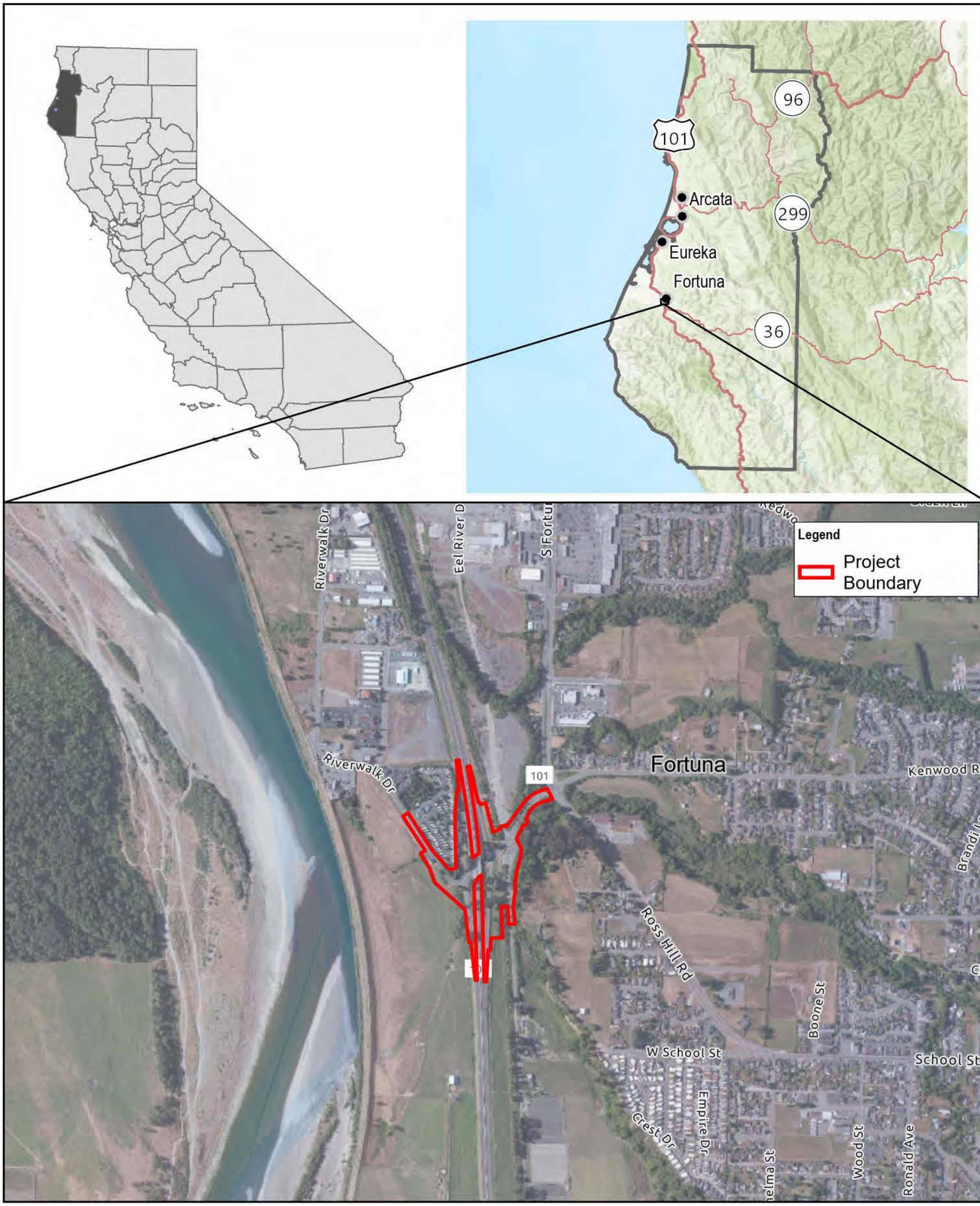
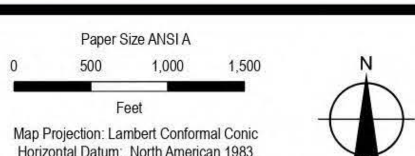
Appendices

Appendix A

Figures





Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

City of Fortuna
Kenmar Road/ US 101 Interchange Project

Project No. **11214735**
Revision No. -
Date **Sep 2022**

Vicinity Map

FIGURE 1

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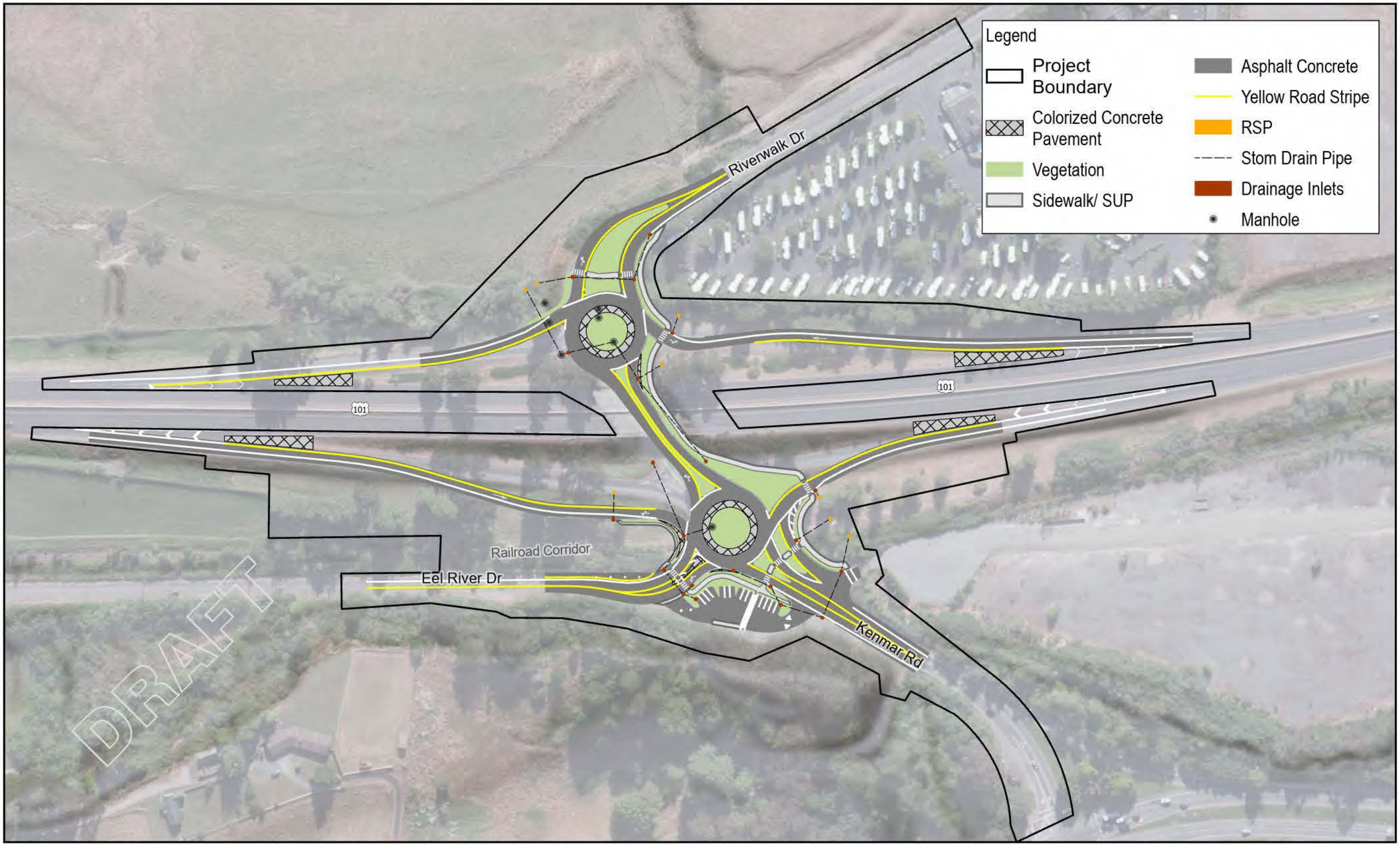
Data source: World Imagery (Clarity): This work is licensed under the Esri Master License Agreement.View Summary | View Terms of UseExport: This layer is not intended to be used to export tiles for offline. Data Collection and Editing: This layer may be used in various ArcGIS apps to support data collection and editing, with the results used internally or shared with others, as described for these use cases.; transportation: USGS The National Map: National Transportation Dataset; U.S. Census Bureau – TIGER/Line; U.S. Forest Service. Data Refreshed July, 2022.; Road Names: Esri Community Maps Contributors,



Paper Size ANSI A

0 50 100 150 200 250

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Fortuna
Kenmar Road/ US 101 Interchange

Project No. **11214735**
Revision No. -
Date **September 2022**

Project Overview

FIGURE 1

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Print date: 20 Sep 2022 - 10:34

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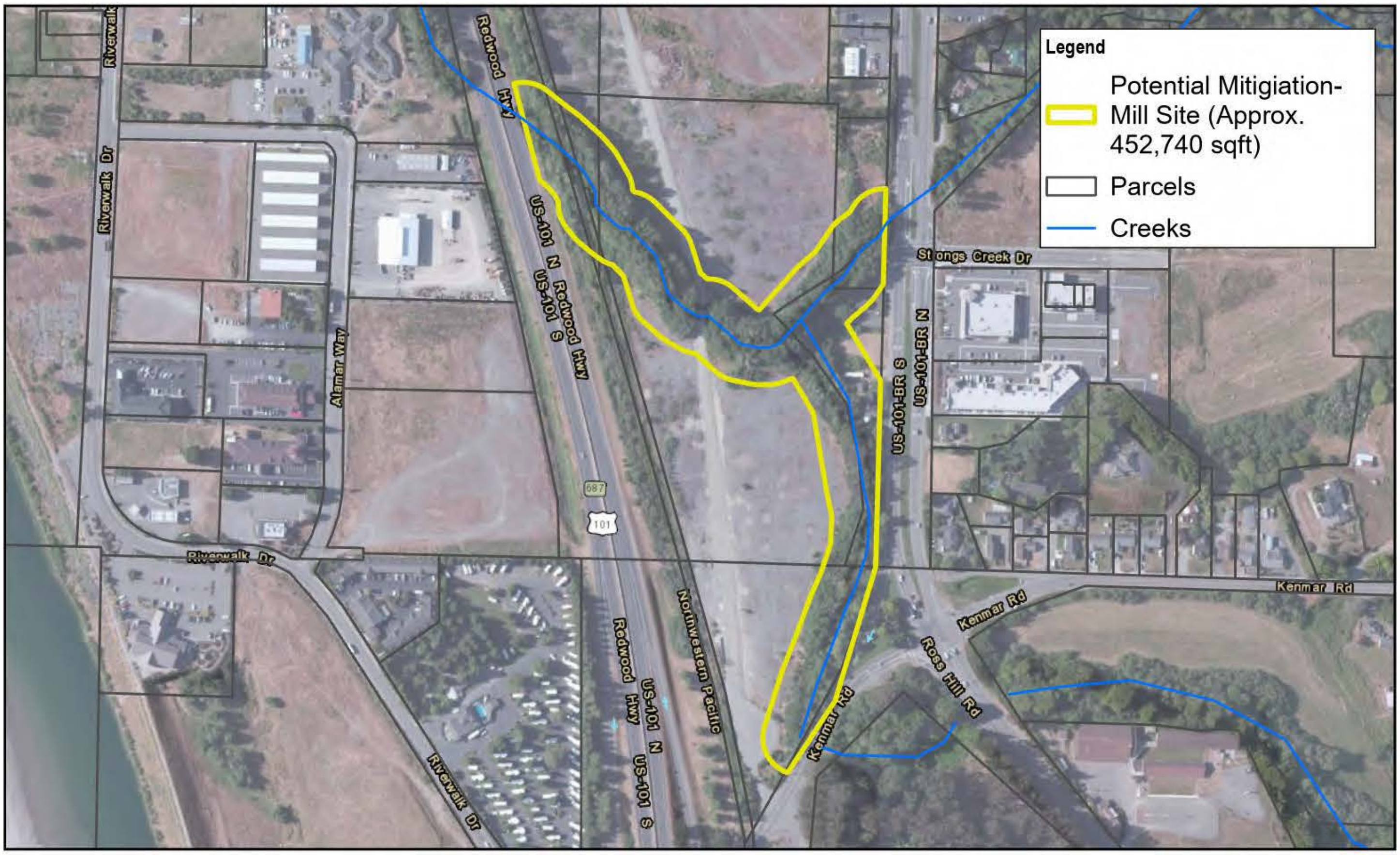
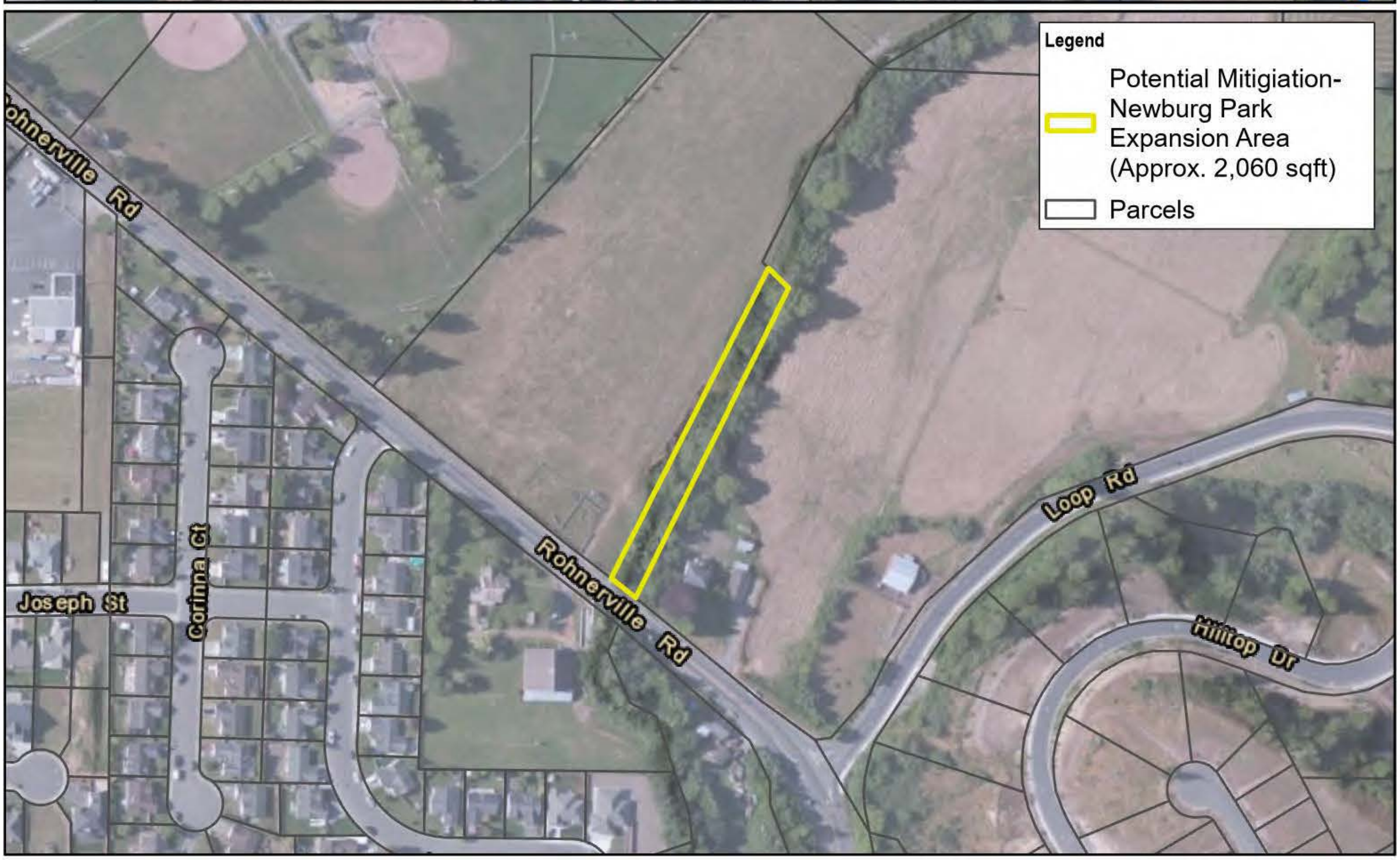
Created by: jlopez4





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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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City of Fortuna
Kenmar Road/ US 101 Interchange

Potential Locations for Off-Site Mitigation

Project No. **11214735**
Revision No. **-**
Date **Nov 2022**

FIGURE 3

\\ghdnet\ghd\US\Eureka\Projects\561\11214735\GIS\Maps\Deliverables\11214735_CEQA\11214735_CEQA.aprx
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Appendix B

Mitigation, Monitoring, and Reporting Program

Mitigation Monitoring and Reporting Program

City of Fortuna - Kenmar Road and US 101 Interchange Project

SCH No. To be assigned

Environmental Protections Actions (EPA) and Mitigation Measures (MM)	Monitoring Responsibility	Monitoring/Reporting Action & Schedule	Verification (Initials/Date)
EPA 1 – Stormwater Pollution Prevention Plan (SWPPP) The Project will obtain coverage under State Water Resources Control Board (Water Board) Construction General Permit associated with construction. The lead agency for construction will submit permit registration documents (notice of intent, risk assessment, site maps, SWPPP, annual fee, and certifications) to the Water Board. The SWPPP will address pollutant sources, best management practices, and other requirements specified in the Order. The SWPPP will include erosion and sediment control measures, and dust control practices to prevent wind erosion, sediment tracking, and dust generation by construction equipment. A Qualified SWPPP Practitioner will oversee implementation of the Project SWPPP, including visual inspections, sampling and analysis, and ensuring overall compliance.	City's contractor, to be verified by a SWPPP practitioner	Performance criteria – North Coast Regional Water Quality Control Board and City standards Reporting actions – As required by the state permit Schedule - During project construction activities, including work and non-work times	
Air Quality			
MM AQ-1: BMPs to Reduce Air Pollution The contractor shall implement the following BMPs during construction: – Disturbed surfaces (e.g., staging areas, soil piles, active graded areas, excavations, and unpaved access roads) shall be watered as needed for dust suppression. – All visible mud or dirt track-out onto adjacent public roads shall be removed using street sweepers at least once per day, or as needed to alleviate dust and debris on the roadway. – All vehicle speeds on unpaved roads shall be limited to 15 miles per hour, unless the unpaved road surface has been treated for dust suppression with water, rock, wood chip mulch, or other dust prevention measures. – All areas to be paved shall be completed as soon as practical. – Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes.	City and City's contractor	Performance criteria – North Coast Unified Air Quality Management District standards Reporting actions – Verify requirements are included in final plans and specifications Schedule – During construction, check jobsite compliance as necessary	

Environmental Protections Actions (EPA) and Mitigation Measures (MM)	Monitoring Responsibility	Monitoring/Reporting Action & Schedule	Verification (Initials/Date)
Biological Resources			
MM BIO-1: Mitigation Measure BIO-1: Protect Special Status Amphibians and Reptiles No more than one week prior to commencement of ground disturbance within 50 feet of mapped wetlands, riparian habitat associated with Mill Creek, and Sensitive Natural Communities within the Project Area, a qualified biologist shall perform a pre-construction survey and shall relocate any individuals of Northern Red-legged Frog, Yellow-legged Frog, or Western Pond Turtle or egg masses of Northern Red-legged Frog that occur within the work-impact zone to nearby suitable habitat. In the event that a Northern Red-legged Frog, Yellow-legged Frog, or Western Pond Turtle is observed in an active construction zone, the contractor shall halt construction activities in the area where observed and the frogs or turtles shall be moved to a safe location in similar habitat outside of the construction zone.	City and City's biologist and contractor	Performance criteria – California Department of Fish and Wildlife (CDFW) standards Reporting actions – Verify requirements are in final specifications; verify completion and documentation of surveys, if necessary Schedule – Pre-construction and during construction; verify applicable protection measures are implemented	
MM BIO-2: Protect Special Status, Migratory, and Nesting Birds Ground disturbance and vegetation clearing shall be conducted, if possible, during the fall and/or winter months and outside of the avian nesting season (March 15 – August 15) to avoid any direct effects to special status and protected birds. If ground disturbance cannot be confined to work outside of the nesting season, a qualified biologist shall conduct pre-construction surveys within the vicinity of the Project Area, to check for nesting activity of native birds and to evaluate the site for presence of raptors and special status bird species. The biologist shall conduct at minimum a one-day pre-construction survey within the 7-day period prior to vegetation removal and ground-disturbing activities. If ground disturbance and vegetation removal work lapses for seven days or longer during the breeding season, a qualified biologist shall conduct a supplemental avian pre-construction survey before Project work is reinitiated. If active nests are detected within the construction footprint or within the construction buffer established by the Project biologist, the biologist shall flag a buffer around each nest. Construction activities shall avoid nest sites until the biologist determines that the young have fledged, or nesting activity has ceased. If nests are documented outside of the construction (disturbance) footprint, but within the construction buffer, nest buffers will be implemented as needed. In general, the buffer size for common species will be determined on a case-by-case basis in consultation with CDFW. Buffer sizes will take into account factors such as (1) noise and human disturbance levels at the construction site at the time of the survey and the noise and disturbance expected during the construction activity; (2)	City and City's biologist and contractor	Performance criteria – California Department of Fish and Wildlife (CDFW) standards Reporting actions – Verify that protection and avoidance measures are in final specifications; verify completion and documentation of surveys, if necessary Schedule – Pre-construction and during construction; verify applicable disturbance buffers and protection measures are implemented	

Environmental Protections Actions (EPA) and Mitigation Measures (MM)	Monitoring Responsibility	Monitoring/Reporting Action & Schedule	Verification (Initials/Date)
distance and amount of vegetation or other screening between the construction site and the nest; and (3) sensitivity of individual nesting species and behaviors of the nesting birds. If active nests are detected during the survey, the qualified biologist shall monitor all nests at least once per week to determine whether birds are being disturbed. Activities that might, in the opinion of the qualified biologist, disturb nesting activities (e.g., excessive noise), shall be prohibited within the buffer zone until such a determination is made. If signs of disturbance or distress are observed, the qualified biologist shall immediately implement adaptive measures to reduce disturbance. These measures may include, but are not limited to, increasing buffer size, halting disruptive construction activities in the vicinity of the nest until fledging is confirmed or nesting activity has ceased, placement of visual screens or sound dampening structures between the nest and construction activity, reducing speed limits, replacing and updating noisy equipment, queuing trucks to distribute idling noise, locating vehicle access points and loading and shipping facilities away from noise-sensitive receptors, reducing the number of noisy construction activities occurring simultaneously, and/or reorienting and/or relocating construction equipment to minimize noise at noise-sensitive receptors.			
MM BIO-3: Compensatory Mitigation for Sensitive Natural Communities Construction within mapped Sensitive Natural Communities (Shining willow groves) shall be avoided to the greatest extent practicable. If impacts are unavoidable and Shining willow groves are removed or detrimentally impacted, mitigation will occur at a minimum ratio of 1:1. A Mitigation and Monitoring Plan shall be prepared in coordination with State resource agencies. Onsite locations for wetland mitigation shall be prioritized. If suitable locations for onsite mitigation is not sufficiently available, offsite mitigation shall occur at locations identified in Figure 3 The Plan shall be acceptable to State agencies with jurisdiction and include the following elements: proposed mitigation ratios; description and size of the restoration or compensatory area; site preparation and design; plant species; planting design and techniques; maintenance activities; plant storage; irrigation requirements; success criteria; monitoring schedule; and remedial measures. The ratio and conditions of mitigation will be negotiated in consultation with the City and State resource agencies with jurisdiction over sensitive natural communities. The Plan shall be implemented by the City.	City and City's contractor	Performance criteria – California Department of Fish and Wildlife (CDFW) standards Reporting actions – Completion and documentation of surveys, if necessary Schedule – Pre-construction and during construction; verify applicable disturbance buffers and protection measures are implemented	
MM BIO-4: Avoidance and Minimization Measures to Protect Juxtaposed Wetlands The City shall implement the following avoidance and protection measures for Waters of the United States and Waters of the State adjacent to areas of planned disturbance that will not be impacted (filled or excavated) during Project construction:	City and City's contractor	Performance criteria – County, state, and federal standards, consistent with the project's permits Reporting actions – Verify that protection and	

Environmental Protections Actions (EPA) and Mitigation Measures (MM)	Monitoring Responsibility	Monitoring/Reporting Action & Schedule	Verification (Initials/Date)
– The City shall attempt to avoid or minimize impacts to wetlands/waters to the greatest extent feasible in the final design plans. – Adjacent wetlands shall be clearly identified in the construction documents and reviewed by the City prior to issuing for bid to ensure they are clearly marked as equipment exclusion zones during construction. – Suitable perimeter control BMPs, such as silt fences, or straw wattles shall be placed below all construction activities at the edge of surface water features to intercept sediment before it reaches the waterway. These BMPs shall be installed prior to any clearing or grading activities.		avoidance measures are in final specifications Schedule – During construction; check jobsite compliance as necessary	
MM BIO-5: Compensate for Loss of Wetlands and Waters The City shall avoid fill of seasonal wetlands and waters, to the extent feasible. If fill cannot be avoided, the City shall compensate for the loss of seasonal wetland habitat so that there is no net loss in wetlands. The City shall compensate for impacts to identified wetlands through restoration, rehabilitation, and/or creation of wetland at a ratio of no less than 1:1.2. A Mitigation and Monitoring Plan shall be prepared in coordination with the NCRWQB, the USACE, and Humboldt County. Compensation for wetlands shall occur so there is no net loss of wetland habitat at ratios to be determined in consultation with the NCRWQCB. Onsite locations for wetland mitigation shall be prioritized. If suitable locations for onsite mitigation is not sufficiently available, offsite mitigation shall occur at locations identified in Figure 3. The Plan shall be acceptable to the regulatory agencies with jurisdiction over wetlands and waters and include the following elements: proposed mitigation ratios; description and size of the restoration or compensatory area; site preparation and design; plant species; planting design and techniques; maintenance activities; plant storage; irrigation requirements; success criteria; monitoring schedule; and remedial measures. The Plan shall be implemented by the City. The City shall also compensate for impacts to other waters by obtaining required permits from the U.S. Army Corp of Engineers, the North Coast Regional Water Quality Control Board, and Humboldt County shall be received prior to the start of any on-site construction activity. The City shall ensure any additional measures outlined in the permits are implemented.	City and City's biologist and contractor	Performance criteria – City, state, and federal standards, consistent with the project's permits Reporting actions – Verify requirements are in final specifications; verify completion of HMMP Schedule – Pre-construction, during construction, and post-construction; verify applicable compensatory mitigation is implemented; check jobsite compliance as necessary	
Cultural Resources			
MM CR-1: Protect Archaeological or Tribal Cultural Resources during Construction All recommendations resulting from the Extended Phase 1 investigation shall be implemented by the City prior to, during and following construction, as appropriate. The City shall document how Phase 1 each recommendation was implemented by recording the date, action taken, and responsible party.	City and City's archaeologist and contractor, Tribal Cultural Resource Monitor	Performance criteria – City, state, and federal standards Reporting actions – Verify requirements are in final plans and specifications;	

Environmental Protections Actions (EPA) and Mitigation Measures (MM)	Monitoring Responsibility	Monitoring/Reporting Action & Schedule	Verification (Initials/Date)
Prior to the ground-disturbing construction activities (on the first day of work), construction personnel shall receive Cultural Resources Awareness Training to ensure that construction activities are conducted in a manner that is protective of known and unknown cultural resources. The training shall include information on the location and lateral extent of potential nearby cultural resources sites, avoidance of those areas, laws protecting such resources, and procedures for responding to inadvertent discovery situations. Avoidance of known cultural resources sites shall be determined by a professional archaeologist or Native American monitor and include establishing a no-disturbance buffer zone around known resources. Initial ground-disturbing activities near the previously recorded prehistoric resource shall be monitored by a Tribal Cultural Resource Monitor within 1,000 ft. If archaeological remains or potential tribal cultural resources are encountered during initial-ground disturbing activities, all work shall halt within a 50-foot radius of a discovery. Construction personnel shall not collect cultural materials. A qualified professional archaeologist shall be retained to evaluate the find, and the Tribal Cultural Resource Monitor shall be notified. If the find qualifies as a historical resource or unique archaeological resource as defined by CEQA, the archaeologist shall develop appropriate measures to protect the integrity of the resource in coordination with appropriate tribal representatives and ensure that no additional resources are affected. If the find qualifies as a tribal cultural resource as defined by CEQA, the City shall ensure that appropriate actions to protect the resource are taken and that no additional resources are affected.		verify completion of DPR 513 forms, if necessary Schedule – Pre-construction and during construction; verify applicable protection measures are implemented	
MM CR-2: Inadvertent Discovery of Archaeological Material If cultural materials for example: chipped or ground stone, historic debris, building foundations, or bone are discovered during ground-disturbance activities, work shall be stopped within 66 feet of the discovery, per the requirements of CEQA (Revised Guidelines, Title 14 CCR 15064.5 (f)). Work near the archaeological finds shall not resume until a professional archaeologist, who meets the Secretary of the Interior's Standards and Guidelines, has evaluated the materials and offered recommendations for further action. Tribal representatives shall be notified.	City and City's archaeologist and contractor	Performance criteria – City, state, and federal standards Reporting actions – Verify requirements are in final specifications; verify completion of archaeological monitoring; verify completion of noticing as detailed in MM CR-2 upon inadvertent discovery Schedule – During construction; verify completion of archaeological monitoring as detailed in MM CR-2	

Environmental Protections Actions (EPA) and Mitigation Measures (MM)	Monitoring Responsibility	Monitoring/Reporting Action & Schedule	Verification (Initials/Date)
MM CR-3: Inadvertent Discovery of Human Remains If human remains are discovered during project construction, work will stop at the discovery location, within 66 feet, and any nearby area reasonably suspected to overlie adjacent to human remains (PRC, Section 7050.5). The Humboldt County Coroner will be contacted to determine if the cause of death must be investigated. If the Coroner determines that the remains are of Native American origin, it is necessary to comply with State laws relating to the disposition of Native American burials, which fall within the jurisdiction of the NAHC (PRC, Section 5097). The Coroner will contact the NAHC. The descendants or most likely descendants of the deceased will be contacted, and work will not resume until they have made a recommendation to the landowner or the person responsible for the excavation work for means of treatment and disposition, with appropriate dignity, of the human remains and any associated grave goods, as provided in PRC, Section 5097.98.	City and City's archaeologist and contractor	Performance criteria – City, state, and federal standards Reporting actions – Verify inclusion of language in final plans and specifications Schedule – During construction; verify completion of protection measures and notifications if inadvertent discovery	
Geology and Soils			
MM GEO-1: Inadvertent Discovery of Paleontological Resources In the event that fossils are encountered during construction (i.e., bones, teeth, or unusually abundant and well-preserved invertebrates or plants), construction activities shall be diverted away from the discovery within 50 feet of the find, and a professional paleontologist shall be notified to document the discovery as needed, to evaluate the potential resource, and to assess the nature and importance of the find. Based on the scientific value or uniqueness of the find, the paleontologist may record the find and allow work to continue, or recommend salvage and recovery of the material, if it is determined that the find cannot be avoided. The paleontologist shall make recommendations for any necessary treatment that is consistent with currently accepted scientific practices. Any fossils collected from the area shall then be deposited in an accredited and permanent scientific institution where they will be properly curated and preserved.	City and City's contractor	Performance criteria – City, state, and federal standards Reporting actions – Verify inclusion of language in final plans and specifications Schedule – During construction; verify completion of protection measures and notifications if inadvertent discovery	
Hazards and Hazardous Materials			
MM HAZ-1: Inadvertent Discovery of Hazardous Soils A Preliminary Site Investigation (PSI) will be required within the Project Area, including: – Pre-characterization of soil and groundwater for potential CAM 17 Metals, TPHg, TPHd, and VOC impacts will happen prior to the start of construction activities, specifically at locations along the remnant railroad corridor anticipated to be impacted during Project construction activities. – Pre-characterization for ADL in near surface soil will occur prior to initiation of construction activities, specifically at representative locations along the Project Area intersecting with Kenmar Road, Riverwalk Drive, Eel River Road, and US Highway 101 ramps. The ADL pre-	City and City's contractor	Performance criteria – City and state standards Reporting actions – Verify requirements are in final specifications; verify completion of SAP; verify completion of SGMP and SESTP, if applicable	

Environmental Protections Actions (EPA) and Mitigation Measures (MM)	Monitoring Responsibility	Monitoring/Reporting Action & Schedule	Verification (Initials/Date)
characterization sampling will be conducted at discreet locations generally representative of soil conditions anticipated to be impacted during Project construction activities. If construction activities include demolition of concrete infrastructure (bridges, overpasses, box culverts), a hazardous materials assessment will be completed to maintain compliance with National Emission Standard for Hazardous Air Pollutant (NESHAP) as promulged under 40 CFR Part 61 and/or 40 CFR Part 63. If construction activities include dewatering, and if laboratory analysis of pre-construction soil borings indicate elevated total and STLC concentrations of ADL and CAM-17 Metals of 1,000 ppm and 5 mg/L, respectively, pre-construction characterization of groundwater will be required. If sampled soil is found to be impacted by constituents of concern above established Solubility Threshold Limit Concentration (STLC) and/or Toxicity Characteristic Leaching Procedure (TCLP) thresholds applicable to roadway land uses (ADL, CAM-17 Metals, TPHg, TPHd, VOC's, etc.), preparation of a Construction Soil Groundwater Monitoring Plan (SGMP) and/or Lead Compliance Plan be required prior to any construction activities. The Construction SGMP and/or Lead Compliance Plan will proactively plan and manage potentially encountered hazardous materials affected soils throughout the Project Area. The SGMP and/or Lead Compliance Plan will identify protocols that will be utilized to proactively manage potentially impacted soil and groundwater within the Project Area and reduce exposure to site workers. If pre-construction characterization indicates constituent of concern impacts above STLC levels to soil and/or groundwater, it is required that site workers involved in excavation activities be Hazardous Waste Operations and Emergency Response (HAZWOPER) trained (Occupational Safety and Health Administration [OSHA] 1910.120		Schedule – Pre- and during construction; verify requirements are implemented; check jobsite compliance as necessary	
Noise			
MM NOI-1: Reduce Construction Noise Levels The City and its contractor shall implement best management practices to reduce construction noise levels emanating from construction activities and minimize disruption and annoyance at the Riverwalk Drive RV Park. Specific measures that can be feasibly implemented to include, but are not limited to, the following: – Provide advance notice to nearby residents and those within the Riverwalk Drive RV Park within 250 feet prior to starting work, with information regarding anticipated schedule, hours of operation and a project contact person. – Best available noise control practices (including mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) shall be used for equipment and trucks to minimize construction noise impacts.	City and City's contractor	Performance criteria – City standards Reporting actions – Verify requirements are in final specifications; verify completion of noticing as detailed in MM NOI-1 Schedule – Pre- and during construction; verify applicable best management practices are implemented;	

Environmental Protections Actions (EPA) and Mitigation Measures (MM)	Monitoring Responsibility	Monitoring/Reporting Action & Schedule	Verification (Initials/Date)
– Stationary noise sources shall be located as far from sensitive noise receptors as feasible. If they must be located near receptors, adequate muffling (with enclosures where feasible and appropriate) shall be used. Enclosure openings or venting shall face away from sensitive noise receptors. – Schedule work and deliveries to minimize noise-generating activities near the Riverwalk Drive RV Park.		check jobsite compliance as necessary	
Transportation			
MM TR-1: Maintain Emergency Access and Notify Emergency Responders The City shall require contractors to provide adequate emergency access to all properties along the corridor during the construction process. At locations where the access to a nearby property is temporarily blocked, the contractor shall be required to have ready the means necessary to accommodate access by emergency vehicles to such properties, such as plating over excavations. As construction progresses, emergency providers shall be notified in advance of the timing, location, and duration of construction activities and the locations and durations of any temporary lane closures.	City and City's contractor	Performance criteria – City and county standards Reporting actions – Verify requirements are in final specifications; verify completion Schedule – Pre- and during construction; verify jobsite compliance as necessary	

Appendix C

Air Quality Modeling Results

Road Construction Emissions Model, Version 9.0.0

Daily Emission Estimates for -> US 101 Kenmar Interchange

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.68	6.40	6.28	1.87	0.27	1.60	0.57	0.24	0.33	0.02	1,637.43	0.42	0.04	1,659.42
Grading/Excavation	3.55	36.44	36.71	3.11	1.51	1.60	1.62	1.29	0.33	0.10	10,278.04	2.46	0.42	10,464.26
Drainage/Utilities/Sub-Grade	3.03	30.92	28.15	2.74	1.14	1.60	1.37	1.03	0.33	0.07	6,915.11	1.55	0.10	6,984.66
Paving	1.20	17.34	14.06	0.65	0.65	0.00	0.52	0.52	0.00	0.04	4,194.31	0.73	0.28	4,294.62
Maximum (pounds/day)	3.55	36.44	36.71	3.11	1.51	1.60	1.62	1.29	0.33	0.10	10,278.04	2.46	0.42	10,464.26
Total (tons/construction project)	0.54	5.67	5.40	0.49	0.22	0.27	0.25	0.19	0.06	0.01	1,450.23	0.33	0.05	1,473.21

Notes:

Project Start Year ->	2025
Project Length (months) ->	18
Total Project Area (acres) ->	4
Maximum Area Disturbed/Day (acres) ->	0
Water Truck Used? ->	Yes

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	200	40
Grading/Excavation	359	0	540	0	720	40
Drainage/Utilities/Sub-Grade	13	0	30	0	600	40
Paving	0	256	0	390	480	40

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> US 101 Kenmar Interchange

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.01	0.13	0.12	0.04	0.01	0.03	0.01	0.00	0.01	0.00	32.42	0.01	0.00	29.81
Grading/Excavation	0.28	2.89	2.91	0.25	0.12	0.13	0.13	0.10	0.03	0.01	814.02	0.20	0.03	751.85
Drainage/Utilities/Sub-Grade	0.21	2.14	1.95	0.19	0.08	0.11	0.09	0.07	0.02	0.00	479.22	0.11	0.01	439.12
Paving	0.04	0.52	0.42	0.02	0.02	0.00	0.02	0.02	0.00	0.00	124.57	0.02	0.01	115.71
Maximum (tons/phase)	0.28	2.89	2.91	0.25	0.12	0.13	0.13	0.10	0.03	0.01	814.02	0.20	0.03	751.85
Total (tons/construction project)	0.54	5.67	5.40	0.49	0.22	0.27	0.25	0.19	0.06	0.01	1450.23	0.33	0.05	1,336.49

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Appendix D

Visual Impact Assessment

Technical Memorandum

May 17, 2022

To	California Department of Transportation – District 1	**Contact No.**	(916) 918-0626
Copy to	City of Fortuna	**Email**	Lucas.piper@ghd.com
From	Lucas Piper, PLA – Landscape Architect Josh Wolf, PE – Project Manager	**GHD Project No.**	11214735
Project Name	Kenmar Road and Highway 101 Interchange Project		
Subject	Visual Resources Technical Memorandum for the Kenmar Road Highway 101 Interchange Project – Humboldt County CA		

1. Purpose of Scenic Resource Evaluation and Visual Impact Assessment

The purpose of this visual resource technical memorandum is to document potential visual changes anticipated from the Kenmar Road and Highway 101 Interchange Project (Project). Visual changes and associated effects are demonstrated by identifying visual resources in the Project area and measuring the amount and type of change that would occur as a result of the Project.

