bay: Arroyo Corte Madera Del Presidio and Corte Madera Creek" (NOAA 1999). Inaccessible areas blocked by dams or other water projects are not considered part of the species' Critical Habitat. The nearest mapped Critical Habitat to the Project site is Pool Creek, which is located approximately 1 mile northwest.

5.2.1.1 Species Description

Adult coho salmon are generally silver in color, typically measuring 21 to 27 inches in length and weighing 6 to 13 pounds (Olswang 2017; CalFish 2022). Sexual dimorphism is apparent in spawning adults. Spawning males display a characteristic dark red on both sides, dark green to brown head and back, and gray to black belly. Most spawning males have an exaggerated hooked jaw and humped backs. Spawning females have similar but comparatively dull coloration, pink on their sides, and a slightly less hooked jaw. All adults have small black spots on the dorsal fin and upper caudal fin, with no spots on the lower portion of the caudal fin. They can be distinguished from other salmon by a white line on the upper area of the gums, at the base of the teeth. Juveniles, in contrast, are dusky gray or brown, and have 8 to 12 widely spaced parr marks on each side of their bodies. Juveniles have a speckled adipose fin, and their other fins are tinted orange. They can be distinguished from other salmonid juveniles by their comparatively large eyes and their anal fin, which is sickle shaped with a white leading edge (Olswang 2017).

5.2.1.2 Life History

Most adult coho salmon spend two years in the ocean before returning to their spawning ground. They begin their migration from the ocean in September through January, with spawning occurring from November through March. Female coho salmon select their desired redd (nest) site, dig a small oval depression in the gravel, and lay approximately 100 eggs, which the male fertilizes externally. The female then buries the first redd by digging another redd immediately upstream, from which loose gravel is deposed into the location of the first redd. The total number of eggs deposited varies based on the female's health and size; studies have found the number of eggs laid per individual ranges from 1,440 to 5,700 (CalFish 2022). Adults die shortly after spawning, although female coho salmon have been seen guarding their fertilized nests for up to 14 days before perishing (CalFish 2022).

Eggs incubate from November through April. Newly hatched coho salmon, called alevins, emerge after 38 to 48 days and remain under the gravel from March through July until their egg sacs are absorbed. After 2 to 10 weeks in this stage, juvenile coho salmon emerge from the gravel and begin to gather in large schools. Unlike other salmonid species, juveniles continue to inhabit freshwater streams for about a year, during which time they exhibit territorial behavior (Brown et al. 1994). After one year in fresh water, the juveniles migrate to the ocean starting in March and continue through July with peak migration from April through June (CalFish 2022). In the ocean, coho salmon congregate in large schools. They stay close to the shore and gradually migrate northward, while feeding on crustaceans, invertebrates, and fish.

5.2.1.3 Habitat Use

Coho salmon typically inhabit cool streams in coastal redwood and conifer forests (Bjorkstedt et al. 2005). The adults return from the ocean and migrate up short coastal streams after heavy rains when sandbars are cleared (CalFish 2022). Water depths below 7.1 inches prevent migration of adult coho salmon upstream. High turbidity and temperatures exceeding 16.1°C delay out-migration of coho salmon. They prefer to wait in upstream refugia rather than migrating to the ocean when conditions are not suitable. Large woody debris, pools, riparian vegetation, and undercut banks provide cover for migrating coho salmon (California Department of Fish and Game [CDFG] 2004).

Coho salmon need small streams (often mainstem tributaries) near the coast for spawning. Females prefer redd sites with turbulent flow near the head of a riffle, just below a pool. Like other anadromous fish, a medium-sized gravel substrate (approximately 6 inches in diameter) is required to protect eggs and alevins while also being large enough to allow for ample oxygenation and waste flushing (CalFish 2022, CDFG 2004). Ideal incubation habitat has water temperatures of 8.9 to 14.4°C, water flow between 2.9 and 3.4 cfs, stream depth between 3.9 and 13 inches, low sedimentation, and good circulation of oxygenated water (CDFG 2004).

CCC coho salmon are most frequently found in small coastal streams and tributaries of large rivers. Juveniles typically use low-gradient coastal streams, channels, alcoves, estuaries, beaver ponds, and slack waters, especially low-gradient alluvial channels with abundant pools and woody debris (CalFish 2022). In contrast to other salmonids, all coho salmon juveniles over-summer in fresh water. As a result, over-summering juvenile coho salmon are at extremely high risk of impact from habitat degradation: California waterways generally exhibit declining water quality and increased temperature in the summer as intermittent waters dry (Bjorkstedt et al. 2005).

Juvenile coho salmon need habitat with at least 80 percent riparian vegetative cover, less than 60 Nephelometric Turbidity Units (NTUs) of turbidity, water depths between 9 and 48 inches, water temperatures between 2.2 and 25.5°C, and water velocity between 0.16 feet/second (pools) and 1.51 feet/second (riffles) (CDFG 2004).

The survival of juvenile coho salmon is highly dependent on water temperatures. Individuals will not survive in water temperatures exceeding 21.7°C for an extended period of time (CalFish 2022). Frissell (1992) found that in Oregon, coho salmon densities decreased linearly as temperatures exceeded 17°C, and two studies in Northern California found that juvenile coho salmon did not persist when weekly average temperatures exceeded 18.3°C (Welsh et al. 2001, Hines and Ambrose 1998).

5.2.1.4 Range, Distribution, and Population Status

Coho salmon were historically abundant in coastal watersheds from the Oregon border through Santa Cruz County. North of Humboldt County, they are believed to only be present in two-thirds of their historic habitat (Olswang 2017). Coho salmon were once present in nearly all tributaries of the San Francisco Bay and most streams south of the Bay Area but are now extirpated from these waterways (Olswang 2017). In 1994, Brown et al. noted that the current coho salmon population in California was estimated to be limited to only about 31,000 returning adults annually, 57 percent of which were born in a hatchery. Statewide, fewer than 5,000 native coho salmon individuals return to spawn that have no known hatchery ancestry; this represents 6 percent of the estimated population from the 1940s. Throughout the Pacific Northwest, coho salmon are considered extinct in the eastern half of their range, and in serious decline across their western range (Brown et al. 1994).

CCC coho salmon populations have dropped rapidly from their prolific abundance in the early 1800s to near extinction today within most of their range. Early logging and milling practices diverted water, dammed streams, increased temperatures, and deposited large quantities of sediment into coho salmon streams, making them unsuitable for habitation. This, combined with overfishing and mining practices, caused significant declines in coho salmon numbers that were apparent by 1880. In response, legislation was established to reduce overfishing and prevent stream pollution, and hatcheries began opening to propagate steelhead, coho, and Chinook salmon populations. However, coho salmon populations were not successfully increased by hatchery efforts until the mid-twentieth century.

An increase in gravel mining from rivers, urban development, and poor erosion control measures damaged and eliminated coho salmon spawning grounds. Additionally, physical barriers were introduced that blocked large portions of the historic range, including the Coyote Valley Dam, constructed in 1958, and the Warm Springs Dam, constructed in 1983 (Spence et al. 1996).

Studies of juvenile coho salmon migrating to the ocean found an 85 percent decline in population between 1975 and 1991. In 2009, only one coho salmon was observed in the Russian River Basin, and it was inadvertently killed by an angler (NMFS 2012).

Two distinct populations of CCC coho salmon were identified by Bjorkstedt et al. (2005); the northwestern portion of the Russian River Basin contains a small ephemeral coho salmon population that occupies tributaries of the Russian River, and the southern portion of the basin supports a large independent population that represents, historically, the largest and most dominant source population in the ESU. Pruitt Creek is in the range of the northwestern ephemeral population that relied on favorable conditions in the typically dryer, warmer tributaries of the Russian River to complete their life cycle.

5.2.2 Environmental Baseline

Historic abundance of coho salmon in the western United States is difficult to measure, as older records are unreliable and frequently do not distinguish between salmon species (NMFS 2012). In the 1930s, the Russian River was known for large coho salmon runs, which were “once a mainstay of California’s sport and commercial fisheries” (NMFS 2012, Moyle 2002). It has been suggested that the San Francisco Bay tributaries historically provided inconsistent quality habitat for coho salmon due to temperature and water quality, and the population was historically reliant on dispersal from coastal populations to persist (Bjorkstedt et al. 2005).

Today, coho salmon are restricted to a few tributaries in the lower watershed and rear only in isolated areas of suitable habitat (Spence et al. 1996). Historically, they represented a significant component of the Russian River Basin aquatic community, occupying many tributaries throughout the basin, and likely spawning in tributaries of the main stem (CDFG 2002). Since the 1800s, the large wetland area known as Laguna de Santa Rosa in the Mark West Creek watershed has gradually been destroyed by reclamation activities. This watershed likely provided historic rearing habitat.

In 2001, the Russian River Coho Salmon Captive Broodstock Program (RRCSCBP) was initiated to re-establish self-sustaining runs of native coho salmon in streams within the Russian River watershed that historically supported them. This program implemented a two-tiered approach to coho salmon recovery by establishing a coho salmon hatchery at Don Clausen/Warm Springs and a continuous monitoring program at all life stages for coho salmon released from the hatcheries (Obedzinski et al. 2007). From 2009 through 2012, the program released 10,000 smolts into historic spawning grounds, and an estimated 173 adults returned (Fishpro and Entrix 2012).

Juvenile coho salmon in the Russian River Basin have measuredly declined in abundance and distribution in recent years (Conrad and White 2006). The RRCSCBP has confirmed the presence of wild juvenile coho salmon in 5 of 32 historic coho salmon streams in the basin (Brown et al. 1994). Similar studies in recent years have found coho salmon juveniles in only 3 of the 32 historic coho salmon streams, and only in intermittent years (Conrad and White 2006).

Recent analyses of coho salmon genetics in the Russian River tributaries suggest that the population has experienced an acute loss of genetic diversity in the basin. The results of genetic analyses are consistent with a population experiencing extremely reduced abundance, strong departures from genetic equilibrium, and recent severe population bottlenecks (Bjorkstedt et al. 2005).

The population of coho salmon in the Russian River Basin is likely trending toward extinction given their steep declines in abundance, lack of genetic diversity, and a fragmented distribution. The population has declined so rapidly that inbreeding and demographic instability will likely occur and lead to an even faster decline (Frankham et al. 2002). The Russian River Basin represents one-third of the CCC coho salmon ESU's entire range by area, and it is located in the center of the ESU's range. This ESU represents the southern extent of the species' range (NOAA 2016b).

Conservation of this regional population is considered essential for recovery of the entire species, which is why widespread coho salmon hatchery operations have existed in the Russian River since 2005. Although hatchery efforts initially resulted in few measurable improvements to the coho salmon population, hatcheries initiated experiments to vary the timing of juvenile release beginning in 2012. Early measurements of the subsequent improvements to coho salmon have been encouraging; counts of returning coho salmon in the 2014-2015 spawning year represented the largest yield since hatchery efforts began (NOAA 2016b).

5.2.2.1 CNDDB Occurrences and Local Records

According to CNDDB, the nearest known record of CCC coho salmon was documented in in 2015 in Mark West Creek, approximately 0.75 miles south of the southern edge of the Project site (Figure 5). This occurrence was mapped to include given detection locations and represents 1,051 smolts counted at a downstream trap near the confluence of Mark West and Windsor creeks from March 26 to June 8, 2015. This occurrence also represents 67 smolts observed during direct observation snorkel surveys that were conducted in July and August of 2015. No additional records of coho salmon are recorded on CNDDB within 3 miles of the Project site.

SCWA actively monitors salmonids in the Russian River Basin using downstream migrant fish traps on the mainstem of the river and on some of the major tributaries. SCWA operates a fish trap on Mark West Creek located near the confluence with the Russian River. The location of this trap is hydrologically connected to Pruitt Creek which is approximately nine river miles upstream. This trap is typically operated during salmonid out-migration from April to July or until flow becomes disconnected. It is an effort to assess population trends of steelhead and salmon smolts. In 2016, the trap was operated from April 6 to June 23, and 37 hatchery smolts, 16 smolts of unknown origin, and 5 wild YOY/parr—all CCC coho salmon—were detected at the trap. The trap was removed in June due to a large drop in the number of fish captured (Martini-Lamb and Manning 2020a). Similarly, in 2017 the trap was operated from April 28 to June 20 and 1,065 hatchery smolts, 44 smolts of unknown origin, and 17 wild smolts, all CCC coho salmon, were detected at the trap. Operation of the trap ended due to a large drop in the number of fish captured (Martini-Lamb and Manning 2020b).

Comparing the number of juvenile coho salmon captured in SCWA-operated traps in Mark West Creek from 2012 to 2017, numbers were the highest in 2013, followed by 2017. In 2021, SCWA reported that due to extreme dry winter conditions, the traps were not operated at all on Mark West Creek because of the lack of sufficient flow during the window they typically monitor migrating smolts (SCWA Technical Advisory Committee meeting June 7, 2021).

5.2.2.2 Site-Specific Conditions

Site-specific conditions are similar for all three Pacific salmonids. Refer to Section 5.1.2.2.

Coho salmon's specific life history requirements make them less adaptable to habitat degradation than other salmonids, especially regarding water quality and temperature. While other salmonids may migrate to the ocean before fully maturing, all coho salmon spend their first summer in freshwater streams, wetlands, and estuaries. Northern California streams are naturally subject to unpredictable changes in flow, which can cause quick jumps in temperature or loss of connectivity with mainstem rivers. Combined with juvenile coho salmon's susceptibility to high water temperatures, natural variability in Northern California waterways can threaten developing coho salmon. Human influences can exacerbate this effect: agricultural runoff can cause eutrophication and algae blooms, decreasing dissolved oxygen and increasing temperatures. Development, logging, and agriculture may result in decrease/removal of emergent vegetation, reducing shade and increasing erosion into waterways, which in turn increases water temperatures and sedimentation.

5.3 Chinook Salmon – CC; ESU

5.3.1 Status of the Species and Critical Habitat

The CC ESU Chinook salmon was designated as a threatened species in 1999, with Critical Habitat designated the same year. In 2005, an addendum to the listing mandated that hatchery-born individuals are protected within this ESU. The ESU is defined as all accessible reaches south of the Klamath River to the Russian River, including seven artificial propagation programs, none of which occur within the Russian River Basin. The CC Chinook salmon Critical Habitat includes waterways in Sonoma, Mendocino, and Humboldt counties, and a few small tributaries of the Eel River that reach into Lake and Trinity counties (NOAA 2005). The closest Critical Habitat to the proposed work area is the Russian River (Figure 4).

5.3.1.1 Species Description

Chinook salmon are the largest Pacific salmonid, ranging from 20 to 99 pounds and 30 to 55 inches in length at adult size (CalFish 2022). Adults are typically blue green, with small black spots across the tail, and black gums along the base of the teeth. While in the ocean, they have silver sides. When returning to their spawning grounds, both sexes display small black spots on the back, dorsal fin, and tail, with olive brown to dark maroon blotches on their sides. Some minor sexual dimorphism is apparent during spawning; males have more hooked jaws, slightly humped backs, and are overall darker in color than females. Juvenile Chinook salmon have 6 to 12 parr marks spaced equal to or wider than the width of the marks, mostly extending below the lateral line. They can be differentiated from other juvenile anadromous fish because all their fins are clear except for the adipose fin, which is pigmented only at the upper edge, and the dorsal fin, which is spotted.

5.3.1.2 Life History

The CC Chinook salmon exhibit only fall-run migration patterns and are typical ocean-type salmon. The spring-run population is believed to be extirpated from the range of this ESU (Moyle et al. 2008). Adults typically return from the ocean to their spawning grounds from September through November. Spawning occurs soon after freshwater entry, starting in October and continuing through December. Each female deposits between 2,000 and 17,000 eggs, and adults die within a few days of spawning (Moyle et al. 2008).

In late winter through spring, alevin emerge from the gravel. Within a month of emerging, most juvenile Chinook salmon are large and strong enough to migrate downstream to deeper and faster waters where they feed opportunistically on small prey items, primarily insects, zooplankton, and other fish larvae during their gradual migration toward the ocean. They spend variable amounts of time growing from juvenile to adult size in transitional habitat such as estuaries, lagoons, and bays before entering the ocean. (Calfish 2022).

Once they enter the ocean, Chinook salmon prey primarily on crustaceans and smaller fish. Individuals often migrate northward along the coast and return to their spawning grounds after two to four years at sea (CalFish 2022).

5.3.1.3 Habitat Use

Ideal spawning habitat for Chinook salmon is similar to steelhead and coho salmon: clear, cool streams with high levels of dissolved oxygen and low sedimentation. Chinook salmon require relatively larger gravel and smaller cobble substrate compared to other salmon species (Santos et al. 2014). Spawning Chinook salmon are also particularly sensitive to low levels of dissolved oxygen and reduced water clarity (Moyle et al. 2008). Chinook salmon eggs develop best at temperatures of 5 to 13°C (Santos et al. 2014). Chinook salmon fries prefer water temperatures of 13 to 18°C for optimal growth rates; water temperatures greater than 24°C are lethal to juveniles (CalFish 2022).

After emerging from the gravel, juvenile Chinook salmon move to shallow stream margins with dense emergent vegetation. Juveniles are highly dependent on transitional habitats such as estuaries, lagoons, and bays where they grow into their adult size. Once in the ocean, Chinook salmon migrate northward along the California coast. They typically use ocean habitat ranging in depth from 65 to 150 feet and will seasonally travel to waters up to 330 feet in depth (CalFish 2022).

Chinook salmon adults migrating upstream often make use of pools with low water velocities to rest. These holding areas are typically bedrock-substrate pools containing overhanging ledges and pockets that provide cover (Calfish 2022).

5.3.1.4 Range, Distribution, and Population Status

Historical conditions of the Russian River provided substantial suitable habitat and likely supported a healthy population of fall-run Chinook salmon. Early accounts from local tribes in the Coyote Valley provide evidence that Chinook salmon were widely harvested prior to the construction of the Coyote Valley Dam in 1958 (Steiner Environmental Consulting [SEC] 1996). However, by the 1980s, Chinook salmon were considered nearly extirpated from the Russian River Basin (Cook 2008). Hatchery programs and fishing regulations introduced since that time have helped the population to rebound, though continued development and habitat degradation increasingly threaten the recovery of the population. The degree to which the population has recovered is unknown, as reliable data on Chinook salmon abundance in the Russian River Basin was not available until 2000 (Chase et al. 2007).

Over the last several years, data from the fish ladders at Mirabel Dam have indicated an increase in Chinook salmon abundance (Chase et al. 2007). Considering there are 548 stream miles of historic habitat in the basin, the current population is not considered stable (Bjorkstedt et al. 2005).

Genetic analysis of Chinook salmon in the Russian River indicates that they are not closely related to nearby populations of Chinook salmon found in the Eel River or the Central Valley. This could be an indication that the population evolved as a diverse group of coastal sub-populations. It could also be a result of widespread hatchery stocking beginning in the 1880s (Bjorkstedt et al. 2005, Chase et al. 2007).

The uncertain genetic origin of this population may mislead researchers conducting genetic analyses of the population's historic abundance. No compelling evidence of the decline of the Russian River population can be made from examining genetics alone. This analysis should be considered with caution because continued degradation of the species' habitat, including water diversion, confinement of the river channel, limited riparian vegetation, and increased sedimentation from roads, construction, and development, continue to threaten the recovery of the Russian River Chinook salmon.

The Russian River Basin is the southernmost extent of the CC Chinook salmon ESU range, and its extirpation from the region would constitute a substantial range restriction. The Russian River represents the largest watershed within the CC Chinook salmon ESU, and currently is believed to support the largest population within the ESU. As such, the Chinook salmon in the Russian River likely contribute a significant amount of genetic diversity to the ESU, and the conservation of this population of Chinook salmon is critical for the conservation of the population.

5.3.2 Environmental Baseline

The Russian River Chinook salmon population was not historically well documented, and no definitive records of the species are available prior to the first fish stocking effort in 1881 (Chase et al. 2007). All prior sources represented an unspecified salmon species. There is extensive historical record of large water projects throughout the Russian River Basin that diverted and impeded the flow of water since 1908. Extensive fish stocking programs of Chinook salmon from other watersheds beginning in the 1800s may have complicated genetic analyses of Chinook salmon populations in the area. Recent hatchery introduction of Chinook salmon from the Don Clausen Fish Hatchery has failed to result in a measurable increase in the adult population of Chinook salmon in the basin. SCWA conducted fish surveys starting in 2000 using improved survey techniques and found spawning salmon in 82 miles of the mainstem Russian River and Dry Creek (Chase et al. 2007).

This recent measured increase in Chinook salmon abundance is thought to have been a result of improved survey methods rather than a true reflection in population increase. SCWA determined that due to a lack of reliable historic data, the population of Chinook salmon in the Russian River Basin is impossible to determine prior to 2000. However, due to widespread destruction of habitat, the population has likely declined (Chase et al. 2007).

5.3.2.1 CNDDB Occurrences and Local Records

There are no recorded occurrences of the CC Chinook salmon in CNDDB within 3 miles of the Project site (Figure 5.). CNDDB data for CC Chinook salmon is limited and currently only exists in Northern California near the Eel River (CNDDB 2022).

SCWA's surveys of the Russian River from Healdsburg at Riverfront Park north to Ukiah found high Chinook salmon abundance and redds between 2002 and 2006. Throughout the watershed, 1,036 redds were observed in 2002, and 1,157 redds were counted in 2003. In 2006, however, only 603 were counted in the same watershed. The highest abundance of redds occurred at Dry Creek near Ukiah, and the highest abundance of adults were counted at Mirabel Dam, approximately 1 mile upstream of the confluence of Mark West Creek and the Russian River. The small number of adults versus juveniles observed could have been caused by spawning occurring after surveys were conducted or outside of study areas; it may also be due to loss of fish to poaching and predation.

SCWA actively monitors salmonids in the Russian River Basin using downstream migrant fish traps on the mainstem of the river and on some of the major tributaries. They also operate a trap on Mark West Creek near its confluence with the Russian River. The location of this trap is hydrologically connected to Pruitt Creek which is approximately 9 river miles upstream. This trap is typically operated during salmonid out-migration from April to July or until flow becomes disconnected and is part of an effort to assess population trends of steelhead and salmon smolts.

In 2016, the trap was operated from April 6 to June 23 and 136 CC Chinook salmon smolts were detected. The trap was removed in June due to a large drop in the number of fish captured (Martini-Lamb and Manning 2020a). Similarly, in 2017 the trap was operated from April 28 to June 20 and no CC Chinook salmon smolts were detected at the trap. Operation of the trap ended due to a large drop in the number of fish captured (Martini-Lamb and Manning 2020b). Relatively few CC Chinook salmon smolts were captured in tributaries of the Russian River in 2016 and 2017, with a sharp drop in 2017. In 2021, SCWA reported that due to extreme dry winter conditions the traps were not operated at all on Mark West Creek because of the lack of sufficient flow during the window they typically monitor migrating smolts (SCWA Technical Advisory Committee meeting June 7, 2021).

5.3.2.2 Site-specific Conditions

Site-specific conditions are similar for all three Pacific salmonids. Refer to Section 5.1.2.2.