1.1 Project Location

The Project area is located approximately 1,000 feet east of the Eel River near the southwestern corner of the City of Fortuna. The Project area is approximately 16 acres in size and is primarily comprised of existing Caltrans right-of-way. West of the US 101 right-of-way, the Project is located largely within the existing Humboldt County right-of-way that contains Riverwalk Drive. The Project would include small areas of encroachment into portions of APN 201-152-013 (agricultural field); APN 201-152-015 (an existing 87-space RV park) will be temporarily or permanently occupied by the realigned roadway, and other parcels in the vicinity (Appendix A – Figure 1).

The Project area also includes non-operational railroad tracks and anadromous Mill Creek, which crosses under Kenmar Road. The Project area is located partially within the city limits of Fortuna and partially within unincorporated Humboldt County. Portions of the Project area are located in the Coastal Zone, including Riverwalk Drive and both southbound and northbound lanes of US 101 to the south of the interchange undercrossing. Of the portions of the Project area located within the Coastal Zone, all Project activities are located within the jurisdiction of the Humboldt County Local Coastal Program (Eel River Area Plan). No portions are located within the State retained Coastal Zone jurisdiction.

1.2 Project Description

The Project is intended to improve traffic operation and safety at a key highway interchange in Fortuna, California. Highway 101 serves as the primary regional roadway in Humboldt County and is critically important to the residents and economy of Fortuna. The existing intersection controls, roadway geometry, and the high volumes of local and regional traffic on Kenmar Road result in poor traffic operation at and near the interchange. The proposed Project will replace the existing intersections of US 101 and Kenmar Road at the interchange with two roundabouts, improving traffic, pedestrian, and bicycle operations. The Project also includes modifications to the US 101 on-ramps and off-ramps, relocation of the park and ride facility, lane improvements on Kenmar road, and the realignment of Eel River Drive and Riverwalk Drive (Appendix A – Figure 2). The Project may also include traffic signal and lane improvements on the western Kenmar leg of the Ross Hill Road intersection. In addition to the proposed motor vehicle-related roadway safety improvements, the Project includes a segment of Class I bike path through the Project area in addition to other at-grade pedestrian and bicycle improvements to enhance pedestrian connections and promote regional bicycle network continuity. The Project will simplify and improve navigation and traffic operations on Kenmar Road and Eel River Drive, including the Kenmar Road and US 101 interchange.

1.3 Visual Resource Components

Viewers of the Project include the general public traveling the corridor, including vehicle users, pedestrian, and cyclists. Viewers of the Project also include local residents living adjacent to or near the Project corridor and individuals employed at places of work based in or near the Project corridor. Visual changes may be more impactful to local residents and non-vehicular users than vehicle-based users.

Kenmar Road and US Highway 101 are not classified as All-America Roads in the National Scenic Byway system or as Designated State Scenic Highways. The Project area would be accessed via Kenmar Road, Eel River Drive, Riverwalk Drive, and US 101. No new access roads would need to be constructed to implement the Project. The Eel River is located approximately 0.15 miles west of the Project area can been seen from Highway 101 along most of the length of the Project area. The Eel River has received both state and federal Wild and Scenic River designation. The Project is in both the Local and Appeal Zone jurisdiction of the Coastal Zone and impacts to the coastal visual environment are addressed. Views of coastal resources are considered scenic resources to be protected. Once implemented, the Project would not impair views of the adjacent coastal resources as the proposed interchange improvements are consistent with the current land use of the Project area and as such, there would be a less than significant impact to scenic vistas/resources.

The visual quality of the existing corridor will not be significantly altered by the proposed Project. Views of local landmarks and resources from the Project corridor include Riverwalk RV Park, Eel River, Best Western Country Inn, Fortuna Park and Ride, out of service railroad tracks crossing Kenmar Road, and a mix of open green space and forested areas (see Exhibit1). Views of and access to these local landmarks and resources are not negatively impacted by the proposed Project. Existing roadway drainage patterns would be maintained to the maximum extent practicable. Replacement, extension, or alteration of the Mill Creek at Kenmar Road culvert would not occur. The visual quality of viewsheds from local landmarks will change because of the Project; however, visual quality will not diminish or be inconsistent with the existing visual character of pre-Project viewsheds from local landmarks.

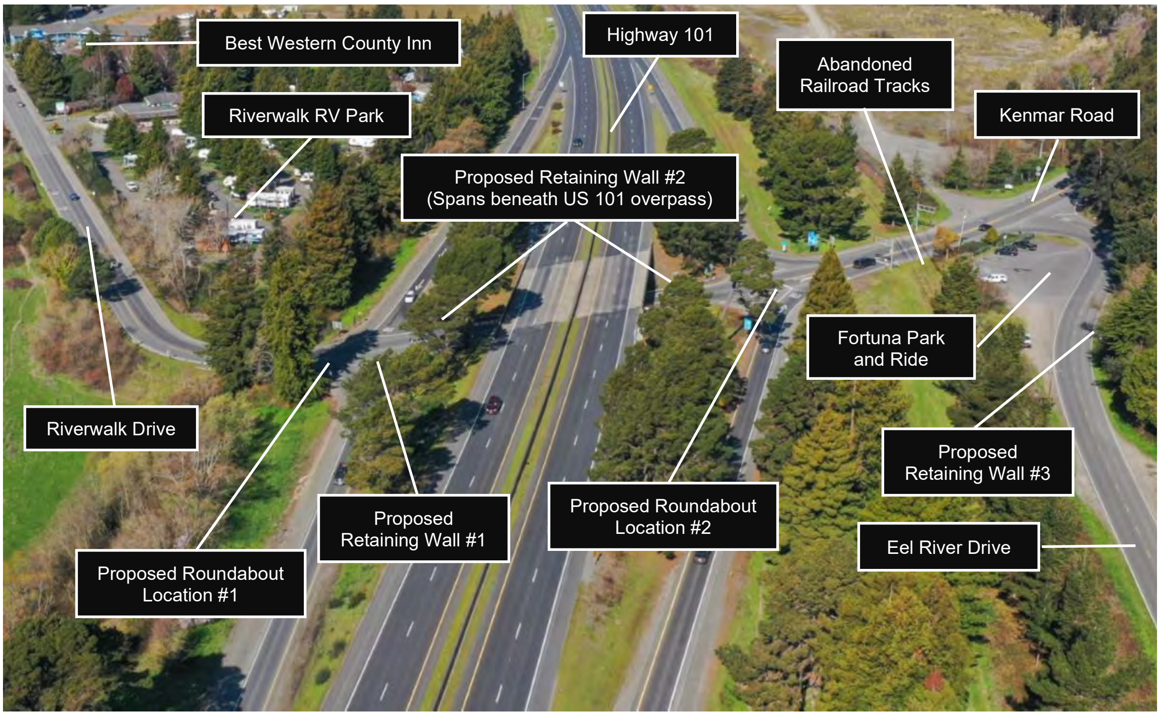


Exhibit 1 – General existing site conditions showing current roadways, striping, and vegetated areas around the Project areas. Aerial view of the Project area looking north from the southern limits of the Project area. Local landmarks, existing roads and resources are shown.

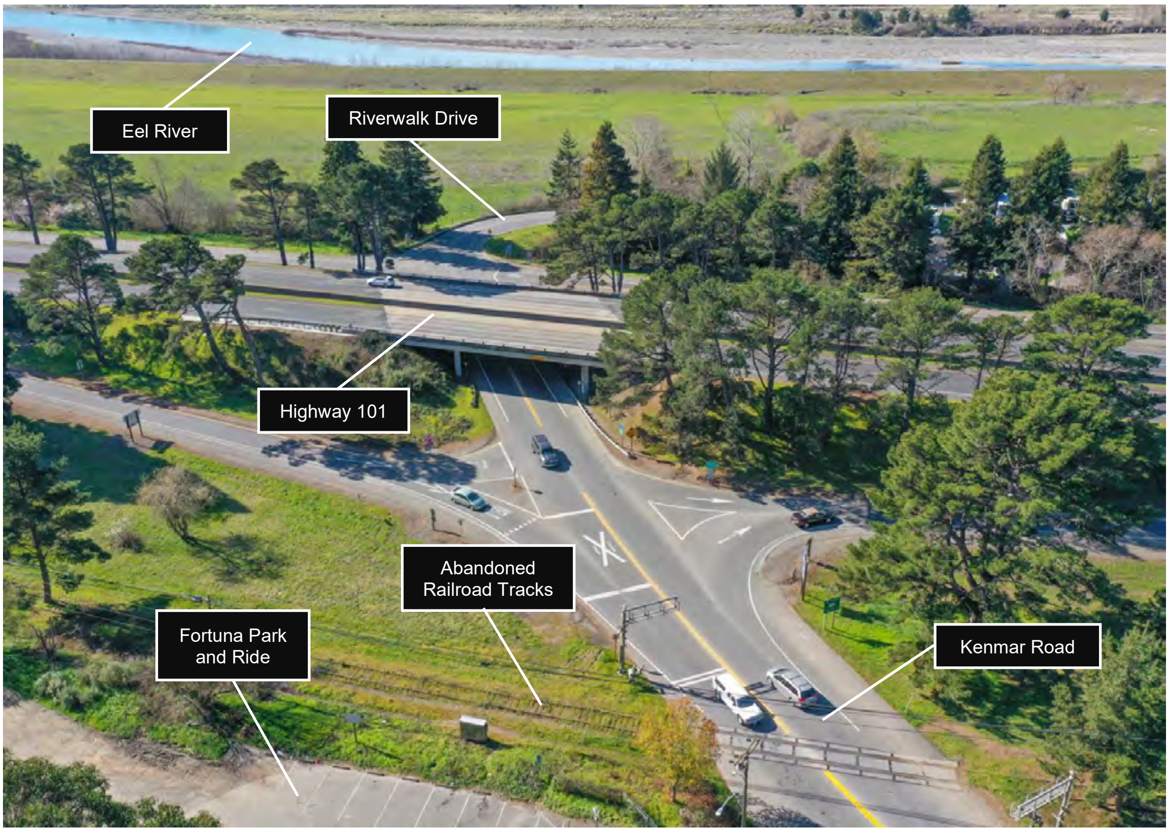


Exhibit 2 – Aerial view of the Project area looking west from the eastern portion of the Project area. Views of the Eel River to the west and abandoned railroad tracks and Fortuna Park and Ride to the east of the Project area.

1.4 Visual Impacts of Proposed Project

The Project would have a less than significant impact to the visual character or quality of public views. A questionnaire to determine Visual Impact Assessment (VIA) level was completed in reference to this Project and the calculated VIA level score result was 14. As defined by Caltrans, this score level is reflective of negligible visual changes to the environment and as a result, only a belief memorandum addressing visual issues is required in lieu of a technical study.

Visual impacts due to Project construction would be short-term and would cease upon Project completion. Vegetated areas temporarily disturbed by construction would be reseeded/restored to pre-construction conditions if needed. Any vegetation incorporated into the Project is anticipated to include low-maintenance planting designed to blend into the surrounding environment without blocking visibility for safe vehicular operation. The disturbed roadside areas would be restored/stabilized with a combination of grass seed (broadcast or hydroseed), straw mulch, rolled erosion control fabric, and, if needed, other plantings/revegetation. If required, revegetation would include replanting. Though the Project will expand the footprint of the interchange, the Project will be designed in to minimize removal of trees/densely forested areas and established vegetation.

The Project would provide enhanced lighting to improve roadway visibility for drivers during night-time hours. Lighting is anticipated to be installed at ramp merges and diverges along the shoulders of US 101 as well as at conflict points in and out of the roundabout and at pedestrian crossings. Lighting will also be provided at approaches to the intersection to improve visibility of the changing roadway features.

Lighting would be designed to protect wildlife and night-time views, including views of the night sky. The Project will be designed to be consistent with the City's design guidelines and the recommendations of the International Dark-Sky Association, which includes standards for fixtures, shielding, wattage, placement, height, and illumination levels. To comply with these requirements, lighting for the Project will be the minimum lumens necessary, directed downward, and shielded. This will ensure lighting is contained within the site and does not cause significant lighting and glare impacts for surrounding land uses.

The existing roadways in the Project area would be rehabilitated by overlaying the existing surface and/or replaced with new pavement. The Project would include required striping and signage to comply with California Manual on Uniform Traffic Control Devices (CA MUTCD) requirements. Existing directional and safety signage would be upgrade and replaced to reflect new traffic flow patterns resulting from the roundabouts. The visual character of the proposed Project will be compatible with the existing visual character of the corridor and impacts to the site or quality of public views are not anticipated.

1.4.1 Roundabouts and Road Realignments

The Project includes proposed roundabouts on either side of US 101, which will expand and reconfigure the existing northbound and southbound off-ramps and on-ramps. Additionally, Kenmar Road, Eel River Drive, and Riverwalk Drive will be realigned and widened to accommodate the roundabouts as well as pedestrian and bicycle lane improvements. To prevent backup into the roundabout and in support of other operational improvements, the Project may also include traffic signal and lane improvements on the western Kenmar leg of the Ross Hill Road intersection. Recreational views from the Riverwalk RV Park would be temporarily altered due to the realignment of Kenmar Road and Riverwalk Drive to accommodate a new roundabout. New plantings or other visual improvements would be integrated into the Project to minimize significant visual changes.

The Project design will change the character of the interchange; however, these improvements will improve traffic operations and safety of the corridor while also providing opportunity in the roundabouts central islands and off-ramp median areas for greenspace and vegetation.

The opportunity for new greenspace will enhance the visual character of the interchange while maintaining composition and unity of the site as well as providing safety improvements to better manage the levels of vehicular traffic. Center medians on Kenmar Road east of the northbound roundabout and Eel River Drive would also serve as pedestrian refuge islands and provide connectivity with new crosswalks. Furthermore, the proposed at-grade pedestrian improvements and installation of a Class I bike path through the Project area will enhance multi-modal connectivity, thus increasing accessibility for the public while improving the visual appearance of the interchange.

1.4.2 Fortuna Park and Ride Reconfiguration

The existing Fortuna Park and Ride would be reconfigured, resurfaced and restriped. The overall footprint of the facility would be similar in size to the existing footprint. As a result of contemporary Caltrans design standards for parking and striping, the number of spaces would reduce from the existing 18 spaces to 15 spaces, including two accessible parking stalls. However, three additional parallel parking stalls are located across from Eel River Drive to bring the total parking stalls back to 18. Crosswalks would extend from the Fortuna Park and Ride across both Eel River Drive and Kenmar Road. The Park and Ride would provide parking for nearby trail access and could accommodate a public bus stop in the future. A shared use path and vegetated buffer would separate the Fortuna Park and Ride from Kenmar Road and Eel River Drive.

Visual impacts of the proposed Project would be temporary during construction and upon completion of the Project, the overall aesthetic and visual quality and continuity of the Fortuna Park and Ride would be enhanced due to enhanced landscaping and improved pedestrian and recreational access around the interchange and to nearby trails. The repaved and restriped parking lot will provide safe and convenient parking and access for vehicles while maintaining consistency with the existing rural visual character of the existing interchange area. Finally, the reconfigured Fortuna Park and Ride will not impede views of or diminish the visual character of nearby landmarks or natural resources.

1.4.3 Pedestrian, Bicycle Lane, and Roadway Improvements

New shared use paths, and curb ramps would be constructed on the north side of Kenmar Road, providing improved pedestrian and bicycle safety and enhanced connectivity to the opposite side of US 101. Beneath the underpass, a retaining wall (RW #1) will be constructed on the southbound side of Kenmar Road beneath the US 101 overpass to accommodate the entire width of the shared use path. A second retaining wall (RW #2) will be constructed on the northbound side of Kenmar Road just before the US 101 overpass and adjacent to the roundabout at Riverwalk Drive (Proposed Roundabout #1). At the Fortuna Park and Ride a third retaining wall (RW #3) will be constructed along the northbound side of the Eel River Drive, which will span the length of the Fortuna Park and Ride lot (See Exhibit 1). Retaining walls #1 and #2 will be ground anchored walls comprised of soil nailing, which is an economical and feasible technique used to construct retaining walls and stabilize existing slopes. Soil nail retaining walls use steel tendons, which are grouted and drilled into the ground to create a composite wall along a highway embankment. Retaining wall #3 may differ slightly in the structure as it will be retaining a natural hillside rather than a highway embankment. Retaining wall #3 will either consist of a soil nail retaining wall or a cantilevered soldier pile wall, which is a retaining wall constructed without ground anchoring and is embedded into the hillside. Further site assessments need to take place to determine the preferred construction and placement of RW #3. All retaining walls will be colorized and texturized to have similar facings to maintain conformity and enhance the visual aesthetic throughout the interchange corridor.

Through signing and striping, cyclists may also proceed through the interchange by taking the full travelled way. The new shared use paths would connect to new crosswalks across the US 101 southbound offramp and US 101 northbound onramp to allow access across the ramps. The roundabout design will allow for future connectivity to the Great Redwood Trail.

The visual impacts of the proposed Project will be compatible with the existing rural visual character of the corridor. The enhanced pedestrian access will improve public access through this interchange while maintaining the rustic/natural aesthetic of the area and safety improvements to better manage the levels of pedestrian and bicycle traffic. Implementation of the Project will not block or alter the existing views or the rural composition of Project corridor.

1.5 Summary

Review of the Project area and Project plans indicate that the Project would not result in substantial adverse impacts to the visual environment. The Project aims to improve operations, safety, and multi-modal access along the Kenmar Road and US Highway 101 corridor. As described above, the materials, form, line, and texture would be altered along the Project alignment, as a result of the widened roadway, road resurfacing, a paved walkway, sidewalks and curb ramps, crosswalks, roundabouts, lighting, landscaping, signage, a retaining wall, and stormwater drainage and infrastructure improvements. Although the Project will expand the existing interchange footprint, the proposed enhancements are consistent with the current land use, function, visual quality, and character of the area.

As a result of the proposed Project, visual aesthetics of the natural environment would be increased through the improved traffic corridor, pedestrian considerations, and bicycle access around the Kenmar Road and US Highway 101 interchange. Although there will be visual modifications to the interchange as compared to existing conditions, the overall view-scape surrounding the Project area will not be impeded or altered by structures or other Project elements. Furthermore, Project plans include expanding greenspace areas with native vegetation, thus adding to the rural visual composition and character of the interchange area.

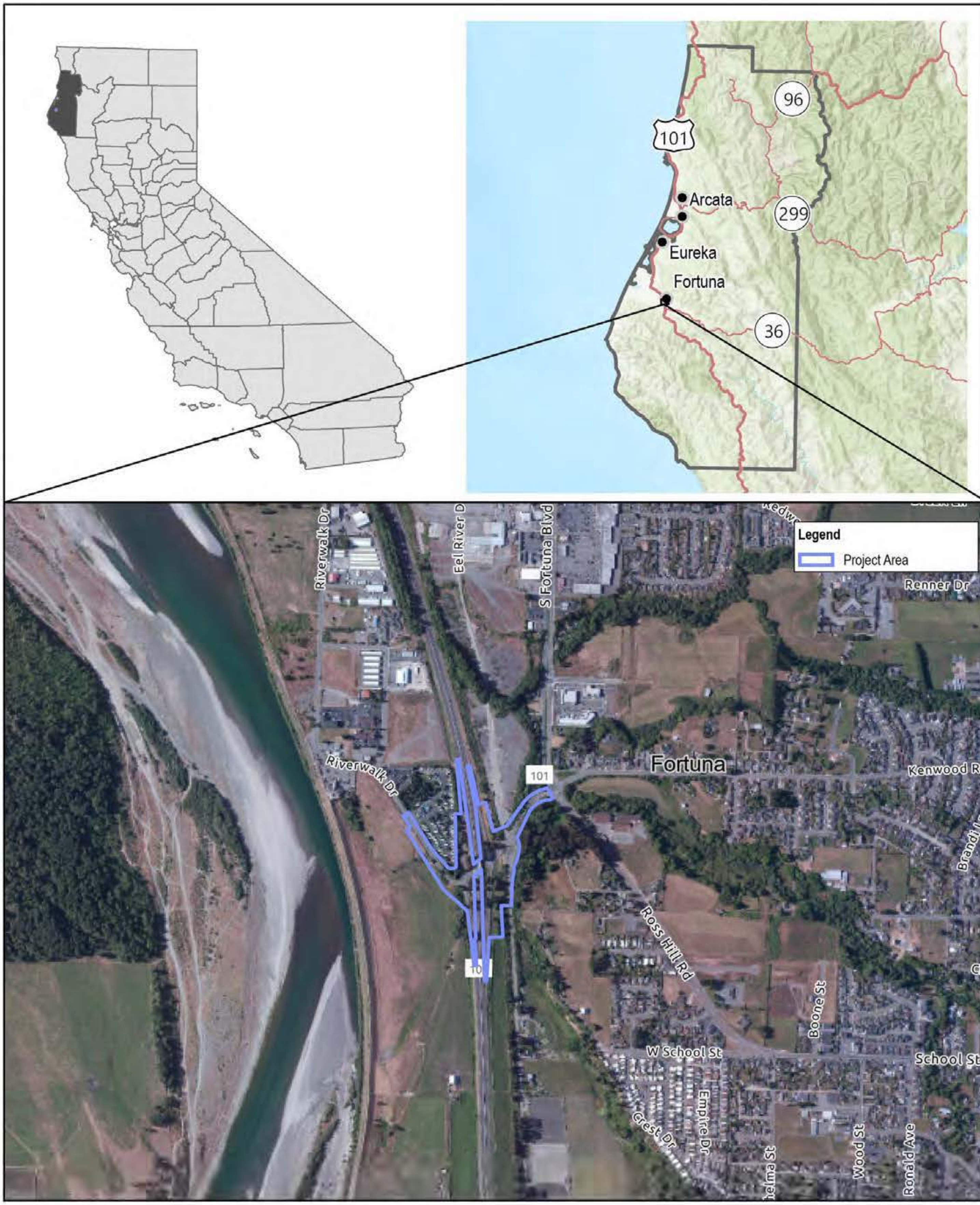
The Project corridor is frequented by recreational viewers, as well as vehicle viewers utilizing the roadway. The proposed Project components would not negatively impact the visual character of the site and would not obstructed views of nearby landmarks or resources. As such, the Project operation is anticipated to have a low impact on viewers in the area and negligible visual changes to the environment are proposed.

Regards,

Lucas Piper
Landscape Architect

Attachments: Appendix A – Graphics

APPENDIX A – GRAPHICS



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City of Fortuna
Kenmar Road/ US 101 Interchange Project

Project No. **11214735**
Revision No. **-**
Date **Apr 2022**

Vicinity Map

FIGURE 1

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Data source: transportation: USGS The National Map: National Transportation Dataset; U.S. Census Bureau – TIGER/Line; U.S. Forest Service. Data Refreshed January, 2022., World Imagery (Clarity): This work is licensed under the Esri Master License Agreement.View Summary | View Terms of UseExport: This layer is not intended to be used to export tiles for offline. Data Collection and Editing: This layer may be used in various ArcGIS apps to support data collection and editing, with the results used internally or shared with others, as described for these use cases., Road Names: Esri Community Maps Contributors,

MARK ARSENAULT CALTRANS DISTRICT 1 NORTH REGION ARCHAEOLOGIST	DATE	SUZANNE TREISS CALTRANS DISTRICT 1 PROJECT LOCAL ASSISTANCE ENGINEER	DATE	BRENDAN BYRD CITY OF FORTUNA DEPUTY CITY ENGINEER	DATE

LEGEND:

AREA OF POTENTIAL EFFECTS

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CITY OF FORTUNA

PROJECT FOOTPRINT

Project No. **11214735**
Comp No. **2132**
Date **SEP 2021**

FIGURE 2

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Appendix E

Natural Environment Study

Kenmar Road and Highway 101 Interchange Project

Natural Environment Study

Kenmar Road and Highway 101 Interchange,

Fortuna, Humboldt County, California

HUM-101-59.2/59.7

CTIPS 1D: 13000003108
EFIS 01 2000 0056

June 2022

Natural Environment Study

Kenmar Road and Highway 101 Interchange,

Fortuna, Humboldt County, California

HUM-101-59.2/59.7

CTIPS 1D: 13000003108
EFIS 01 2000 0056

June 2022

STATE OF CALIFORNIA

Department of Transportation

Humboldt County Department of Public Works

Prepared By: ______________________________ Date: __________

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The public can obtain this document in an alternative format by contacting the City of Fortuna at (707) 725-1469 or use the California Relay Service 1 (800) 735-2929 (Voice) or 711 for further information.

Table of Contents

List of Tables

Acronyms List

API	Area of Potential Impact
BMPs	Best Management Practices
BIOS	Biogeographic Information and Observation System
BSA	Biological Study Area
CC	California Coast
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
Caltrans	California Department of Transportation
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
FGC	California Fish and Game Code

FP	California fully protected
CNPS	California Native Plant Society
CNDDB	California Natural Diversity Database
CRPR	California Rare Plant Ranking
SAL	CDFW Special Animals List
CWA	Clean Water Act
cfs	cubic feet per second
dbh	diameter at breast height
DPS	Distinct Population Segment
ECOS	Environmental Conservation Online System
EPA	Environmental Protection Agency
ESHA	Environmentally Sensitive Habitat Areas
EFH	Essential Fish Habitat
ESU	Evolutionarily Significant Unit
F	Fahrenheit
ESA	federal Endangered Species Act
GPS	Global Positioning System
HCP	Habitat Conservation Plan
HBAP	Humboldt Bay Area Plan
HCPW	Humboldt County Department of Public Works
in	inch/inches
IPaC	Information for Planning and Consultation
LSAA	Lake or Streambed Alteration Agreement
LCP	Local Coastal Program
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MBPA	Migratory Bird Protection Act
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Protection Act
NOAA Fisheries	National Oceanic and Atmospheric Administration Fisheries
NPPA	Native Plant Protection Act
NES	Natural Environment Study
NCRWQCB	North Coast Regional Water Quality Control Board
OHWM	Ordinary High Water
PM	Post Mile

RWQCB	Regional Water Quality Control Board
ROW	right of way
RSP	Rock Slope Protection
SNC	Sensitive Natural Community
SONCC	southern Oregon/northern California coast
SSC	Species of Special Concern
ft^2	square feet
SC	State candidate for listing
SE	State endangered
SR	State Rare
ST	State threatened
SFA	Sustainable Fisheries Act
USACE	U.S. Army Corps of Engineers
EEZ	U.S. Exclusive Economic Zone
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Summary

The Kenmar Road and Highway 101 Interchange Project (hereafter “Project”) is intended to improve traffic operation and safety at a key highway interchange in Fortuna, California. Highway 101 serves as the primary regional roadway in Humboldt County and is critically important to the residents and economy of Fortuna. The existing intersection controls, roadway geometry, and the high volumes of local and regional traffic on Kenmar Road result in poor traffic operation at and near the interchange.

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Six federally threatened, endangered, or candidate wildlife species, including one threatened mammal (Pacific Marten), four threatened bird species (Marbled Murrelet, Northern Spotted Owl, Western Snowy Plover, Yellow-billed Cuckoo), and one candidate insect (Monarch Butterfly) have the potential to occur in the Area of Potential Impact (API). Four fish species and their associated critical habitat were indicated as having potential presence in the Project vicinity (9-quad search area): Green Sturgeon (southern DPS), Coho Salmon (southern Oregon / northern California ESU, Chinook Salmon (Coastal California ESU) and Steelhead (northern California DPS). The proposed Project will have no effect on these species and their associated critical habitat. Additionally, impacts to Essential Fish Habitat (EFH), designated for anadromous fish species in Mill Creek, would not occur, as the Project does not involve in-water work or channel modification.

State listed threatened and endangered species include with the potential to occur in the API include Coho Salmon, Tricolored Blackbird, Marbled Murrelet, Western Yellow-billed Cuckoo, Bald Eagle, Bank Swallow, Northern Spotted Owl, and Pacific Martin. The project would have no impact or a less than significant impact on these state-listed species.

Three special status plant species listed as both federally and state endangered were identified in the U.S. Fish and Wildlife Service (USFWS) official species list and California Natural Diversity Database (CNDDB) RareFind 5 query; Menzies wallflower, Beach layia, and Western lily. The Project would not impact or effect federally and/or state listed special status plants or upland Environmentally Sensitive Habitat Areas (ESHA), as neither was identified within the API or would be likely to occur given habitat conditions.

With the incorporation of standard avoidance and minimization efforts, potential impacts to other state special status wildlife species would also not result.

The Project would result in temporary and permanent impacts to delineated one- and three-parameter wetlands (see accompanying Wetland Delineation Report for additional details; GHD 2021a). The Project would also result in temporary and permanent impacts to shining willow groves (*Salix lasiandra var. lasiandra* Alliance, G4 S3.2), a Sensitive Natural Community (SNC), which are co-located with delineated wetlands.

The area of one-parameter, three-parameter, and SNC impacts will be determined in the future, as the design progresses. Required compensatory mitigation for impacts to wetlands would be determined in coordination with jurisdictional resource agencies at ratios to be no less than 1:1.2, to the satisfaction of each agency (North Coast Regional Water Quality Control Board [NCRWQCB], County of Humboldt, and the U.S. Army Corps of Engineers [USACE]).

Invasive plant species including Himalayan blackberry (*Rubus armeniacus*) and French broom (*Genista monspessulana*) were noted throughout the Project's Biological Study Area (BSA; see accompanying Botanical Report for additional details; GHD 2021b). Removal of these invasive species is recommended for incorporation into the compensatory wetland mitigation that will be required of the Project.

The Project will require permits from the County of Humboldt (Coastal Development Permit), State Water Board (Construction General Permit), NCRWQCB (Clean Water Act [CWA] Section 401 Water Quality Certification), and the USACE (CWA Section 404 Permit).

Beneficial environmental impacts of the Project include neutral or better effect on existing local drainage, flooding, and implementation of stormwater design to contemporary standards, as well as invasive species removal.

Chapter 1: Introduction

Project History

Project Purpose and Need

The Project is intended to improve traffic operation and safety at a key highway interchange in Fortuna, California (**Appendix A, Figure 1 – Vicinity Map**). Highway 101 serves as the primary regional roadway in Humboldt County and is critically important to the residents and economy of Fortuna. The existing intersection controls, roadway geometry, and the high volumes of local and regional traffic on Kenmar Road result in poor traffic operation at and near the interchange.