6.0 EFFECTS OF THE PROJECT ON LISTED PACIFIC SALMONIDS AND CRITICAL HABITAT

6.1 Potential Effects to Terrestrial Habitats and Aquatic Features

Vineyards and Ornamental Landscaping

Development of the Proposed Project would impact between approximately 49 and 53 acres of vineyards and ornamental landscaping depending on the size and type of seasonal storage selected for treated effluent. Vineyards and ornamental landscaping are not considered critical or sensitive habitats; therefore, no significant impacts would occur to biological resources as a result of a reduction in vineyards and ornamental landscaping. Ornamental trees around the perimeter of the Project Site would be left in place, except for where the new accesses on Old Redwood Highway and Shiloh Road would be installed.

Intermittent Drainage (Pruitt Creek) and Riparian Corridor

As shown in Appendix A, the majority of the development would occur outside of the riparian corridor, with the exception of the enclosed clear-span pedestrian bridge connecting the parking garage with the casino approximately 12 feet above Pruitt Creek and a clear-span vehicle bridge on the southern portion of the Project Site. The two bridges would be constructed outside of the OHWM of Pruitt Creek and, therefore, would have no direct impacts to the intermittent drainage. The pedestrian bridge would not impact the riparian corridor at ground level but may involve cutting tree branches in the canopy. Depending on the final alignment, the clear-span vehicle bridge may require some tree removal and ground clearing within the riparian corridor. Additionally, the pipelines and outfall structures for treated effluent discharge and stormwater drainage would be developed within the riparian corridor and bed, bank, and channel of Pruitt Creek. Directional drilling or other trenchless construction methods would be used to install the pipelines for water and sewage beneath the Pruitt Creek to avoid impacts to the creek and riparian corridor.

The removal or alteration of riparian vegetation may lead to a loss of instream cover, loss of temperature regulation capacity, and a reduction of bank stabilization. A loss or reduction of instream cover could result in an increase in predation of salmonids. Removing shade along the riparian corridor may increase the temperature of the water. However, salmonids are anticipated to only occur in Pruitt Creek during the late fall, winter, and early spring when temperature stress is low and canopy cover has less effect on the temperature of the creek, during appropriate flow conditions. Once constructed, the clear-span bridges would provide additional shade to the creek, and cover from predation. In addition to providing shade and protection from predation, vegetation plays an important role in stabilizing the banks of a creek, and alteration to this vegetation could increase erosion and change the course of a stream. These effects have the potential to affect individual listed Pacific salmonids by degrading water quality and reducing the habitat suitability of Pruitt Creek. Wildlife movement would not be restricted, as the riparian corridor would remain unimpeded under the bridges and around the outfalls.

As described in Sections 2.1.4 of the Administrative Draft Environmental Impact Statement (EIS; Bureau of Indian Affairs 2024)**,** the outfall structures would be designed to prevent erosion of the natural creek banks and erosion downstream. The outfall pipe outlet would include a duckbill check valve or similar component to protect against settlement/silting inside the pipe or nesting of small animals or rodents. The area around the outfall pipe would be covered with riprap or similar material to prevent natural erosion around the pipe from occurring and to protect the banks during periods of discharge. The pipe material would be suitable for permanent exposure to sunlight and creek water quality conditions. Effects to water quality and fish habitat are further addressed under the heading of Special Status Fish Species below.

As described in Section 2.3.4 of this BA, the Tribe would comply with the NPDES General Construction Permit from the USEPA, for construction site runoff during the construction phase in compliance with the CWA. Mitigation measures included in Section 4 of the EIS (See Appendix E) would minimize construction impacts to Pruitt Creek by limiting ground disturbing activities, such as grading, clearing, and excavation to between June 15 and October 15 when Pruitt Creek has little to no water flow, as well as requiring consultation with the USACE and USEPA regarding the need to obtain permits under Sections 404 and 401 of the CWA. Further, mitigation measures (Appendix E) would minimize potential impacts to the riparian corridor through minimizing the project footprint in those areas, installation of high-visibility fence to prevent incursion in the riparian corridor, and replanting of native trees and shrubs in any temporarily disturbed riparian areas.

With adherence to the conditions of applicable permits and implementation of BMPs in Table 2.1-3 of the EIS, and mitigation measures (Appendix E), the proposed Project would have a less than significant effect on Pruitt Creek and the riparian corridor.

6.2 Effects to Individual Listed Pacific Salmonids

Effects of the Proposed Action are anticipated to be similar for the three Federally listed Pacific salmonids and will come from potential changes in water quality and associated changes in downstream habitat suitability, as the reach of Pruitt Creek, particularly the section within the Project footprint, is generally poor-quality breeding habitat for all salmonids due to hydrological period and water quality parameters. Salmonids are sensitive to changes in water quality and temperature. They prefer a range from 7.2 to 14.4°C with adequate dissolved oxygen levels and low turbidity. Water quality can adversely affect salmonid growth and survival at all stages of their lifecycle. Water quality along with the hydroperiod can determine migration timing and spawning location, and the success of incubation, rearing and out-migration. Their resilience is highly limited by the quality and availability of their habitat.

The potential for Pacific salmonids to occur and use habitat in this far east portion of the Russian River Basin is temporally and physically limited. There is a low potential that CC Chinook salmon will occur in Pruitt Creek based on their current distribution and their patterns of migration. There is a moderate potential for CCC coho salmon and steelhead to occur in Pruitt Creek; however, consistent normal annual rainfall and associated increases in water flow and decreases in water temperature need to align with their migration event, particularly for steelhead which have a historical presence. Historic records exist (2001-2016) of anadromous adult steelhead occurring regularly within Pruitt Creek upstream of the Project site in years with adequate rainfall, viz., not during an extensive drought period; however, no evidence of breeding has been observed. Additionally, all higher-order tributaries to the Russian River connected to Pruitt Creek would need to have sufficient flow and provide uninhibited access to Pruitt Creek particularly to the upstream perennial reach adjacent to Faught Road.

The extent of potential indirect effects includes the portion of Pruitt Creek within the Project site as well as a small portion of the watershed downstream. Furthermore, potential effects of the proposed Project would be minimal, short-term, and localized. Thus, no effects to the environmental baseline of the Russian River Basin are anticipated.

6.2.1 Direct Effects

Water quality can be degraded during construction activities. There is a potential for an increase in soil erosion, suspended sediment load, turbidity, or direct introduction of harmful materials such as grease and oil. This can have a direct effect on salmonids by reducing water clarity for feeding visibility, clogging fish gills, introducing fine sediment to spawning beds, or introducing an environmental toxin (Bash, Berman, and Bolton 2001). Though there is potential for such direct effects during construction, industry recognized BMPs (refer to Section 0) and Mitigation Measures (Appendix E) will be implemented to manage construction on the Project site. After construction is complete, there is a potential for untreated storm water to reach Pruitt Creek if it flows over an impervious surface. This could have the same direct effects to the water quality in Pruitt Creek as discussed above. Bioswales will be created to treat stormwater on the Project site and help avoid water qualiy degradation in the creek. In addition, direct effects to listed Pacific salmonids can be avoided by limiting all activities with the likelihood to degrade water quality to a work window of June 15 through October 15, when Pruitt Creek is dry. During this time, salmonids would be absent from the section of Pruitt Creek bisecting the Project site; therefore, no direct effects to salmonids are anticipated as a result of the proposed Project.

Discharge of wastewater directly into Pruitt Creek from the on-site MBR treatment system could potentially decrease water quality. Water discharged into the creek could alter the temperature, hydrogen ion concentration (pH), and dissolved oxygen level. The current projected discharge volume would be greater than 1% of Pruitt Creek flow, which would degrade water conditions on site as well as impact the ability of salmonids to migrate through the site upstream or downstream. The turbidity could increase as well as the bacteria and toxicity content, and a temperature increase can have a direct effect on salmonids. Salmonid spawning, incubation, emergence, and maturation can all be affected by increasing water temperatures and consequently negatively affect the success of salmonid reproduction (Carter 2008). If temperatures are increased significantly and reach a lethal threshold for multiple days in a row, it can cause death for all life stages of salmonids. According to Carter (2008), the literature suggests that for steelhead adults migrating and holding as well as juveniles growing and rearing, the lethal temperature is 24°C and 20°C for spawning, incubation, and emergence. For Chinook and coho salmon adults migrating and holding as well as juveniles growing and rearing, the lethal temperature is 25°C and 20°C for spawning, incubation, and emergence.

Changes in the pH levels that sustain for extended periods of time in a freshwater system can have a direct effect on salmonids. Altered pH levels decrease activity levels, create stress responses, cause a decrease or absence of feeding, and can lead to a loss of physiological equilibrium. Altered pH levels can also be exacerbated by increases in water temperature (Wagner, Boasakowski, and Intelmann 1997). Reproduction and juvenile growth and rearing is affected by low levels of pH in a system (Jordahl and Benson 1987).

Dissolved oxygen at adequate levels is essential to survival, and alterations in dissolved oxygen can have direct effects on salmonids. Reduced levels of dissolved oxygen can negatively impact growth and maturation of salmonids at all life stages. High levels of dissolved oxygen can also cause disease and death for salmonids (Carter 2008). As discussed above, increased turbidity can directly affect salmonids by reducing water clarity for feeding visibility, clogging fish gills, and introducing fine sediment to spawning beds (Bash, Berman, and Bolton 2001).

Though there is potential for direct effects from wastewater discharged into Pruitt Creek, these effects from the Project will be minimized, as the design of the MBR treatment system will implement the water quality and recycled water discharge requirements based on the EPA NPDES permit and those provided in the Basin Plan (NCRWQCB 2018) and Title 22 (SWRCB 2018). The Basin Plan recognizes the unique characteristics of the region (including the Russian River watershed) and how they relate to natural water quality beneficial uses and water quality issues. The Basin Plan specifically considers the North Coast Region streams and rivers, which support anadromous fisheries such as CCC coho, CC Chinook, and CCC steelhead and details how healthy fisheries and riparian ecosystems are integral to the continued success of these native fish populations. Pruitt Creek is part of the Mark West Hydrological Subarea, and beneficial uses include cold freshwater habitat and Spawning, Reproduction, and/or Early Development (SPWN) as defined in Chapter 2 of the Basin Plan. The wastewater discharge from the Project will meet all Basin Plan requirements for water quality for a designated cold freshwater habitat and spawning, reproduction, and/or early development. It will also consider the standards established in Title 22.

For water temperature, this means at no time or place shall the temperature be increased by more than 5°F above natural receiving water condition. If deemed necessary, a cooling mechanism will be integrated into the design to ensure that water is cooled before it is discharged into Pruitt Creek and meets the conditions required per the Basin Plan and Title 22. For turbidity, it will meet or exceed Title 22 standards of less than 0.2 NTU as well as the Basin Plan's requirement that it shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof. The pH levels will be between 8.5 and 6.5.

The daily minimum objective for dissolved oxygen will be 9 milligrams per liter (mg/L) with a 7-day moving average objective of 11 mg/L. This is the average of each set of seven consecutive daily averages and represents the highest water quality requirements based on the SPWN designation for the Mark West Hydrological Subarea. Water quality objectives designed to protect SPWN-designated waters apply to reaches where spawning occurs and during the periods of time when spawning, egg incubation, and larval development occur or have historically occurred. For the North Coast Region, this period is between September 15 and June 4. Outside of that date range, the daily minimum objective for dissolved oxygen will be 6 mg/L with a 7-day moving average objective of 8 mg/L per the cold freshwater habitat requirement.

The bacteria content will meet or exceed the Title 22 standards of less than a most probable number (MPN) of 2.2 per 100 ml for coliform. It shall not be degraded beyond natural background levels according to the North Coast Region. Additives planned for use include chlorine, which would be added to water being reused in the toilets on site. Water would be dechlorinated before being discharged to surface waters; therefore, no additives for the treated effluent will be discharged to Pruitt Creek. According to the Basin Plan, no biostimulatory substances may be discharged.

The timing of discharge will coincide with a specific threshold streamflow that must be present in Pruitt Creek. Discharge will occur only when there is sufficient flow to dilute the effluent, and it seasonally aligns with the natural low regime of the system both to minimize changes in water quality and to avoid altering migration or movement patterns of salmonids. The Basin Plan prohibits effluent discharges from wastewater treatment plants to some surface waters between May 15 and September 30 due to significant seasonal flow variations during the summer and winter months. Discharges during the wetter winter months (October 1 to May 14) must comply with the surface water rate discharge flow limitation. The wastewater discharged from the Project will be limited to discharging up to 1 percent of the measured flow at a gauge station that would be installed as part of Project compliance with NDPES at the point of discharge on Pruitt Creek. For example, this percentage is equal to 4.48 gallons per minute when Pruitt Creek is flowing at 1 cfs. This scenario minimizes any long-term or widely spread effects to water quality from direct discharge.

The implementation of these requirements coupled with water quality monitoring as an AMM will minimize the direct effects of discharge from the MBR treatment system into Pruitt Creek.

6.2.2 Indirect Effects

Removal or alteration of riparian vegetation may lead to a loss of instream cover, loss of temperature regulation capacity, and a reduction of bank stabilization. A loss or reduction of instream cover could result in an increase in predation. Removing shade along the riparian corridor may increase the temperature of the water. Vegetation plays an important role in stabilizing the banks of a creek, and alteration to this vegetation could increase erosion and change the course of a stream. These effects have the potential to indirectly affect individual listed Pacific salmonids by degrading water quality and reducing the habitat suitability of Pruitt Creek. Salmonids are anticipated to only occur during the late fall, winter, and early spring when temperature stress is low and canopy cover has less effect on the temperature of the creek, during appropriate flow conditions. These indirect effects will have an insignificant effect on individual salmonids with implemented BMPs coupled with the seasonality of the construction window.

Water quality changes in Pruitt Creek from MBR treatment system discharge could alter habitat characteristics that would indirectly affect salmonids. Injecting bacteria into the system could cause algal blooms that could decrease oxygen levels in the water, release toxins into the system, and decrease visibility. High water temperatures, pH changes, and increased turbidity all promote the growth of bacterial algal blooms (CDC 2022). Artificially increased temperatures from effluent may limit the geographic range of salmonids which could decrease opportunities for spawning, rearing, and/or migration. Increases in water temperatures can also increase salmonid susceptibility to disease (Carter 2008) making habitat less suitable for salmonids.

The planned gravity sewer main would be installed beneath the existing creek to reach a lift station and wastewater treatment plant (WWTP). Hydrofracture (i.e., frac out) during construction of the gravity sewer main could result in erosion, sedimentation, reduced water quality, and degraded riparian habitat. Directional drilling or other trenchless construction methods would be used to avoid impacts to the creek and riparian areas. Impacts would be minimized by limiting drilling and construction of the pipeline to the dry season. Wastewater would then be pumped from the lift station wet well through a sewer pipeline to the headworks of the WWTP.

These indirect effects from discharge will have an insignificant effect on individual salmonids with implemented requirements from the Basin Plan (NCRWQCB 2018) and Title 22 (SWRCB 2018) coupled with water quality monitoring required as an AMM.

6.3 Effects on Critical Habitat

The Proposed Action may have short-term and localized effects on designated CCC steelhead DPS Critical Habitat. With the implementation of the AMMs described in this BA, these potential direct and/or indirect effects would be reduced to an insignificant and discountable level.

6.4 Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the Federal action subject to consultation (50 CFR 402.02). Future Federal actions that are unrelated to the Proposed Action are not considered in these cumulative effects analysis because those actions would require separate consultation pursuant to Section 7 of the ESA.

Current, future, and reasonably foreseeable actions in the Project area that could affect listed salmonids, Critical Habitat, and EFH potentially affected by the proposed Project are discussed below:

- Development and the associated increase in surface area of impervious surfaces creates more sheet flow runoff after precipitation events. Runoff could discharge sediment and hazardous waste into Pruitt Creek and decrease the quality of habitat.
- Increase in human activity within the Project area creates more opportunity for disturbance within the creek and riparian corridor.
- Non-Federal activities that contribute to climate effects within the Project area must be considered. It is challenging to identify, qualify, or quantify the future environmental conditions caused by climate changes, but it is reasonably certain that indirect adverse effects can be expected for listed salmonids and their habitat.

Construction of the proposed project would contribute a minor amount to the cumulative loss of suitable aquatic habitat for CCC steelhead, CCC coho salmon, and CC Chinook salmon. With the implementation of the AMMs described in this BA, the Project's contribution to effects on listed fish would be reduced to a less than cumulatively considerable level.

6.5 Interrelated and Interdependent Activities

Interrelated and interdependent effects are effects that occur because of interrelated or interdependent activities. They can be direct or indirect effects. The construction of the proposed Project is an interrelated and interdependent activity to the proposed Federal action of placing land into Federal trust. The Project would not be constructed but for the transfer of land into a Federal trust.

7.0 AVOIDANCE AND MINIMIZATION MEASURES

The Project's EIS describes best management plans and mitigation measures to avoid impacts (Appendix E). BMPs include trash management and the development of a Stormwater Pollution Prevention Plan and a Spill Prevention and Response Plan. All wastewater discharge from the on-site MBR treatment system will follow requirements set forth in the EPA NPDES, Basin Plan (NCRWQCB 2018), and standards established in Title 22 (SWRCB 2018). This section provides AMMs that will protect and minimize impacts to Federally listed Pacific salmonid species that may be adversely affected by the proposed Project. These measures are an integral part of the Proposed Action and will be carried out by the Applicant. AMMs as part of this Project include:

The following AMMs from the EIS will be implemented to reduce potential impacts on listed salmonids:

A. Alterations to riparian vegetation shall be avoided to the maximum extent possible. The project footprint shall be established at the minimum size necessary to complete the work. Temporary setback areas shall be marked with fencing to protect the riparian zone and its function. Any disturbed riparian areas shall be replanted with native trees and shrubs. A restoration plan will be created to restore disturbed riparian areas and replanting will use native trees and shrubs.

B. A qualified biologist shall delineate an Environmentally Sensitive Area along Pruitt Creek. The contractor shall install high-visibility fence to prevent accidental incursion on the Environmentally Sensitive Area.

C. Staging areas, access routes, and total area of activity shall be limited to the minimum area necessary to achieve Project goals. Routes and boundaries shall be clearly marked and outside of the riparian area and create a buffer zone wide enough to support sediment and nutrient control and bank stabilization function.

The following AMMs shall be implemented to minimize or avoid potential impacts to wetlands, Waters of the U.S., and special-status species:

D. The wastewater discharged will flow through a gauge station that would be installed as part of Project compliance with NDPES. The gauge will be located at the point of project-related discharge on Pruitt Creek. No more than 1% of Pruitt Creek flow will be discharged to be consistent with NCRWQCB Basin Plan standards for receiving waters. A water quality monitoring protocol and schedule will be established to ensure that parameters are being met during discharge activities in Pruitt Creek.

E. Prior to the start of construction, wetlands and jurisdictional features shall be fenced, and excluded from activity. Fencing shall be located as far as feasible from the edge of wetlands and riparian habitats and installed prior to the dry season, after special-status species surveys have been conducted and prior to construction. The fencing shall remain in place until all construction activities on the site have been completed.

F. Ground disturbing activities, such as grading, clearing, and excavation, within 50 feet of any U.S. Army Corps of Engineers (USACE) jurisdictional features identified in the formal delineation process shall be conducted during the dry season (between June 15 and October 15) to minimize erosion. In the event of substantial, unseasonably high flow within Pruitt Creek on or after April 15, work shall be altered or stopped until flow ceases in the creek. Temporary stormwater Best Management Practices such as vegetative stabilization and linear sediment barriers shall be established between disturbed portions of the Project Site and Pruitt Creek to prevent sedimentation in the watercourse.

G. Staging areas shall be located away from the areas of aquatic habitat that are fenced off. Temporary stockpiling of excavated or imported material shall occur only in approved construction staging areas. Excess excavated soil shall be used on site or disposed of at a regional landfill or other appropriate facility. Stockpiles that are to remain on the site through the wet season shall be protected to prevent erosion (e.g. with tarps, silt fences, or straw bales). All storm runoff will be managed through an erosion control plan. Temporary erosion control measures should remain on the Project site until perennial or planted vegetation is established and functioning to minimize sediment discharged into the creek.

H. Standard precautions shall be employed by the construction contractor to prevent the accidental release of fuel, oil, lubricant, or other hazardous materials associated with construction activities into jurisdictional features. A contaminant program shall be developed and implemented in the event of release of hazardous materials.

I. If impacts to Waters of the U.S. and wetland habitat are unavoidable, a 404 permit and 401 Certification under the Clean Water Act shall be obtained from the USACE and U.S. Environmental Protection Agency (USEPA). Mitigation measures may include creation or restoration of wetland habitats either on site or at an appropriate off-site location, or the purchase of approved credits in a wetland mitigation bank approved by the USACE. Compensatory mitigation shall occur at a minimum of 1:1 ratio or as required by the USACE and USEPA.

J. Consultation with the National Oceanic and Atmospheric Administration Fisheries for impacts to fish and essential fish habitat shall be conducted in accordance with Section 7 of the federal Endangered Species Act (FESA) and Magnuson-Stevens Act and any requirements resulting from that consultation shall be adhered to.

8.0 CONCLUSION AND DETERMINATION

The proposed project has been designed to avoid and minimize impacts to species and habitats within the Action Area. This section provides a summary of potential project impacts to each species; see Section 6 above for a full discussion of potential impacts.

Following the analysis of the potential impacts that may result from the Proposed Action, a determination is made that the Proposed Action has a determination of "May Affect, Not Likely to Adversely Affect" the CCC steelhead – DPS, the CCC coho salmon – ESU, and the CC Chinook salmon ESU.

The Proposed Action may result in effects to the salmonids and their habitat in Pruitt Creek. Due to this finding of effect, the BIA is requesting initiation of formal consultation with NMFS, in accordance with Section 7 of the ESA.

To reduce these potential impacts to a level regarded as less than significant, appropriate construction measures and AMMs will be implemented prior to Project commencement and throughout the duration of Project-related activities. Implementation of the prescribed AMMs will ensure that the proposed Project does not adversely affect CCC steelhead – DPS, the CCC coho salmon – ESU, and the CC Chinook salmon ESU, CCC steelhead – DPS Critical Habitat, Pacific salmonid EFH, and downstream receiving waters.

In conclusion, the Applicant is requesting concurrence from the NMFS that the Project "may affect but is not likely to adversely affect" the CCC steelhead – DPS, the CCC coho salmon – ESU, the CC Chinook salmon ESU, CCC steelhead – DSP Critical Habitat, and Pacific salmonid EFH.