Project Description

The proposed Project would replace the existing intersections of Highway 101 and Kenmar Road with two roundabouts at the interchange, improving traffic, pedestrian, and bicycle operations (**Appendix A, Figure 2 – Area of Potential Impact**). The Project also includes modifications to the Highway 101 on-ramps and off-ramps and the realignment of Eel River Drive. In addition to the proposed motor vehicle-related roadway safety improvements, the Project includes a segment of Class I bike path through the Project in addition to other at-grade pedestrian and bicycle improvements to enhance pedestrian connections and promote regional bicycle network continuity. The Project would simplify and improve navigation and traffic operations on Kenmar Road and Eel River Drive, including the Kenmar Road and Highway 101 interchange.

The Project is being designed to accommodate the expected volume and diversity of users, and mobility modes. As described in more detail below, the Project includes road resurfacing, a paved walkway, sidewalks and curb ramps, crosswalks, roundabouts, lighting, landscaping, signage, retaining walls, and stormwater drainage and infrastructure improvements. Particular constraints within the Project alignment may warrant adjustments to the standards to address site specific issues. Primary construction activities would include clearing and grubbing to remove vegetation, grading, excavation, paving, installation of Rock Slope Protection (RSP), and hauling. Please see the associated Project Description for additional Project details (GHD 2021c).

The Project is located along an urban portion of Kenmar Road in Fortuna, Humboldt County, California (**Appendix A**, **Figure 1 – Vicinity Map**). The location is included on the Fortuna U.S. Geological Survey (USGS) 7.5” quadrangle. There is adequate available shoulder area for staging areas. Access to the Project and staging areas is via paved roads, and all work will occur within the City’s right of way (ROW).

Area of Potential Impact (API)

The Project area, or area of potential impact (API) for the purposes of this Natural Environment Study (NES), includes all areas where Project-related ground disturbances are anticipated to occur. This encompasses the roadway and the proposed staging area(s), a total area of approximately 16.14 acres (**Appendix A, Figure 2 – Area of Potential Impact**). Approximately 30% the API consists of an existing paved roadway (construction area) and adjacent road shoulder (staging areas).

Cumulative Projects

To evaluate potentially cumulative projects, outreach to the following local and state agencies was completed to identify any recent, current, or planned projects within 0.5 to 1.0 mile of the Project:

- Humboldt County Planning and Building Department (0.5-mile radius)
- Humboldt County Department of Public Works (0.5-mile radius)
- Caltrans (1-mile radius)
- City of Fortuna (0.5-mile radius)

A cumulative project summary is provided in **Table 1**. The Humboldt County Planning and Building Department reported they did not have records of projects within a 0.5-mile radius.

The Humboldt County Department of Public Works Department did not report any applicable projects within a 0.5-mile radius.

Caltrans responded and indicated they were aware of four projects within a 1-mile radius of the Project. The projects are located on and off the highway system.

Additional City of Fortuna projects within a 0.5-mile radius are included in **Table 1**.

Table 1: Cumulative Projects Summary

Agency	Project	Construction Year	In-Water Work?
Caltrans	Construct Materials Lab	2023	No
Caltrans	Fortuna Median Paving/Fortuna Median Roadside Safety Project	2026	No
Caltrans	Rehabilitate Drainage/HUM-101 Drainage North	2026	No
Caltrans	Fortuna Maintenance Station Crane/Hoist	Not programmed for construction	No
City of Fortuna	Secondary Entry to Old Mill Site	Long-term future	No
City of Fortuna	Expired Approved Subdivision for 39 Homes on 23 acres	Unknown	No
City of Fortuna	Generator Repair Shop in Commercial Zone	TBD, Building Permit Pending	No
City of Fortuna	Brewery Expansion in Commercial Zone	Unknown	No

Chapter 2 – Study Methods

Regulatory Requirements

Federal Jurisdiction

Endangered Species Act (ESA)

The ESA of 1973 (16 USC 1531 et seq.) establishes a national policy that all federal departments and agencies provide for the conservation of threatened and endangered species and their ecosystems. The Secretary of the Interior and the Secretary of Commerce are designated in the ESA as responsible for: (1) maintaining a list of species likely to become endangered within the foreseeable future throughout all or a significant portion of their range (threatened) and that are currently in danger of extinction throughout all or a significant portion of their range (endangered); (2) carrying out programs for the conservation of these species; and (3) rendering opinions regarding the impact of proposed federal actions on listed species. The ESA also outlines what constitutes unlawful taking, importation, sale, and possession of listed species and specifies civil and criminal penalties for unlawful activities.

Pursuant to the requirements of the ESA, an agency reviewing a proposed Project within its jurisdiction must determine whether any federally-listed or proposed species may be present in the Project region, and whether the proposed Project would result in a “take” of such species. The ESA prohibits “take” of a single threatened and endangered species except under certain circumstances and only with authorization from the U.S. Fish and Wildlife Service (USFWS) or the National Oceanic and Atmospheric Administration (NOAA) Fisheries through a permit under Section 7 (for federal entities or federal actions) or 10(a) (for non-federal entities) of the Act. “Take” under the ESA includes activities such as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” USFWS regulations define harm to include “significant habitat modification or degradation.” On June 29, 1995, a U.S. Supreme Court ruling further defined harm to include habitat modification “…where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.”

In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under the ESA, or result in the destruction or adverse modification of critical habitat for such species (16 USC 1536[3][4]). If it is determined that a project may result in the "take" of a federally-listed species, consultation would be required under Section 7 or Section 10 of the ESA.

Critical habitat is defined by the ESA as a specific geographic area containing features essential for the conservation of an endangered or threatened species. Under Section 7 of the ESA, critical habitat should be evaluated if designated for federally-listed species that may be present in a project’s Action Area (federally designated term for a BSA).

Habitat Conservation Plans (HCPs)

Conservation plans were incorporated into the ESA in 1982 (sections 10(a)(1)(B) and 10(a)(2)(A) of the ESA, as amended) to create a pathway for take exemptions under the Act for federal and non-federal entities (previously prohibited under Section 9 of the Act). HCPs are planning documents that provide measures to minimize or mitigate Project impacts to listed or candidate species (as well as eagles, following 2011 guidance) at an ecosystem versus single-species level. An HCP provides a degree of assurance for private entities that measures agreed upon in the HCP by federal regulators and the entity would be upheld and not altered for the lifespan of the document, and no additional obligations (financial, land use, or other) would be required at a later date with respect to the species covered in the HCP (referred to as the “No Surprises Rule”; 63 FR 8859). Requirements for issuance of an HCP require that all take is incidental, that take would be minimized and mitigated to the maximum extent practical, that adequate funds are available to implement the plan, and that the incidental take would not appreciably reduce the survival and recovery potential of the species, among others. HCPs also must comply with the Five Point Policy (65 FR 35242) that requires the incorporation of biological goals and objectives for each species in the document, adaptive management, monitoring, a set time frame for implementation, and public participation through the National Environmental Protection Act (NEPA) process.

The Project does not overlap any HCPs (Data Basin 2021a). The nearest HCP covers Humboldt Redwood Company property industrial timberlands and is located several miles northwest of the API (USFWS 2015).

Clean Water Act (CWA)

The CWA of 1977 as amended establishes the basic structure for regulating discharges of pollutants into waters of the U.S. It gives the U.S. Environmental Protection Agency (EPA) the authority to implement pollution control programs, including setting wastewater standards for industry and water quality standards for contaminants in surface waters. The CWA makes it unlawful for any person to discharge any pollutant from a point source into navigable waters, without a permit under its provisions.

Discharge of fill material into “waters of the U.S.,” including wetlands, is regulated by the USACE under Section 404 of the CWA (33 USC 1251-1376). USACE regulations implementing Section 404 define “waters of the U.S.” to include intrastate waters (such as lakes, rivers, streams, wetlands, and natural ponds) that the use, degradation, or destruction of could affect interstate or foreign commerce. Wetlands are defined for regulatory purposes as “areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3; 40 CFR 230.3). The placement of structures in “navigable waters of the U.S.” is also regulated by the USACE under Section 10 of the Federal Rivers and Harbors Act (33 USC 401 et seq.). Projects are approved by USACE under standard (i.e., individual) or general (i.e., nationwide, programmatic, or regional) permits. The type of permit is determined by the USACE and based on project parameters.

The Fish and Wildlife Coordination Act requires consultation with the USFWS, NOAA Fisheries, and responsible state wildlife agency for any federally authorized action to control or modify surface waters. Therefore, any Project proposed or permitted by the USACE under the CWA Section 404 must also be reviewed by the federal wildlife agencies and the California Department of Fish and Wildlife (CDFW).

Section 401 of the CWA requires any applicant for a federal license or permit, which involves an activity that may result in a discharge of a pollutant into waters of the U.S., obtain a certification that the discharge will comply with applicable effluent limitations and water quality standards. CWA 401 certifications are issued by Regional Water Quality Control Boards (RWQCBs) under the California Environmental Protection Agency.

Executive Order 11990 – Protection of Wetlands

Executive Order 11990 of 1977 furthers the protection of wetlands under NEPA through avoidance of long- and short-term adverse impacts associated with the destruction or modification of wetlands where practicable. The order requires all federal agencies managing federal lands, sponsoring federal projects, or funding state or local projects to assess the effects of their actions on wetlands. The agencies are required to follow avoidance, mitigation, and preservation procedures. The Presidential Wetland Policy of 1993 and subsequent reaffirmation of the policy in 1995 supports effective protection and restoration of wetlands, while advocating for increased fairness of federal regulatory programs.

Executive Order 13112 – Invasive Species

Executive Order 13112 directs federal agencies to use relevant programs and authorities to:

- Prevent the introduction of invasive species;
- Detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner;
- Monitor invasive species populations accurately and reliably;
- Provide for restoration of native species and habitat conditions in ecosystems that have been invaded;
- Conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species;
- Promote public education on invasive species and the means to address them; and

- Not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, in accordance with guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

Executive Order 11988 (Floodplain Management)

Executive Order 11988 requires federal agencies to avoid the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and avoid direct and indirect support of floodplain development.

Migratory Bird Treaty Act (MBTA)

The MBTA of 1918 (16 USC 703-712) as amended established federal responsibilities for the protection of nearly all species of birds, their eggs, and nests. A migratory bird is defined as any species or family of birds that live, reproduce, or migrate within or across international borders at some point during their annual life cycle. The MBTA prohibits the take, possession, buying, selling, purchasing, or bartering of any migratory bird listed in 50 CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). Only exotic species such as Rock Pigeons (*Columba livia*), House Sparrows (*Passer domesticus*), and European Starlings (*Sturnus vulgaris*) are exempt from protection.

Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA)

The MSFCMA of 1976 (16 U.S.C. 1801 et seq.) as amended provides the federal government with the authority to manage fisheries in the U.S. Exclusive Economic Zone (EEZ) (from state waters which end three nautical miles offshore to a distance of 200 nautical miles). In addition, the Act mandates inter-agency cooperation in achieving protection, conservation, and enhancement of EFH. The Act defines EFH as "Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting the 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 600.10).

EFH relates directly to the physical fish habitat and indirectly to factors that contribute to degradation of this habitat. Important features of EFH that deserve attention are adequate water quality, temperature, food source, water depth, and cover/vegetation. Adverse effects to EFH are considered to be “any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions" (50 CFR 600.10). Federal agencies are required to consult with NOAA Fisheries regarding any actions (may include funding, permitting, or activities) that may adversely impact EFH.

Sustainable Fisheries Act (SFA)

The SFA of 1996 (Public Law 104-107) serves as an amendment to the MSFCMA to "authorize appropriations, to provide for sustainable fisheries, and for other purposes". The SFA includes requirements for describing EFH in Fishery Management Plans (FMP) and also mandates the protection EFH. According to the SFA, "[o]ne of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats. Habitat considerations should receive increased attention for the conservation and management of fishery resources of the United States." This act also mandates the delineation of EFH for all managed species.

State Jurisdiction

Porter-Cologne Water Quality Act

The Porter-Cologne Act provides for statewide coordination of water quality regulations by establishing the California State Water Resources Control Board. The State Board is the statewide authority that oversees nine separate RWQCBs that collectively oversee water quality at regional and local levels. California RWQCBs issue CWA Section 401 Water Quality Certifications for possible pollutant discharges into waters of the U.S. or state. On April 2, 2019 the California State Water Resources Control Board adopted new definitions and procedures for discharges of dredged or fill material to Waters of the State.

California Endangered Species Act (CESA)

The CESA includes provisions for the protection and management of species listed by the State of California as endangered, threatened, or designated as candidates for such listing (California Fish and Game Code [FGC] Sections 2050 through 2085). The CESA generally parallels the main provisions of the ESA and is administered by the CDFW, who maintains a list of state threatened and endangered species as well as candidate species. The CESA prohibits the "take" of any species listed as threatened or endangered unless authorized by the CDFW in the form of an Incidental Take Permit. Under the FGC, "take" is defined as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."

Other State Special Status Species and Communities

The CDFW maintains a list of species of special concern (CDFW 2022). These are broadly defined as species that are of concern to the CDFW because of population declines and restricted distributions, and/or they are associated with habitats that are declining in California. The criteria used to define special status species are described by the CDFW. Impacts to special status plants, animals, and SNCs may be considered significant under the California Environmental Quality Act (CEQA).

State Species of Special Concern (SSC) include those plants and wildlife species that have not been formally listed yet are proposed or may qualify as endangered or threatened. In addition, USFWS Birds of Conservation Concern, and CDFW special status invertebrates are considered special status species by CDFW.

Sensitive Natural Communities (SNCs)

CDFW provides oversight of habitats (i.e., plant communities) listed as Sensitive in the California Natural Diversity Database (CNDDB) and on the California Sensitive Natural Communities List, based on global and state rarity rankings. The natural communities are broken down to alliance and association levels for vegetation types affiliated with ecological sections in California. The alliances on the California Sensitive Natural Communities List coincide with A Manual of California Vegetation (Sawyer et al. 2009, CNPS 2021a). CDFW considers alliances and associations with a state rank of S1 to S3 to be Sensitive. The application of ranking for determination of Sensitive Communities is summarized as follows in **Table 2** (NatureServe 2021):

Table 2: NatureServe Conservation Status Ranks

Name	Calculated Status Rank	Status Description
Score ≤ 1.5	G1, N1, S1	Critically Imperiled
1.5 ≤ Score ≤ 2.5	G2, N2, S2	Imperiled
2.5 ≤ Score ≤ 3.5	G3, N3, S3	Vulnerable
3.5 ≤ Score ≤ 4.5	G4, N4, S4	Apparently Secure
Score > 4.5	G5, N5, S5	Secure

California Fish and Game Code (FGC)

<u>Native Plant Protection Act (NPPA)</u>

The CDFW administers the NPPA (Sections 1900–1913 of the FGC). These sections allow the California Fish and Game Commission to designate endangered and rare plant species and to notify landowners of the presence of such species. Plant species on California Native Plant Society's (CNPS) California Rare Plant Ranking (CRPR) Lists 1 and 2 are considered eligible for state listing as Endangered or Threatened pursuant to the FGC and CDFW has oversite of these special status plant species as a trustee agency. As part of the CEQA process, such species should be considered as they meet the definition of

Threatened or Endangered under Sections 2062 and 2067 of the FGC. CRPR List 3 and 4 plants may warrant protection under CEQA Guidelines 15380 only in special circumstances. CDFW publishes and periodically updates lists of special status species which include, for the most part, the above categories. Additionally, there are 64 plant species designated as “rare” which is a special designation created before plants were rolled into CESA in the 1980s. The CESA and the NPPA required a Project to have a “Scientific, Educational, or Management Permit” from CDFW for activities that would result in “take,” possession, import, or export of state-listed plant species including research, seed banking, reintroduction efforts, habitat restoration, and other activities relating to any plant designated SE (State endangered), ST (State threatened), SR (State rare), or SC (State candidate for listing).

Birds of Prey and Native Nesting Birds

Sections 3503 and 3513 of the FGC prohibits the take, possession, or needless destruction of the nest or eggs of any bird. Subsection 3503.5 specifically prohibits the take, possession, or destruction of any birds in the orders Falconiformes (hawks and eagles) or Strigiformes (owls) and their eggs or nests. These provisions, along with the federal MBTA, essentially serve to protect nesting native birds. Non-native species, including the European Starling, Rock Pigeon, and House Sparrow, are not afforded protection under the MBTA or FGC.

Fully Protected Species

The CDFW enforces the FGC, which provides protection for “fully protected birds” (Section 3511), “fully protected mammals” (Section 4700), “fully protected reptiles and amphibians” (Section 5050), and “fully protected fish” (Section 5515). As fully protected (FP) species, the CDFW cannot authorize any Project or action that would result in “take” of these species, even with an incidental take permit.

Migratory Bird Protection Act (MBPA)

The California MBPA (FGC Section 3513, as amended) was introduced in the California State Assembly 2019 by Assembly Member Ash Kalra and co-sponsored by the National Audubon Society. The text of the Act specifies that it is unlawful to take or possess any migratory nongame bird as designated in the federal MBTA (16 USC 703-712) before January 1, 2017. This upholds the interpretation of the MBTA under Clinton’s Executive Order 13166, where “take” was defined as both “unintentional as well as intentional.” Governor Gavin Newson signed the Act into law on September 27, 2019. The MBPA effectively closes the federal MBTA loophole on incidental take of migratory birds in California.

Regional Jurisdiction

The Project would not be required to obtain a Humboldt County Grading Permit.

Humboldt County Local Coastal Program

The API is partially within and regulated by the Humboldt Bay Area Plan (HBAP) of the Humboldt County Local Coastal Program (LCP), of which Humboldt County has the primary permitting authority. LCPs can be adopted by local governments and serve as the regulatory equivalent of the Coastal Act. The HBAP extends from the Mad River in the north to Table Bluff/Hookton Road in the south, excluding the cities of Eureka and Arcata, and identifies land uses and standards by which development will be evaluated within the Coastal Zone as defined by the Coastal Act. The HBAP was certified by the California Coastal Commission in 1982.

Studies Required

Biological Study Area (BSA)

The BSA, or the area directly or indirectly impacted by the proposed Project, encompasses a 500-foot radius around the API (construction area and staging area[s]) (**Appendix A, Figure 3 – Biological Study Area**). The BSA encompasses approximately 111.3 acres around the 16.14-acre API. The BSA boundary was determined based on the scope of work and includes all potential areas of impact (physical impacts such as sediment discharge and habitat loss, as well as potential for visual and auditory disturbance) to sensitive biological resources.

Literature Search

The following information or sources pertaining to biological resources within the BSA reviewed during this analysis, includes (but is not limited to):

- Bat Acoustic Monitoring Visualization Tool (BAMVT 2021);
- Bumble Bee Watch - Bumblebee Sightings Map (Bumble Bee Watch 2021);
- CDFW Biogeographic Information and Observation System (BIOS) (CDFW 2021a);
- CDFW CNDDB RareFind5 (CDFW 2021b) (see **Appendix A, Figure 4 – CNDDB Occurrences in 3-mile radius,** and **Appendix B**);
- CDFW Special Animals List (SAL) as of January 2022 (CDFW 2022);
- CNPS Online Inventory of Rare and Endangered Plants (8th Edition) (CNPS 2021b; **Appendix C**);
- eBird Hot Spot Data (eBird 2021);
- iNaturalist Occurrence Data (iNaturalist 2021);

- NOAA Fisheries West Coast Region California Species List (NOAA Fisheries 2020; **Appendix D**);
- NOAA Fisheries EFH mapper (NOAA Fisheries 2021a);
- NOAA Fisheries Critical Habitat-Salmon and Steelhead (NOAA Fisheries 2021b);
- Satellite imagery of the proposed BSA and surrounding area;
- USFWS Information for Planning and Consultation (IPaC) tool (USFWS 2022; **Appendix E**);
- USFWS Environmental Conservation Online System (ECOS; USFWS 2021a);
- USFWS Wetlands Mapper (USFWS 2021b; **Appendix A, Figure 5 – NWI Wetlands**);

Field Reviews

Below follows a summary of field reviews by other organizations in the Project vicinity. An Environmental Constraints Analysis was conducted in 2016 by GHD for the Fortuna Highway 101/Riverwalk Connectivity Planning Study focusing on the 12th Street and Kenmar Road crossings of Highway 101 (GHD 2016).

A stream inventory survey was completed in 2004 by the California Department of Fish and Game (CDFG, now CDFW) along Mill Creek, a tributary to Strongs Creek, from upstream of the BSA at the footbridge approximately 300 feet downstream of Rohnerville Road to 0.2 miles upstream (CDFG 2004). At the time of the survey, the culvert passing underneath Rohnerville Road did not meet CDFG or NOAA Fisheries fish passage criteria (CDFG 2004), and was considered a partial barrier in the California Fish Passage Assessment Database (CDFW 2021b). The survey reach was upstream of the Project and no barriers to fish passage have been documented below the Rohnerville Road culvert that would inhibit fish passage to the API. The Rohnerville Road culvert was replaced in 2020 as part of a separate project and is no longer a barrier to fish passage. Although no biological inventory (i.e., fish sampling) was completed, the CDFG recommended Mill Creek be managed as an anadromous stream.

Additionally, a stream inventory survey was completed in 2009 along Strongs Creek, a tributary to the Eel River, from the confluence with the Eel River to 5.8 miles upstream (CDFG 2009). This survey included a biological inventory which documented juvenile Steelhead (*Oncorhynchus mykiss irideus*). The CDFG recommended Strongs Creek be managed as an anadromous stream.

A field reconnaissance survey of the BSA was conducted by GHD in February 2021 and is described further.

Survey Methods

GHD performed pedestrian reconnaissance surveys of the BSA by walking the full Project footprint (API) as well as adjacent accessible areas. Field investigations included a general inspection to characterize existing habitat with emphasis on areas having the potential to support special status species or sensitive habitats. The survey methods were intended to identify vegetation communities and sensitive habitat, and to determine the potential for sensitive species presence. Where the habitat allowed the surveyor to walk without risk of damaging nests or dens and surrounding vegetation, the survey included a physical search of the area. This included inspecting the ground, shrubs, culverts, holes, etc. for the presence of any wildlife species or special status plants. This reconnaissance-level survey was conducted to identify general wildlife resources, plants, and habitat in the BSA. No protocol-level surveys for special status wildlife were conducted at this time. A formal wetland delineation was conducted. Protocol-level surveys for rare plants were completed (see separate Botanical Report; GHD 2021b).

Personnel and Survey Dates

A reconnaissance-level site visit was conducted by GHD field staff in support of Project development on February 20, 2016 (GHD 2016).

A reconnaissance-level biological field survey was conducted by Kelsey McDonald, GHD Botanist (hereafter surveyor), on February 24, 2021, 09:00-16:00, and March 10, 2021, 09:00-12:00. The weather was mostly clear on February 24, with a few high strata clouds, and the temperature was 45 degrees Fahrenheit (°F) with variable wind (Beaufort scale 2-4). The survey concluded with similar weather conditions, and the temperature at 50°F. The weather on March 10 was overcast, 45 °F with low wind (Beaufort scale 2), with a slight drizzle as the survey ended. The survey included an assessment of the entire API. The surrounding BSA, including adjacent private property, was assessed visually from the Kenmar Road ROW. The surveyor walked throughout the API and within the creek bed.

Wetland delineation field work was completed on February 24, 2021 and April 8, 2021 by Kelsey McDonald and Rose Dana, GHD Botanists.

Seasonally appropriate rare plant and botanical surveys were completed on April 7, 2021 and July 30, 2021, also by Kelsey McDonald and Rose Dana.

Agency Coordination and Professional Contacts

Official Species Lists for the proposed Project were obtained from 1) NOAA Fisheries for the Project quad (Fortuna) and the surrounding eight quads (NFMS 2020; **Appendix D**; December 2020), and 2) the Arcata Fish and Wildlife Office for the API (USFWS 2022; **Appendix E;** March 2022).

Additional agency coordination has yet to occur but is anticipated as part of the permitting phase. Local agency permits from the City of Fortuna will not be required. The following permits are anticipated to be required for the Project:

- County of Humboldt – Coastal Development Permit
- State Water Board – Construction General Permit
- NCRWQCB – CWA Section 401 Water Quality Certification
- USACE – CWA Section 404 Permit
- Caltrans Encroachment Permit
- County of Humboldt Encroachment Permit

Limitations That May Influence Results

The API was defined based on preliminary design and is subject to modification pending final design. Determinations reached in this NES are based on historic surveys and studies, as well as web-based sensitive species database and literature searches. Protocol-level surveys for rare plants have been conducted. However, no protocol-level surveys or studies were conducted to determine the presence or absence of listed or sensitive wildlife species within the BSA; only relatively brief reconnaissance-level site visits were conducted. As the historic studies/surveys may not accurately reflect actual occurrence of species presence in the BSA at this time, conclusions were based on the assumption of presence or non-presence based on existing habitat conditions, and impact and minimization measures have been developed accordingly.

Chapter 3 – Results: Environmental Setting

Description of the Existing Physical and Biological Conditions

Information regarding existing biological and physical conditions presented in this section is based on literature review of known resources within the vicinity of the BSA and on-site investigations.

Study Area

The study area is limited to the BSA as defined above. A description of physical and biological conditions within the BSA and API is provided in the following sections. Representative photographs of the BSA are provided in **Appendix F**.

Physical Conditions

Climate

The Mediterranean climate is relatively mild and cool due to year-around coastal influences, including fog in the summer months. Precipitation primarily falls in the form of rain at this low elevation. Annual rainfall averages 49 inches per year in

Fortuna (BestPlaces 2021). Air temperatures vary, with winter/summer highs in the 50s (degrees Fahrenheit) and high 60s, respectively.

Topographic Conditions

The topography of the BSA is generally composed of a flat road and highway, and relatively flat pasturelands and industrial or residential areas (**Appendix A, Figure 6 – Topography**). The climate is mild and cool due to year-round coastal influences, including fog in the summer months. The elevation at the API is approximately 28 to 72 feet above mean sea level. Steep slopes are present to the southeast of Highway 101.

Hydrological Resources

The Project will take place adjacent to Mill Creek (**Appendix A, Figure 5 – NWI Wetlands**). Mill Creek originates on private timberlands and is tributary to Strong's Creek which drains into the Eel River and ultimately into the Pacific Ocean. Mill Creek is considered a first order stream (CDFG 2004). The majority of the approximately 2.04-mile-long creek is within urban habitat, with a small portion of the headwaters in forested habitats (CDFG 2004). Additionally, the API/BSA is located approximately a quarter mile east of the Eel River.

Biological Conditions

A portion of the BSA located east of Highway 101 includes a steep slope with non-native eucalyptus at the extreme east end, and a parking lot immediately to the west. Continuing west, an inactive rail line runs through a series of mostly open areas of low herbaceous growth with scattered coastal redwoods (*Sequoia sempervirens*) and Monterey pines (*Pinus radiata*). West of Highway 101 and associated ramps, ditches and runoff around the intersection drain through mixed willow thickets along the western slope and collect in ephemerally ponding wet pasture below. Redwoods of moderate size occur near the intersection of Kenmar Road and the Highway 101 ramps. Primary habitat features include several large individual redwoods and eucalyptus trees, the Mill Creek riparian area, willow thickets, and emergent wetlands. While these habitat features are not extensive, they could harbor sensitive wildlife species and have habitat and aesthetic value.

Aquatic resources in the BSA include delineated one- and three-parameter wetlands as well as Mill Creek, an anadromous tributary to the Eel River.

Invasive botanic species present include English ivy (*Hedera helix*), widespread Himalayan blackberry (*Rubus armeniacus*), French broom (*Genista monspessulana*), and pampas grass (*Cortaderia selloana*). Other habitat communities include invasive Himalayan blackberry and French broom thickets, landscaped Monterey pine and coastal redwood, arroyo willow riparian thickets, and shining willow groves (an SNC).

Habitat Connectivity

Wildlife corridors refer to established migration routes commonly used by resident and migratory species for passage from one geographic location to another. Maintaining the continuity of established wildlife corridors is important to: a) sustain species with specific foraging requirements, b) preserve a species' distribution potential, and c) retain diversity among many wildlife populations. Therefore, resource agencies consider wildlife corridors to be a sensitive resource.

No wildlife movement corridors or regional wildlife linkages have been identified within the BSA. The BSA is not located within or near a high-integrity forest habitat "natural landscape block" identified in the California Essential Habitat Connectivity Project (Spencer et al. 2010, Data Basin 2021b).

The Mill Creek riparian area consists of a narrow alder-dominated riparian corridor that runs north under Kenmar Road and along the north side of Kenmar Road. General dispersal of terrestrial wildlife may occur along the Mill Creek corridor through the BSA. This would occur as random movement of species throughout a normal home range. The Mill Creek crossing consists of two box culverts that are suitable for fish passage. Low flows and high sedimentation were observed in Mill Creek during the February 24 and March 10 site visits (see **Appendix F**). Habitats are fragmented by the interchange and other development in the area.

Regional Species and Habitats and Natural Communities of Concern

Habitats and Natural Communities of Special Concern

A list of regionally occurring habitats and natural communities of special concern was compiled based on a review of the CNDDB (**Appendix B**) database records and the February, March, April, and July 2021 site visits. Three locations of SNCs were documented in the Project vicinity (within the 9-quad search, all specifically mapped in the Cannibal Island 7.5" quadrangle; CDFW 2021b). One SNC was documented in the BSA: shining willow groves (GHD 2021b).

A discussion of the potential for habitat occurrence, avoidance and minimization measures, and potential Project-related impacts to habitats and natural communities of special concern is provided in **Chapter 4 – Discussion of Shining Willow Groves SNC**. Mill Creek was identified as an aquatic feature and is discussed in **Chapter 4 – Discussion of Aquatic Habitat, Regulated Waters, and Wetlands**. Habitats and natural communities of special concern potentially occurring or known to occur in the BSA are listed in the following table.

Table 3: Habitats and Natural Communities of Special Concern Potentially Occurring or Known to Occur in the Project BSA

Name	Global Rank[1]	State Rank[2]	General Habitat[3]	Habitat Present/ Absent[4]	Rationale
Arroyo Willow Riparian	G4	S4	Fresh emergent wetland	P	Documented within the BSA during field surveys. Not considered an SNC because SNCs are defined as S1 through S3; excluded from further consideration.
Shining Willow Groves	G4	S3.2	Valley foothill riparian	P	Documented within the BSA during field surveys.

Footnotes:

[1] Global Ranks: G4 = Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors; G3 [Vulnerable] – At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors; G4 [Apparently Secure] – At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors (NatureServe 2020).

[2] State Ranks: S4 = Apparently Secure – Uncommon but not rare in the state; S3 [Vulnerable] – At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors (NatureServe 2020).

[3] Reprinted from CNPS Manual of California Vegetation Online (February 2021; CNPS 2021a).

[4] Habitat Present/Absent: Present [P] - the sensitive natural community is present.

Special Status Plant Species

For the purpose of this study, special status plant species include plants that are (1) listed as threatened or endangered under the CESA or the ESA; (2) designated as rare by the CDFW; (3) state or federal candidate or proposed species for listing as threatened or endangered; and/or (4) have a California Rare Plant Rank of 1 or 2. Additionally, locally significant plants (CEQA Guidelines, § 15125, subd. (c)), or as designated in local or regional plans, policies, or ordinances) are considered special status plant species (CDFW 2018).

A list of regionally occurring special status plant species was compiled based on a review of the USFWS official species list (generated for the API; **Appendix E**; March 2022), CNDDB RareFind 5 (generated for the Fortuna 7.5" quadrangle and surrounding 8 quads; **Appendix B**; February 2021), and CNPS (generated for the Fortuna 7.5" quadrangle and surrounding 8 quads; **Appendix C**; February 2021) database records. Three federally-listed and state-listed plant species (also CNPS-ranked) have been documented in the Project vicinity (9-quad search). Twenty-six CRPR rank 1 and 2 plant species have also been documented.

Habitat requirements for each species were assessed and compared to the habitats within the BSA in order to evaluate the potential for species presence. A discussion of the habitat requirements, potential for species occurrence, avoidance and minimization measures, and potential Project-related impacts to special status plant species is provided in Section 4.2. Special status plant species potentially occurring or known to occur in the BSA are listed in the following table. Effects determinations have been provided for all federally-listed species.

Table 4: Special Status Plant Species Potentially Occurring or Known to Occur in the Project BSA

Common Name	Scientific Name	Status[1]	CRPR[2]	General Habitat[3]	Habitat Present/ Absent[4]	Rationale
pink sand-verbena	*Abronia umbellata var. breviflora*	--/--	1B.1	Coastal dunes	A	No known occurrences in API or BSA. No suitable habitat (e.g., coastal dunes) present in API or BSA; excluded from further consideration.
coastal marsh milk-vetch	*Astragalus pycnostachyus var. pycnostachyus*	--/--	1B.2	Coastal dunes (mesic), Coastal scrub, Marshes and swamps (coastal salt, streamsides)	A	No known occurrences in API or BSA. No suitable habitat (e.g., coastal dunes, salt marsh) present in API or BSA; excluded from further consideration.
seaside bittercress	*Cardamine angulata*	--/--	2B.1	North coast coniferous forest, lower montane coniferous forest. Wet areas, streambanks.	HP	Marginal wet areas may occur in the API. See **Chapter 4 – Discussion of Special Status Plants**.
bristle-stalked sedge	*Carex leptalea*	--/--	2B.2	Bogs and fens, Meadows and seeps (mesic), Marshes and swamps	HP	Marginal wet areas may occur in the API. See **Chapter 4 – Discussion of Special Status Plants**.
Lyngbye's sedge	*Carex lyngbyei*	--/--	2B.2	Marshes and swamps (brackish or freshwater)	A	No known occurrences in API or BSA. No suitable habitat (e.g., coastal marshes) present in API or BSA; excluded from further consideration.
Humboldt Bay owl's-clover	*Castilleja ambigua var. humboldtiensis*	--/--	1B.2	Marshes and swamps (coastal salt)	A	No known occurrences in API or BSA. No suitable habitat (e.g., coastal salt marshes) present in API or BSA; excluded from further consideration.