8.1 Determination

Based on the analysis provided in this document and the more than negligible probability of take of individual listed anadromous salmonids, the Proposed Action has the following determinations:

CCC Steelhead – DPS: "May Affect, Not Likely to Adversely Affect"

CCC Coho Salmon – ESU: "May Affect, Not Likely to Adversely Affect"

CC Chinook Salmon – ESU: "May Affect, Not Likely to Adversely Affect"

CCC Steelhead – DPS Critical Habitat: "May Affect, Not Likely to Adversely Affect"

EFH for Pacific Salmonids: "May Affect, Not Likely to Adversely Affect"

9.0 ESSENTIAL FISH HABITAT CONSULTATION

9.1 Overview of Essential Fish Habitat

The MSA established methods designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. The MSA requires Federal agencies to consult with NMFS on all Actions, or Proposed Actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (MSA Section 305(B)(2)). “Adverse effect” means any impact that reduces quality and/or quantity of EFH, and may include direct, indirect, site-specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of Actions (50 CFR 600.810).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA Section 3). For the purpose of interpreting this definition of EFH, “waters” include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate. “Substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities. “Necessary” means the habitat required to support a sustainable fishery and the managed species’ contribution to a healthy ecosystem. And “spawning, breeding, feeding, or growth to maturity” covers a species’ full life cycle (50 CFR 600.110).

Consultation under Section 305(b) of the MSA (16 U.S.C. 1855(B)) requires that:

“Federal agencies must consult with NMFS on all Actions, or Proposed Actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH;”

NMFS shall provide conservation measure recommendations for any Federal or State activity that may adversely affect EFH; Federal agencies shall, within 30 days after receiving conservation measure recommendations from NMFS, provide a detailed response in writing to NMFS regarding the recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the recommendations of NMFS, the Federal agency shall explain its reason for not following the recommendations.

The MSA requires consultation for all Actions that may adversely affect EFH and does not distinguish between Actions within EFH and Actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must consider Actions that occur outside EFH, such as upstream and upslope activity, which may have an adverse effect on the EFH. Therefore, EFH consultation with NMFS is required by Federal agencies undertaking, permitting, or funding activities that may adversely affect EFH, regardless of location.

9.2 Identification of EFH

EFH for the Pacific Coast Salmon Fishery means those waters and substrate necessary for salmon production needed to support a long-term sustainable fishery and salmon contributions to a healthy ecosystem. To achieve that level of production, EFH must include all those streams, lakes, ponds, wetlands, and other currently viable water bodies. It must also include most of the habitat historically accessible to salmon in Washington, Oregon, Idaho, and California, except above the impassible barriers identified by Pacific Fisheries Management Council (PFMC 2014). Salmon EFH excludes areas upstream of longstanding naturally impassable barriers. In the estuarine and marine areas, salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone offshore of Washington, Oregon, and California, north of Point Conception.

9.3 Effect on Essential Fish Habitat

With the implementation of the measures outlined in Section 7.0, the effects to EFH in the Project area from the Proposed Action will be reduced to a less than significant level. The direct and indirect effects of this Project will not significantly reduce the available breeding and rearing habitat for Pacific salmonids and will not significantly reduce their likelihood of survival in the wild by reducing their population size, distribution, or reproduction.

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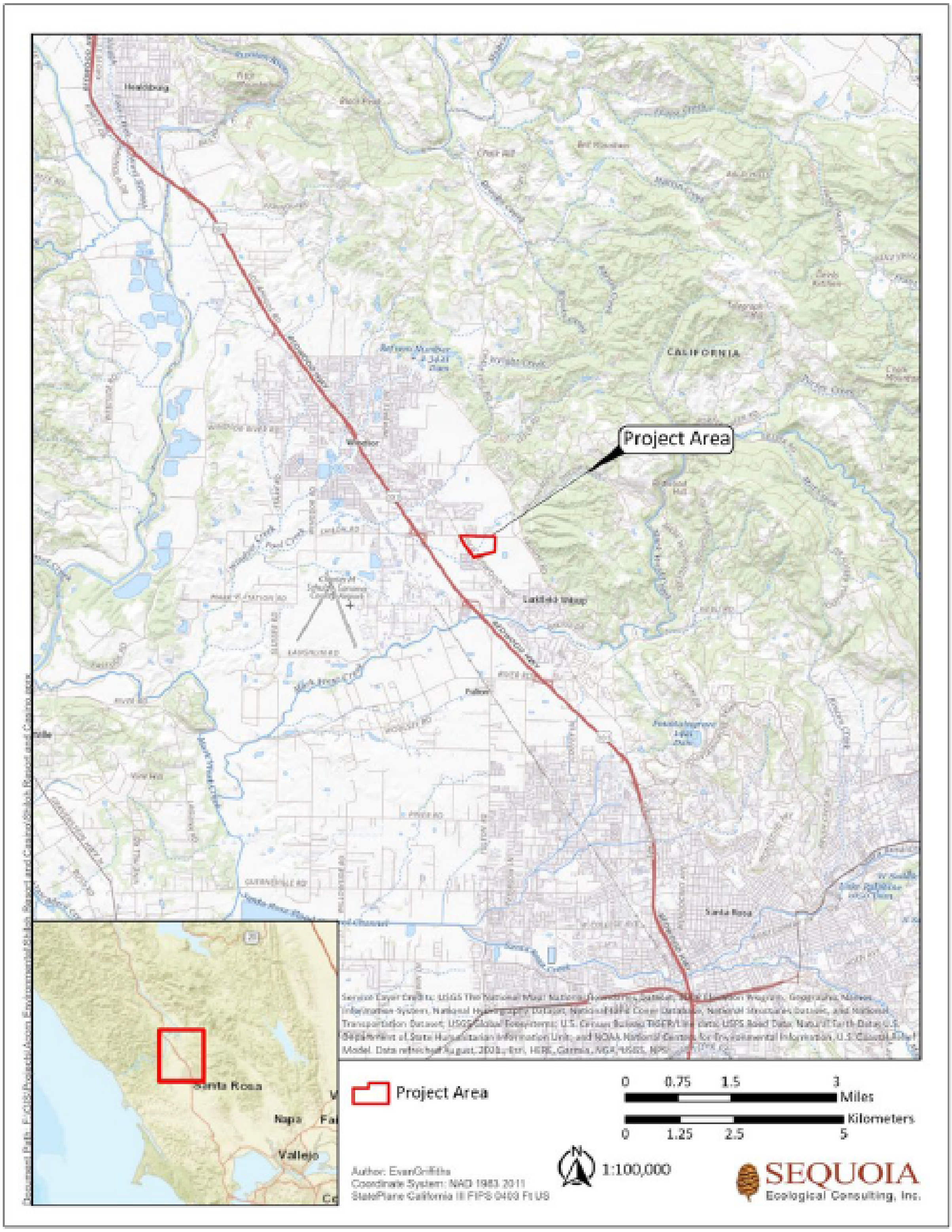

Figure 1. Regional map of the proposed Shiloh Resort and Casino project site.

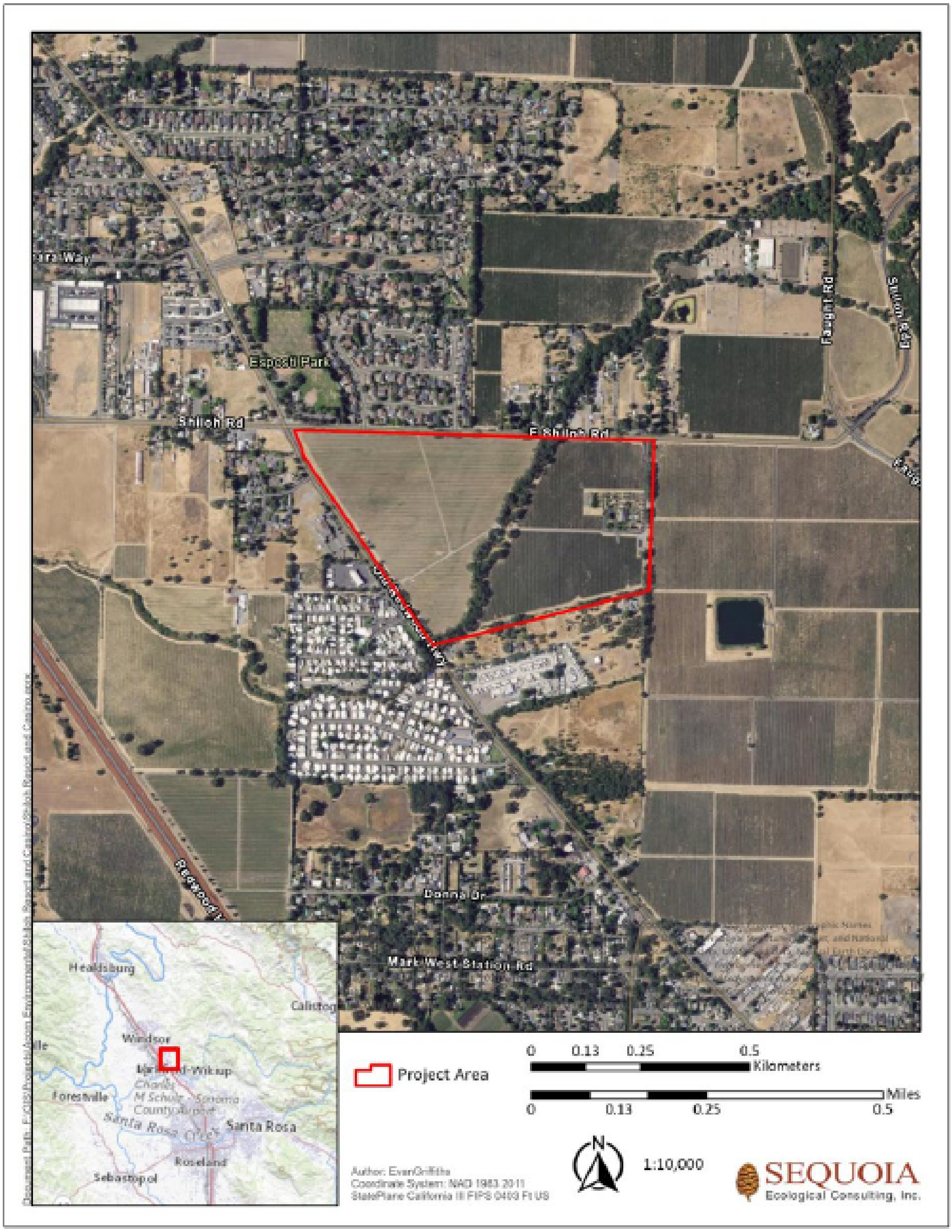

Figure 2. Location map of the proposed Shiloh Resort and Casino project site.

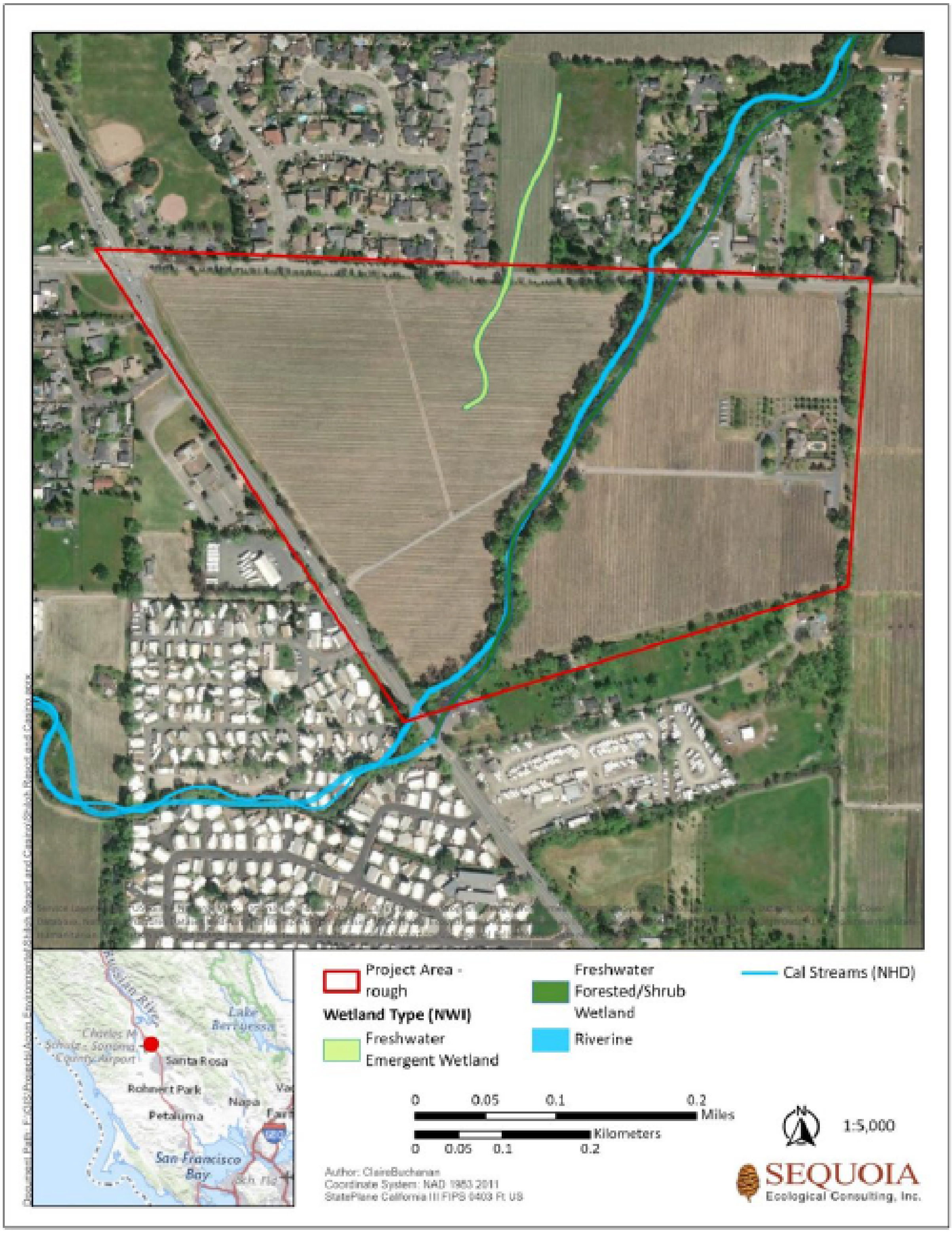

Figure 3. Aquatic features on the proposed Shiloh Resort and Casino project site.

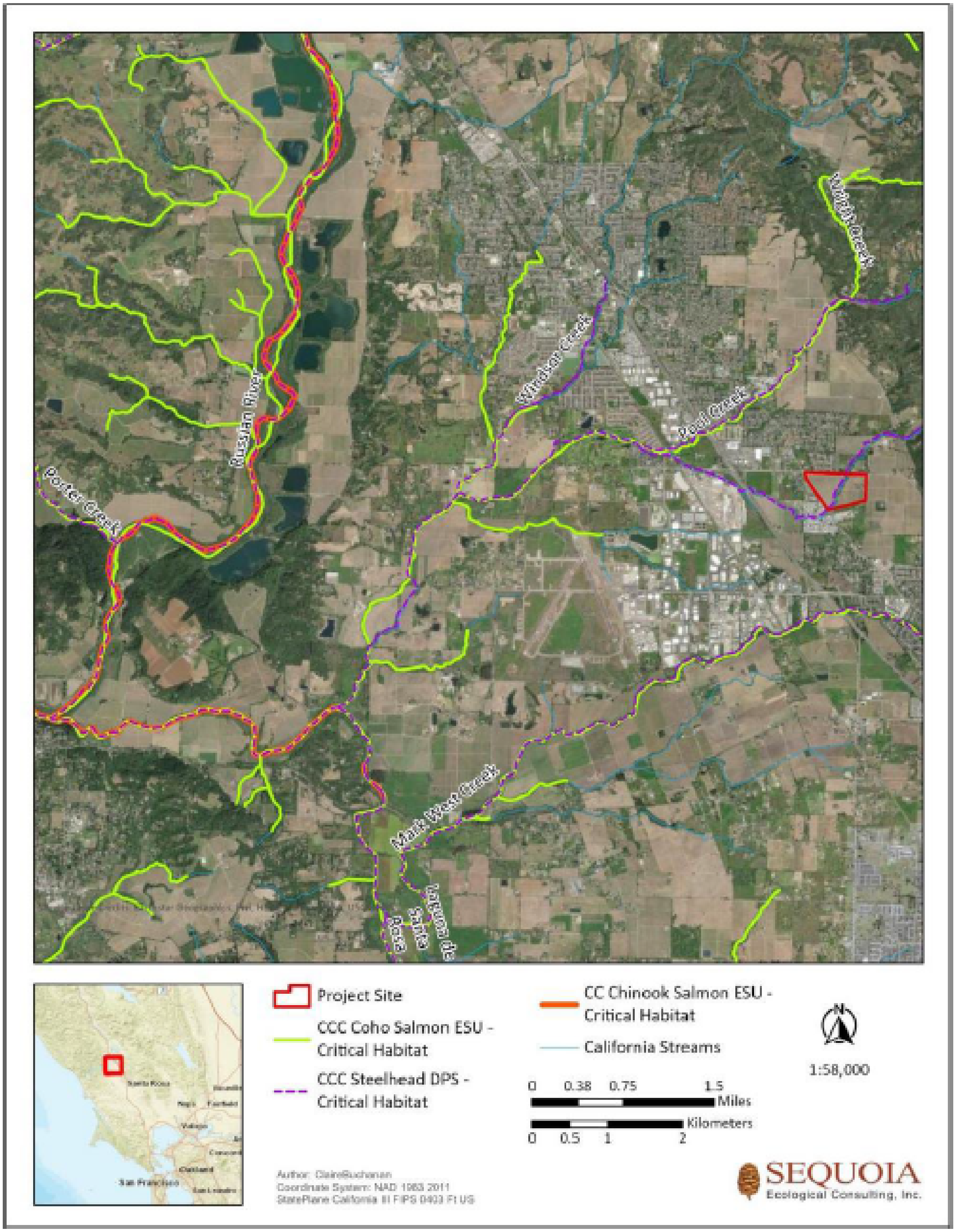

Figure 4. NMFS Critical Habitat in the vicinity of the proposed Shiloh Resort and Casino project site.

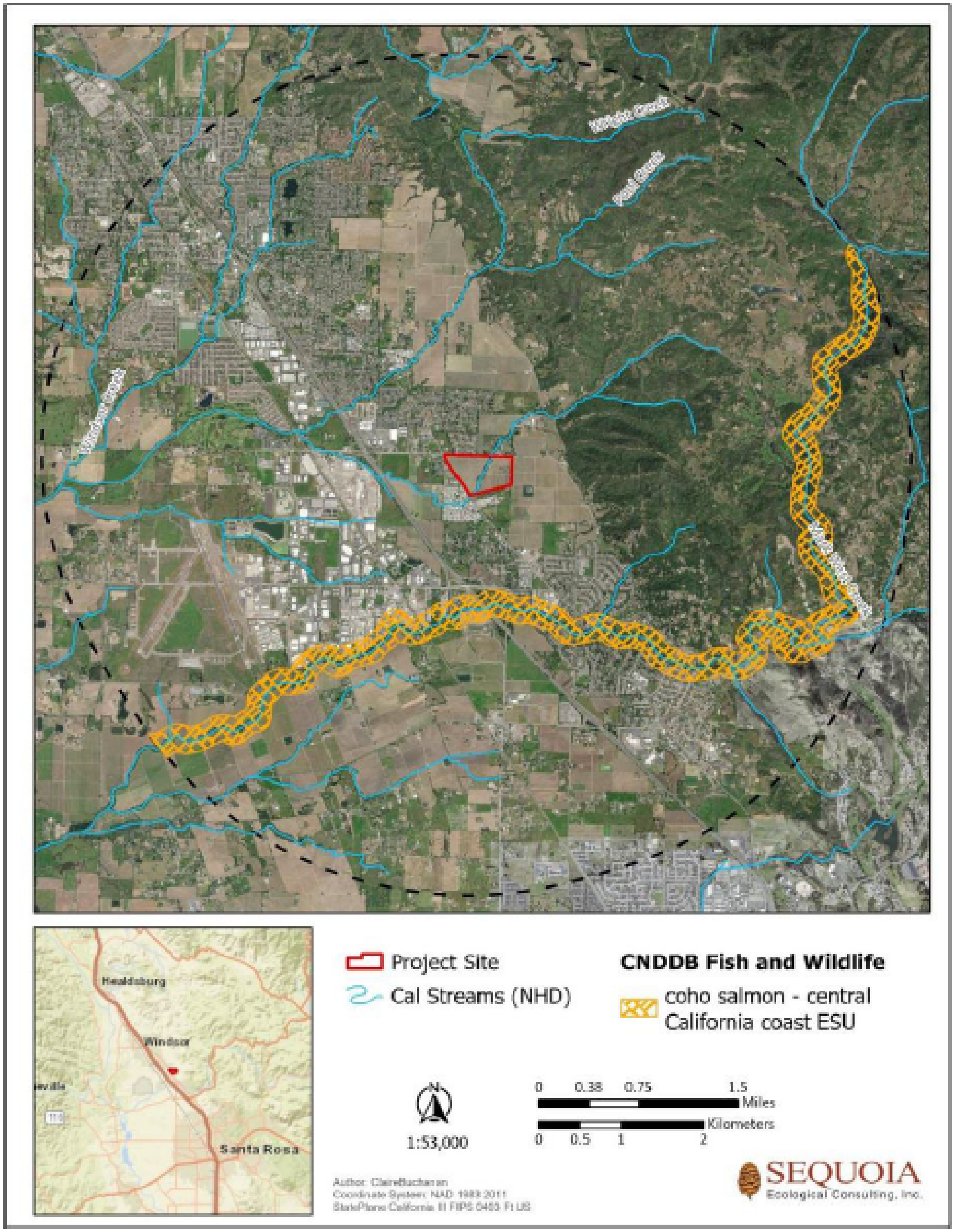

Figure 5. Closest known occurrences of federally listed species within 3 miles of the proposed Shiloh Resort and Casino project site.

Table 1. Federally listed fish species known to occur in the vicinity of the Project site.

Scientific Name	Common Name	Listed Status	Critical Habitat	Essential Fish Habitat	Potential for Occurrence	Effects Determination
Oncorhynchus kisutch	Coho salmon California Central Coast ESU	FE, CE	No, final Critical Habitat within the Action Area	Yes; EFH within Action Area	Moderate potential for occurrence in Pruitt Creek. Hydrological events and accessibility must align temporally with migration events for occurrence.	May Affect, Not Likely to Adversely Affect
Oncorhynchus mykiss irideus	Steelhead California Central Coast DPS, Northern California DPS	FT	Yes, final Critical Habitat within the Action Area	No EFH within Action Area	Known to seasonally occur (upstream/downstream movement) in intermittent project reach of Pruitt Creek and occur in upstream perennial reach (Church, 2023). Hydrological events and accessibility must align temporally with migration events for occurrence.	May Affect, Not Likely to Adversely Affect
Oncorhynchus tshawytcha	Chinook salmon California Coastal ESU	FT	No, final Critical Habitat within the Action Area	Yes, EFH within Action Area	Low potential for occurrence in Pruitt Creek based on their current distribution and their patterns of migration.	May Affect, Not Likely to Adversely Affect

Key to status:
FT - Federally listed as threatened species
CE - California listed as endangered species

Appendix A

Preliminary Site Plans for Proposed Shiloh Resort and Casino Project

Appendix B

North-Central California Coast Recovery Domain Map


NOAA FISHERIES
WASHINGTON
OREGON
IDAHO
CALIFORNIA
West Coast Region
Salmon & Steelhead
Recovery Domains
Puget Sound
Interior Columbia
Willamette / Lower Columbia
Oregon Coast
Southern Oregon / Northern California Coast
North-Central California Coast
California Central Valley
South-Central / Southern California Coast

Appendix C

Aquatic Resources Delineation Map (Revised December 2023)

Appendix D

Water and Wastewater Feasibility Study

The Water and Wastewater Feasibility Study is included within the appendices of the Koi Nation of Northern California Shiloh Resort and Casino Project EIS. Please see Appendix D-1 of the EIS.