Common Name	Scientific Name	Status[1]	CRPR[2]	General Habitat[3]	Habitat Present/ Absent[4]	Rationale
Oregon coast paintbrush	*Castilleja litoralis*	--/--	2B.2	Coastal bluff scrub, Coastal dunes, Coastal scrub; sandy	A	No known occurrences in API or BSA. No suitable habitat (e.g., sandy coastal bluff and dune habitats) present in API or BSA; excluded from further consideration.
Point Reyes bird's-beak	*Chloropyron maritimum ssp. palustre*	--/--	1B.2	Marshes and swamps (coastal salt)	A	No known occurrences in API or BSA. No suitable habitat (e.g., coastal salt marshes) present in API or BSA; excluded from further consideration.
Whitney's farewell-to-spring	*Clarkia amoena ssp. whitneyi*	--/--	1B.1	Coastal bluff scrub, Coastal scrub	HP	Marginal scrub habitat may occur in the API. See **Chapter 4 – Discussion of Special Status Plants**.
Cascade downingia	*Downingia willamettensis*	--/--	2B.2	Cismontane woodland (lake margins), Valley and foothill grassland (lake margins), Vernal pools	HP	Marginal seasonally wet areas and grasslands may occur in the API. See **Chapter 4 – Discussion of Special Status Plants**.
Menzies wallflower	*Erysimum menziesii*	FE/SE	1B.1	Coastal dunes	A	No known occurrences in API or BSA. No critical habitat has been designated (USFWS 2022). No suitable habitat (e.g., coastal dunes) present in API or BSA; excluded from further consideration. *No effect*.
giant fawn lily	*Erythronium oregonum*	--/--	2B.2	Cismontane woodland, Meadows and seeps; sometimes serpentinite, rocky, openings	HP	Marginal wet meadows, seeps, and woodlands may occur in the API. See **Chapter 4 – Discussion of Special Status Plants**.
coast fawn lily	*Erythronium revolutum*	--/--	2B.2	Bogs and fens, Broadleafed upland forest, North Coast coniferous forest; Mesic, streambanks	HP	Marginal wet and mesic areas may occur in the API. See **Chapter 4 – Discussion of Special Status Plants**.

Common Name	Scientific Name	Status[1]	CRPR[2]	General Habitat[3]	Habitat Present/ Absent[4]	Rationale
minute pocket moss	*Fissidens pauperculus*	--/--	1B.2	North Coast coniferous forest (damp coastal soil)	A	No known occurrences in API or BSA. No suitable habitat (e.g., North Coast coniferous forest) present in API or BSA; excluded from further consideration.
Pacific gilia	*Gilia capitata ssp. pacifica*	--/--	1B.2	Coastal bluff scrub, Chaparral (openings), Coastal prairie, Valley and foothill grassland	HP	Marginal scrub and grassland habitat may occur in the API. See **Chapter 4 – Discussion of Special Status Plants**.
dark-eyed gilia	*Gilia millefoliata*	--/--	1B.2	Coastal dunes	A	No known occurrences in API or BSA. No suitable habitat (e.g., coastal dunes) present in API or BSA; excluded from further consideration.
short-leaved evax	*Hesperevax sparsiflora var. brevifolia*	--/--	1B.2	Coastal bluff scrub (sandy), Coastal dunes, Coastal prairie	HP	Marginal scrub habitat may occur in the API. See **Chapter 4 – Discussion of Special Status Plants**.
glandular western flax	*Hesperolinon adenophyllum*	--/--	1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland; usually serpentinite	A	No known occurrences in API or BSA. No suitable habitat (e.g., serpentine habitat) present in API or BSA; excluded from further consideration.
beach layia	*Layia carnosa*	FE/SE	1B.1	Coastal dunes, Coastal scrub (sandy)	A	No known occurrences in API or BSA. No critical habitat has been designated (USFWS 2022). No suitable habitat (e.g., coastal dunes or scrub) present in API or BSA; excluded from further consideration. *No effect.*
western lily	*Lilium occidentale*	FE/SE	1B.1	Bogs and fens, Coastal bluff scrub, Coastal prairie, Coastal scrub, Marshes and swamps (freshwater), North Coast	A	No known occurrences in API or BSA. No critical habitat has been designated (USFWS 2022). Marginal scrub and wetland habitat may occur in the API but is not expected to support the species.

Common Name	**Scientific Name**	**Status[1]**	**CRPR[2]**	**General Habitat[3]**	**Habitat Present/ Absent[4]**	**Rationale**
				coniferous forest (openings)		*No effect.*
Howell's montia	*Montia howellii*	--/--	2B.2	Meadows and seeps, North Coast coniferous forest, Vernal pools; vernally mesic, sometimes roadsides	HP	Seasonally wet roadsides may occur in the API. See **Chapter 4 – Discussion of Special Status Plants**.
Wolf's evening-primrose	*Oenothera wolfii*	--/--	1B.1	Coastal bluff scrub, Coastal dunes, Coastal prairie, Lower montane coniferous forest; sandy, usually mesic	HP	Marginal scrub and grassland habitat may occur in the API. See **Chapter 4 – Discussion of Special Status Plants**.
seacoast ragwort	*Packera bolanderi var. bolanderi*	--/--	2B.2	Coastal scrub, North Coast coniferous forest; Sometimes roadsides	HP	Marginal scrub and roadside habitat may occur in the API. See **Chapter 4 – Discussion of Special Status Plants**.
white-flowered rein orchid	*Piperia candida*	--/--	1B.2	Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest; sometimes serpentinite	A	No known occurrences within API or BSA. The BSA is largely developed and there is no suitable pristine habitat present in API or BSA; excluded from further consideration.
Oregon polemonium	*Polemonium carneum*	--/--	2B.2	Coastal prairie, Coastal scrub, Lower montane coniferous forest	HP	Marginal scrub and grassland habitat occurs within API and BSA. **Chapter 4 – Discussion of Special Status Plants**.
dwarf alkali grass	*Puccinellia pumila*	--/--	2B.2	Marshes and swamps (coastal salt)	A	No known occurrences in API or BSA. No suitable habitat (e.g., coastal salt marshes) present in API or BSA; excluded from further consideration.

Common Name	Scientific Name	Status[1]	CRPR[2]	General Habitat[3]	Habitat Present/ Absent[4]	Rationale
Siskiyou checkerbloom	*Sidalcea malviflora ssp. patula*	--/--	1B.2	Coastal bluff scrub, Coastal prairie, North Coast coniferous forest; often roadcuts	HP	Scrub and open roadside habitats may occur within the API. See **Chapter 4 – Discussion of Special Status Plants**.
coast checkerbloom	*Sidalcea oregana ssp. eximia*	--/--	1B.2	Lower montane coniferous forest, Meadows and seeps, North Coast coniferous forest	HP	Marginal seeps may occur in API. See **Chapter 4 – Discussion of Special Status Plants**.
Hitchcock's blue-eyed grass	*Sisyrinchium hitchcockii*	--/--	1B.1	Cismontane woodland (openings), Valley and foothill grassland	HP	Marginal habitat (e.g., grasslands and openings) may occur in API. See **Chapter 4 – Discussion of Special Status Plants**.
western sand-spurrey	*Spergularia canadensis var. occidentalis*	--/--	2B.1	Marshes and swamps (coastal salt)	A	No known occurrences in API or BSA. No suitable habitat (e.g., coastal salt marshes) present in API or BSA; excluded from further consideration.

Footnotes:

[1] Status: FE = Federal Endangered; SE = State Endangered.

[2] California Rare Plant Ranking: 1A = Plants presumed extinct in California; 1B = Plants rare, threatened or endangered in California and elsewhere; 2 = Plants rare, threatened, or endangered in California, but more common elsewhere; Threat Code extensions and their meanings:" .1 - Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat); .2 – Moderately threatened in California (20-80% of occurrences threatened / moderate degree and immediacy of threat); .3 – Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)" (CNPS 2021).

[3] General habitat column information reprinted from CNDDB (February 2021; CDFW 2021c).
[4] Habitat Present/Absent: Absent [A] - no habitat present and no further work needed. Habitat Present [HP] -habitat is or may be present. The species may be present. Present [P] - the species is present.

Special Status Invertebrate Species

Special status invertebrate species include species that are (1) listed as threatened or endangered under the CESA or the ESA; (2) proposed for federal listing as threatened or endangered; (3) state or federal candidates for listing as threatened or endangered; and/or (4) identified by the CDFW as SSC, California FP species, or species on their SAL (CDFW 2022).

The USFWS IPaC official species list (generated for the API; **Appendix E**; March 2022) did not identify any federally-listed invertebrate species in the Project vicinity. The CNDDB RareFind 5 (generated for the Fortuna 7.5" quadrangle and surrounding 8 quads; **Appendix B**; February 2021) indicates five special status invertebrate species potentially occurring within the 9-quad search area. A discussion of the habitat requirements, potential for species occurrence, avoidance and minimization measures, and potential Project-related impacts to special status invertebrate species is provided in **Chapter 4 – Discussion of Special Status Invertebrates** of this document. Special status invertebrate species potentially occurring or known to occur in the BSA are listed in the following table.

Table 5 Special Status Invertebrate Species Potentially Occurring or Known to Occur in the Project BSA

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
Mollusks					
California Floater	*Anodonta californiensis*	--/--/SAL	Freshwater lakes and slow-moving streams and rivers. Taxonomy under review by specialists. Generally in shallow water.	HP	No known occurrences within API or BSA or surrounding 5 miles. Marginal habitat present in Mill Creek within API and BSA. See **Chapter 4 – Discussion of Special Status Invertebrates**.
Western Ridged Mussel	*Gonidea angulata*	--/--/SAL	Primarily creeks & rivers & less often lakes. Originally in most of state, now extirpated from Central & Southern Calif.	HP	No known occurrences within API or BSA or surrounding 5 miles. Marginal habitat present in Mill Creek within API and BSA. See **Chapter 4 – Discussion of Special Status Invertebrates**.
Western Pearlshell	*Margaritifera falcata*	--/--/SAL	Aquatic. Prefers lower velocity waters.	HP	No known occurrences within API or BSA or surrounding 5 miles. Marginal habitat present in Mill Creek within API and BSA. See **Chapter 4 – Discussion of Special Status Invertebrates**.
Insects					
Obscure Bumble Bee	*Bombus caliginosus*	--/--/SAL	Coastal areas from Santa Barbara county north to Washington state. Food plant genera include *Baccharis* ssp., *Cirsium* ssp., *Lupinus* ssp., *Lotus* ssp.,	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Invertebrates**

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
			Grindelia ssp., and *Phacelia* ssp.		
Western Bumble Bee	*Bombus occidentalis*	UR/--/SAL	Once common & widespread, species has declined precipitously from central California to southern British Columbia, perhaps from disease.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Invertebrates**
Monarch Butterfly - California overwintering population (pop. 1)		FC/--/SAL	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Invertebrates**

Footnotes:

[1] Status: FC = Federal Candidate; SAL = CDFW Special Animals List; UR = federally under review for listing (CDFW 2021a).

[2] General habitat column information reprinted from CNDDB (February 2021; CDFW 2021c).

[3] Habitat Present/Absent: Absent [A] - no habitat present and no further work needed. Habitat Present [HP] -habitat is or may be present. The species may be present.

Special Status Fish Species

Special status fish species include species that are (1) listed as threatened or endangered under the CESA or the ESA; (2) proposed for federal listing as threatened or endangered; (3) state or federal candidates for listing as threatened or endangered; and/or (4) identified by the CDFW as SSC, California FP species, or species on their SAL.

The USFWS IPaC official species list (generated for the API; **Appendix E**; March 2022), NOAA Fisheries West Coast Region California Species List (generated for the Fortuna 7.5" quadrangle and surrounding 8 quads; **Appendix D**; February 2021), and CNDDB RareFind 5 (generated for the Fortuna 7.5" quadrangle and surrounding 8 quads; **Appendix B**; February 2021) identified six federally-listed species, one federal candidate species, and three state SSC with potential to occur in the 9-quad search area. Mill Creek within the BSA contains requisite aquatic habitat for several special status fish species. See **Chapter 4 – Discussion of Special Status Fish** for general aquatic habitat conservation measures. Special status fish species potentially occurring or known to occur in the BSA are listed in the following table. Effects determinations have been provided for all federally-listed species.

Table 6: Special Status Fish Species Potentially Occurring or Known to Occur in the Project BSA

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
Green Sturgeon	*Acipenser medirostris*	FT/--/SSC	These are the most marine species of sturgeon. Abundance increases northward of Point Conception. Spawns in the Sacramento, Klamath, & Trinity Rivers. Spawns at temps between 8-14 C. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock.	A	No known occurrences within API or BSA. No suitable habitat present (Mill Creek is a small tributary lacking deep pool habitat required by this species); excluded from further consideration. *No effect.* No in-water work or channel modification will occur.
Pacific Lamprey	*Entosphenus tridentatus*	--/--/SSC	Found in Pacific Coast streams north of San Luis Obispo County, however regular runs in Santa Clara River. Size of runs is declining. Swift-current gravel-bottomed areas for spawning with water temps between 12-18 C. Ammocoetes need soft sand or mud.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Fish.**
Tidewater Goby	*Eucyclogobius newberryi*	FE/SE/--	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River. Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels.	A	BSA is located at an inland location. No known occurrences within API or BSA. BSA does not overlap designated critical habitat (USFWS 2020b). No suitable habitat (e.g., brackish water) present in BSA; excluded from further consideration. *No effect.* Estuarine habitat absent in the BSA.

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
Western Brook Lamprey	*Lampetra richardsoni*	--/--/SSC	Aquatic | Freshwater rivers and streams.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Fish.**
Coast Cutthroat Trout	*Oncorhynchus clarkii clarkii*	--/--/SSC	Small coastal streams from the Eel River to the Oregon border. Small, low gradient coastal streams and estuaries. Needs shaded streams with water temperatures <18C, and small gravel for spawning.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Fish.**
Coho Salmon - southern Oregon / northern California ESU	*Oncorhynchus kisutch pop. 2*	FT/ST/--	Federal listing refers to populations between Cape Blanco, Oregon and Punta Gorda, Humboldt County, California. State listing refers to populations between the Oregon border and Punta Gorda, California.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Fish.** *No effect.* No in-water work or channel modification will occur.
Chinook Salmon - California coastal ESU	*Oncorhynchus tshawytscha pop. 17*	FT/--/--	Federal listing refers to wild spawned, coastal, spring & fall runs between Redwood Cr, Humboldt Co & Russian River, Sonoma Co	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Fish.** *No effect.* No in-water work or channel modification will occur.
Steelhead - northern California DPS	*Oncorhynchus mykiss irideus pop. 16*	FT/--/--	Coastal basins from Redwood Creek south to the Gualala River, inclusive. Does not include summer-run steelhead.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Fish.** *No effect.* No in-water work or channel modification will occur.
Longfin Smelt	*Spirinchus thaleichthys*	FC/ST/--	Euryhaline, nektonic & anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column. Prefer salinities of 15-30 ppt, but can be found in completely freshwater to almost pure seawater.	A	*No effect.* Estuarine habitat absent in the BSA.

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
Eulachon	*Thaleichthys pacificus*	FT/--/--	Found in Klamath River, Mad River, Redwood Creek, and in small numbers in Smith River and Humboldt Bay tributaries. Spawn in lower reaches of coastal rivers with moderate water velocities and bottom of pea-sized gravel, sand, and woody debris.	A	The BSA contains requisite foraging habitat within Mill Creek. However, this species is believed to be extirpated south of the Klamath River. This species has no potential to occur in the API or BSA; excluded from further consideration.

Footnotes:

[1] Status: FC = Federal Candidate; FE = Federal Endangered; FE = Federal Threatened; SE = State Endangered; ST = State Threatened; SSC = State Special Status Species.

[2] General habitat column information reprinted from CNDDB (February 2021; CDFW 2021c).

[3] Habitat Present/Absent: Absent [A] - no habitat present and no further work needed. Habitat Present [HP] -habitat is or may be present. The species may be present.

Special Status Amphibian Species

Special status amphibian species include species that are (1) listed as threatened or endangered under the CESA or the ESA; (2) proposed for federal listing as threatened or endangered; (3) state or federal candidates for listing as threatened or endangered; and/or (4) identified by the CDFW as SSC, California FP species, or species on their SAL.

The USFWS IPaC official species list (generated for the API; **Appendix E**; March 2022) did not identify any federally-listed amphibian species in the Project vicinity. The CNDDB RareFind 5 (generated for the Fortuna 7.5" quadrangle and surrounding 8 quads; **Appendix B**; February 2021) indicates there are four special status amphibian species potentially occurring within the 9-quad search area. A discussion of the habitat requirements, potential for species occurrence, avoidance and minimization measures, and potential Project-related impacts to special status amphibian species is provided in **Chapter 4 – Discussion of Special Status Amphibians** of this document. Special status amphibian species potentially occurring or known to occur in the BSA are listed in the following table.

Table 7: Special Status Amphibian Species Potentially Occurring or Known to Occur in the Project BSA

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
Pacific Tailed Frog	*Ascaphus truei*	--/--/SSC	Occurs in montane hardwood-conifer, redwood,	A	No known occurrences within the API or BSA. No

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
			Douglas-fir & ponderosa pine habitats. Restricted to perennial montane streams. Tadpoles require water below 15 degrees C.		suitable habitat (e.g., high-gradient rocky streams) present in BSA; excluded from further consideration.
Northern Red-legged Frog	*Rana aurora*	--/--/SSC	Humid forests, woodlands, grasslands, and streamsides in northwestern California, usually near dense riparian cover. Generally near permanent water, but can be found far from water, in damp woods and meadows, during non-breeding season.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Amphibians.**
Foothill Yellow-legged Frog	*Rana boylii*	--/--/SSC	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Needs at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Amphibians.**
Southern Torrent Salamander	*Rhyacotriton variegatus*	--/--/SSC	Coastal redwood, Douglas-fir, mixed conifer, montane riparian, and montane hardwood-conifer habitats. Old growth forest. Cold, well-shaded, permanent streams and seepages, or within splash zone or on moss-covered rocks within trickling water.	A	No known occurrences within the API or BSA. No suitable habitat (e.g., high-gradient rocky streams) present in BSA; excluded from further consideration.

Footnotes:

[1] Status: SSC = State Species of Special Concern.

[2] General habitat column information reprinted from CNDDB (February 2021; CDFW 2021c).

[3] Habitat Present/Absent: Absent [A] - no habitat present and no further work needed. Habitat Present [HP] -habitat is or may be present. The species may be present.

Special Status Reptile Species

Special status reptile species include species that are (1) listed as threatened or endangered under the CESA or the ESA; (2) proposed for federal listing as threatened or endangered; (3) state or federal candidates for listing as threatened or endangered; and/or (4) identified by the CDFW as SSC, California FP species, or species on their SAL.

The USFWS IPaC official species list (generated for the API; **Appendix E**; March 2022) did not identify any federally-listed invertebrate species in the Project vicinity. The CNDDB RareFind 5 (generated for the Fortuna 7.5” quadrangle and surrounding 8 quads; **Appendix B**; February 2021) indicates one additional special status reptile species potentially occurring within the 9-quad search area. Marine reptiles (i.e., sea turtles) indicated as potentially occurring within the 9-quad search area by the NOAA Fisheries West Coast Region California Species List (generated for the Fortuna 7.5” quadrangle and surrounding 8 quads; **Appendix D**; February 2021) are not included as there is no suitable marine habitat within the API or BSA. A discussion of the habitat requirements, potential for species occurrence, avoidance and minimization measures, and potential Project-related impacts to special status amphibian species is provided in **Chapter 4 – Discussion of Special Status Reptiles** of this document. Special status reptile species potentially occurring or known to occur in the BSA are listed in the following table.

Table 8: Special Status Reptile Species Potentially Occurring or Known to Occur in the Project BSA

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
Western Pond Turtle	*Emys marmorata*	--/--/SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Reptiles.**

Footnotes:

[1] Status: State Species of Special Concern (SSC).

[2] General habitat column information reprinted from CNDDB (February 2021; CDFW 2021c).
[3] Habitat Present/Absent: Habitat Present [HP] -habitat is or may be present. The species may be present.

Special Status Bird Species

Special status bird species include species that are (1) listed as threatened or endangered under the CESA or the ESA; (2) proposed for federal listing as threatened or endangered; (3) state or federal candidates for listing as threatened or endangered; and/or (4) identified by the CDFW as SSC, California FP species, or species on their SAL.

The USFWS IPaC official species list (generated for the API; **Appendix E**; March 2022) identified seven species with potential to occur in the Project vicinity. The CNDDB RareFind 5 (generated for the Fortuna 7.5” quadrangle and surrounding 8 quads **Appendix B**; February 2021) indicates there are 14 additional special status bird species potentially occurring within the 9-quad search area. A discussion of the habitat requirements, potential for species occurrence, avoidance and minimization measures, and potential Project-related impacts to special status bird species is provided in **Chapter 4 – Discussion of Special**

Status Birds of this document. Special status bird species potentially occurring or known to occur in the BSA are listed in the following table.

Table 9: Special Status Bird Species Potentially Occurring or Known to Occur in the Project BSA

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
Cooper's Hawk	*Accipiter cooperii*	--/--/WL	Woodland, chiefly of open, interrupted or marginal type. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Birds**.
Sharp-shinned Hawk	*Accipiter striatus*	--/--/WL	Ponderosa pine, black oak, riparian deciduous, mixed conifer, and Jeffrey pine habitats. Prefers riparian areas. North-facing slopes with plucking perches are critical requirements. Nests usually within 275 ft of water.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Birds**.
Tricolored Blackbird	*Agelaius tricolor*	--/ST/SSC	Highly colonial species, most numerous in Central Valley & vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.	A	Closest known record is of an extirpated colony in Fortuna, within 1 mile of the API (CDFW 2021b). No known occurrences within the API or BSA. Rare seasonal visitor to Humboldt County. No suitable habitat (e.g., open water and emergent vegetation) in the BSA; excluded from further consideration.
Grasshopper Sparrow	*Ammodramus savannarum*	--/--/SSC	Dense grasslands on rolling hills, lowland plains, in valleys and on hillsides on lower mountain slopes. Favors native grasslands with a mix of grasses, forbs and scattered shrubs. Loosely colonial when nesting.	A	No known occurrences within the API or BSA. Rare seasonal visitor to Humboldt County. No suitable habitat (e.g., native grasslands) in the BSA; excluded from further consideration.
Golden Eagle	*Aquila chrysaetos*	--/--/FP, WL	Rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	A	No known occurrences within the API or BSA. No suitable habitat (e.g., grasslands, large trees for nesting, etc.) in the BSA; excluded from further consideration.
Great Egret	*Ardea alba*	--/--/SAL	Colonial nester in large trees. Rookery sites located near marshes, tide-flats,	HP	Suitable habitat present; see **Chapter 4 –**

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
			irrigated pastures, and margins of rivers and lakes.		**Discussion of Special Status Birds**.
Great Blue Heron	*Ardea herodias*	--/--/SAL	Colonial nester in tall trees, cliffsides, and sequestered spots on marshes. Rookery sites in close proximity to foraging areas: marshes, lake margins, tide-flats, rivers and streams, wet meadows.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Birds**.
Marbled Murrelet	*Brachyramphus marmoratus*	FT/SE/--	Feeds near-shore; nests inland along coast from Eureka to Oregon border and from Half Moon Bay to Santa Cruz. Nests in old-growth redwood-dominated forests, up to six miles inland, often in Douglas-fir.	A	Closest record is ~5 miles east of the API on private timberlands (CDFW 2021b). BSA does not overlap designated critical habitat (USFWS 2021a). No suitable nesting habitat (old growth coniferous forest) is present in the API or BSA; excluded from further consideration. *No effect.* Required habitat not present within the BSA.
Mountain Plover	*Charadrius montanus*	--/--/SSC	Short grasslands, freshly plowed fields, newly sprouting grain fields, & sometimes sod farms. Short vegetation, bare ground, and flat topography. Prefers grazed areas and areas with burrowing rodents.	A	No known occurrences within the API or BSA. Rare seasonal visitor to Humboldt County. No suitable habitat present in API or BSA; excluded from further consideration.
Western Snowy Plover	*Charadrius nivosus nivosus*	FT/--/SSC	Sandy beaches, salt pond levees & shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	A	API is located at an inland location approximately 10 miles from the nearest extant recorded population (Humboldt Bay South Spit; CDFW 2021c). BSA does not overlap designated critical habitat (USFWS 2021a). No suitable habitat present in API or BSA; excluded from further consideration. *No effect.* Required habitat not present within the BSA.
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*	FT/SE/WL	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian	A	BSA does not overlap proposed critical habitat (USFWS 2020b).

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
			jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.		*No effect.* Required habitat not present within the BSA.
Yellow Rail	*Coturnicops noveboracensis*	--/--/SSC	Summer resident in eastern Sierra Nevada in Mono County. Freshwater marshlands.	A	Closest known record (rare incidental) was from 2013 (of a cat-caught individual) near the Blue Ox Mill in Eureka, ~16 miles north of the API (eBird 2021). The API and BSA contain requisite habitat (e.g., marsh) for this species. However, Humboldt County is outside the current occupied species' range (most recent occurrences from the San Francisco Bay estuary); excluded from further consideration.
Snowy Egret	*Egretta thula*	--/--/SAL	Colonial nester, with nest sites situated in protected beds of dense tules. Rookery sites situated close to foraging areas: marshes, tidal-flats, streams, wet meadows, and borders of lakes.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Birds**.
Bald Eagle	*Haliaeetus leucocephalus*	FD/SE/FP	Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests within 1 mile of water. Nests in large, old-growth, or dominant live tree with open branches, especially ponderosa pine. Roosts communally in winter.	A	Closest known record is form the Fortuna Riverfront, within 0.5 miles of the API (eBird 2021). No known occurrences within the API or BSA. No suitable nesting habitat (large dbh trees) or foraging habitat (large waterbody) are present in the API or BSA; excluded from further consideration.
Black-crowned Night-heron	*Nycticorax nycticorax*	--/--/SAL	Colonial nester, usually in trees, occasionally in tule patches. Rookery sites located adjacent to foraging areas: lake margins, mud-bordered bays, marshy spots.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Birds**.
Osprey	*Pandion haliaetus*	--/--/WL	Ocean shore, bays, freshwater lakes, and larger streams. Large nests built in tree-tops within 15 miles	A	No known occurrences within the API or BSA. No suitable nesting habitat (large dbh trees) or

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
			of a good fish-producing body of water.		foraging habitat (large waterbody) are present in the API or BSA; excluded from further consideration.
Bank Swallow	*Riparia riparia*	--/ST/--	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Birds**.
Northern Spotted Owl	*Strix occidentalis caurina*	FT/ST/SSC	Old-growth forests or mixed stands of old-growth and mature trees. Occasionally in younger forests with patches of big trees. High, multistory canopy dominated by big trees, many trees with cavities or broken tops, woody debris, and space under canopy.	A	Closest known record is of a nest on private timberlands approximately 1.75 miles east of the API, occupied in 1992 with nearby records as recently as 2003 (CDFW 2021b). No known occurrences within the API or BSA. BSA does not overlap designated critical habitat (USFWS 2021a). The narrow riparian forest within the BSA does not contain suitable habitat (e.g., mature contiguous forest with complex structure) and traffic-generated noise (moderate ambient sounds levels, 71-80 decibels [dB]) along Kenmar Road likely discourages nesting activity adjacent to the API. No suitable habitat present in BSA; excluded from further consideration. *No effect.* Required habitat not present within the BSA.

Footnotes:

[1] Status: FE = Federal Endangered; FD = Federal Delisted; FT = Federal Threatened; SE = State Endangered; ST = State Threatened; FP = CDFW Fully Protected Species; WL = CDFW Watch List Species; SAL = CDFW Special Animals List; SSC = State Species of Special Concern.

[2] General habitat column information reprinted from CNDDB (February 2021; CDFW 2021c).

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
[3] Habitat Present/Absent: Absent [A] - no habitat present and no further work needed. Habitat Present [HP] -habitat is or may be present. The species may be present.					

Special Status Mammal Species

Special status mammal species include species that are (1) listed as threatened or endangered under the CESA or the ESA; (2) proposed for federal listing as threatened or endangered; (3) state or federal candidates for listing as threatened or endangered; and/or (4) identified by the CDFW as SSC, California FP species, or species on their SAL.

The USFWS IPaC official species list (generated for the API; **Appendix E**; March 2022) did not identify any federally-listed amphibian species in the Project vicinity. The CNDDB RareFind 5 (generated for the Fortuna 7.5" quadrangle and surrounding 8 quads; **Appendix B**; February 2021) indicates there are an additional two special status mammal species potentially occurring within the 9-quad search area. Marine mammals indicated as potentially occurring within the 9-quad search area by the NOAA Fisheries West Coast Region California Species List (generated for the Fortuna 7.5" quadrangle and surrounding 8 quads; **Appendix D**; February 2021) are not included as there is no suitable marine habitat within the API or BSA. A discussion of the habitat requirements, potential for species occurrence, avoidance and minimization measures, and potential Project-related impacts to special status mammal species is provided in **Chapter 4 – Discussion of Special Status Mammals** of this document. Special status mammal species potentially occurring or known to occur in the BSA are listed in the following table.

Table 10: Special Status Mammal Species Potentially Occurring or Known to Occur in the Project BSA

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
Pallid Bat	*Antrozous pallidus*	--/--/SSC	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	A	No known occurrence records from API or BSA. Recent sampling efforts in coastal Humboldt County have not detected this species (BAMVT 2020). Species typically occurs in more inland, arid regions, and present is not expected to occur in a coastal, beach environment; this species is excluded from further consideration.
Humboldt Mountain Beaver	*Aplodontia rufa humboldtiana*	--/--/SAL	Coast Range in southwestern Del Norte County and northwestern	A	No known occurrence records from API or BSA. No suitable habitat

Common Name	Scientific Name	Status[1]	General Habitat[2]	Habitat Present/ Absent[3]	Rationale
			Humboldt County. Variety of coastal habitats, including coastal scrub, riparian forests, typically with open canopy and thickly vegetated understory.		(coniferous forest slopes adjacent to suffice water) present in API or BSA; excluded from further consideration.
Sonoma Tree Vole	*Arborimus pomo*	--/--/SSC	North coast fog belt from Oregon border to Somona County. In Douglas-fir, redwood & montane hardwood-conifer forests. Feeds almost exclusively on Douglas-fir needles. Will occasionaly take needles of grand fir, hemlock or spruce.	A	No known occurrence records from API or BSA. No suitable habitat (coniferous forest) present in API or BSA; excluded from further consideration.
Townsend's Big-eared Bat	*Corynorhinus townsendii*	--/--/SSC	Throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Mammals**.
North American Porcupine	*Erethizon dorsatum*	--/--/SAL	Forested habitats in the Sierra Nevada, Cascade, and Coast ranges, with scattered observations from forested areas in the Transverse Ranges. Wide variety of coniferous and mixed woodland habitat.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Mammals**.
Hoary Bat	*Lasiurus cinereus*	--/--/SAL	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Mammals**.
Pacific Marten, Coastal Distinct Population Segment (Humboldt Marten)	*Martes caurina humboldtensis*	FT/SE/SSC	Occurs only in the coastal redwood zone from the Oregon border south to Sonoma County. Associated with late-successional coniferous forests, prefer forests with low, overhead cover.	A	Closest record is historical (1913) near Carlotta, ~5.25 miles east of the API (CDFW 2021c). No known occurrence records from API or BSA. BSA does not overlap proposed critical habitat (USFWS 2021a). There are no recent records of this

Common Name	**Scientific Name**	**Status[1]**	**General Habitat[2]**	**Habitat Present/ Absent[3]**	**Rationale**
					species south of the Klamath River. Current populations are only known from coastal redwood forests in Del Norte and northern Humboldt County (CDFW 2018). No suitable habitat within the BSA; species is excluded from further consideration. *No effect.* South of known range and habitat not present.
Yuma Myotis	*Myotis yumanensis*	--/--/SAL	Optimal habitats are open forests and woodlands with sources of water over which to feed. Distribution is closely tied to bodies of water. Maternity colonies in caves, mines, buildings or crevices.	HP	Suitable habitat present; see **Chapter 4 – Discussion of Special Status Mammals**.
Fisher	*Pekania pennanti*	--/--/SSC	Intermediate to large-tree stages of coniferous forests and deciduous-riparian areas with high percent canopy closure. Uses cavities, snags, logs and rocky areas for cover and denning. Needs large areas of mature, dense forest.	A	No known occurrence records from API or BSA. No suitable habitat present in API or BSA; excluded from further consideration.

Footnotes:

[1] Status: FPT = Federal Proposed Threatened; SE = State Endangered; SSC = State Species of Special Concern; FP = State Fully Protected Species.

[2] General habitat column information reprinted from CNDDB (February 2021; CDFW 2021c).
[3] Habitat Present/Absent: Absent [A] - no habitat present and no further work needed. Habitat Present [HP] -habitat is or may be present. The species may be present. Present [P] - the species is present.

Chapter 4 – Results: Biological Resources, Discussion of Impacts, and Mitigation

Habitats and Natural Communities of Special Concern

Habitats and SNCs of Special Concern include the shining willow groves, and aquatic habitat within the waters of Mill Creek. One-parameter and three-parameter wetlands were also delineated within the API (GHD 2021a). ESHA was also found within the portion of the Project located in the Coastal Zone.

Discussion of Shining Willow Groves SNC

Shining Willow Groves are an SNC based on the state ranking of S3.2 (Sawyer et al. 2009, CDFW 2021b).

Survey Results

The southwestern slope of the API is classified as shining willow groves, a SNC. The shining willow groves are located within the Coastal Zone and mapped as a one-parameter wetland. The arroyo willow (*Salix lasiolepis*)-dominated Mill Creek riparian area is not considered an SNC, but riparian habitats are subject to City of Fortuna Streamside Management Area policies and CDFW jurisdiction. See the accompanying Wetland Delineation Report for details on wetlands and waters within the API (GHD 2021a). Planted redwoods and Monterey pines occurring in the Project Area have not been classified as an SNC. Dense thickets of invasive Himalayan blackberry and French broom along Riverwalk Drive are recommended for removal as mitigation for disturbance to the Shining Willow Grove SNC, Mill Creek riparian area, or other sensitive resources. No critical habitat for federally-listed plants or wildlife occurs within the API or BSA.

The shining willow groves were observed along the western extent of the API at the boundary of the agriculture pasture, concentrated near the intersection of Riverwalk Drive and the Highway 101 southbound on-ramp (**Appendix A, Figure 2 - API**). The shining willow groves contained a diverse mixture of willows at roughly even dominance, with approximately 25% shining willow cover, 22% arroyo willow cover, and 18% Sitka willow (*Salix sitchensis*) cover. Shining willow, arroyo willow, and Sitka willow are all Facultative Wetland (FACW) indicator species, meaning they usually occur in wetlands, but are occasionally found in non-wetlands (Lichvar et al. 2016). Red alder (*Alnus rubra*; Facultative [FAC] = Commonly occurs as either a hydrophyte or nonhydrophyte; Lichvar et al. 2016) and other trees also occurred in the area. The shining willow groves are concentrated along the slope above the wet pasture and around a ditch where stormwater runoff collects from southern Riverwalk Drive and Highway 101. Shining willow, arroyo willow, and Sitka willow dominate the canopy along the edge of the agricultural field up to approximately 475 feet west of the Riverwalk Drive and Highway 101 intersection. Associated understory vegetation included high cover (50%) of invasive Himalayan blackberry (FAC), with poison hemlock (*Conium maculatum*; FAC), spiny sow thistle (*Sonchus asper*; Facultative Upland [FACU] = Occasionally is a hydrophyte, but usually occurs in uplands; Lichvar et al. 2016), creeping buttercup (*Ranunculus repens;* FAC), Kentucky bluegrass (*Poa pratensis;* FAC), and creeping bentgrass (*Agrostis stolonifera;* FAC). The strip of willows occurs on an anthropogenically modified slope in a highly altered landscape and the understory is dominated by invasive Himalayan blackberry. Given that the SNC is dominated by wetland indicator species and within the Coastal Zone, it was mapped as a Coastal Commission one-parameter wetland. See the accompanying Wetland Delineation Report (GHD 2021a) for additional details on wetlands and waters that may be subject to Coastal Commission and state water board jurisdiction.

Project Impacts

Portions of the shining willow groves may be temporarily or permanently impacted as a result of construction on the south side of Riverwalk Drive. The footprint of temporary and permanent impacts will be determined as Project design progresses. Temporary and permanent impacts to shining willow groves will be co-located with equivalent impacts to one- and three-parameter wetlands, discussed below.

Avoidance and Minimization Efforts

Shining willow groves, including tree and branch removal, shall be avoided to the extent practicable. Exclusion fencing will be used to protect shining willow groves outside the construction footprint. The location of exclusion fencing will be noted in the final construction plan set. No rodenticides, pesticides, or herbicides will be used as part of the Project. During construction, vehicles will not enter or be parked on any vegetated areas outside of designated staging areas or the API.

Compensatory Mitigation

Given the shining willow groves are co-located with one- and three-parameter wetlands, compensatory mitigation will be achieved through wetland mitigation required for the Project, as described below.

Cumulative Impacts

SNC mapping for the cumulative projects summarized in **Table 1** is not available; however, each of the considered cumulative projects would also be subject to review under CEQA. As such, any potential impact to SNCs would be addressed through separate requirements for compensatory mitigation. As such, a cumulative impact to SNCs, and specifically the shining willow groves would not result.

Discussion of Aquatic Habitat, Regulated Waters, and Wetlands

Aquatic habitat includes the waters of Mill Creek, an anadromous tributary to Strongs Creek and the Eel River. One- and three-parameter wetlands were also delineated within the API (GHD 2021a).

Survey Results

Mill Creek was not surveyed for the purposes of this report, as no in-water work, culvert modification, and/or channel modification will occur.

A National Wetlands Inventory (NWI) query was completed and a delineation conducted (see **Appendix A, Figure 5 – NWI Wetlands**). One- and three-parameter wetlands are present within the API, as summarized in **Table 11** and shown in **Appendix A, Figure 7 – Wetland Delineation** (GHD 2021a).

Table 11: Wetlands and Other Waters within the API and Potential Jurisdiction

Aquatic Resource Name	**Location (lat/long) of point or center of polygon**	**Aquatic Resource Size (ft^2)**	**Jurisdiction**		
			USACE	**RWQCB**	**CCC**
Wetland 1 (W1T1-W)	40.576114, -124.147984; 40.575926, -124.148328	1,128	No	Likely	N/A
Wetland 2 (W2T1-W)	40.575466, -124.151100	3,425	N/A	N/A	N/A
Wetland 3 (W3T1-W, W3T2-W)	40.575926, -124.148328	13,644	Yes	Likely	Yes
Mill Creek (OHW)	40.576252, -124.14747; 40.576433, -124.147678	1,245	Yes	Yes	N/A
Ditch 1 (OHW)	40.574722, -124.149895	545	Yes	Unlikely	Yes
Ditch 2 (OHW)	40.574286, -124.149774	189	Yes	Unlikely	Yes
Impoundment A	40.574952, -124.148307	2,063	No Jurisdictional Status		
Impoundment B	40.574952, -124.148153	109	No Jurisdictional Status		
Wetland A	40.574369, -124.150027	22,087	No	No	Yes
Wetland B	40.574992, -124.150257	6,672	No	No	Yes
Total Wetlands and Other Waters in API		**51,107ft^2 (1.17 acres)**			

Project Impacts

The Project would not modify the existing Mill Creek culvert. Within Mill Creek, in-water work, channel alteration, or riparian removal would not occur. With the implementation of standard Best Management Practices (BMPs) during construction, water quality impacts or changes to the aquatic habits of Mill Creek would not occur. Temporary dewatering would not occur. Thus, impacts to Mill Creek are not expected.

As detailed in GHD (2021b):

> A total of 14,772 ft^2 (0.34 acres) of three-parameter wetlands occur within the API, but they do not have any surficial hydrological connection with a navigable water, and therefore are not regulated by the USACE (GHD 2021b).
>
> A total of 28,759 ft^2 (0.66 acres) of one-parameter wetlands and 564 ft^2 (0.01 acres) of intermittent waters (Ditch 1 and Ditch 2) occur within the API and Coastal Zone. All one- to three-parameter wetlands and other waters within the Coastal Zone fall within the jurisdiction of Humboldt County, and are appealable to the CCC within the Appeals Jurisdiction.

The Project would impact delineated one- and three-parameter wetlands within the API. Construction access and activities would result in temporary and permanent impacts to wetlands. The area of these impacts would be determined as the design progresses.

Accidental spills and release of hazardous material from construction occurring near aquatic environments could occur, which would result in a potential impact to aquatic habitat and water quality.

Avoidance and Minimization Efforts

Any monitoring, maintenance, and reporting required by the regulatory agencies (i.e., USACE, RWQCB, and Humboldt County) shall be implemented and completed pursuant to established criteria and/or schedules. All measures contained in Project permits or associated with agency approvals would be implemented in a timely manner.

All exposed mineral soil or stockpiles to remain on-site through the wet season shall be protected from erosion associated with wind and rain (e.g., silt fences, straw bales, straw mulch, and tarps shall be deployed as needed). To avoid accidental spills, refueling and equipment maintenance would occur in designated staging and stockpiling areas. Refueling and equipment maintenance would not occur near regulated waters in the API.

Any delineated wetlands within the API to be protected in place would be surrounded by exclusion fencing, the location of which to be included on the final construction plan set. Temporary disturbance to delineated wetlands would be minimized to the greatest extent feasible. Following construction, any wetlands that are temporarily disturbed will be fully restored to their pre-construction condition or better.

Compensatory Mitigation

One- and three-parameter wetlands would be impacted as a result of Project construction. For permanent impacts, compensatory mitigation would occur to the satisfaction of jurisdictional agencies and at a ratio of no less than 1:1.2. If required, compensatory mitigation would occur on-site if possible; however, off-site compensatory mitigation may also be necessary. The final locations of any compensatory mitigation areas would be submitted to jurisdictional agencies for approval as part of the Project's permitting phase.

Cumulative Impacts

Cumulative projects summarized in **Table 1**do not involve potential impacts to Strongs Creek, Mill Creek, or other regulated waters within the watershed sub-basin. Cumulative impacts would not result.

Special Status Plant Species

As discussed in **Chapter 3**, based on the USFWS Official Species List generated for the API (**Appendix E**; March 2022), three federally-listed plant species (also state-listed and CNPS-ranked) are expected to occur within the Project vicinity. However, none of these species are expected to occur within the API or greater BSA given lack of suitable habitat or only marginal habitat in the API, and that they were not observed during two protocol-level botanical surveys conducted in 2021. There are 27 CRPR rank 1 and 2 plant species recorded in the CNDDB and CNPS as known to occur nearby and that the BSA likely provides some level of habitat for: 15 of these species. A discussion of the habitat requirements, potential for species occurrence, survey results, potential Project-related impacts, applicable impact avoidance and minimization measures, compensatory mitigation, and cumulative impacts to special status plants species is provided below.

Discussion of Special Status Plant Species

<u>Seaside Bittercress (2B.2)</u>

Seaside bittercress (*Cardamine angulata*) has a CRPR of 2B.2 which means it is rare or endangered in California and common elsewhere, and the ".2" modifier indicates it is moderately threatened in California. This species is an annual herb in the Mustard family (Brassicaceae) that typically blooms from March through July but may bloom as early as January. This species grows in wet areas in lower montane coniferous forest and North Coast coniferous forest from 50 – 3,000 feet in California (Del Norte, Humboldt, Marin, and Mendocino Counties), Oregon, Washington, and Alaska. Threats may include foot traffic and road maintenance (CNPS 2022).

The closest known record is from 1964, approximately 15 miles north of the API (CDFW 2021b). There are no known occurrences within API or BSA. Marginal wet areas may occur in the API. However, this species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Seaside bittercress.

Bristle-stalked Sedge (2B.2)

Bristle-stalked sedge (*Carex leptalea*) has a CRPR of 2B.2 which means it is rare or endangered in California and common elsewhere, and the ".2" modifier indicates it is moderately threatened in California. This species is a perennial rhizomatous herb in the Sedge family (Cyperaceae) that typically blooms from March through July. This species grows in bogs, fens, meadows, seeps, marshes, and swamps from 0 – 2,296 feet in California (Del Norte, Humboldt, Marin, and Trinity Counties) and most of North America up to Alaska. Major threats include hydrological alterations, logging, and non-native plants (CNPS 2022). This species was last observed in the project vicinity in 1918.

The closest known record is from 1918, approximately 10 miles northwest of the API (CDFW 2021b). There are no known occurrences within API or BSA. Marginal wet areas may occur in the API. However, this species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Bristle-stalked sedge.

Whitney's Farewell-to-Spring (1B.1)

Whitney's farewell-to-spring (*Clarkia amoena ssp. whitneyi*) has a CRPR rank of 1B.1, which means it is rare, threatened or endangered in California and elsewhere, and the ".1" modifier indicates it is seriously endangered in California (CNPS 2021b). It is a California endemic annual herb in the evening primrose family (Onagraceae). It grows at 0 - 33 feet in coastal dunes along the coast of Northern California (Humboldt and Mendocino counties), as well as Oregon and Washington (CNPS 2021b). It typically blooms June through October, and is threatened by invasive plants, and disturbance from off-road vehicles and pedestrian trampling (CNPS 2021b).

The closest known record is from 1918, within 1 mile west of the API (CDFW 2021b). Marginal scrub habitat may occur in the API. However, this species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Whitney's farewell-to-spring.

Cascade Downingia (2B.2)

Cascade downingia (*Downingia willamettensis*) has a CRPR of 2B.2 which means it is rare or endangered in California and common elsewhere, and the ".2" modifier indicates it is moderately threatened in California. This species is an annual herb in the Bellflower family (Campanulaceae) that typically blooms from June through July, but may bloom as late as September (CNPS 2021b). This species grows in lake margins in cismontane woodland, valley and foothill grassland, and vernal pools from 50 – 3,640 ft (15 – 1,100 m) in California (Del Norte, Humboldt, Lake, and Mendocino Counties), Oregon, and Washington (CNPS 2021b).

The closest known record is from 1937, within 0.25 miles of the API (CDFW 2021b). Marginal seasonally wet areas and grasslands may occur in the API. However, this species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Cascade downingia.

Giant Fawn Lily (2B.2)

Giant fawn lily (*Erythronium oreganum*) has a CRPR of 2B.2, which means it is rare or endangered in California and common elsewhere, and the ".2" modifier indicates it is fairly endangered in California. It is perennial bulb in the lily family (Liliaceae) that typically blooms from March to June or July (CNPS 2021b). It is primarily found in rocky woodland openings as well as seeps, meadows, and serpentine areas (Baldwin et al. 2012, CNPS 2021b).

The closest known record is from 1918, approximately 15.75 miles northeast of the API (CDFW 2021b). No known occurrences in API or BSA. Marginal wet meadows, seeps, and woodlands may occur in the API. However, this species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Giant fawn lily.

Coast fawn lily (2B.2)

Coast fawn lily (*Erythronium revolutum*) has a CRPR of 2B.2, which means it is rare or endangered in California and common elsewhere, and the ".2" modifier indicates it is fairly endangered in California. It is a perennial bulb found in bogs and fens, broad leafed upland forest, and North Coast coniferous forest. It typically blooms from March through July at elevations ranging from 400 to 2800 feet. Primary threats to this species include road maintenance and logging (CNPS 2021b).

The closest known record is from 2011, approximately 12.5 miles southeast of the API (CDFW 2021b). There are no known occurrences in API or BSA. Marginal wet and mesic areas may occur in the API. However, this species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Coast fawn lily.

Pacific Gilia (1B.2)

Pacific gilia (*Gilia capitata ssp. pacifica*) is ranked 1B.2 by CNPS, and It is an annual herb most often found in coastal bluff scrub, chaparral, coastal prairie, and valley and foothill grassland. The species thrives in well-drained soil and full sunlight. Pacific gilia is known to California and Oregon, where it typically blooms from April to August, and is found at elevations from near sea level to just over 3,000 feet. The subspecies is threatened by development and recreational activities, and possibly threatened by road construction and logging (CNPS 2021b).

The closest known record is from 1927, within 1 mile of the API (CDFW 2021b). Marginal scrub and grassland habitat may occur in the API. However, this species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Pacific gilia.

Short-leaved Evax (1B.2)

Short-leaved evax (*Hesperevax sparsiflora var. brevifolia*) has a CRPR of 1B.2 which means it is rare or endangered throughout its range, and the ".2" modifier indicates it is moderately threatened in California. This species is an annual herb in the Sunflower family (Asteraceae) that typically blooms from March through June. This species grows in sandy soils in coastal dunes, coastal prairie, and coastal bluff-scrub from 0 – 705 feet in California (Del Norte, Humboldt, Marin, Mendocino, San Francisco, San Mateo, Santa Cruz, and Sonoma Counties), and Oregon. Major threats include development, competition with non-native plants, foot traffic, and recreational activities (CNPS 2021b).

The closest known record is from 2018, approximately 10 miles northwest of the API (CDFW 2021b). There are no known occurrences in API or BSA. Marginal scrub habitat may occur in the API. However, this species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Short-leaved evax.

<u>Howell's montia (CRPR 2B.2)</u>

Howell's montia has a CRPR of 2B.2, which means it is rare or endangered in California and common elsewhere, and the ".2" modifier indicates it is fairly endangered in California. It is an annual herb in the Miner's Lettuce family (Montiaceae). This species grows at 0 - 2740 ft in vernally mesic areas as well as occasionally along roadsides within meadows and seeps, North Coast coniferous forest, and vernal pools. It occurs in Northern California (Humboldt and Trinity counties), Oregon, and Washington. It primarily blooms from March to May, but may bloom early in January and February. Major threats include logging, road construction, road maintenance, vehicles, and competition, trampling, grazing, and potentially non-native plants (CNPS 2021b).

In Humboldt County, this species commonly grows on seasonally wet portions of logging roads or other low-use unpaved roads. There are no records of this species from the Project vicinity. The closest known record is from 2001, approximately 4 miles north of the API (CDFW 2021b). There are no known occurrences in API or BSA. Seasonally wet roadsides may occur in the API. However, this species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Howell's montia.

<u>Wolf's Evening-primrose (1B.1)</u>

Wolf's evening-primrose has a CRPR rank of 1B.1, which means it is rare, threatened or endangered in California and elsewhere, and the ".1" modifier indicates it is seriously endangered in California (CNPS 2021b). It is a perennial herb in the evening primrose family (Onagraceae). The subspecies grows at 10 - 2625 feet in sandy, usually mesic areas of coastal bluff scrub, dunes, and prairie as well as lower montane coniferous forest within California (Del Norte, Humboldt, Mendocino, and Trinity counties), Oregon, and Washington (CNPS 2021b). It typically blooms from May through October and is threatened by disturbance from road maintenance and pedestrian trampling, development, invasive plants, and hybridization with non-native *Oenothera* species (CNPS 2021b).

The closest known record is from 2001, approximately 17.75 miles northwest of the API (CDFW 2021b). There are no known occurrences within the API or BSA. Marginal scrub and grassland habitat may occur in the API. However, this species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Wolf's evening-primrose.

Seacoast Ragwort (2B.2)

Seacoast ragwort has a CRPR rank of 2B.2, which means it is rare or endangered in California and common elsewhere, and the ".2" modifier indicates it is fairly endangered in California (CNPS 2021b). It is perennial rhizomatous herb in the sunflower family (Asteraceae). The varietal grows at 100 – 2,133 feet within coastal scrub and North Coast coniferous forest, as well as occasionally along roadsides in Northern California (Del Norte, Humboldt, and Mendocino counties), Oregon, and Washington (CNPS 2021b). It blooms primarily in May through July but may also be found as early as January through April and as late as August (CNPS 2021b). The species is likely threatened by logging, erosion, and disturbance as a result of road maintenance (CNPS 2021b). Marginal coniferous forest and scrub habitat occur within the API and BSA.

Closest known record is from 1934, approximately 7 miles south of the API (CDFW 2021b). No known occurrences within the API or BSA. Marginal scrub and roadside habitat may occur in the API. However, this species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Seacoast ragwort.

Oregon Polemonium (2B.2)

Oregon polemonium (*Polemonium carneum*) has a CRPR rank of 2B.2, which means it is rare or endangered in California and common elsewhere, and the ".2" modifier indicates it is fairly endangered in California (CNPS 2021b). It is a rare perennial herb in the phlox family (Polemoniaceae) and typically blooms from April to September (CNPS 2021b). It grows primarily in openings in moist to dry habitat (Baldwin et al. 2012). Oregon polemonium can be found in prairie, scrub, and lower montane coniferous forest (CNPS 2021b).

The closest known record is from 1950, within 2 miles of the API (CDFW 2021b). Marginal scrub and grassland habitat occurs within API and BSA. However, this species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Oregon Polemonium.

Siskiyou Checkerbloom (1B.2)

Siskiyou checkerbloom (*Sidalcea malviflora* ssp. *patula*) has a CRPR rank of 1B.2, which means it is rare, threatened or endangered in California and elsewhere, and the ".2" modifier indicates it is fairly endangered in California (CNPS 2021b). It is a rare perennial rhizomatous herb in the mallow family (Malvaceae) that typically blooms from May to August, but may bloom as early as March (CNPS 2021b). It grows in coastal forests, scrub, prairie, bluff, and edge habitats such as road cuts along the North Coast (Baldwin et al. 2012, CNPS 2021b). Potential threats to this plant include road widening, non-native plants, logging, grazing, and trampling (CNPS 2021b).

The closest known record is from 2020, within 1.5 miles of the API. Scrub and open roadside habitats may occur within the API. However, this species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Siskiyou checkerbloom.

Coast Checkerbloom (1B.2)

Coast checkerbloom (*Sidalcea oregana ssp. eximia*) has a CRPR of 1B.2 which means it is rare or endangered throughout its range, and the ".2" modifier indicates it is moderately threatened in California. This species is a perennial herb in the Mallow family (Malvaceae) that typically blooms from June through August (CNPS 2021b). This species grows in meadows and seeps in North Coast coniferous forest and lower montane coniferous forest from 15 – 4,395 feet in California (Del Norte, Humboldt, Siskiyou, and Trinity Counties). This species is known from approximately ten occurrences and was last seen in the project vicinity in 2015.

The closest known record is from 1937, approximately 8.25 miles northwest of the API (CDFW 2021b). There are no known occurrences within API or BSA. Marginal seeps may occur in API. This species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impact would result to Coast checkerbloom.

Hitchcock's Blue-eyed Grass (1B.1)

Hitchcock's blue-eyed grass (*Sisyrinchium hitchcockii*) is a CNPS 1B.1 rare perennial rhizomatous herb found in grassy, vernally moist areas (Baldwin et al. 2012). This species is a perennial rhizomatous herb in the iris family (Iridaceae) that typically blooms in June (CNPS 2021b). It grows in the openings of cismontane woodlands as well as in valley and foothill grasslands (CNPS 2021b). This rare plant, which is primarily differentiated from other similar locally common *Sisyrinchium bellum* by the unbranched stem, lack of cauline leaves, extensive rhizome, and lack of yellow tepal blotch (Baldwin et al. 2012, CNPS 2021b). Hitcock's blue-eyed grass is primarily known in California from an occurrence in the Cape Ridge area, and also occurs in southwestern Oregon.

The closest known record is from 1938, approximately 14 miles southwest of the API (CDFW 2021b). There are no known occurrences within API or BSA. Marginal habitat (e.g., grasslands and openings) may occur in API. This species was not observed during protocol-level floristic surveys in 2021 (GHD 2021a). No impacts to this species are anticipated. No impact would result to Hitchcock's blue-eyed grass.

Survey Results

No special status plants were observed during the two protocol-level, seasonally appropriate floristic surveys conducted in 2021 within the API. See separate Botanical Report for a list of plant species observed on-site (GHD 2021a).

The API and BSA do not overlap designated or proposed critical habitat for any federally-listed plant species.

Project Impacts

Since protocol-level surveys have been completed and no special plant status species were observed, this study concludes the evaluation of potential impacts to special status plant species. Available roadside habitat is generally poor. No impacts to special status plant species are anticipated.

Avoidance and Minimization Efforts

As no impacts to special status plants are anticipated, no avoidance and minimization efforts are proposed.

Compensatory Mitigation

The proposed Project has been designed such that conservation measures and proposed avoidance and minimization measures shall avoid or minimize potential effects to vegetation to the fullest extent feasible. A small amount of disturbance to vegetation will occur. However, no compensatory mitigation is proposed for special status plant species at this time because rare plant surveys have thus far not identified sensitive species that would be impacted at significant levels, and the temporary disturbance area will be restored in place.

Cumulative Impacts

Special status plant mapping results for the cumulative projects summarized in **Table 1** is not available and/or has not been completed for all identified projects; however, each of the considered cumulative projects would also be required to undergo CEQA review. As such, any potential impact to special status plants would be addressed through separate requirements for compensatory mitigation. As such, cumulative impacts to special status plants would not result.

Special Status Animal Species

Discussion of Special Status Invertebrates

As discussed in **Chapter 3**, based on the USFWS Official Species List generated for this Project (**Appendix E**), no federally-listed invertebrate species are expected to occur within the Project vicinity. There are five special status invertebrate species recorded in the CNDDB as known to occur nearby and that the BSA likely provides suitable habitat for. A discussion of the habitat requirements, potential for species occurrence, survey results, potential Project-related impacts, applicable impact avoidance and minimization measures, compensatory mitigation, and cumulative impacts to invertebrate species is provided below.

California Floater (SAL)

A great deal of uncertainty surrounds the taxonomy of this species and its western North American cogeners, *Anodonta wahlametensis, Anodonta nuttalliana,* and *Anodonta oregonensis* (NatureServe 2021). The historic range of the California Floater may have spanned from British Columbia to Mexico (NatureServe 2021). It is considered extirpated from the Central Valley of California and its current range is disjunct (NatureServe 2021). Extant populations in California may be limited to the Fall and Pit rivers in Shasta County (NatureServe 2021). One large population (approximately 8,000 individuals) has been recorded in the Eel River (with thousands in a 100-meter span of a river bend (NatureServe 2021). This species is threatened by pollution, water diversion and impoundments, elimination of their fish host species, and eutrophication (NatureServe 2021).

The closest known record is from an unknown year, approximately 6 miles north of the API in the Elk River (CDFW 2021b). No known occurrences within API or BSA or surrounding 5 miles (CDFW 2021b). Based on suitable aquatic habitat, the species may be present in the BSA within Mill Creek, although no suitable habitat is present in the API. No impact would result to the California Floater.

Western Ridged Mussels (SAL)

Western Ridged Mussels were historically known from rivers and creeks across western North America including California, Oregon, Washington, Idaho, Nevada, and British Columbia (Blevins et al. 2020). However, the species has experienced a drastic 43% range reduction, especially within southern California (Blevins et al. 2020). Recent studies have documented their presence in northern California and southern Oregon rivers (Howard 2010).

The closest known record is from 1981, approximately 12.5 miles south of the API (CDFW 2021b). No mussels were recorded at this site during a survey in 2009. Recent survey efforts were conducted within the Eel River watershed (Howard 2010). Based on suitable aquatic habitat, the species may be present in the BSA within Mill Creek, although no suitable habitat is present in the API. No impact would result to the Western Ridged Mussel.

Western Pearlshell (SAL)

The Western Pearlshell is an aquatic freshwater mussel. Its geographic distribution spans the western U.S. including Alaska, California, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming (NatureServe 2021). The mussel tends to prefer low velocity water. This species is primarily threatened by water diversion, pollution, and siltation (NatureServe 2021).

The closest known record is from 2000, approximately 8.6 miles north of the API in the Elk River (CDFW 2021b). Based on suitable aquatic habitat, the species may be present in the BSA within Mill Creek, although no suitable habitat is present in the API. No impact would result to the Western Pearlshell.

Obscure Bumble Bee (SAL)

Individuals can live approximately one year (Hatfield et al. 2014). They occur in coastal habitat within the fog-belt from British Columbia to southern California (Koch et al. 2012, Hatfield et al. 2014). Preferred plants for foraging include the following genera: *Baccharis, Cirsium, Lupinus, Lotus, Grindelia, Phacelia* (Koch et al. 2012). Their populations have experienced severe declines range wide. These declines are poorly understood, largely because they overlap with *Bombus vosnesenskii*, a common bee that is difficult to distinguish from *B. caliginosus* in the field (Xerces Society 2020).

The closest known record is from 1968 in Ferndale, approximately 6 miles west of the API (CDFW 2021c). Recent records are from 2014 near Pamplin Grove, approximately 10 miles southeast of the API (Bumble Bee Watch 2021). The API and BSA fall within the species current range (Hatfield et al. 2014). In addition, the API and BSA is within the coastal fog belt and includes several of the species' food plants. No impact would result to the Obscure Bumble Bee.

Western Bumble Bee (SAL)

Western Bumble Bees were historically widespread in coastal valleys and foothills throughout western North America. However, the species has experienced precipitous declines and they are now regionally rare. Western Bumble Bees are habitat generalists but require reliable sources of nectar plants and pollen resources (blooming periods from spring through fall). Meadow complexes are a preferred habitat type (DoW 2015). Colonies are typically located underground in rodent burrows (BumbleBee Watch 2021).

The closest known record is from 1970 in Fortuna, within 1 mile of the API (CDFW 2021b). There are no recent documented occurrences of this species within the BSA or nearby (BumbleBeeWatch 2021, CDFW 2021b). Although the API and BSA fall within the species’ pre-2002 range (according to ICUN Redlist), the range has contracted significantly in the last decade and now primarily includes the intermountain west and cascade regions of the US (Hatfield et al. 2015). This being the case, the species is not expected to occur in the API or BSA during construction. No impact would result to the Monarch Buttery.

Monarch Butterfly (Federal Candidate)

The Monarch Butterfly - California overwintering population (pop. 1) was proposed for listing under the federal ESA in 2014 (Xerces Society 2014). Critical habitat has not been designated or proposed (USFWS 2022).

Monarchs are distributed across North America in the spring and summer months. The Continental Divide splits their overwintering populations: those on the eastern side typically overwinter in Mexico, while those on the western side overwinter in California. There are over 400 known overwintering sites along the coast of California from Mendocino County to Baja California, Mexico (Pelton et al. 2016). Individuals begin arriving at their overwintering sites in October and remain as late as early March (Marriott 1997). Mating begins during warm days in late January, and subsequently females begin dispersing inland to lay their eggs on their obligate host plant, milkweed (Asclepias spp.; Marriott 1997). They rely on milkweed for larval development and various nectar plants for adult food. Threats to their populations include breeding habitat loss and pesticide use, as well as loss to their overwintering habitat (Pelton et al. 2016). From population data collected at overwintering sites, scientists estimate that the population has experienced a 74% decline since the late 1990s (Pelton et al. 2016).

Monarchs are relatively rare in Humboldt County, although a few observations have been reported generally concentrated between Trinidad and Fortuna from 2015 to 2021 (iNaturalist 2021). The closest known (research grade) record is from July 2016 in Fortuna (iNaturalist 2021). No Monarch roosts have been recorded in Humboldt County despite community science surveys since 1997 (Xerces Society 2022). The APE does not include habitat suitable for Monarch overwintering. Given the lack of suitable overwintering habitat within the APE, this species is highly unlikely to occur and the Project would have no effect on the Monarch.

Survey Results.

No special status invertebrates were observed during the 2021 site visits. However, this survey was not targeted towards detection of the full range of invertebrates. Some nectar sources that could be utilized by Obscure Bumble Bee and Western Bumble Bee were observed. No other targeted surveys for these species or incidental occurrence data are known from the BSA (Bumble Bee Watch 2021, iNaturalist 2021).

The API and BSA do not overlap designated or proposed critical habitat for any federally-listed invertebrate species.

Project Impacts

Vegetation removal will be limited to minor roadside vegetation and will include minor mowing and minor brush removal. No impacts to large areas of nectar sources or open meadow are expected. The Project is not expected to result in any impacts to the Obscure Bumble Bee, Western Bumble Bee, or Monarch Butterfly if present.

Given that no in-water work within Mill Creek would occur, direct impacts to aquatic mollusks would not result. Standard BMPs would be implemented to avoid indirect impacts associated with sedimentation and accidental spills.

Avoidance and Minimization Efforts

Project design (including staging and stockpile locations) considered minimization of impacts to vegetation and sensitive wildlife habitat during design. No further avoidance or minimization measures are proposed as no suitable habitat is present for special status insects or aquatic mussels in the API (habitat may only be present in the greater BSA, where no direct impacts to vegetation/nectar sources or Mill Creek will occur).

Compensatory Mitigation

The proposed Project has been designed such that Project-specific conservation measures and avoidance and minimization measures shall effectively avoid or minimize to the greatest extent feasible, impacts to sensitive habitat and wildlife resources. As no impacts to special status invertebrates or their habitat is expected, no compensatory mitigation is proposed.

Cumulative Impacts

The proposed Project will not facilitate further development in the area. In addition, with implementation of the recommended avoidance and minimization measures, the Project would not contribute to cumulative impacts to special status invertebrates.

Discussion of Special Status Fish

As discussed in **Chapter 3**, the BSA contains suitable habitat for federally and state listed anadromous salmonids as well as state special status Pacific Lamprey and summer-run Steelhead Trout within Mill Creek. A discussion of the habitat requirements, potential for species occurrence, survey results, potential Project-related impacts, applicable impact avoidance and minimization measures, compensatory mitigation, and cumulative impacts to fish species is provided below.

Pacific Lamprey (SSC)

Pacific Lamprey, *Entosphenus tridentatus* formerly *Lampetra tridentata*, is a primitive fish lacking true fins and jaws of true fishes (Streif 2007, Stillwater Sciences 2010). Pacific Lamprey range from the Japan to the Bering Sea in Alaska and along the west coast of North America to central Baja, California (Stillwater Sciences 2010).

Pacific Lamprey are anadromous with typical spawning from March through July (Stillwater Sciences et al. 2016). Both sexes build redds (nests) where eggs are deposited by moving stones with their mouths, typically in riffles of gravel-bottomed streams and upstream of quality ammocoete (larval lamprey) habitat. Ammocoetes hatch within approximately 19 days depending on water temperature (Streif 2007). Upon hatching, ammocoetes move downstream where they settle into silty sandy substrates (Streif 2007). They remain in these areas, often in colonies, for two to seven years filter feeding primarily on algae until they metamorphose into macropthalmia (juveniles; Streif 2007). As macropthalmia, they emigrate downstream to the ocean (Streif 2007). They mature into adults where they are parasitic on a variety of fishes. Adults return to their natal streams following one to three years in the marine environment (Streif 2007). There may be two major life strategies in which some adults spawn immediately upon returning to freshwater and other adults may overwinter in freshwater before spawning (Streif 2007, Stillwater Sciences et al. 2016).

Threats include limits to passage (e.g., dams), diversions, urban development, mining, pollution, estuary modification, stream and floodplain degradation, declines in prey abundance, predation by non-native species, and overharvest (Streif 2007, Stillwater Sciences and Wiyot Tribe 2017).

Pacific Lamprey are common in the Eel River year-round, and are known to occur in the Strongs Creek watershed (UC Davis 2021a). Suitable rearing and migratory habitat and potentially spawning habitat are present for Pacific Lamprey in Mill Creek within the BSA. Based on suitable aquatic habitat, the species may be present in the BSA within Mill Creek, although no suitable habitat is present in the API. With the implementation of avoidance and minimization measures, the project would have no impact on Pacific Lamprey.

Western Brook Lamprey (SSC)

The Western Brook Lamprey is a small (total length typically less than 18 centimeters [7 inches]) non-migratory lamprey that resides in freshwater (69 FR 77158, UC Davis 2021b). They inhabit coastal streams along the Pacific Coast from Alaska to California (CTUIR 2004). The species occurs in many of the same habitats and has been considered in conjunction with Pacific Lamprey in conservation efforts (i.e., petition to be listed; 69 FR 77158, Nawa et al. 2003). Despite these similarities, Western Brook Lamprey differ in being non-migratory and non-parasitic. Both lamprey species have otherwise similar life histories, including being semelparous (adults die after spawning). Additionally, ammocoetes are nearly indistinguishable (69 FR 77158).

Spawning typically occurs March-July (69 FR 77158), often involving spawning groups (12 individuals have been documented at a single nest) and nests may be laid on top of each other (CTUIR 2004). Both sexes build redds (nests), by moving stones with their mouths, typically in riffles of gravel-bottomed streams (USFWS unk. yr.). A given female may lay 1,100-5,500 eggs (69 FR 77158). Ammocoetes hatch within approximately 10 days, dependent on water temperature (CTUIR 2004, UC Davis 2021b, 69 FR 77158). Upon hatching, ammocoetes move downstream where they settle into silty substrates in "backwater" areas (69 FR 77158). They remain in these areas, often in very high densities, for two to seven years filter feeding on algae and detritus until they metamorphose into adults (69 FR 77158). Adult metamorphosis occurs February-July (69 FR 77158). However, their gonads are not fully developed at this metamorphosis; they will burrow into the stream during the winter months until emerging in the spring to spawn (69 FR 77158). After reaching sexual maturation, all feeding stops as their small, poorly developed oral disc and teeth are non-functional (69 FR 77158). Adults die after spawning.

This species is of particular cultural importance to many native indigenous tribes along the Pacific Coast (CTUIR 2004). Their populations are threatened by stream/floodplain and water quality degradation, overharvest, predation by nonnative freshwater fish, dredging, and dewatering (USFWS unk. yr.).

Western Brook Lamprey are known to occur in the Strongs Creek watershed (UC Davis 2021a). Suitable rearing and migratory habitat and potentially spawning habitat are present for Western Brook Lamprey in Mill Creek within the BSA. Based on suitable aquatic habitat, the species may be present in the BSA within Mill Creek, although no suitable habitat is present in the API. With the implementation of avoidance and minimization measures, the project would have no impact on Western Brook Lamprey.

Coastal Cutthroat Trout (SSC)

The Coastal Cutthroat Trout ranges from the southernmost extent of its range in the Eel River (California) to Prince Williams Sound in Alaska. Life history strategies are more variable than for most salmonids. Moyle (2002) and Trotter (1989, 1997) recognized four main life history groupings including sea run, lacustrine, riverine, and stream resident. Ecological requirements are similar to those of Steelhead, and where the two species co-occur. Coastal Cutthroat Trout usually occupy smaller tributary streams (Moyle et al. 2008). Unlike most salmon, and similar to Steelhead, this species may spawn more than once. Adults commonly enter streams during the fall and feed on eggs from other salmons' redds. Spawning can occur from December through May. Young Cutthroat Trout may spend up to two weeks in the gravel before emerging and from one to nine years in freshwater before migrating to estuaries and ocean in the spring. Coastal Cutthroat Trout usually spend less than one year in salt water before returning to spawn. Juveniles and adults are carnivorous, feeding mostly on insects, crustaceans, and other fish throughout their lives. In freshwater, adult Cutthroat Trout typically reside in large pools while the young reside in riffles, most commonly in upper tributaries of small rivers. Coastal Cutthroat Trout utilize a wide variety of habitat types during their complex life cycle. They spawn in small tributary streams, and utilize slow flowing backwater areas, low velocity pools, and side channels for rearing of young. Good forest canopy cover, in-stream woody debris, and abundant supplies of insects are crucial for the young Cutthroat Trout's survival. During the estuarine or ocean phase of life, Cutthroat Trout utilize tidal sloughs, marshes, and swamps as holding areas and feeding grounds.