Appendix E

Applicable Best Management Practices and Mitigation Measures from the Shiloh Casino and Resort Project Administrative Draft Environmental Impact Statement (April 2024)

Best Management Practices

Resource Area	Protective Measures and Best Management Practices
Water Resources	The Tribe will apply for coverage under and comply with the NPDES General Construction Permit from the USEPA, for construction site runoff during the construction phase in compliance with the CWA. A Stormwater Pollution Prevention Plan (SWPPP) will be prepared, implemented, and maintained throughout the construction phase of the development, consistent with the General Construction Permit requirements. The SWPPP prepared for the Project Site would include, but would not be limited to, the following BMPs to minimize storm water effects to water quality during construction. Grading activities will be limited to the immediate area required for construction. Temporary erosion control measures (such as silt fences, fiber rolls, vegetated swales, a velocity dissipation structure, staked straw bales, temporary re-vegetation, rock bag dams, erosion control blankets, and sediment traps) will be employed for disturbed areas. Construction activities will be scheduled to minimize land disturbance during peak runoff periods. Disturbed areas will be paved or re-vegetated following construction activities. Construction area entrances and exits will be stabilized with large-diameter rock. A spill prevention and countermeasure plan will be developed that identifies proper storage, collection, and disposal measures for potential pollutants (such as fuel, fertilizers, pesticides, etc.) used on site. Petroleum products will be stored, handled, used, and disposed of properly in accordance with provisions of the CWA (33 USC § 1251 to 1387). Construction materials, including topsoil and chemicals, will be stored, covered, and isolated to prevent runoff losses and contamination of surface and groundwater. Fuel and vehicle maintenance areas will be designed to control runoff. Sanitary facilities will be provided for construction workers. Disposal facilities will be provided for soil wastes, including excess asphalt during construction. Food-related trash will be stored in closed containers and removed from the site daily. Wheel wash or rumble strips and sweeping of paved surfaces will be used to remove any and all tracked soil. LID methods (e.g., bioswales) will be implemented that would help store, infiltrate, evaporate, and detain stormwater runoff. Should dewatering (the process of removing surface or ground water from a particular location) be needed during construction, extracted water would be treated in a proposed or temporary basin and/or be trucked out and disposed of consistent with stormwater regulations.

	During operation, internal roadways and parking areas will be subject to trash clean-up daily and swept weekly to prevent debris from entering the stormwater management system.
Biological Resources	Prior to construction, all construction workers will take part in an environmental awareness program conducted by an agency-approved biologist. Special-status species to be covered in the program include, but are not limited to: California red-legged frog, northwestern pond turtle, nesting migratory birds, western burrowing owl, Chinook salmon (CC ESU), coho salmon (CCC ESU), and steelhead (CCC DPS). This training shall include a description of the special-status species with the potential to occur in the work area, habitat needs, an explanation of the status of the species and protection under federal law, and a list of the measures being taken to avoid or reduce impacts to the species during project construction. The awareness program will be conducted at the start of construction and thereafter as required for new construction personnel. The training shall include a handout containing training information. The project manager shall use this handout to train any additional construction personnel that were not in attendance at the first meeting, prior to starting work on the project. At the end of each workday, all excavations (e.g., holes, construction pits, and trenches) of a depth of eight inches or greater will be covered with plywood or other hard material, and gaps around the cover will be filled with dirt, rocks, or other appropriate material to prevent entry by wildlife. If excavations cannot be covered, then they will include escape ramps constructed of either dirt fill, wood planking, or other appropriate material installed at a 3:1 grade (i.e., an angle no greater than 30 degrees) to allow wildlife that fall in a means to escape. If directional drilling is used, pipelines would be installed a minimum of 10 feet below the bottom of Pruitt Creek and during the dry season, to prevent hydrofracture (e.g., frac-out).
Public Services and Utilities	BMPs to be implemented during construction: The site will be cleaned daily of trash and debris to the maximum extent practicable. BMPs to be implemented during construction and operation: A solid waste management plan will be developed and adopted by the Tribe that addresses recycling and solid waste reduction and proper disposal onsite during construction and operation. These measures will include, but not be limited to, the installation of a trash compactor for cardboard and paper products, the installation of ample and visible trash and recycling bins to encourage proper disposal, and periodic waste stream audits.
Visual Resources	Exterior lighting on buildings will be designed so as to not cast significant light or glare into the public right-of-way or any surrounding residentially zoned properties, natural areas, or properties used for activities falling under household living. Lighting equipment at the project entrances will aim

	downward and backward toward the site to create only indirect illumination that would be visible to adjacent sensitive receptors. No direct lighting shall be cast on Pruitt Creek. The riparian line will be used to establish an internal project boundary in which no illumination will be permitted. A no-lighting zone will also be created on either side of the creek riparian lines extending to the building structures and out to the Project Site boundary. All signage lighting will aim downward and backward toward the Project Site to create only indirect illumination that would be visible to adjacent sensitive receptors. No signage will be internally illuminated. Outdoor light fixtures will be fully or partially shielded and filtered and oriented downward when possible. The onsite loop road planned vehicular traffic will be unlit except where there is potential conflict with pedestrians or hazards such as bus parking, sharp curves, and intersections. Lighting at the front roadways will be concentrated at the points of entry, the roundabout, and intersections. Lighting between these points may be considered where shielded by sufficiently mature landscape. Marking and lighting necessary to indicate the presence of buildings, structures, or vegetation to operators of aircraft in the vicinity of the airport will be provided if required by the Federal Aviation Administration. The exterior lighting of will be designed in accordance with the International Dark-Sky Association's Model Lighting Ordinance so as not to cast light or glare off site (e.g. utilize a warm correlated color temperatures (3000K or less) for exterior lighting for reduced likelihood of blue wavelengths which stimulate the photoreceptors of humans and some wildlife). Lighting will consist of pole-mounted lights up to a maximum height of 16 feet and use high pressure sodium or light-emitting diodes (LEDs) with cut-off lenses and downcast illumination unless an alternative light configuration is needed for security or emergency purposes. Additionally, no strobe lights, spotlights, or flood lights will be used. Shielding will be used in accordance with the International Dark-Sky Association's Model Lighting Ordinance. Efforts shall be made to "capture" the light emitted upward with built or natural material beyond what is specified in the Dark-Sky Association's Model Lighting Ordinance. Less reflective materials will be used in uncovered areas to reduce reflected light and glare. A wall with a gate will be constructed around the service yard to shield Pruitt Creek from work lights which will be automatically controlled-off when not in use. The foot bridge from the parking garage to the casino will incorporate electrochromic glass which can be automatically shaded when electric pathway lighting is required to contain electric light within the bridge. This will enable the bridge to be transparent during the day but prevent illumination from being cast on Pruitt Creek during the night.

	The surface parking lot will be restricted to daytime use only to prevent the need for permanent lighting in this area. Interior light will be controlled from spilling onto Pruit Creek or nearby sensitive receptors through the following methods: • Casino/Events windows – glazing will be minimized and primarily facing the main entryway and spill light will be utilized for backlighting of rain screens or contributing to illumination below canopies. • Casino skylights – shading devices will be used to black out interior light that would otherwise be wasted into the night sky. • Hotel – guest room windows facing Shiloh Road and the creek will be minimized, and automated shading and lighting sequences will be employed. A reliable presence detection method such as room-key docking will be used to enable lighting and also lower shades at sunset. The interior room lighting will also be developed with consideration of luminaire placement relative to windows. Parking structure lighting – Shielding will be used to reduce light reaching sensitive receptors and Pruitt Creek, such as a parapet wall wrapping all other exposures to contain reflected light. Lighting placement and luminaire distribution will be carefully coordinated to contain direct light onto the parking garage footprint. Further, automated controls will reduce light levels when occupants are not detected. On the top level, pole lights will be located interior to the parking surfaces so that all emitted light can be useable on the parking surface. Sight lines will be studied to ensure the lighting equipment is not visible from common angles of adjacent properties, and reflection reducing materials will be used in the parking to reduce reflectance.
Noise	The following BMPs will be implemented during construction: Construction activities involving noise generating equipment will be limited to daytime hours between 7:00 a.m. and 6:00 p.m., with the exception of federal holidays where no work will occur, and with no construction work occurring between the hours of 10:00 p.m. to 7:00 a.m. All powered equipment will comply with applicable federal regulations and all such equipment will be fitted with adequate mufflers according to the manufacturer’s specifications to minimize construction noise effects. Noise-generating construction equipment will be located as away far from sensitive receptors as practicable while in usage. The use of vibratory rollers will be limited to locations beyond 250 feet from an existing sensitive receptor and non-vibratory rollers will be utilized at locations within 250 feet from an existing sensitive receptor. The following BMPs will be implemented during operation: Heating, ventilation, and air conditioning equipment will be shielded to reduce noise. Noise generating equipment associated with water and wastewater treatment facilities will be shielded, enclosed, or located within buildings.

Hazardous Materials and Hazards	Personnel will follow BMPs for filling and servicing construction equipment and vehicles. BMPs that are designed to reduce the potential for incidents/spills involving hazardous materials include the following. Fuel, oil, and hydraulic fluids will be transferred directly from a service truck to construction equipment to reduce the potential for accidental release. Catch-pans will be placed under equipment to catch potential spills during servicing. Refueling will be conducted only with U.S. Department of Labor Occupational Safety and Health Administration approved pumps, hoses, and nozzles. All disconnected hoses will be placed in containers to collect residual fuel from the hose. Vehicle engines will be shut down during refueling. Refueling will be performed away from bodies of water to prevent contamination of water in the event of a leak or spill. Service trucks will be provided spill containment equipment, such as absorbents. Should a spill contaminate soil, the soil will be put into containers and disposed of in accordance with local, State, and federal regulations. All containers used to store hazardous materials will be inspected at least once per week for signs of leaking or failure. In the event that contaminated soil and/or groundwater is encountered during construction-related earthmoving activities, all work will be halted until a professional hazardous materials specialist or other qualified individual assesses the extent of contamination. If contamination is determined to be hazardous, the Tribe will consult with the USEPA to determine the appropriate course of action, including development of a Sampling and Remediation Plan if necessary. Contaminated soils that are determined to be hazardous will be disposed of in accordance with federal regulations. Personnel will follow the following BMPs that are designed to reduce the potential for igniting a fire during construction: Construction equipment will contain spark arrestors, as provided by the manufacturer. Staging areas, welding areas, or areas slated for development using spark-producing equipment will be cleared of dried vegetation or other materials that could serve as fire fuel. No smoking, open flames, or welding will be allowed in refueling or service areas. Service trucks will be provided with fire extinguishers. Diesel fuel storage tanks for on-site emergency generators would comply with the National Fire Protection Association standards for aboveground storage tanks and have secondary containments systems. Materials used for the emergency generators would be handled, stored, and disposed of according to federal and manufacturer's guidelines. BMPs to be implemented during operation to address fire hazards:

	• Annual maintenance will be conducted to ensure fire resistive materials and construction details are maintained at their highest level to reduce ember impacts. • Fire protection devices including, but not limited to, fire sprinkler systems, alarm systems, commercial kitchens, and fire hydrants will be maintained, inspected, and tested per National Fire Protection Association standards. The exterior landscape of ignition resistant plants and existing vineyard areas will be maintained, including a five-foot non-combustible zone around each structure that will remain void of vegetation and landscaping.

Mitigation Measures

Resource Area	Proposed Mitigation	Alternative
Biological Resources	The following measures shall be implemented to avoid and/or reduce impacts to the Riparian Corridor: A. Alterations to riparian vegetation shall be avoided to the maximum extent possible. The project footprint shall be established at the minimum size necessary to complete the work. Temporary setback areas shall be marked with fencing to protect the riparian zone and its function. Any disturbed riparian areas shall be replanted with native trees and shrubs. A restoration plan will be created to restore disturbed riparian areas and replanting will use native trees and shrubs. B. A qualified biologist shall delineate an Environmentally Sensitive Area along Pruitt Creek. The contractor shall install high-visibility fence to prevent accidental incursion on the Environmentally Sensitive Area. C. Staging areas, access routes, and total area of activity shall be limited to the minimum area necessary to achieve Project goals. Routes and boundaries shall be clearly marked and outside of the riparian area and create a buffer zone wide enough to support sediment and nutrient control and bank stabilization function. The following measures shall be implemented to minimize or avoid potential impacts to wetlands, Waters of the U.S., and special-status species: D. The wastewater discharged will flow through a gauge station that would be installed as part of Project compliance with NDPES. The gauge will be located at the point of project-related discharge on Pruitt Creek. No more than 1% of Pruitt Creek flow will be discharged to be	A, B, C

	consistent with NCRWQCB Basin Plan standards for receiving waters. A water quality monitoring protocol and schedule will be established to ensure that parameters are being met during discharge activities in Pruitt Creek. E. Prior to the start of construction, wetlands and jurisdictional features shall be fenced, and excluded from activity. Fencing shall be located as far as feasible from the edge of wetlands and riparian habitats and installed prior to the dry season, after special-status species surveys have been conducted and prior to construction. The fencing shall remain in place until all construction activities on the site have been completed. F. Ground disturbing activities, such as grading, clearing, and excavation, within 50 feet of any U.S. Army Corps of Engineers (USACE) jurisdictional features identified in the formal delineation process shall be conducted during the dry season (between June 15 and October 15) to minimize erosion. In the event of substantial, unseasonably high flow within Pruitt Creek on or after April 15, work shall be altered or stopped until flow ceases in the creek. Temporary stormwater Best Management Practices such as vegetative stabilization and linear sediment barriers shall be established between disturbed portions of the Project Site and Pruitt Creek to prevent sedimentation in the watercourse. G. Staging areas shall be located away from the areas of aquatic habitat that are fenced off. Temporary stockpiling of excavated or imported material shall occur only in approved construction staging areas. Excess excavated soil shall be used on site or disposed of at a regional landfill or other appropriate facility. Stockpiles that are to remain on the site through the wet season shall be protected to prevent erosion (e.g. with tarps, silt fences, or straw bales). All storm runoff will be managed through an erosion control plan. Temporary erosion control measures should remain on the Project site until perennial or planted vegetation is established and functioning to minimize sediment discharged into the creek. H. Standard precautions shall be employed by the construction contractor to prevent the accidental release of fuel, oil, lubricant, or other hazardous materials associated with construction activities into jurisdictional features. A contaminant program shall be developed and implemented in the event of release of hazardous materials. I. If impacts to Waters of the U.S. and wetland habitat are unavoidable, a 404 permit and 401 Certification under the Clean Water Act shall be obtained from the USACE and U.S. Environmental Protection Agency (USEPA). Mitigation measures may include creation or restoration of wetland habitats either	

	on site or at an appropriate off-site location, or the purchase of approved credits in a wetland mitigation bank approved by the USACE. Compensatory mitigation shall occur at a minimum of 1:1 ratio or as required by the USACE and USEPA. J. Consultation with the National Oceanic and Atmospheric Administration Fisheries for impacts to fish and essential fish habitat shall be conducted in accordance with Section 7 of the federal Endangered Species Act (FESA) and Magnuson-Stevens Act and any requirements resulting from that consultation shall be adhered to. The following measures shall be implemented to avoid impacts to California red-legged frogs (CRLF): K. A qualified biologist shall conduct a preconstruction habitat assessment survey for CRLF following Appendix D of the U.S. Fish and Wildlife Service [USFWS (2005)] *Revised Guidance of Site Assessments and Field Surveys for the California Red-legged Frog*. The survey shall be conducted no less than 14 days and no more than 30 days prior to the beginning of ground disturbance, construction activities, and/or any project activity likely to impact the CRLF. The survey shall be conducted in all potential CRLF habitat on and within 200 feet of ground disturbance. L. If CRLF is detected during pre-construction surveys or during construction, the USFWS shall be contacted immediately to determine the best course of action. M. Should CRLF be identified during surveys, additional silt fencing shall be installed after surveys have been completed to further protect this species from construction impacts. The fencing shall remain in place until construction activities cease. The following measures shall be implemented to avoid impacts to northwestern pond turtle (NWPT): N. A qualified biologist shall conduct a preconstruction survey for NWPT along Pruitt Creek 24 hours prior to the beginning of ground disturbance, construction activities, and/or any project activity likely to impact the NWPT. The survey shall be conducted within 350 feet of the stretch of Pruitt Creek. If NWPT is detected within or immediately adjacent to the area of ground disturbance, the USFWS shall be contacted immediately to determine the best course of action. O. Should NWPT be identified during surveys, additional silt fencing shall be installed after surveys have been completed to further protect this species from construction impacts. The fencing shall remain in place until construction activities cease.	

	The following measures shall be implemented to avoid and/or reduce impacts to potentially nesting migratory birds and other birds of prey in accordance with the federal Migratory Bird Treaty Act. P. Removal of vegetation and trimming or removal of trees shall occur outside the bird nesting season (February 1 to August 30) to the extent feasible. Q. If removal or trimming of vegetation and trees cannot avoid the bird nesting season, a qualified wildlife biologist shall conduct a pre-construction nesting survey within 7 days prior to the start of such activities or after any construction breaks of 14 days or more. Surveys shall be performed for the Project Site and suitable habitat within 250 feet of the Project Site in order to detect any active passerine (perching bird) nests and within 500 feet of the Project Site to identify any active raptor (bird of prey) nests. R. If active nests are identified during the pre-construction bird nesting surveys, the wildlife biologist shall place species- and site-specific no-disturbance buffers around each nest. Buffer size would typically be between 50 and 250 feet for passerines and between 300 and 500 feet for raptors (birds of prey). These distances may be adjusted depending on the level of surrounding ambient activity (e.g., if the Project Site is adjacent to a road or community development) and if an obstruction, such as a building structure, is within line-of-sight between the nest and construction. For bird species that are federally- and/or State-listed sensitive species (i.e., fully protected, endangered, threatened, species of special concern), a Project representative, supported by the wildlife biologist, shall consult with the USFWS and/or the California Department of Fish and Wildlife (CDFW) regarding modifying nest buffers. The following measures shall be implemented based on their determination: ▪ If construction would occur outside of the no-disturbance buffer and is not likely to affect the active nest, the construction may proceed. However, the biologist shall be consulted to determine if changes in the location or magnitude of construction activities (e.g., blasting) could affect the nest. In this case, the following measure would apply: ▪ If construction may affect the active nest, the biologist and a Project representative shall consult with USFWS and/or CDFW, dependent on regulatory status, to develop alternative actions such as modifying construction, monitoring of the nest during construction, or removing or relocating active nests.	

	S. Any birds that begin nesting within the Project Site and survey buffers amid construction activities shall be assumed to be habituated to construction-related or similar noise and disturbance levels and minimum work exclusion zones of 25 feet shall be established around active nests in these cases. T. A qualified wildlife biologist shall conduct pre-construction burrowing owl surveys within 7 days prior to the start of such activities or after any construction breaks of 14 days or more. Surveys shall be performed at known mammal burrows or areas with the potential for new mammal burrows, within 250 feet of the Project Site. Surveys shall be conducted between morning civil twilight and 10:00 AM or two hours before sunset until evening civil twilight to provide the highest detection probabilities. U. If surveys identify evidence of western burrowing owls within 250 feet of the Project Site, the contractor shall: ▪ Establish a 250-foot exclusion zone around the occupied burrow or nest, as directed by the qualified biologist. ▪ Avoid the exclusion zone while the burrow is occupied. ▪ Not resume construction activities within the 250-foot zone until the Project representative provides written Notice to Proceed based on the recommendation of the qualified biologist. V. If avoidance of occupied burrows is not feasible during the September 1 to January 31 non-breeding season, construction may occur within 250 feet of the overwintering burrows as long as the contractor's qualified biologist monitors the owls for at least 3 days prior to Project construction and during construction and finds no change in owl foraging behavior in response to construction activities. If there is any change in owl foraging behavior as a result of construction activities, activities shall cease within the 250-foot exclusion zone. W. If destruction of occupied burrows is necessary, burrow exclusion can be conducted in accordance with the Staff Report on Burrowing Owl Mitigation.	
Hazardous Materials and Hazards – Wildfire Hazards	The following measures shall be implemented for all alternatives: A. Prior to opening day the Tribe shall engage a qualified arborist and/or biologist to develop a riparian corridor wildfire management plan to be implemented annually during operation. The goal of the plan shall be to reduce fire hazard on and adjacent to the on-site riparian corridor. At a minimum the plan shall include the following procedures and best management practices that shall be overseen by a qualified arborist and/or biologist:	A, B, C

	▪ Weed abatement and fuel load reduction outside of the creek channel shall be conducted in late Spring (May and June) by hand crews and repeated as necessary through the fire season. ▪ When riparian vegetation is within a 100-foot radius of a structure or the property line, the following procedures shall be implemented: ○ All dead or dying trees, branches, shrubs, or other plants adjacent to or overhanging buildings shall be removed. ○ Lower branches of trees shall be pruned to a height of 6 to 15 feet or 1 /3 tree height for trees under 18 feet. ○ All dead or dying grass, leaves, needles, or other vegetation shall be removed. ○ Live flammable ground cover and shrubs shall be removed or separated. ○ Climbing vines shall be maintained free of dead or dying material or removed from trees and structures. ○ Dead or dying grass shall be mowed to a maximum of 4 inches in height. Trimmings may remain on the ground. ○ Live flammable ground cover less than 18 inches in height may remain, but overhanging and adjacent trees must be pruned to a height of 6 to 15 feet. ○ Logs and stumps embedded in the soil shall be removed or isolated from structures and other vegetation. ○ All dead or dying brush or trees, and all dead or dying tree branches within 15 feet of the ground shall be removed. ▪ Vegetation management is prohibited in the wetted channel (i.e., the creek must be dry to perform work) ▪ Vegetation removal is with hand tools; if a chain saw is needed to perform work, a tarp is used to contain any wood chips/debris. ▪ No motorized vehicles are allowed in the channel. ▪ Vegetation shall not be removed from channel banks. ▪ Large woody debris (downed logs and root wads) in the channel and banks shall remain in place. ▪ Debris jams (fallen trees) that block the channel causing obstruction shall be removed. ▪ Vegetation management shall be conducted in a manner that protects riparian habitat and water quality, including tree canopies that provide shade to the channel (i.e., trees shall be trimmed only if a canopy can be maintained over the creek). ▪ Vegetation removal shall either conducted outside the bird nesting season (February 1 to August 15) or a field survey	

		for bird nests by a qualified biologist shall occur prior to starting work and implementing appropriate avoidance buffers.	