Despite widespread decline throughout its range, Coastal Cutthroat Trout populations are present in the Eel River as well as lower Eel River tributaries (CDFW 2015). Additionally, the species is known to occur in the Strongs Creek watershed (UC Davis 2021a). The closest known occurrence record is from 1990 in the Eel River (0.35 miles west of the API) and its tributaries (CDFW 2021c). Suitable rearing and migratory habitat is present for Coastal Cutthroat Trout in Mill Creek within the BSA. However, no spawning habitat (based on lack of graveled stream bottom in Mill Creek) is present in the BSA. Based on suitable aquatic habitat, the species may be present in the BSA within Mill Creek, although no suitable habitat is present in the API. With the implementation of avoidance and minimization measures, the project would have no impact on Coastal Cutthroat Trout.

Coho Salmon - southern Oregon / northern California ESU Coho Salmon (FT/ST)

The southern Oregon/northern California coast Coho Salmon (SONCC) Coho Salmon ESU was federally-listed as a threatened effective June 5, 1997 (62 FR 24588). The listing status was reaffirmed effective August 29, 2005 (70 FR 37159) and April 14, 2014 (79 FR 20802). Critical habitat was designated for SONCC Coho Salmon, effective June 4, 1999. Critical habitat includes all accessible reaches between and including the Mattole River (California) and Elk River (Oregon) (64 FR 24049). This ESU is also state listed as threatened under the CESA.

The SONCC ESU is defined as all Coho Salmon naturally produced in streams between Punta Gorda in northern California (Humboldt County) and Cape Blanco in southern Oregon (70 FR 37160). Adult Coho Salmon enter rivers from late summer to mid-winter with most spawning occurring in early to mid-winter. Eggs incubate for one to one and a half months during winter. Fry emerge and occupy shallow areas with vegetative cover. Juvenile Coho Salmon rear in freshwater for over a year (some for two years) before migrating to the ocean in spring (Weitkamp et al. 1995, NMFS 2014). Juveniles and yearlings spend various amounts of time in freshwater/estuary transition zones. Length of stay by an individual averages about one to two months, with spring being the heaviest time of use. Adults typically spend the next two years in the ocean before returning to their home streams to spawn (Wallace 2010). Marine invertebrates, such as copepods, euphausids, amphipods, and crab larvae, are the primary food sources for Coho Salmon when they first enter saltwater. Fish represent an increasing proportion of the diet as Coho Salmon grow and mature (Moyle 2002).

Freshwater habitat requirements for juvenile Coho Salmon include cool water temperatures (53.6-57.2 ºF is optimal), clear water, riparian vegetation that provides shade, clean silt-free gravel for spawning, in-stream large woody debris, availability of food (invertebrates), and overwintering habitat consisting of large off-channel pools with complex cover or small spring-fed tributary streams (Moyle 2002). Coho Salmon from Humboldt Bay tributaries that rear in the estuary grow larger than their cohorts that reared farther upstream, which suggests that a stream/estuary ecotone is an important overwintering and rearing habitat for juvenile Coho Salmon (Wallace and Allen 2009).

Population declines and extirpations in individual streams and tributaries have occurred due to widespread degradation of freshwater habitats from activities such as timber harvest, road building, grazing and mining activities, urbanization, stream channelization, dam construction, wetland filling or draining, beaver trapping, and water withdrawals and diversions for irrigation (NOAA Fisheries 2011). These activities have resulted in changes to channel morphology and substrate, loss and degradation of estuaries, wetlands, and riparian areas, declines in water quality (e.g., elevated pH and water temperatures, reduced dissolved oxygen, altered stream fertility and biological communities, and toxics), altered stream flows, and fish passage impediments such as dams and road crossings (NOAA Fisheries 2011).

Despite drastic declines, the Eel River supports populations of Coho Salmon (Yoshiyama and Moyle 2010). However, Coho Salmon are not known to occur in the Strongs Creek watershed historically or currently (UC Davis 2021a). This species is unlikely to be present within the BSA in Mill Creek, but given the absence of fish passage barriers between the Eel River and the BSA, presence cannot be ruled out. With the implementation of avoidance and minimization measures, the project would have no impact and no effect on Coho Salmon.

Chinook Salmon – California Coastal ESU (FT)

The California Coastal (CC) Chinook Salmon ESU was listed as threatened, effective November 15, 1999 (64 FR 50394). The listing was updated effective August 29, 2005 (70 FR 37159) and April 14, 2014 (79 FR 20802). Critical habitat was designated for Chinook Salmon (Coastal California ESU), effective January 2, 2006. Designated critical habitat includes riverine and estuarine habitat in Humboldt, Trinity, Mendocino, Sonoma, Lake, Napa, Glenn, Colusa, and Tehama counties (70 FR 52487).

The California Coast Chinook Salmon (California coastal ESU) ranges from Redwood Creek in Humboldt County south to the Russian River in Sonoma County. California Coast Chinook Salmon spawn and rear in coastal and interior rivers in northern California. Ocean-type Chinook (fall run) rear for less than one year in freshwater, while stream-type Chinook (spring run) remain in freshwater for one year or more before emigrating to forage in coastal and marine zones of California for two to five years (Healey 1991). Currently, only fall-run Chinook appear to be extant in the DPS. These Chinook Salmon typically migrate to the ocean within their first year from April through July (NOAA Fisheries 2007). The ideal temperature range for rearing, smolting, and migrating (seaward) Chinook Salmon appears to be 50° to 55° F (Rich 1997). Habitat requirements for spawning also include clean, loose gravel, a lack of fine sediment, cool water, and unimpeded passage to the ocean. After spawning, females bury fertilized eggs in gravel and guard them until they die. Rearing habitat is characterized by the presence of pools, off-stream channels, and riparian cover.

The destruction and modification of historic spawning habitat, fish passage barriers, over-harvesting, decreased floodplain connectivity and function, as well as reduced stream flow and predation are considered moderate to very high threats to this ESU. Land use activities (logging, road construction, streambank alterations, etc.), water diversions and overutilization of rivers and streams for recreational purposes are also have contributed to the decline of the ESU. The main factors limiting this Chinook Salmon ESU are low abundance, low distribution, and negative population trends. Predation by pikeminnow in the Eel River and genetic integrity are considered significant threats to the population (NOAA Fisheries 2007).

Despite drastic declines, the Eel River supports populations of Chinook Salmon (Yoshiyama and Moyle 2010). Chinook Salmon are known to occur in the Strongs Creek watershed (UC Davis 2021a), and recreational fishermen have reported three catches in Strongs Creek near the mouth with the Eel River (Fishbrain 2021). This species is unlikely to be present within the BSA in Mill Creek, but given the absence of fish passage barriers between the Eel River and the BSA, presence cannot be ruled out. With the implementation of avoidance and minimization measures, the project would have no impact and no effect on Chinook Salmon.

Steelhead, Northern California DPS (FT/SE)

Steelhead (northern California DPS) was listed as threatened, effective August 7, 2000 (65 FR 36074). This listing was reaffirmed, effective February 6, 2006 (at which point two hatchery stocks were added; these are no longer active) (71 FR 833), and again on April 14, 2014 (79 FR 20802). Both summer and winter-run Steelhead are included in this DPS. NOAA Fisheries recently announced that a petition to list summer-run Steelhead as a unique DPS was not warranted (85 FR 6527). Critical habitat was designated for Steelhead (northern California DPS), effective January 2, 2006. Designated critical habitat includes riverine and estuarine habitat in Humboldt, Trinity, Mendocino, Sonoma, Lake, Glenn, Colusa, and Tehama counties (70 FR 52487). Northern California summer Steelhead within four North Coast watersheds (including the Eel River) were recently listed as state endangered under CESA as of June 16, 2021.

The Northern California Steelhead (northern California DPS) occupies river basins from Redwood Creek in Humboldt County to the Gualala River (near the Mendocino/Sonoma County line). Both summer and winter-run Steelhead are included in this DPS. Steelhead spend their adult lives in marine environments, returning to freshwater at the age of four or five to spawn, usually in their stream of origin. Winter-run, sexually mature, Steelhead populations migrate from the ocean to freshwater rivers and streams in the fall/winter, spawn, and quickly return to marine habitat. In contrast, summer-run populations migrate to freshwater habitat in the late spring/summer, spend several months in freshwater (reaching sexual maturity during this time), and then spawn in the winter (NMFS 2016).

Steelhead is the anadromous form of rainbow trout. Unlike salmon, Steelhead do not necessarily die after spawning. Eggs are deposited in redds constructed in gravel, and (for winter run fish) hatch after three to 14 weeks in later winter through spring. The hatchlings, or alevins, emerge from the gravel after an additional two to five weeks (Moyle 2002). During the egg and alevin stages, survival depends in part on the presence of clean, well-oxygenated gravel (excessive siltation contributes to mortality at these stages) (Barnhart 1991, Stillwater Sciences 2006). Juveniles remain in fresh water for one or two years before returning to saltwater, with emigration typically occurring from March through June. A second year of growth is thought to contribute to a much higher probability of survival in the open ocean (Stillwater Sciences 2006). Less is known about the life history of summer run Steelhead, although adult fish are believed to enter rivers in May (Yoshiyama and Moyle 2010).

In the Northern California DPS, the decline of Steelhead has been attributed to factors such as watershed disturbances, including logging on steep slopes, grazing, road building, water diversions, and severe habitat degradation caused by timber harvest and intensive agricultural practices. These factors have resulted in decreased flows, loss of riparian habitat, channel widening, and increased siltation and water temperatures. Despite this decline, north coast rivers and streams have the greatest amount of Steelhead habitat in California. Importantly, summer-run Steelhead adults rely upon cold-water refuges to oversummer in (CalTrout un. yr., NMFS un. yr). The most abundant populations of Steelhead are in the Klamath/Trinity River system (Barnhart 1991, Stillwater Sciences 2006).

Juvenile Steelhead (not distinguishable to run type) have been documented in Strongs Creek as recently as 2009 (CDFG 2009). Both winter-run and summer-run Steelhead are found in the Eel River (NFS 2020). Recreational fishermen have reported four catches of this species in nearby Jameson Creek, another tributary to Strongs Creek (Fishbrain 2021). Suitable rearing and migratory habitat is present for Steelhead in Mill Creek within the BSA. However, no spawning habitat (based on lack of graveled stream bottom in Mill Creek) is present in the BSA. Based on suitable aquatic habitat, the species may be present in the BSA within Mill Creek, although no suitable habitat is present in the API. With the implementation of avoidance and minimization measures, the project would have no impact and no effect on Northern California Steelhead.

Survey Results

Although no fish surveys were conducted as part of this environmental review, previous stream inventory reports have been completed by CDFG in Mill Creek (overlapping the BSA; CDFG 2004) and in Strongs Creek (downstream; CDFG 2009). There is marginal habitat (based on low flows and sedimented channel) for salmonids within Mill Creek and no fish passage barriers exist between the API and Strongs Creek, where Steelhead have been recorded.

The presence of Coho Salmon, Chinook Salmon, Steelhead, and Pacific Lamprey is well documented in the Eel River (CDFW 2021b).

The Eel River and its tributaries are considered EFH for Chinook Salmon and Coho Salmon (NOAA 2021a). Chinook and Coho Salmon are managed under the Pacific Coast Salmon Fisheries Management Plan (NOAA Fisheries 2021c). The Eel River and its tributaries is also considered critical habitat for Coho Salmon, Chinook Salmon, and Steelhead (NOAA 2021b).

Project Impacts

Given that no in-water work within Mill Creek would occur, direct impacts to anadromous fish would not result. Standard BMPs would be implemented to avoid indirect impacts associated with sedimentation and accidental spills. **Table 12** provides a summary of potential impacts to fisheries resources and habitat associated with permanent roadway restoration.

Table 12: Impacts to Fish and Habitat Resources

Description and Likelihood of Impacts	
Description of Potential Impact	**Anticipated Level of Effect:** (None/Minimal/Moderate/High)
Loss or Modification of Juvenile Rearing Habitat	None
Loss of Spawning Habitat	None
Loss of Riparian Habitat	None
Hydroacoustic Effects	None
Increased Turbidity and Suspended Sediment	Less than significant with BMPs
Impaired Fish Passage during Construction	None
Potential Spill Hazard	Less than significant with BMPs
Injury and Mortality of Juveniles during Construction	None

Loss or Modification of Juvenile Rearing Habitat

Given no in-water work, culvert replacement or modification, and channel alternation would occur, the loss or modification of juvenile rearing habitat would not occur.

Loss of Spawning Habitat

Given no in-water work, culvert replacement or modification, and channel alternation would occur, the loss or modification of spawning habitat would not occur.

Loss of Riparian Habitat

Tree removal along Mill Creek at the upstream and downstream end of the culvert crossing under Kenmar Road would not occur. There would be no loss of riparian habitat.

Hydroacoustic Effects

Noise effects would be limited to repaving and related construction activities on the roadway surface. Construction-related noise would be similar to the existing background noise on the roadway, which includes frequent passenger and commercial traffic at the interchange. Given the noise setting would not be substantially different, hydroacoustic effects would not impact special status salmonids and other special status fish species.

Increased Turbidity and Suspended Sediment

Increased turbidity and suspended sediments have the potential to enter Mill Creek during construction. Avoidance and minimization measures are recommended to minimize risks related to habitat sedimentation.

Impaired Fish Passage During Construction

Given no in-water work, culvert replacement or modification, and channel alternation would occur, impairment of fish passage would not occur.

Potential Spill of Hazardous Materials

Potential spills of hazardous materials (i.e., oil, grease, fuels, and coolants) could have deleterious effects on fisheries resources downstream of the Project. Additionally, operating construction equipment in or adjacent to any watercourse, whether it is wet or dry, poses the risk of serious environmental damage if a spill were to occur. The Project requires daily on-site refueling of construction equipment. As a result of that activity, minor fuel and oil spills can occur, and there is always the risk of larger releases. Without rapid containment, such materials can be extremely difficult to clean up in their entirety, when taking into consideration the size of a spill and its proximity to flowing water. Oils, fuels, and other toxic contaminants can have deleterious effects on fisheries resources, with the risk being substantially elevated when spills are near streams or other waterbodies. Safeguards to prevent spills in the BSA are critical because of the Project's relationship to a fish-bearing stream (Mill Creek). Avoidance and minimization measures are recommended to minimize risks related to the accidental spill of hazardous materials.

Injury and Mortality of Fisheries Resources

Given no in-water work, dewatering, or fish relocation would occur, injury and mortality of fisheries resources would not occur.

Avoidance and Minimization Efforts

Avoidance and minimization efforts include:

- Sediment and/or erosion control shall be established along Kenmar Road adjacent to the upstream and downstream ends of the Mill Creek culvert crossing. The location of sediment and/or erosion control measures will be included on the final construction plan set.
- Equipment shall be cleaned of deleterious materials before being delivered to the job site.
- Equipment shall be staged, and materials shall be stockpiled outside Mill Creek riparian habitat, in designated staging and stockpile areas.
- Any construction equipment operating adjacent to a stream shall be inspected daily for leaks. Any oil, fuel, and grease residue that has the potential to fall from machinery shall be removed and properly disposed of. Refueling and equipment maintenance would occur in designated staging and stockpiling areas only.
- Spill containment booms shall be available on-site at all times during construction operations and/or staging of equipment or during fueling when work occurs over

live waterbodies. Fueling trucks shall at all times be equipped with sealed spill kits.

- The awarded contractors shall develop and implement site-specific BMPs, a Storm Water Pollution Prevention Plan, and emergency spill control plan. The awarded contractor shall be responsible for immediate spill containment and cleanup, as well as proper disposal of hazardous materials and BMPs used during spill recovery.

Compensatory Mitigation

The proposed Project has been designed such that Project-specific conservation measures and avoidance and minimization measures shall effectively avoid or minimize, to the greatest extent feasible, affects to fisheries and water resources. It is not anticipated that other compensatory mitigation would be required.

Cumulative Impacts

Cumulative projects summarized in **Table 1** do not involve aquatic work, avoiding the potential to impact fisheries resources. Thus, a cumulative impact to fisheries resources would not result.

Discussion of Special Status Amphibians

As discussed in **Chapter 3**, based on the USFWS Official Species List generated for this Project (**Appendix E**), no federally-listed amphibian species are expected to occur within the Project vicinity. There are two special status amphibian species recorded in the CNDDB as known to occur nearby and that the BSA likely provides suitable habitat for: the Northern Red-legged Frog and Foothill Yellow-legged Frog. A discussion of the habitat requirements, potential for species occurrence, survey results, potential Project-related impacts, applicable impact avoidance and minimization measures, compensatory mitigation, and cumulative impacts to amphibian species is provided below.

Northern Red-legged Frog (SSC)

Northern Red-legged Frogs occur along the west coast of North America from British Columbia to California. The geographic range split between the Northern and California Red-legged Frog species occurs just south of Elk Creek in Mendocino County where both species overlap (Nafis 2021, AmphibiaWeb 2021). Northern Red-legged Frogs are typically found near freshwater sources (e.g., wetlands, ponds, streams, etc.). However, they can range widely and inhabit damp places far from water. Northern Red-legged Frogs reproduce in water from December to February in Humboldt County, with some breeding occurring as late as March. Preferred egg laying locations are in “vegetated shallows with little water flow in permanent wetlands and temporary pools” (Nafis 2021). Northern Red-legged Frogs are relatively common in and near coastal portions of Humboldt County.

The closest known occurrence record is from1993 on private timberlands, approximately 4.15 miles south of the API (CDFW 2021). The BSA includes suitable breeding, foraging, and overwintering habitat, especially within the riparian habitat and wetlands surrounding Mill Creek (see **Appendix F**). With the implementation of avoidance and minimization measures, potential impacts to the Northern Red-legged Frog would be less than significant.

Foothill Yellow-legged Frog (SSC)

Foothill Yellow-legged Frogs occur from sea level to elevations of 7,000 feet and range from the Willamette River in Oregon south to the Upper San Gabriel River in California, including the coast ranges and Sierra Nevada Foothills (Stebbins 2003, NatureServe 2021). The species prefers open to partially shaded, perennial streams with rocky substrate, often near riffles. These rivers and streams are typically bordered by chaparral, riparian habitat, mixed conifer forest, or wet meadows. Streams are usually small to mid-size with shallow pools and slow-moving water (CBD 2012). They are also found at river edges, in calm pools, and vegetated backwaters (CBD 2012, NatureServe 2021). Rocky, cobble substrate (3 in or larger) is preferred, particularly for egg laying sites (CBD 2012).

Breeding activity typically occurs from March through May with some regional variation (breeding in northern California is reported to occur from April through June; USFS 1997). Breeding coincides with a decrease in stream and river flows during the spring, following periods of winter storms and runoff (NatureServe 2021). Adult frogs congregate on river and stream gravel bars during this time, with oviposition occurring in stream and river margins (USFS 1997). Eggs are laid in masses (may include up to 3,000 eggs per mass) and attached to gravel or rocks (USFS 2016, Nafis 2021, NatureServe 2021). Eggs may be covered with a layer of silt, potentially to hide them from predators. Hatching time occurs in five to 27 days and is dependent on water temperature (Nafis 2021). Tadpoles are not known to overwinter, and larvae undergo metamorphosis during the summer (USFS 2016, NatureServe 2021). Fidelity to breeding sites has been reported in this species (USFS 2016).

The closest known occurrence record, including adults, juveniles, and young of the year, is from 2018 at the mouth of Strongs Creek on the Eel River near the Fortuna Wastewater Treatment Plant, approximately 1 mile northwest of the API (CDFW 2021c). The BSA includes requisite foraging and overwintering habitat within Mill Creek. However, no breeding habitat (e.g., sunny gravel/cobble river bars). With the implementation of avoidance and minimization measures, potential impacts to the Foothill Yellow-legged Frog would be less than significant.

Survey Results

During the reconnaissance level biological survey, GHD Botanist Kelsey McDonald, noted the habitat conditions within the BSA are suitable for several state special status amphibian species. Specifically, Mill’s Creek appears to include requisite foraging and overwintering habitat for Foothill Yellow-legged Frogs. Riparian and moist woodlands and herbaceous seeps within the API and BSA include suitable habitat for Northern Red-legged Frogs. One common amphibian species was observed on-site during 2021 site visits (**Appendix G**, **Table 13: Wildlife Species Detected On-site**). No other amphibian surveys or incidental occurrence data are known from the BSA.

The API and BSA do not overlap designated or proposed critical habitat for any federally-listed amphibian species.

Project Impacts

Northern Red-legged Frogs and Foothill Yellow-legged Frogs may occur in the BSA, but are unlikely to be not present in the API; therefore, impacts to these two species would be less than significant.

The proposed Project has the potential to result in adverse impacts to the aforementioned amphibian species for the reasons identified below:

- Construction related impacts could have in an adverse impact via direct mortality or injury (e.g., due to grading, ground disturbance, or operation of equipment). The potential for direct injury is likely low since the majority of impacts will be restricted to previously disturbed areas and work would occur in late summer or fall outside of peak surface activity periods for these species. Implementation of various avoidance and minimization measures will minimize the potential for direct injury.

- Certain activities related to the Project could result in disturbance to vegetation and soil. Vegetation removal and soil disturbances can accelerate erosion processes in the API/BSA and increase the potential for sediment to enter nearby streams. Excessive sedimentation into streams has the potential to reduce habitat quality for amphibians and other sensitive species (e.g., decreasing availability of potential food items including aquatic invertebrates and filling interstitial spaces in substrate).

- Construction activities typically include the on-site refueling and maintenance of equipment. As a result, minor fuel and oil spills may occur as well as a risk of large-scale releases. Without rapid containment and clean up, these materials can be potentially toxic depending on the location of the spill in proximity to surface water features.

Avoidance and Minimization Efforts

As well as adhering to the sediment reduction measures and efforts to minimize disturbances to vegetation, the footprint of the proposed Project, when in proximity to wetlands or aquatic habitat, will be restricted to the minimum area necessary.

Within seven days prior to the start of construction, a qualified biologist will conduct a pre-construction survey for special status amphibians within the API. Any special status amphibians found will be relocated to nearby suitable habitat outside of the API.

Compensatory Mitigation

The proposed Project has been designed such that Project-specific conservation measures and avoidance and minimization measures shall effectively avoid or minimize, to the greatest extent feasible, impacts to amphibians and their habitat. It is not anticipated that other compensatory mitigation will be required.

Cumulative Impacts

The proposed Project will not facilitate further development in the area. Most impacts to Northern Red-legged Frogs and Foothill Yellow-legged Frogs, potentially found in the API/BSA, if any, will be avoided or minimized. Projects considered for cumulative effects, summarized in **Table 1**, do not involve work in or near aquatic environments suitable for amphibians. Thus, cumulative impacts would not result.

Discussion of Special Status Reptiles

As discussed in **Chapter 3**, based on the USFWS Official Species List generated for this Project (**Appendix E**), no federally-listed reptile species are expected to occur within the Project vicinity. There is one special status reptile species recorded in the CNDDB as known to occur nearby and that the BSA is likely to provide suitable habitat for: the Western Pond Turtle. A discussion of the habitat requirements, potential for species occurrence, survey results, potential Project-related impacts, applicable impact avoidance and minimization measures, compensatory mitigation, and cumulative impacts to reptile species is provided below.

Western Pond Turtle (SSC)

Western Pond Turtles occur in a variety of permanent and semi-permanent freshwater aquatic habitats including lakes, rivers, ponds, creeks, and marshes. Nesting occurs on land in areas of loose to hard-packed soils on south or west facing slopes (Rathbun et al. 1992, Reese and Welsh 1997). The species is frequently observed basking on exposed banks, logs, and rocks. Winter activity is possible but limited to unusually warm, sunny days. Normally pond turtles are dormant during winter months on the north coast, which typically involves the turtle burrowing into loose substrate above the high water mark (Thomson et al. 2016).

The closest known record is from 2020 approximately 3 miles north of the API (iNaturalist 2021). The API and BSA include suitable aquatic habitat within the Mill Creek. However, there is only very limited upland habitat available in the BSA that may be suitable for nesting. With the implementation of avoidance and minimization measures, potential impacts to the Western Pond Turtle would be less than significant.

Survey Results

No special status reptiles were observed during the 2021 site visits. Given the presence of suitable habitat within Mill Creek, it is assumed that Western Pond Turtles could be present in the API and/or BSA during construction. No other reptile surveys or incidental occurrence data are known from the BSA.

The API and BSA do not overlap designated or proposed critical habitat for any federally-listed reptile species.

Project Impacts

The proposed Project has the potential to result impacts to Western Pond Turtle for the reasons identified below and has thus incorporated avoidance and minimization measures to ensure the potential impact remains less than significant:

- Construction related impacts could have in an adverse impact via direct injury (e.g., due to operation of equipment in or adjacent to stream channels where flowing, standing, or sub-surface water is present). The potential for direct injury is likely low since the majority of impacts will be restricted to the previously disturbed road prism or areas directly adjacent to the road prism, and the lower slope. Work at the toe of slope would be completed after dewatering. Implementation of various avoidance and minimization measures will minimize the potential for direct injury.
- Certain activities related to the Project could result in localized disturbances to vegetation and soil. Vegetation removal and soil disturbances can accelerate erosion processes in the API/BSA and increase the potential for sediment to enter nearby streams. Excessive sedimentation into streams has the potential to reduce habitat quality for semi-aquatic reptiles and other sensitive species (e.g., decreasing availability of potential food items including aquatic invertebrates and filling interstitial spaces in substrate).
- Construction activities typically include the on-site refueling and maintenance of equipment. As a result, minor fuel and oil spills may occur as well as a risk of large-scale releases. Without rapid containment and clean up, these materials can be potentially toxic depending on the location of the spill in proximity to surface water features.

Avoidance and Minimization Efforts

As well as adhering to the sediment reduction and spill prevention measures, and efforts to minimize disturbances to vegetation, the footprint of the proposed Project when in proximity to wetlands or aquatic habitat will be restricted to the minimum area necessary.

Within seven days prior to the start of construction, a qualified biologist will conduct a pre-construction survey for special status wildlife within the API. Any special status reptiles found will be relocated to nearby suitable habitat outside the API.

Compensatory Mitigation

The proposed Project has been designed such that Project-specific conservation measures and avoidance and minimization measures shall effectively avoid or minimize, to the greatest extent feasible, impacts to reptiles and their habitat. It is not anticipated that other compensatory mitigation will be required.

Cumulative Impacts

The proposed Project will not facilitate further development in the area. Most impacts to Northern Red-legged Frogs and Foothill Yellow-legged Frogs, potentially found in the API/BSA, if any, will be avoided or minimized. Projects considered for cumulative effects, summarized in **Table 1**, do not involve work in or near aquatic environments suitable for semi-aquatic reptiles. Thus, cumulative impacts would not result.

Discussion of Special Status Birds

As discussed in **Chapter 3**, based on the USFWS Official Species List generated for this Project (**Appendix E**), seven federally-listed bird species are expected to occur within the Project vicinity. However, none of these species are expected to occur within the API or greater BSA (see justification for exclusion in **Table 9**). There are seven state special status avian species recorded in the CNDDB as known to occur nearby and that the BSA likely provides suitable habitat for. A discussion of the habitat requirements, potential for species occurrence, survey results, potential Project-related impacts, applicable impact avoidance and minimization measures, compensatory mitigation, and cumulative impacts to avian species is provided below.

Cooper's Hawk (WL)

Cooper's Hawks are year-round residents across most temperate areas in North America. In California, migrants from more northern climes (southern Canada) pass through the state during the fall months (August-November). Some of these northern populations of Cooper's Hawks likely winter in the state. Cooper's Hawks may be found in a variety of forested habitats included deciduous, mixed, or evergreen forests in urban, suburban, or rural areas. Cooper's Hawk populations have increased over the past few decades in urban and suburban areas, likely as a result of readily available prey populations in these habitats (e.g., European Starling and Rock Pigeon flocks). Cooper's Hawks build their nests in any number of tree species including pines, oaks, firs, eucalyptus, etc. Nest site selection is most likely related to dense prey availability in the surrounding area as well as canopy cover and the adjacent habitat structure. Their nests are constructed out of sticks and bark and may be built on top of existing squirrel or other raptor nests. Cooper's Hawks prey on a variety of small bird and mammal species including European Starlings, Mourning Doves (*Zenaida macroura*), Rock Pigeons, Deer Mice (*Peromyscus maniculatus*), squirrels, and hares. (Rosenfield 2020).

There are numerous records from the Project vicinity (surrounding 5 miles; eBird 2021). Suitable nesting and foraging habitat are present within the BSA. With the implementation of avoidance and minimization measures, potential impacts to the Cooper's Hawk would be less than significant.

Sharp-shinned Hawk (WL)

Sharp-shinned Hawks are year-round residents across most densely forested areas of western and eastern North America. In California, migrants from more northern climes (southern Canada) pass through the state during the fall months (August-November). Some of these northern populations of Sharp-shinned Hawks winter in the state. Sharp-shinned Hawks may be found in a variety of forested habitats including coniferous forests, deciduous forests, woodlots, and transitional/forested edges. They prefer to nest in dense stands of a diversity of tree species. Nests are constructed out of dead twigs and placed against a tree trunk on a horizontal limb. Sharp-shinned Hawks primarily prey on small forest birds and mammals. In more urban/developed areas, Sharp-shinned Hawks hunt at bird feeders. (Bildstein and Meyer 2000).

There are numerous records from the Project vicinity (surrounding 5 miles; eBird 2021). Suitable nesting and foraging habitat are present within the BSA. With the implementation of avoidance and minimization measures, potential impacts to the Sharp-shinned Hawk would be less than significant.

Great Egret (SAL)

Great Egrets are year-round residents in western California, with breeders concentrated in the Klamath and Warner basin in Siskiyou and Modoc Counties, along the coast in Humboldt County, the San Francisco Bay area, Monterey County, the Salton Sea, and the Central Valley. This species favors wetlands, estuaries, lakes, rivers, ponds, streams, marshes, and tidal flats. Great Egrets utilize a variety of substrates for nesting including trees, woody vegetation, or artificial nest platforms. Nests platforms are typically constructed of locally available sticks and vegetation. Great Egrets nest communally or in mixed-species colonies. They are opportunistic foragers, wading in shallow water to feed on fish, amphibians, and invertebrates. They also hunt on shore for reptiles, birds, and small mammals. (Mccrimmon Jr. et al. 2020).

There are numerous records from the Project vicinity (surrounding 5 miles; eBird 2021). Suitable foraging habitat is present within the API and BSA, especially within Mill Creek; marginal nesting habitat may be present within the BSA (e.g., large Eucalyptus trees on to the southeast of the API). With the implementation of avoidance and minimization measures, potential impacts to the Great Egret would be less than significant.

Great Blue Heron (SAL)

Great Blue Herons are year-round residents in the majority of coastal and central California. Notable exceptions include the Sierras and the very southeastern desert regions of the state. Great Blue Herons are extremely adaptable to a variety of habitats including most saltwater and freshwater bodies, agricultural land, wetlands, as well as commercial and residential areas such as golf courses. Nesting habitat includes trees, bushes, or artificial structures. Nest platforms are typically constructed out of locally available sticks and lined with material such as grass, moss, and reeds. Great Blue Herons are colonial nesters in mixed-species colonies. They are opportunistic foragers, wading in shallow water to feed on fish, amphibians, and invertebrates. They also hunt on shore for reptiles, birds, and small mammals. Additionally, they are known to scavenge carrion. (Vennesland and Butler 2020).

There are numerous records from the Project vicinity (surrounding 5 miles; eBird 2021). Suitable foraging habitat is present within the API and BSA, especially within Mill Creek; marginal nesting habitat may be present within the BSA (e.g., large Eucalyptus trees on to the southeast of the API). With the implementation of avoidance and minimization measures, potential impacts to the Great Blue Heron would be less than significant.

Bank Swallows (ST)

Bank Swallows breed in most of North America at low elevations in suitable habitat. Breeding ranges extend from Alaska to Northern California, and occasionally occurs in the southern half of the U.S.A. Wintering grounds occur along the western coast of Central America. In California, Bank Swallows are found in Siskiyou, Shasta, Yolo, Del

Norte, Humboldt, and Lassen Counties. Bank Swallows favor open habitat associated with water features such as coastlines, streams, rivers, lake banks, wetlands, agricultural areas, prairies, and riparian woodlands. Bank Swallows generally nest colonially along stream/river banks in burrows excavated perpendicular to the bank. These burrows are lined with grasses, straw, leaves, feathers, and other organic material. Bank Swallows capture insects on the wing but will also consume aquatic insects and larvae. (Garrison and Turner 2020).

The closest known record is from 2010, within 0.25 miles west of the API at the Fortuna Riverfront (eBird 2021). Suitable foraging habitat is present in the API and BSA. No available muddy banks/cliffs for nesting are present in the API or BSA. With the implementation of avoidance and minimization measures, potential impacts to the Bank Swallow would be less than significant.

Survey Results

A total of thirteen common avian species (protected by the MBTA and FGC) were observed flying through or over the API during 2021 site visits (**Appendix G**, **Table 13: Wildlife Species Detected On-site**). Mill Creek within the API and BSA includes suitable foraging habitat for numerous avian species including Great Egrets, Great Blue Herons, and Bank Swallows among others. The riparian habitat surrounding Mill Creek although narrow likely provides suitable nesting habitat for various avian species such as Cooper's Hawks or Sharp-shinned Hawks as well as other common bird species. Most nearby habitat was low, mowed fields. No other avian surveys or incidental occurrence data are known from the BSA.

The API and BSA do not overlap designated or proposed critical habitat for any federally-listed avian species.

Project Impacts

The Project is expected to have no effect on the Marbled Murrelet, Western Snowy Plover, Yellow-billed Cuckoo (Western DPS), and Northern Spotted Owl. The Project will have no effect on designated critical habitat for the Marbled Murrelet, Western Snowy Plover, Yellow-billed Cuckoo (Western DPS), or Northern Spotted Owl. With implementation of avoidance and minimization measures, any potential Project-related impacts to Cooper's Hawks, Sharp-shinned Hawks, Great Egrets, Great Blue Herons, Bank Swallows, and other nesting migratory bird species are expected to be, at most, temporary and minimal. With the incorporation of avoidance and minimization measures, potential impacts to nesting migratory bird species would be less than significant.

As described above, common, protected migratory bird species may nest in the API or greater BSA. Construction-related disturbance (noise and visual disturbance, as well as possible nest destruction during clearing and grubbing) during the nesting season could result in the loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Loss of fertile eggs or any activities resulting in nest abandonment may have the potential to affect these species. However, most disturbances will occur in the roadway or directly adjacent to the roadway, where nesting habitat does not occur. Additionally, the removal of vegetation shall be mostly limited to grasses, forbs, and a minor amount of scrub along the edges of the roadway and the stockpiling/staging area and a more extensive area of scrub on the lower slope. The shining willow groves habitat, which is co-located with one- and three-parameter wetlands, would be impacted, as discussed above. Riparian habitat in the BSA would not be impacted by the Project. It is more likely that the majority of nesting activity will occur outside of the API itself, in adjacent habitat within the BSA. Project implementation will be concluded in as short a timeframe as is reasonable to minimize long-term disturbance to migratory and resident nesting birds.

Avoidance and Minimization Efforts

The following measures shall be implemented to avoid or minimize the potential for Project-related impacts on protected avian species potentially nesting adjacent to the API:

- Contractors shall attempt to remove trees and other vegetation that could potentially contain nesting birds outside the bird nesting season (March 15 to August 15). If vegetation removal occurs outside the bird nesting season, no further mitigation is necessary. If vegetation removal or construction work occur adjacent to suitable nesting habitat between March 15 and August 15 a qualified wildlife biologist shall conduct pre-construction surveys within the vicinity of the Project, to check for nesting activity of native birds and to evaluate the site for presence of raptors and special status bird species. As specified by CDFW, "a qualified wildlife biologist shall be defined as a person who is 1) knowledgeable in distribution, habitat, nesting behavior, and life history of northern California birds; 2) can correctly identify bird species found in northern California; 3) has conducted previous field surveys of nesting birds; and 4) is knowledgeable in survey protocols and has obtained the necessary state and federal authorization for any potential take of listed birds, if necessary." The qualified wildlife biologist shall conduct at minimum a one-day pre-construction survey within the 7-day period prior to vegetation removal and ground-disturbing activities. If ground disturbance and vegetation removal work lapses for seven days or longer during the breeding season, a qualified wildlife biologist shall conduct a supplemental avian pre-construction survey before Project work is reinitiated.
- If active special status and MBTA nests are detected within the construction footprint or up to 500 feet from construction activities, the qualified wildlife biologist shall flag a buffer around each nest (assuming property access). Construction activities shall avoid nest sites until the qualified wildlife biologist determines that the young have fledged or nesting activity has ceased. If nests are documented outside of the construction footprint, but within 500 feet of the construction area, buffers will be implemented as needed (buffer size dependent on species). In general, the buffer size for common species would be determined on a case-by-case basis in consultation with the CDFW and, if applicable, with USFWS. Buffer sizes will take into account factors such as (1) noise and human disturbance levels at the construction site at the time of the survey and the noise and disturbance expected during the construction activity; (2) distance and amount of vegetation or other screening between the construction site and the nest; and (3) sensitivity of individual nesting species and

behaviors of the nesting birds. An absolute minimum buffer size of 30 feet is recommended as a starting point of discussion for common species, with larger buffers expected for special status species and raptors.

- If active nests are detected during the survey within the construction footprint or surrounding 500 feet, the qualified wildlife biologist shall monitor all nests at least once per week to determine whether birds are being disturbed. Activities that might, in the opinion of the qualified wildlife biologist, disturb nesting activities (e.g., excessive noise), shall be prohibited within the buffer zone until such a determination is made. If signs of disturbance or distress are observed, the qualified wildlife biologist shall immediately implement adaptive measures to reduce disturbance. These measures may include, but are not limited to, increasing buffer size, halting disruptive construction activities in the vicinity of the nest until fledging is confirmed or nesting activity has ceased, placement of visual screens or sound dampening structures between the nest and construction activity, reducing speed limits, replacing and updating noisy equipment, queuing trucks to distribute idling noise, locating vehicle access points and loading and shipping facilities away from noise-sensitive receptors, reducing the number of noisy construction activities occurring simultaneously, and/or reorienting and/or relocating construction equipment to minimize noise at noise-sensitive receptors.

Compensatory Mitigation

The proposed Project has been designed such that Project-specific conservation measures and avoidance and minimization measures shall effectively avoid or minimize to the greatest extent feasible, affects to birds and their habitat. It is not anticipated that other compensatory mitigation will be required.

Cumulative Impacts

The proposed Project will not facilitate further development in the area. With implementation of the recommended avoidance and minimization measures, the proposed Project would not contribute to cumulative impacts on special status birds.

Discussion of Special Status Terrestrial Mammals

As discussed in **Chapter 3**, based on the USFWS Official Species List generated for this Project (**Appendix E**), no federally-listed mammalian species are expected to occur within the Project vicinity. There is one special status mammal species recorded in the CNDDB as known to occur nearby and that the BSA likely provides suitable habitat for: the North American Porcupine. A discussion of the habitat requirements, potential for species occurrence, applicable impact avoidance and minimization measures, potential Project-related effects, and cumulative effects to mammalian species is provided below.

<u>North American Porcupine (SAL)</u>

The North American Porcupine are primarily nocturnal but can sometimes be seen during the day. Their range extends across mainland Canada, Alaska, and the western and northeastern United States (Reid 2006). They use a wide variety of habitats, but are most common in montane conifer, Douglas fir, alpine dwarf-shrub (Sweitzer 2013). A population in Del Norte County, centered in Tolowa Dunes State Park, is especially known to concentrate in riparian areas. Porcupines are herbivores and feed on a variety of plant materials depending on the season (Appel et al. 2017, SNZ and CBI 2019). They feed on berries, seeds, grasses, leaves, roots and stems during the spring and summer (SNZ and CBI 2019). In contrast, they primarily feed on evergreen needles and tree bark during the winter.

The closest known record is from 2016 along Highway 101, approximately 4.75 miles south of the API (CDFW 2021c). Suitable habitat for this species is limited in the API (narrow strip of riparian vegetation); however, they may to occur in the greater BSA. With the incorporation of avoidance and minimization measures, the potential impact to North American Porcupine would be less than significant.

Survey Results

No special status mammals were observed during the 2021 site visits. No other mammalian surveys or incidental occurrence data are known from the BSA.

The API and BSA do not overlap designated or proposed critical habitat for any federally-listed mammalian species.

Project Impacts

The API does not provide suitable foraging or denning habitat for the North American Porcupine. However, habitat within the greater BSA may serve as suitable habitat for these species. However, the following avoidance and minimization measures are recommended to ensure potential impacts remain less than significant.

Avoidance and Minimization Efforts

The Project footprint shall be restricted to the minimum necessary. Deep steep-sided excavations will be covered or ramped if left overnight, to avoid the risk of a nocturnally dispersing terrestrial mammals (e.g., North American Porcupine) becoming trapped. Food waste and other trash shall be removed from the site at the end of each work day to avoid attractants. Pets (e.g., dogs) will not be permitted on the construction site.

Compensatory Mitigation

The proposed Project has been designed such that Project-specific conservation measures and avoidance and minimization measures shall effectively avoid or minimize to the greatest extent feasible, affects to terrestrial mammals and their habitat. It is not anticipated that other compensatory mitigation will be required.

Cumulative Impacts

The proposed Project will not facilitate further development in the area. In addition, with implementation of the recommended avoidance and minimization measures, the Project would not contribute to cumulative impacts to terrestrial mammals.

Discussion of Special Status Bats

As discussed in **Chapter 3**, based on the USFWS Official Species List generated for this Project (**Appendix E**), no federally-listed bat species are expected to occur within the Project vicinity. There are three special status bat species recorded in the CNDDB as known to occur nearby: Townsend's Big-eared Bat, Hoary Bat, and Yuma Myotis. A discussion of the habitat requirements, potential for species occurrence, applicable impact avoidance and minimization measures, potential Project-related effects, and cumulative effects to mammalian species is provided below.

The BSA likely provides suitable roosting habitat for foliage and tree roosting bats (will roost in woodpecker holes, under loose bark, and basal hollows as well as other cavities). In addition, open water in the vicinity (Mill Creek) likely serves as a foraging area for several species (and sources of water for species that need to drink freshwater regularly).

Townsend's Big-eared Bat (SSC)

Townsend's Big-eared Bats are medium-sized bats, distinguished from other co-occurring bat species by their large ears and a two-pronged horseshoe-shaped lump on the muzzle. The species occurs throughout the western U.S. and Canada. In California, the species is found throughout the state with the exception of the high elevations in the Sierra Nevada Mountain Range (CDFW 2016). Townsends' Big-eared Bats are typically associated with coastal redwood forests, foothill oak woodlands, inland deserts, pinyon-juniper and pine forests, and mixed coniferous-deciduous forests (Erickson et al. 2002, CDFW 2016). The species roosts colonially in a variety of structures including hollow trees, buildings (barns), mines, and lava tubes. Roost site fidelity is high. Maternity colonies (of females) occur between March and June (CDFW 2016). Males roost singly (Erickson et al. 2002). Females give birth to a single pup per year between May and July. The species winters in mixed sex groups in caves and lava tubes. Townsend's Big-eared Bats feed primarily on moths (Erickson et al. 2002, CDFW 2016).

The closest known recent record is from 2018 near Fickle Hill, approximately 20.75 miles north of the API (BAMVT 2021). Additionally, an historic (1949) record exists near Falk, approximately 7.5 miles north of the API (CDFW 2021c). Suitable roosting habitat may be present in the BSA, and foraging habitat may be present in the API and BSA. With the incorporation of avoidance and minimization measures, potential impacts to Townsend's Big-eared Bat would remain less than significant.

Hoary Bat (SAL)

The Hoary Bat is a relatively large bat with brown to rufous fur with a white "frosting" on the tips (SBDWG 2004). They are found throughout North, Central and South America but not usually in great densities (SBDWG 2004, NatureServe 2020). The species is found throughout California with the exception of xeric desert habitats in the southeast. The species breeds in inland forest habitat and winters along the coast and in the southern portion of the state. The species engages in seasonal movements which results in sexual segregation during the warmer months (males are found in greater numbers in western portions of the state while the females are more common in the northeast). Hoary Bats migrate between the summer and winter ranges from September through November. Mating occurs during migration or on the wintering grounds. Females give birth to one to four pups in May through July of the following year (Harris et al. 2008a).

Preferred habitat includes a mosaic of forested habitat for roosting and open/edge habitat for foraging. Hoary Bats are insectivorous and feed primarily on moths (usually over water or over the forest canopy). The species roosts solitarily in dense tree foliage typically near water (species requires water for drinking) (SBDWG 2004, Harris et al. 2008a). Threats to the species include deforestation, wind energy developments (common source of mortality for the species), and reduced prey from over application of pesticides (NatureServe 2020).

The closest known recent record is from 2018 in Humboldt Redwoods State Park, approximately 17.75 miles south of the API (BAMVT 2021). Additionally, an historic (1934) record exists from Ferndale, approximately 5.75 miles west of the API (CDFW 2021c). Suitable roosting habitat may be present in the BSA, and foraging habitat may be present in the API and BSA. With the incorporation of avoidance and minimization measures, potential impacts to Hoary Bat would remain less than significant.

Yuma Myotis (SAL)

The Yuma Myotis is a medium-sized bat with light to dark brown fur and a paler underbelly (NorCalBats 2017). The species is widespread and common throughout western North America from southern British Columbia to southern Mexico (NatureServe 2021). In California, the species is widespread throughout the state except for the desert regions. The species is thought to engage in seasonal and possibly elevational migratory movements (Harris et al. 2008b). The species feeds on moths and insects over water and other open habitat types (NatureServe 2021). Roosts include bridges, swallow nests, rock crevices, tunnels, tree cavities, and buildings (NatureServe 2021). The species mates during the fall. Females form maternity roosts in April and give birth to one pup between May through July (NatureServe 2021). Maternity roots may include several thousand individuals and are most common in mines and caves (Harris et al. 2008b). Threats to the species include roost disturbance, roosting habitat loss, and reduced prey from over application of pesticides (NatureServe 2021).

The closest known occurrence record is from 1999 in Humboldt Redwoods State Park, approximately 11 miles south of the API (CDFW 2021c). Suitable roosting habitat may be present in the BSA, and foraging habitat may be present in the API and BSA. With the incorporation of avoidance and minimization measures, potential impacts to Yuma Myotis remain less than significant.

Survey Results

No special status bats were observed during the 2021 site visits. However, the site visits occurred during daylight hours when bat activity is known to be very low, and the survey methods were not focused on documenting bat presence. No data collection has occurred in the immediate Project vicinity (nearest bat monitoring efforts have occurred in Humboldt Redwoods State Park, approximately 17 linear miles south of the API, and surrounding Arcata, approximately 20 miles north of the API; BAMVT 2021). Nonetheless, the BSA contains suitable habitat for a variety of special status bats (Townsend’s Big-eared Bat, Hoary Bat, and Yuma Myotis), and it is anticipated that there is moderate potential for these special status bat species to occur in the API and BSA during Project implementation.

The API and BSA do not overlap designated or proposed critical habitat for any federally-listed bat species.

Project Impacts

The API is unlikely to provide high-quality foraging and roosting habitat for sensitive bat species. However, the greater BSA is likely to provide foraging and roosting habitat for bats. As only small trees (<12-inch diameter at breast height [dbh]) will be removed during Project implementation, it is unlikely that any physical impacts to bat or bat roosting sites will occur. Additional avoidance and minimization measures for sensitive bat species and roosts are detailed below. With the incorporation of avoidance and minimization measures, potential impacts to special status bats would remain less than significant.

Avoidance and Minimization Efforts

Should nighttime work occur, Project-related lighting shall be minimized and focused on active construction aeras, and areas needed for safety, security or other essential requirements.

Compensatory Mitigation

The proposed Project has been designed such that Project-specific conservation measures and avoidance and minimization measures shall effectively avoid or minimize to the greatest extent feasible, affects to special status bats and their habitat. It is not anticipated that other compensatory mitigation will be required.

Cumulative Impacts

The proposed Project will not facilitate further development in the area. With implementation of the recommended avoidance and minimization measures, the proposed Project would not contribute to cumulative impacts to special status bats.

Chapter 5 – Conclusions and Regulatory Determinations

Federal Endangered Species Act Consultation Summary

An USFWS official species list for the API was received on December 11, 2020 and updated on March 30, 2022 (USFWS 2022; **Appendix E**). Seven federally threatened, endangered, or candidate species, including one threatened mammal (Pacific Marten), four threatened bird species (Marbled Murrelet, Northern Spotted Owl, Western Snowy Plover, Yellow-billed Cuckoo), one candidate insect (Monarch Butterfly), and one endangered plant species (western lily) were indicated as having potential presence in the API. The CNDDB RareFind 5 database search for the Project quadrangle and surrounding 8 quads (CDFW 2021b; **Appendix B**) indicated an additional two federally-listed plant species (both endangered) as having potential presence in the Project vicinity (9-quad search area): Menzies' wallflower and Beach layia. The proposed Project will have no effect on these species and their associated critical habitat.

An official NOAA Fisheries species list for the Project quadrangle and surrounding 8 quads was obtained on December 11, 2020 (NOAA Fisheries 2020; **Appendix D**). Four species and their associated critical habitat were indicated as having potential presence in the Project vicinity (9-quad search area): Green Sturgeon (southern DPS), Coho Salmon (southern Oregon / northern California ESU, Chinook Salmon (Coastal California ESU) and Steelhead (northern California DPS). The CNDDB RareFind 5 database search for the Project quadrangle and surrounding 8 quads (CDFW 2021b; **Appendix B**) indicated an additional federally-listed fish species as having potential presence in the Project vicinity (9-quad search area): Tidewater Goby. Given no in-water work, culvert replacement or modification, and channel alternation would occur, the Project will have no effect on these species or their associated critical habitat.

Essential Fish Habitat (EFH) Consultation Summary

EFH is designated for species managed within Fisheries Management Plans under the MSFCMA. The Pacific Coast Salmon Fisheries Management Plan (PCS FMP) addresses EFH for Pacific salmonid species. EFH for Pacific salmonids is designated within the BSA of the proposed Project (e.g., Mill Creek, tributary of Strongs Creek and the Eel River). Mill Creek passes through a double box culvert under Kenmar Road within the eastern extent of the API and BSA.

The PCS FMP was created to promote sustainable salmon harvest and fisheries management across a broad geographic region. According to the PCS FMP, freshwater EFH includes "all water bodies currently or historically occupied by [Pacific Fisheries Management Council] PFMC-managed salmon in Washington, Oregon, Idaho, and California; including aquatic areas above all artificial barriers that are not specifically excluded" (75 FR 75449). The plan manages Chinook Salmon (*Oncorhynchus tshawytscha*), Coho Salmon (*Oncorhynchus kisutch*), and Pink Salmon (*Oncorhynchus gorbuscha*). Steelhead are not managed under a FMP, and are thus not discussed further here. Although Coho Salmon have not recently been documented in Mill Creek (or Strongs Creek), Mill Creek is still considered to be EFH under the PCS FMP and is managed as such.

The PCS FMP designates five Habitat Areas of Particular Concern (HAPCs), which include complex channels and floodplain habitats, thermal refugia, spawning habitat, estuaries, and marine and estuarine submerged aquatic vegetation (SAV). The PFMC is "guided by the principle that there should be no net loss of the productive capacity of marine, estuarine, and freshwater habitats that sustain commercial, recreational, and tribal salmon fisheries beneficial to the nation" (PFMC 2014). According to the PCS FMP, adverse effects to EFH may include "direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH" (PFMC 2014).

No HAPCs were observed within the area of Mill Creek that overlaps the BSA during the reconnaissance-level Project surveys. However, it should be noted that the Stream Inventory Report of the creek indicates that Mill Creek should be managed for anadromous salmonids and some suitable habitat features are present (CDFG 2004).

As a result of construction activities, the following adverse effects could potentially occur to EFH:

- Increased turbidity and suspended sediment from work on the Kenmar Road shoulder, immediately adjacent to Mill Creek; and
- Potential contaminant releases from equipment adjacent to Mill Creek.

As no work will occur within Mill Creek or below the top of bank, no effects associated with in-water work are expected. Effects to EFH, if any, resulting from potential for sediment and contaminants to enter the creek, would be minimized through implementation of key avoidance and minimization measures (**Chapter 4 – Aquatic Habitat, Regulated Waters, and Wetlands**) during Project implementation, and diligent monitoring for stormwater damage post-construction will ensure that Project effects on EFH, if any, would be insignificant. No consultation with NOAA Fisheries on EFH is anticipated.

California Endangered Species Act Consultation Summary

The CESA states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected or preserved. The CDFW is mandated to protect and preserve such sensitive resources and their habitats. However, CESA also allows for take incidental to otherwise lawful development projects. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate mitigation planning to offset project-caused losses of listed species. No incidental take of CESA-listed species would occur in association with this Project.

Wetlands and Other Waters Coordination Summary

The Project includes temporary and permanent impacts to jurisdictional and non-jurisdictional one- and three-parameter wetlands. All wetlands delineated within the Coastal Zone will be subject to compensatory mitigation requirements as required by the County of Humboldt through the Coastal Development Permit approval process, to be no less than 1:1.2. Other impacted wetlands, located both inside and outside the Coastal Zone, and jurisdictional to the NCRWQCB and/or the USACE will also be subject to compensatory mitigation requirements to the satisfaction of each agency, to be no less than 1:12.

Invasive Species

Implementation of Prevention of Spread of Invasive Species measures (see **Chapter 4 – Special Status Plants**) will avoid and minimize the spread of invasive species as required by Executive Order 13112. Invasive Himalayan blackberry and French broom were noted throughout the BSA (GHD 2021a). Removal of these invasive species is recommended for incorporation into the compensatory wetland mitigation that will be required of the Project.

Other

Migratory Bird Treaty Act (MBTA)

Several avian species protected under the MBTA have the potential to nest within the BSA. Avoidance and minimization measures (detailed in **Chapter 4 – Discussion of Special Status Birds**) will be implemented to avoid adverse effects on migratory birds.

California Fish and Game Code (FGC)

In addition to being protected by the MBTA, avian species are protected under FGC Sections 3503 and 3503.5 (protection of birds' nests) and 3513 (taking of MBTA birds). Several species have the potential to nest within the BSA. Avoidance and minimization measures (detailed in **Chapter 4 – Discussion of Special Status Birds**) will be implemented to avoid adverse effects on migratory birds.

The proposed Project does not include work within any stream which has the potential to alter the bed, channel, or bank of said stream. Additional coordination or regulations (beyond those discussed throughout this NES) are not applicable at this time. However, should the scope of the Project change significantly, enforcement of further regulations may be necessary for Project implementation.

California Coastal Act

The portion of the Project within the Coastal Zone will be subject to the requirements of a Coastal Development Permit, to be issued under the County of Humboldt via their Local Coastal Program.

Chapter 6 – References

AmphibiaWeb. 2021. *AmphibiaWeb.* University of California, Berkeley, California, USA. http://amphibiaweb.org (03/16/2021)

Appel, C. L., W. J. Zielinski, F. V. Schlexer, R. Callas, and T. Bean. 2017. Distribution of the North American Porcupine (*Erethizon dorsatum*) in northern California. *Western Wildlife* **4**:17-28.

Baldwin, B. D. 2012. The Jepson Manual, Second Edition. University of California Press. Berkeley, California, USA.

Barnhart, R. A. 1991. Steelhead *Oncorhynchus mykiss*. Pages 324-336 *in* J. Stolz and J. Schnell, editors. *The Wildlife Series: Trout*. Stackpole Books. Harrisburg, Pennsylvania, USA.

Bat Acoustic Monitoring Visualization Tool (BAMVT). 2021. A companion to BatAmp. Conservation Biology Institute, Corvallis, Oregon, USA. https://visualize.batamp.databasin.org/ (02/22/2021)

BestPlaces. 2021. Climate in Fortuna, California. https://www.bestplaces.net/climate/city/california/fortuna#:~:text=Fortuna%2C%20California%20gets%2049%20inches,inches%20of%20snow%20per%20year. (02/19/2020)

Bildstein, K. L. and K. D. Meyer. 2021. Sharp-shinned Hawk (*Accipiter striatus*), version 1.0. S. M. Billerman, B. K. Keeney, P. G. Rodewald, and T. S. Schulenberg, editors. *The birds of world online*. Cornell Lab of Ornithology, Ithaca, New York, USA. https://doi.org/10.2173/bow.shshaw.01 (02/24/2021)

Blevins, E., S. Jepsen, and S. Selvaggio. 2020. Petition to list the Western Ridged Mussel (*Gonidea angulata*) as an endangered species under the Endangered Species Act, 16 USC § 1531 et seq. The Xerces Society for Invertebrate Conservation, Portland, Oregon, USA.

Bumble Bee Watch. 2021. *Bumble Bee Sightings Map.* Xerces Society for Invertebrate Conservation, Portland, Oregon, USA. https://www.bumblebeewatch.org/ (02/24/2021)

California Department of Fish and Game (CDFG). 2004. Stream inventory report: Mill Creek. State of California, Natural Resources Agency, Department of Fish and Game, Fortuna, California, USA.

California Department of Fish and Game (CDFG). 2009. Stream inventory report: Strongs Creek. State of California, Natural Resources Agency, Department of Fish and Game, Fortuna, California, USA.

California Department of Fish and Wildlife (CDFW). 2015. Fish Species of Special Concern Accounts, 3rd Edition. State of California, Natural Resources Agency, Department of Fish and Wildlife, Fisheries Branch, West Sacramento, California, USA. Available at: https://www.wildlife.ca.gov/Conservation/SSC/Fishes

California Department of Fish and Wildlife (CDFW). 2016. A status review of Townsend's Big-eared Bat (*Corynorhinus townsendii*) in California – report to the Fish and Game Commission. State of California, Natural Resources Agency, Department of Fish and Wildlife, Sacramento, California, USA.

California Department of Fish and Wildlife (CDFW). 2018. *Protocols for surveying and evaluating impacts to special status native plant populations and sensitive natural communities.* State of California, Natural Resources Agency, Department of Fish and Wildlife, Sacramento, California, USA.

California Department of Fish and Wildlife (CDFW). 2021a. *Biogeographic Information and Observation System (BIOS).* State of California, Natural Resources Agency, Department of Fish and Wildlife, Biogeographic Data Branch, Sacramento, California, USA. https://wildlife.ca.gov/data/BIOS (02/19/2021)

California Department of Fish and Wildlife (CDFW). 2021b. *California Natural Diversity Data Base (CNDDB) RareFind 5.* State of California, Natural Resources Agency, Department of Fish and Wildlife, Biogeographic Data Branch, Sacramento, California, USA. https://apps.wildlife.ca.gov/rarefind/view/RareFind.aspx (2/19/2021)

California Department of Fish and Wildlife (CDFW). 2022. *Special Animals List as of January 2022.* State of California, Natural Resources Agency, Department of Fish and Wildlife, Biogeographic Data Branch, Sacramento, California, USA. (01/01/2022)

California Native Plant Society (CNPS). 2021a. *A Manual of California Vegetation, Online Edition*. California Native Plant Society, Sacramento, California, USA. http://www.cnps.org/cnps/vegetation/ (01/12/2021)

California Native Plant Society (CNPS). 2021b. *CNPS Inventory of Rare Plants*. California Native Plant Society, Sacramento, California, USA. https://www.cnps.org/rare-plants/cnps-inventory-of-rare-plants (02/19/2021)

California Trout (CalTrout). Unknown year. Northern California Coast Summer Steelhead *Oncorhynchus mykiss*. CalTrout, San Francisco, California, USA. https://caltrout.org/pdf/N-CA%20Coast%20Summer%20Steelhead.pdf (04/14/2021)

Center for Biological Diversity (CBD). 2012. Petition to list 53 amphibians and reptiles in the United States as Threatened or Endangered Species under the Endangered Species Act. CBD, Tucson, Arizona, USA.

Chinnici, S., D. R. Dill, D. Bigger, D. Early and L. Diller (unpubl. data). Golden Eagle Surveys, Habitat Characteristics, and Nest Monitoring in Del Norte and Humboldt Counties, CA. Humboldt Redwood Company, Scotia, California;

Deputy District Ranger, Lower Trinity Ranger District, Six Rivers National Forest; Willow Creek, California; Green Diamond Resource Company, Korbel, California, USA.

Collins, B. W. 2004. Report to the National Marine Fisheries Service for instream fish relocation activities associated with fisheries habitat restoration program projects conducted under Department of the Amery (Permit No. 22323N) within the United States Army Corps of Engineers, San Francisco District during 2002 and 2003. California Department of Fish and Game, Northern California and North Coast Region, Fortuna, California, USA.

Confederated Tribes of the Umatilla Indian Reservation (CTUIR). 2004. Species of Interest: Pacific and Western Brook Lamprey and Freshwater Mussels Detailed Life History, Distribution, Abundance, and Other Information. CTUIR, Pendleton, Oregon, USA.

Data Basin. 2021a. Habitat Conservation Plans. Conservation Biology Institute, Corvallis, Oregon, USA. https://databasin.org/maps/new/#datasets=c116dd0d32df408cb44ece185d98731c (5/1/2021)

Data Basin. 2021b. Essential Connectivity Areas of California (USA). Conservation Biology Institute, Corvallis, Oregon, USA. https://databasin.org/ (5/1/2021)

Defenders of Wildlife (DoW). 2015. A petition to list the western bumble bee *(Bombus occidentalis)* as an endangered, or alternatively as a threatened, species pursuant to the Endangered Species Act and for the designation of critical habitat for this species. Submitted to the U.S. Secretary of the Interior acting through the U.S. Fish and Wildlife Service. Defenders of Wildlife, Denver, Colorado, USA.

Downie, S. T., C. W. Davenport, E. Dudik, F. Yee, and J. Clements (multi-disciplinary team leads). 2002. Mattole River Watershed Assessment Report. State of California, Resources Agency and Environmental Protection Agency, Sacramento, California, USA.

Erickson, Gregg A., E. D. Pierson, et al. 2002. Bat and Bridges Technical Bulletin (Hitchhiker Guide to Bat Roosts). State of California, Department of Transportation, Sacramento, California, USA.

eBird. 2021. *eBird: an online database of bird distribution and abundance.* Cornell Lab of Ornithology, Ithaca, New York, USA. http://www.ebird.org (04/07/2021

Fishbrain. 2021. Strongs Creek. Stockholm, Sweden. https://fishbrain.com/fishing-waters/q5aUTFK8/strongs-creek (5/27/2021)

Forsman, E. D. 1976. A preliminary investigation of the spotted owl in Oregon. M.S. Thesis, Oregon State University, Corvallis, Oregon, USA.

Forsman, E. D., E. C. Meslow, and H. M. Wight. 1984. Distribution and biology of the Spotted Owl in Oregon. *Wildlife Monographs* **87**:1-64.

Franklin, A. B., J. P. Ward, R. J. Gutiérrez, and G. I. Gould, Jr. 1990. Density of Northern Spotted Owls in northwest California. *Journal of Wildlife Management* **54**:1-10.

Garrison, B. A., and A. Turner. 2020. Bank Swallow (*Riparia riparia*), version 1.0. S. M. Billerman, editor. *In the birds of the world online*. Cornell Lab of Ornithology, Ithaca, New York, USA. https://doi.org/10.2173/bow.banswa.01 (04/14/2021)

GHD (GHD Inc.). 2016. Environmental Constraints Analysis in support of the Fortuna Highway 101/Riverwalk Area Connectivity Project. GHD, Eureka, California, USA.

GHD (GHD Inc.). 2021a. Kenmar Road/Highway 101 Interchange Project Wetland Delineation Report. Prepared for the City of Fortuna. GHD, Eureka, California, USA.

GHD (GHD Inc.). 2021b. Kenmar Road/Highway 101 Interchange Project Botanical Report. Prepared for the City of Fortuna. GHD, Eureka, California, USA.

GHD (GHD Inc.). 2021c. Kenmar Road and Highway 101 Interchange Project Description. Prepared for the City of Fortuna. GHD, Eureka, California, USA.

Harris, J., P. Brown, D. Alley, and R. Duke. 2008a. Life history – Yuma Myotis. California Department of Fish and Wildlife, California Wildlife Habitat Relationships System, California Interagency Wildlife Task Group, Sacramento, California, USA.

Harris, J., P. Brown, D. Alley, and R. Duke. 2008b. Life history – hoary bat. State of California, Natural Resources Agency, Department of Fish and Wildlife, California Wildlife Habitat Relationships System, Sacramento, California, USA. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=2341&inline=1

Hatfield, R., S. Jepsen, R. Thorp, L. Richardson, and S. Colla. 2014. *Bombus caliginosus.* The IUCN (International Union for Conservation of Nature) Red List of Threatened Species 2014, Gland, Switzerland. https://dx.doi.org/10.2305/IUCN.UK.2014-3.RLTS.T44937726A69000748.en (11/30/2020)

Hatfield, R., Jepsen, S., Thorp, R., Richardson, L., Colla, S., and S. Foltz Jordan. 2015. *Bombus occidentalis.* The IUCN (International Union for Conservation of Nature) Red List of Threatened Species 2015, Gland, CH. e.T44937492A46440201. https://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T44937492A46440201.en (11/30/2020)

Healey, M. C. 1991. The life history of Chinook salmon (*Oncorhynchus tshawytscha*). C. Groot and L. Margolis, editors. *Life history of Pacific salmon*. University of British Columbia Press, Vancouver, British Columbia, Canada.

Hobbs, D. F. 1937. The natural reproduction of quinnat salmon, brown and rainbow trout in certain New Zealand waters. *New Zealand Marine Department Fisheries Bulletin* **6**:1-104.

Howard, J. K. 2010. Sensitive freshwater mussel surveys in the Pacific Southwest Region: assessment of conservation status. Prepared for U.S. Department of Agriculture, Forest Service, Pacific Southwest Region, Vallejo, California, USA.

iNaturalist. 2021. *Observations.* iNaturalist Department, California Academy of Sciences and National Geographic Society, San Francisco, California, USA. https://www.inaturalist.org (02/24/2021)

Jepsen, S. 2009. Species fact sheet for Western Ridged Mussel. Xerces Society for Invertebrate Conservation, Portland, Oregon, USA

Koch, J., J. Strange, and P. Williams. 2012. Bumble bees of the Western United States. U.S. Department of Agriculture, Forest Service, San Francisco, California, USA.

Levine Fricke Recon (LFR). 2004. Draft Remedial Investigation/ Feasibility Study, Lodi Central Plume Area, Lodi, California, prepared for Guild Cleaners, Inc. and Downey Brand LLP.

Lichvar et al. 2016. The National Wetland Plant List: 2016 wetland ratings. U.S. Department of the Army, Corps of Engineers, Washington, District of Columbia, USA. http://acwc.sdp.sirsi.net/client/search/asset:asset?t:ac=$N/1012381 (04/30/2021)

Marriott, D. 1997. Where to see the Monarchs in California, first edition. The Monarch Program, California Monarch Studies, Inc.

McCrimmon Jr., D. A., J. C. Ogden, G. T. Bancroft, A. Martínez-Vilalta, A. Motis, G. M. Kirwan, and P. F. D. Boesman. 2020. Great Egret (*Ardea alba*), version 1.0. S. M. Billerman, editor. *In birds of the world online*. Cornell Lab of Ornithology, Ithaca, New York, USA. https://doi.org/10.2173/bow.greegr.01 (02/24/2021)

Moyle, P.B. 2002. Inland fishes of California. University of California Press, Berkeley and Los Angeles, California, USA.

Moyle, P. B., R. M. Yoshiyama, E. D. Wikramanayake, and J. E. Williams. 1995. *Fish species of special concern.* State of California, Resources Agency, Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California, USA. Final report for contract, (2128IF).

Moyle, P.B., J. A. Israel, and S. E. Purdy. 2008. Salmon, steelhead, and trout in California: Status of an emblematic fauna. A report commissioned by California Trout. California Trout, San Francisco, California, USA.

Nafis, G. 2021. CaliforniaHerps: A guide to the amphibians and reptiles of California. http://www.californiaherps.com (02/24/2021)

National Marine Fisheries Service (NMFS). Unknown year. Northern California Steelhead. U.S. Department of Commerce, National Oceanic and Atmospheric Administration Fisheries, NMFS, Southwest Region, Arcata, California, USA. https://www.st.nmfs.noaa.gov/data-and-tools/Salmon_CVA/pdf/Salmon_CVA_Name_Northern_California_steelhead.pdf (02/24/2021)

National Marine Fisheries Service (NMFS). 2012. NOAA's National Marine Fisheries Service's final programmatic biological opinion of NOAA Restoration Center's proposed funding and the U.S. Army Corps of Engineers proposed permitting of restoration projects within the National Marine Fisheries Service's Northern California Office jurisdictional area. U.S. Department of Commerce, National Oceanic and Atmospheric Administration Fisheries, NMFS, Arcata, California.

National Marine Fisheries Service (NMFS). 2014. Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon (Oncorhynchus kisutch). National Marine Fisheries Service. Arcata, California, USA.

National Marine Fisheries Service (NMFS). 2016. Southern Oregon/Northern California Coast recovery domain 5-year review: summary and evaluation of Southern Oregon/Northern California Coast Coho Salmon ESU. National Marine Fisheries Service, Southwest region, Arcata, California, USA.

National Oceanic and Atmospheric Administration (NOAA) Fisheries. 2007. Federal recovery outline for the evolutionarily significant unit of California coastal Chinook Salmon. U.S. Department of Commerce, NOAA Fisheries, National Marine Fisheries Service, Southwest Regional Office, Santa Rosa, California, USA.

National Oceanic and Atmospheric Administration (NOAA) Fisheries. 2011. 5-year review: summary and evaluation of southern Oregon/northern California coast Coho Salmon ESU. Southern Oregon/northern California coast recovery domain. National Marine Fisheries Service, Southwest Region, Long Beach, California, USA.

National Oceanic and Atmospheric Administration (NOAA) Fisheries. 2020. *West Coast Region California Species List.* U.S. Department of Commerce, NOAA Fisheries, Silver Spring, Maryland, USA. https://archive.fisheries.noaa.gov/wcr/maps_data/california_species_list_tools.html (12/11/2020)

National Oceanic and Atmospheric Administration (NOAA) Fisheries. 2021a. *Essential fish habitat mapper.* U.S. Department of Commerce, NOAA

Fisheries, Silver Spring, Maryland, USA. https://www.habitat.noaa.gov/application/efhmapper/index.html (02/24/2021)

National Oceanic and Atmospheric Administration (NOAA) Fisheries. 2021b. *Critical Habitat-Salmon and Steelhead (all West Coast).* U.S. Department of Commerce, NOAA Fisheries, Silver Spring, Maryland, USA. https://www.Fisheries.noaa.gov/resource/map/critical-habitat-Salmon-and-steelhead-all-west-coast (03/30/2021)

National Oceanic and Atmospheric Administration (NOAA) Fisheries. 2021c. Salmon and steelhead fisheries on the West Coast. https://www.fisheries.noaa.gov/west-coast/sustainable-fisheries/salmon-and-steelhead-fisheries-west-coast (04/19/2021)

Native Fish Society (NFS). 2020. New Science Shines Light on Eel River Steelhead Ecology. NFS, Oregon City, Oregon, USA.

NatureServe. 2021. NatureServe Explorer: An online encyclopedia of life. Version 7.1. NatureServe, Arlington, Virginia, USA. http://explorer.natureserve.org (4/14/2021)

Nawa, R. K., J. E. Vaile, P. Lind, T. M. K. Nadananda, T. McKay, C. Elkins, B. Bakke, J. Miller, W. Wood, K. Beardslee, and D. Wales. 2003. A petition for rules to list: Pacific Lamprey (*Lampetra tridentata*); River Lamprey (*Lampetra ayresi*); Western Brook Lamprey (*Lampetra richardsoni*); and Kern Brook Lamprey (*Lampetrahubbsi*) as threatened or endangered under the Endangered Species Act. http://www.biologicaldiversity.org/species/fish/Pacific_lamprey/pdfs/petition.pdf (10/15/2020)

NorCalBats. 2017. Bat Information. Northern California Bats, Davis, California, USA. http://norcalbats.org/tag/yuma-myotis/ (4/14/2021)

Pacific Fishery Management Council (PFMC). 2014. Appendix A to the Pacific Coast Salmon Fishery. Identification and description of essential fish habitat, adverse impacts, and recommended conservation measures for salmon. PFMC, Portland, Oregon, USA.

Pelton, E., S. Jepsen, C. Schultz, C. Fallon, and S. H. Black 2016. State of the Monarch Butterfly Overwintering Sites in California. The Xerces Society for Invertebrate Conservation, Washington, District of Columbia, USA.

Rathbun, G. B., N. Seipel, and D. Holland. 1992. Nesting behavior and movements of western pond turtles. *Clemmys marmorata*. *Southwestern Naturalist* **37**:319-324.

Reese, D. A., and H. H. Welsh, Jr. 1997. Use of terrestrial habitat by western pond turtles, *Clemmys marmorata*: implications for management. Proceedings of an international conference on conservation, restoration, and management of tortoises and turtles. State University of New York, Albany, New York, USA.

Rich, A. A. 1997. Testimony of Alice A. Rich, Ph.D. regarding water rights applications for the Delta Wetlands Project. California Department. of Fish and Game Exhibit DFG-7. Submitted to State Water Resources Control Board.

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evans. 2009. *A manual of California vegetation, second edition*. California Native Plant Society. Sacramento, California, USA.

Shuford, W. D., G. W. Page, and C. M. Hickey. 1995. Distribution and abundance of Snowy Plovers wintering in the interior of California and adjacent states. *Western Birds* **26**:82-98.

Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California essential habitat connectivity project: A strategy for conserving a connected California. California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.

South Dakota Bat Working Group (SDBWG). 2004. South Dakota bat management plan. South Dakota Bat Working Group, Wildlife Division, South Dakota, USA.

Stebbins, R. C. 2003. *A field guide to western reptiles and amphibians.* Third edition. Houghton Mifflin Company, Boston, Massachusetts, USA.

Stillwater Sciences. 2006. Upper Penitencia creek: limiting factors analysis. Final technical report. Santa Clara Valley Urban Runoff Pollution Prevention Program, Oakland, California, USA.

Stillwater Sciences. 2010. Pacific lamprey in the Eel River basin: a summary of current information and identification of research needs. Prepared for the Wiyot Tribe, Loleta, California. Stillwater Sciences, Arcata, California, USA.

Stillwater Sciences and Wiyot Tribe Natural Resources Department. 2017. Status, distribution, and population of origin of green sturgeon in the Eel River: results of 2014–2016 studies. Prepared for National Oceanic and Atmospheric Administration, Fisheries Species Recovery Grants to Tribes, Silver Springs, Maryland, USA. Stillwater Sciences, Arcata, California and Wiyot Tribe, Natural Resources Department, Loleta, California, USA.

Streif, B. 2007. Pacific Lamprey Fact Sheet. U.S. Department of the Interior, Fish and Wildlife Service, Portland Fish and Wildlife Service Office, Oregon, USA.

Thomson, R. C., A. N. Wright, and H. B. Shaffer. 2016. *California amphibian and reptile species of special concern.* University of California Press, Berkeley, California, USA.

Trotter, P. C. 1989. Coastal Cutthroat Trout: a life history compendium. *Transactions of the American Fisheries Society* **118**(5):463-473.

Trotter, P.C. 1997. Sea-run cutthroat trout: life history profile. Pages 7-15 *in* J.D. Hall, P.A. Bisson and R.E. Gresswell, editors. Sea-run cutthroat trout: biology, management, and future conservation. American Fisheries Society, Corvallis, Oregon, USA.

Tuttle, D. C., R. Stein, and G. Lester. 1997. Snowy plovers nesting on Eel River gravel bars, Humboldt County. *Western Birds* **28**:174-176.

UC Davis. 2021a. Fish Species by Watersheds: 'Strongs Creek-Eel River-180101051102'. University of California, Division of Agriculture and Natural Resources, Davis, California, USA. http://calfish.ucdavis.edu/location/?ds=698&reportnumber=1293&catcol=4712&categorysearch=%27Strongs%20Creek%2DEel%20River%2D180101051102%27 (5/27/2021)

UC Davis. 2021b. *Western Brook Lamprey.* University of California, Division of Agriculture and Natural Resources, Davis, California, USA. http://calfish.ucdavis.edu/species/?uid=177&ds=698 (05/27/2021)

U.S. Army Corps of Engineers (USACE). 1987. Wetlands Delineation Manual, Tech. Rep 4-87-1. U.S. Department of the Army, Corps of Engineers, Vicksburg, Mississippi, USA.

U.S. Army Corps of Engineers (USACE). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0). U.S. Department of the Army, Corps of Engineers, Washington, District of Columbia, USA.

U.S. Fish and Wildlife Service (USFWS). Unknown year. Western Brook Lamprey Fact Sheet. U.S. Department of the Interior, Fish and Wildlife Service, Portland Fish and Wildlife Service Office, Oregon, USA. https://www.fws.gov/wafwo/species/Fact%20sheets/WesternBrookLamprey_final.pdf (05/27/2021)

U.S. Fish and Wildlife Service (USFWS). 2015. Habitat Conservation Plan for the Properties of The Pacific Lumber Company, Scotia Pacific Holding Company, and Salmon Creek Corporation. Established February 1999, Revised 12 August 2015. U.S. Department of the Interior, Fish and Wildlife Service, Sacramento, California, USA.

U.S. Fish and Wildlife Service (USFWS). 2021a. *ECOS - Environmental Conservation Online System.* U.S. Department of the Interior, Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California, USA. https://ecos.fws.gov/ecp/ (04/07/2021)

U.S. Fish and Wildlife Service (USFWS). 2021a. *National Wetland Mapper.* U.S. Department of the Interior, Fish and Wildlife Service, Washington, District of Columbia, USA. https://www.fws.gov/wetlands/data/mapper.html (04/07/2021)

U.S. Fish and Wildlife Service (USFWS). 2022. *IPaC - Information for Planning and Consultation.* U.S. Department of the Interior, Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California, USA. https://ecos.fws.gov/ipac/ (03/30/2022)

U.S. Forest Service (USFS). 1997. Foothill Yellow-legged Frog (*Rana boylii*) natural history. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station, Redwood Sciences Laboratory, Arcata, California, USA.

U.S. Forest Service (USFS). 2016. Foothill Yellow-legged Frog conservation assessment in California. General Technical Report: PSW-GTR-248. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station, Redwood Sciences Laboratory, Arcata, California, USA. Western Bat Working Group. 2017. Western Bat Species. Western Bat Working Group, Rapid City, South Dakota, USA. http://wbwg.org/western-bat-species/ (04/14/2021)

U.S. Geological Survey (USGS). 2021. USGS 11469000 MATTOLE R NR PETROLIA CA gage record. U.S. Department of the Interior, Geological Survey, California Water Science Center, Sacramento, California, USA. https://nwis.waterdata.usgs.gov/ca/nwis/dv/?site_no=11469000&agency_cd=USGS&referred_module=sw (04/21/2021)

Vennesland, R. G. and R. W. Butler. 2020. Great blue heron *(Ardea herodias),* version 1.0. A. F. Poole, editor. *In the birds of the world online.* Cornell Lab of Ornithology, Ithaca, New York, USA. https://doi.org/10.2173/bow.grbher3.01 (11/30/2020)

Wallace, M. 2010. Juvenile Coho Salmon use of the tidal portions of Humboldt Bay tributaries. Presented at the Humboldt Bay Symposium, April 23, 2010. Eureka, California, USA.

Wallace, M. and S. Allen. 2009. Juvenile salmonid use of the tidal portions of selected tributaries to Humboldt Bay, California. Final Report for contract P0610522. State of California, Resources Agency, Department of Fish and Game, Pacific States Marine Fisheries, Oroville, California, USA.

Weitkamp, L. A., T. C. Wainwright, G. J. Bryant, G. B. Milner, D. J. Teel, R. G. Kope, and R. S. Waples. 1995. Status review of Coho Salmon from Washington, Oregon, and California. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-NWFSC-24. NMFS, Northwest Fisheries Science Center, Seattle, Washington, USA.

Xerces Society. 2014. Before the Secretary of the Interior – Petition to Protect the Monarch Butterfly (*Danaus plexippus plexippus*) under the Endangered Species Act. Xerces Society for Invertebrate Conservation, Portland, Oregon, USA.

Xerces Society. 2020. Western bumble bee *(Bombus occidentalis).* Xerces Society, Portland, Oregon, California, USA. https://xerces.org/endangered-species/species-profiles/at-risk-bumble-bees/western-bumble-bee#:~:text=Bombus%20occidentalis%20occurs%20along%20the,Pacific%20Northwest%20and%20into%20Alaska (11/30/2020)

Xerces Society. 2022. Find an Overwintering Site. Xerces Society for Invertebrate Conservation, Portland, Oregon, USA. https://www.westernmonarchcount.org/find-an-overwintering-site-near-you/ (03/02/2022)

Yoshiyama, R. M., and P. B. Moyle. 2010. *Historical review of Eel River anadromous salmonids, with emphasis on Chinook salmon, coho salmon and steelhead*. University of California, Center for Watershed Sciences, Davis, California, USA. A Report Commissioned by California Trout, San Francisco, California, USA.

Appendix A - Figures

Appendix B - CNDDB Database Search Results

Appendix C - CNPS Database Search Results

Appendix D - NOAA FISHERIES Official Species List

Appendix E - USFWS IPAC Official Species List

Appendix F – Site Visit Photographs

Appendix G - On-site Wildlife Species List

Table 13: Wildlife Species Detected On-site

Common Name	**Scientific Name**	**Special Status**
Avian Species		
Mourning Dove	*Zenaida macroura*	MBTA/FGC
Yellow-rumped Warbler	*Setophaga coronata*	MBTA/FGC
Red-shouldered Hawk (2)	*Buteo lineatus*	MBTA/FGC
Chestnut-backed Chickadee	*Poecile rufescens*	MBTA/FGC
Hutton’s Vireo	*Vireo huttoni*	MBTA/FGC
Pacific Wren	*Troglodytes pacificus*	MBTA/FGC
White-crowned Sparrow	*Zonotrichia leucophrys*	MBTA/FGC
Turkey Vulture	*Cathartes aura*	MBTA/FGC
Red-tailed Hawk	*Buteo jamaicensis*	MBTA/FGC
American Crow	*Corvus brachyrhynchos*	MBTA/FGC
Song Sparrow	*Melospiza melodia*	MBTA/FGC
Golden-crowned Sparrow	*Zonotrichia atricapilla*	MBTA/FGC
American Robin	*Turdus migratorius*	MBTA/FGC
Amphibian Species		
Pacific Chorus Frog	*Pseudacris regilla*	None
Key: MBTA = federal Migratory Bird Treaty Act FGC = California Fish and Game Code, including the California Migratory Bird Protection Act		

Appendix F

Wetland Delineation Report

Kenmar Road/Highway 101 Interchange Project

Wetland Delineation Report

September 2021
Revised: October 2022

Table of Contents

Appendices

1. Introduction

GHD prepared this wetland delineation report of wetlands and Other Waters of the U.S. and/or State, and accompanying appendices on behalf of the City of Fortuna, in support of the proposed Kenmar Road/Highway 101 Interchange Project (Project) within the city of Fortuna (**Appendix A Figure 1**). This report supports the Project's environmental documentation, permitting, and construction planning as deemed appropriate. The proposed Project Area includes the proposed construction area, staging areas and area around access routes to construct the proposed interchange improvement between Kenmar Road and Highway 101 (**Appendix A Figure 2**). This report is subject to, and must be read in conjunction with, the limitations set out in Section 5, Special Terms and Conditions, and the assumptions and qualifications contained throughout the report.

1.1 Project Description

The City of Fortuna (City) proposes to install two proposed roundabout improvements at the US 101 Kenmar Interchange. One roundabout is located at the intersection of Kenmar Road , Eel River Drive, and the US 101 northbound ramps. The second roundabout is located at the intersection of Kenmar Road, Riverwalk Drive, and US 101 southbound ramps. The proposed roundabouts consist of both single and/or double lanes, with access to Kenmar Road, Highway 101, and its adjacent streets, Eel River Drive and Riverwalk Drive.

1.2 Summary

GHD conducted the wetland delineation fieldwork on February 24, 2021 and April 8, 2021. The delineation was conducted within the Project Area (or Project Study Boundary [PSB]), as shown in **Appendix A, Figure 2**. United States Army Corps of Engineers (USACE) three-parameter wetlands were mapped based on wetland indicative vegetation, hydric soils, and wetland hydrology. The western extent of the Project overlaps the Coastal Zone, specifically within the Appeal and Local Jurisdictions, which is regulated by Humboldt County under the Eel River Area Plan under the Coastal Act (the Appeal Jurisdiction may be appealed to the Coastal Commission). Therefore one-parameter wetlands were also mapped per the Eel River Area Plan. Both three- and one-parameter wetlands, and Other Waters of the U.S, were mapped as shown in **Appendix A, Figure 3**.

The wetland delineation identified potenital three-parameter wetlands with hydric soil, hydrophytic vegetation, and hydrology indicators located west of Mill Creek, along the boundary between the agricultural pasture and Riverwalk Drive and Highway 101, and noth of Riverwalk Drive in roadside areas. The total area of three-parameter wetlands within the Project Area is 13,234 ft^2 (0.30 acres) (**Figure 3**). Mill Creek flows under Kenmar Road and was delineated by marking Ordinary High Water (OHW) indicators in the field; this perennial stream occupies 1,245 ft^2 of the Project Area. Mill Creek flows into Strongs Creek north of the Project Area boundary. Two intermittent roadside ditches flow west of Highway 101 and were delineated by marking OHW indicators in the field, and occupy 545 ft^2 (Ditch 1), and 188 ft^2 (Ditch 2). These ditches flow into the low-elevation pasture (below Wetland 3), where water either collects and percolates into the water table (during the dry season), or outlets into the Eel River via a drainage swale and culvert to the northwest (during the rainy season).

The Project Area also contains potential one-parameter wetlands within the Coastal Zone based on the dominance of Facultative (FAC) or wetter vegetation. Wetlands with at least one parameter (vegetation, soils, or hydrology) may be regulated within the Coastal Zone. One-parameter wetlands within the Coastal Zone included willow thickets characterized by shining willow (*Salix lasiandra),* Arroyo willow (*Salix lasiolepis),* and Sitka willow (*Salix sitchensis*), and the upper edge of the non-native pasture. Shining willow groves are considered Sensitive Natural Communities (SNCs). Areas with FAC or wetter dominant vegetation may be regulated under the Eel River Area Plan as one-parameter wetlands. Sensitive Natural Communities and/or riparian areas may also be regulated as upland Enviornmentally Sensitive Habitat Area (ESHA) when they are within the Coastal Zone.

1.3 Regulatory Background

1.3.1 Federal

Waters of the United States

The Code of Federal Regulations (CFR), 40 CFR § 230.3 states the following:

The term waters of the United States means:

(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(2) All interstate waters including interstate wetlands;
(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
(ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
(iii) Which are used or could be used for industrial purposes by industries in interstate commerce;
(4) All impoundments of waters otherwise defined as waters of the United States under this definition;
(5) Tributaries of waters identified in paragraphs (s)(1) through (4) of this section;
(6) The territorial sea;
(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States. (40 CFR § 230.3).

Wetlands Definition

40 CFR § 230.3 continues and defines, “(t) The term wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas” (40 CFR § 230.3).

Wetlands Delineation Manual

The 1987 U.S. Army Corps of Engineers (USACE) Weltand Delineation Manual provides guidelines and methods to determine whether an area is a wetland subject to federal regulation under Section 404 of the Clean Water Act. The manual specifies that wetland hydrology, soil, and vegetation indicators must be present to identify a wetland (USACE 1987, p. 10). In addition, the Wetlands Delineation Manual states, "If hydrophytic vegetation is being maintained only because of man-induced wetland hydrology that would no longer exist if the activity (e.g., irrigation) were to be terminated, the area should not be considered a wetland," (USACE 1987).

Federal Geographic Data Committee (FGDC) Wetland Classification Standard

The Classification of Wetlands and Deepwater Habitats of the United States (FGDC 2013), based on Cowardin et al. (1979), states that wetlands must have at least one of the three wetland attributes: predominantly hydrophytic vegetation, predominantly hydric soil, and hydrology. However, they state that all available information should be used, and all three attributes should be considered if they are present (FGDC 2013).

1.3.2 State

The State Water Resources Control Board's (SWRCB) April 2019 *Procedures for Discharges of Dredged or Fill Material to Waters of the State* says the following:

> *An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.*
>
> *The Water Code defines "waters of the state" broadly to include "any surface water or groundwater, including saline waters, within the boundaries of the state." "Waters of the state" includes all "waters of the U.S." The following wetlands are waters of the state:*
>
> *1. Natural wetlands,*
> *2. Wetlands created by modification of a surface water of the state, and*
> *3. Artificial wetlands that meet any of the following criteria:*
> *a. Approved by an agency as compensatory mitigation for impacts to other waters of the state, except where the approving agency explicitly identifies the mitigation as being of limited duration;*
> *b. Specifically identified in a water quality control plan as a wetland or other water of the state;*
> *c. Resulted from historic human activity, is not subject to ongoing operation and maintenance, and has become a relatively permanent part of the natural landscape; or*
> *d. Greater than or equal to one acre in size, unless the artificial wetland was constructed, and is currently used and maintained, primarily for one or more of the following purposes (i.e., the following artificial wetlands are not waters of the state unless they also satisfy the criteria set forth in 2, 3a, or 3b):*
> *i. Industrial or municipal wastewater treatment or disposal,*
> *ii. Settling of sediment,*
> *iii. Detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial stormwater permitting program,*
> *iv. Treatment of surface waters,*
> *v. Agricultural crop irrigation or stock watering,*

vi. Fire suppression,

vii. Industrial processing or cooling,

viii. Active surface mining – even if the site is managed for interim wetlands functions and values,

ix. Log storage,

x. Treatment, storage, or distribution of recycled water, or

xi. Maximizing groundwater recharge (this does not include wetlands that have incidental groundwater recharge benefits); or

xii. Fields flooded for rice growing.

All artificial wetlands that are less than an acre in size and do not satisfy the criteria set forth in 2, 3.a, 3.b, or 3.c are not waters of the state. If an aquatic feature meets the wetland definition, the burden is on the applicant to demonstrate that the wetland is not a water of the state" (SWRCB 2019).

The February 2020 *Draft Guidance State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* further clarifies as follows:

Human activity can cause changes to the surrounding landscape (e.g., grading activities, road construction, direct hydromodification) such that wetlands form where wetlands did not previously exist. Where such artificial wetlands are now a relatively permanent part of the natural landscape, and are not subject to ongoing operation and maintenance, they are waters of the state. By requiring that the wetlands are relatively permanent, the framework excludes wetlands that are temporary or transitory. That they are part of the natural landscape also indicates the relative permanence of the wetlands and suggests that the wetland is self-sustaining without ongoing operation and maintenance activities, and provides similar ecosystem services as natural wetlands. By way of example, this category of wetlands includes situations where water flow is permanently redirected as the result of human activity, such as grading in another area, such that new wetlands form in areas that were previously dry. These wetlands may not be natural wetlands because they result from human activity and they were not formed by modifying a water of the state (rather they were an indirect result), but nevertheless they take on the function of natural wetlands such that they should be considered waters of the state. This category would not include artificial wetlands constructed for specific purposes listed in section II.3.d because the construction of the artificial wetlands would be too recent to be deemed "historic" and the artificial wetland would likely require ongoing maintenance such that they would not be deemed "relatively permanent," and/or the artificial wetland is not part of the "natural landscape" (SWRCB 2020).

1.3.3 Eel River Area Local Coastal Plan

See **Appendix A, Figure 5** for the portion of the Project Area that is within the Appeal and Local Jurisdiction of the Coastal Zone, which is regulated by Humboldt County under the Eel River Area Local Coastal Plan (Eel River Area Plan) under the the Coastal Act. The Appeal Jurisdiction is appealable to the California Coastal Commission.

The Eel River Area Plan (certified in 1982) uses the Coastal Act definition of wetlands (Ch.3, p.30), and states "No land use or development shall be permitted in areas adjacent to coastal wetlands, called Wetland Buffer Areas, which degrade the wetland or detract from the natural resource value" (Ch.3, p.31, Humboldt County 2014). The Local Coastal Plan provides specific examples of ESHA within the Eel River Area coastal zone (Ch.3, p.28):

a. Environmentally sensitive habitats within the Eel River Planning Area include:

(1) Rivers, creeks, and associated riparian habitats;

(2) Estuaries, sloughs, and wetlands;.

(3) Rookeries for herons and egrets;

(4) Harbor seal pupping areas;

(5) Critical habitats for rare or endangered species listed on State or Federal lists.

2. Methodology

2.1 Wetland Delineation Approach

GHD environmental scientists conducted the wetland delineation on February 24, 2021 and April 8, 2021, with an additional hydrology check after heavy rains on March 10, 2021 and site visit on April 27, 2021. In early August 2022, the Project Area boundary was modified slightly based on advanced engineering design. Misha Schwarz, Professional Wetland Scientist and Certified Professional Soil Scientist, revisited the site on the September 9, 2022 to investigate the change in the Project Area with regard to one and three-parameter wetlands. To define a wetland, the USACE requires that vegetation, soil, and hydrology (three-parameters) all show wetland attributes (USACE 1987; USACE 2010). The CCC requires only one-parameter of the three to be present in order to define the site as a wetland (14 CCR 13577). The wetland delineation used USACE criteria from the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region* (USACE 2010). The current standard field forms provided by the USACE (2010) were used to collect vegetation, soils, and hydrology data (**Appendix B)**.

In potential three-parameter wetland areas, vegetation, soil, and hydrology data were collected in a transect across the upland/wetland boundary with two plots (upland/wetland) per transect. The naming convention used on datasheets to designate upland or wetland plots associated with a transect is -U or -W, respectively.

One-parameter and three-parameter wetland/upland boundaries and plots were mapped in the field with a Eos Arrow 100 Submeter Global Positioning System (GPS) Reciever with Global Navigation Satellite System (GNSS) and an iPad running ArcGIS Collector software. The wetland/upland boundary was recorded with the GPS unit as needed to map the wetland's spatial extent. The points were then connected in the office using ArcMap software for figure creation and the boundaries were clipped to the extent of the Project Area.

Each three-parameter wetland area was designated with a number (e.g., W1). The wetland points were also labeled with their respective wetland number. In addition to the wetland sampling points, two upland sampling points were described. These were labeled beginning with a "U" and numbered in sequence (e.g., U1, U2). The upland sampling points were completed to confirm and document the absence of any wetland indicators (soils, hydrology, and vegetation). **Appendix B** contains all datasheets recorded during the delineation.

2.2 Botanical methodology

Vegetation data collection consisted of listing the dominant species in the herbaceous, shrub, and tree layer within a standard-sized plot determined by the strata layer. Nomenclature follows *The Jepson Manual* (Baldwin et al. 2012), which was cross-walked to federal standard nomenclature to identify the indicator status. The species' wetland indicator status for the Western Mountains, Valleys, and Coast Region was denoted in the respective column, using the standard reference: *State of California 2016 Wetland Plant List* (Lichvar et al. 2016). This list classifies species based on the probability that they are found in wetlands (USACE 1987) as follows:

- Obligate (OBL): almost always in wetlands (99% probability)
- Facultative Wetland (FACW): usually occurring in wetlands (67% to 99% probability)
- Facultative (FAC): commonly occurring in wetlands and uplands (34% to 66% probability of occurring in wetlands)
- Facultative Upland (FACU): usually occurring in uplands (1% to 33% probability of occurring in wetlands)
- Upland (UPL): upland obligate, rarely in wetlands (1% in wetlands)

Species that do not appear on the list are considered to be in the upland category (Lichvar et al. 2016). Standard procedures for documenting hydrophytic vegetation indicators were used per the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (USACE 2010). A complete list of plants documented at the site with respective wetland indicator status is included as **Appendix C**. Vegetation communities that may be regulated under the Coastal Act, and/or the Eel River Area Plan were documented according to the Manual of Calfornia Vegetation at the Alliance level (Sawyer et al. 2009). Sensitive Natural Communities overlapping the Project Area that may qualify as one-parameter wetlands were characterized using Rapid Assessment protocol (**Appendix D**). Site photographs have been included as **Appendix E.** The separate Botanical Report will contain the location and extent of mapped vegetation alliances and Sensitive Natural Communities within the Project Area.

2.3 Soils Methodology

Hydric soils were defined based on the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (*USACE 2010) procedures in combination with the Natural Resources Conservation Service's (NRCS) definitions presented in *Field Indicators of Hydric Soils in the United States* (USDA/NRCS 2018). Soil pits were dug to an approximate depth of 14 inches. Data on soil color, texture, and redoximorphic features were recorded. Any observed redoximorphic features (iron concentrations) were noted along with their percentage within the soil matrix, and care was taken to distinguish chromas of 1 and 2 indicative of an iron-depleted soil within 12 inches of the soil surface (USACE 2010; USDA/NRCS 2016).

The *Munsell Soil Color Book* (COLOR, M. 2000) was used to describe the soil colors for the entire depth of the test pit. Moist, natural soil aggregate (ped) surfaces, which had not been crushed, were used to determine the soil's color. Soils with low chroma were verified as being hydric or upland with *Field Indicators of Hydric Soils in the United States* (Version 8.2, 2018).

2.3.1 Existing Soils Information

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) identifies three soil units within the Project Area (**Figure 5 in Appendix A** and NRCS report in **Appendix F**). A brief map unit description, as generated by the NRCS, is provided for each soil unit below (NRCS 2021). Although NRCS soil mapping is informative, the scale is generally too broad to definitively characterize potential wetlands. Please see the full report included as **Appendix F** for complete details.

Dungan, 0 to 2 percent slopes

The Dungan 0 to 2 percent slopes map unit composition contains: 85% Dungan and similar soils, and 15% minor components (consisting of 7% Ferndale, 5% Arlynda and 3% Russ). Dungan soils can be found on alluvial fans and fan remnants and floodplain steps, and the parent material is alluvium derived from mixed sources. Dungan consists of silt loam in the top horizons, with fine sandy loam followed by silty clay loam at the deepest horizon. Dungan has a land capability classification (LCC) of 1 if irrigated, and 2s if not irrigated, and is not rated as a hydric soil. They are well drained, and the depth to water table is 39-61 inches. This soil type is located in the western and southern extent of the Project and overlaps into the Coastal Zone (see **Figure 5**).

Fiedler-Petellen-Nanningcreek complex, 15 to 30 percent slopes

The map unit composition is as follows: 32% Fiedler and similar soils, 28% Petellen and similar soils, 25% Nanningcreek and similar soils, and 15% minor components (consisting of 10% Rootcreek, and 5% Salmoncreek). Fiedler, Petellen and Nanningcreek soils can be found on mountain slopes, and the parent material is colluvium derived from conglomerate and colluvium derived from sandstone (for Nanningcreek). Fiedler consists of organic matter and loam in the top horizons (down to 20 inches). Petellen consists of an organic layer above gravelly loam, and very cobbly loam (down to 60 inches). Nanningcreek consists of loam to approximately 20 inches depth, with sandy clay loam beneath it down to approximately 60 inches. Fiedler, Petellen and Nanningcreek soils are not rated as hydric soils. Fiedler and Petellen soils are well drained and depth to water table is more than 80 inches. Nanningcreek soil is considered moderately well drained and the depth to the water table is 20 to 39 inches. This soil complex is located in the eastern extent of the Project and is outside of the Coastal Zone (see **Figures 4** and **5**).

Urban land-Friendlycity association, 0 to 2 percent slopes

The map unit composition is as follows: 65% Urban land, residential, 25% Friendlycity and similar soils, and 10% minor components (consisting of 4% Canalschool, 3% Carlotta, and 3% Ferndale). Urban land, residential, and Friendlycity occur on terraces and alluvial fans, and Friendlycity soil originates from alluvium derived from metamorphic and sedimentary rock. The typical soil profile of Urban land, residential, is not listed. The typical soil profile of Friendlycity includes silt loam to approximately 6 inches followed by silty clay loam to approximately 55 inches. Urban land and Friendlycity soils are not hydric soils, and Friendlycity soils are considered moderately well drained and the typical depth to water table is 20-39 inches. This soil association comprises 82% of the Project and is located in the central portion of the Project boundary, within and outside of the Coastal Zone (see **Figure 5**).

2.4 Hydrology Methodology

GHD delineated wetlands within the area on February 24th and April 8th, 2021, during and near the end of the wet season, respectively. An additional field check for hydrology indicators and hydrological connectivity was conducted on March 10, 2021 after a period of high precipitation. A WETS table showing climate data for the Woodley Island, Eureka Station is provided in **Appendix G**. Aerial photography and the National Wetland Inventory Mapper were referenced before conducting fieldwork (**Appendix A, Figure 6**) (NWI 2021). The flood hazard map is also included in **Appendix A, Figure 7** (FEMA 2021). Wetland hydrology indicators, such as drainage patterns, material deposits, soil saturation, high water table, or surface water presence, were recorded in the field.

The northeastern portion of the Project Area is surficially hydrologically connected to the lower Eel River watershed via Mill Creek. The remainder of the Project Area drains via a network of ditches and culverts to an agricultural field used for grazing, where water percolates the soil and drains subsurface to the Eel River. High levees surrounding the Eel River likely prevent runoff from the pasture and adjacent Kenmar interchange into the Eel River.

3. Results

Weather conditions during field visits were mostly clear and sunny, and the February survey took place following a period of wet weather (3.14 inches of precipitation recorded within the previous two weeks). The Project Area contains two three-parameter, USACE jurisdictional wetlands, and two one-parameter wetlands that meet CCC and local requirements based only upon hydrophytic vegetation (FAC or wetter). The Project Area boundary was modified after this wetland delineation, and an additional three-parameter wetland ("W2") was formerly within the Project Area boundary and not is not included the Project Area but is included in this report and figures. Willow thickets along the western slope, and the upper edge of the non-native pasture occurring in the Coastal Zone were mapped as one-parameter wetlands based on the dominant vegetation. Upland sampling points were also described within areas of planned disturbance to confirm and document the absence of wetland indicators in these areas**. Appendix A Figure 3** shows the results of the three-parameter wetland delineation, other waters, and one-parameter wetlands within the Coastal Zone. Summaries and potential jurisdictional status of each wetland or other water is presented in **Table 3-1** below.

3.1 Three-Parameter Wetlands

A small patch of three-parameter wetlands were observed in the northern portion of the Project Area ("W1"), and a larger patch of three-parameter wetlands was observed in the western extent of the Project Area ("W3"). Wetland 2 ("W2") is located north of W3, and is outside of the Project Area boundary (see **Appendix A, Figure 3**). Summaries of each three-parameter wetland are provided below, and square footage is provided in **Table 3-1**. Please see the USACE Data Forms in **Appendix B** for more details.

3.1.1 Wetland 1 **("W1")**

Wetland 1 was identified north of Kenmar Road around the gated portion of Fortuna Millsite in the northeastern portion of the Project Area. Wetland 1 was observed outside of the Coastal Zone. Wetland 1 consists of two extents which are hydrologically connected by a culvert under Eel River Drive. The eastern extent is a constructed depression which appeared to collect runoff from surrounding pavement within the depression. The western extent also appeared to be a depression, however did not resemble to be a constructed depression like the eastern extent. During large storm events, Wetland 1 may overflow into an upland ditch located to the west (Up-3). Hydrological connection between Wetland 1 and the upland ditch was not observed during the delineation or hydrology check after heavy rains on March 10, 2021. Wetland 1 terminates near the rail line to the west. Wetland 1 was observed to collectively occupy 1,128 ft^2 of the Project Area.

The area around the eastern extent of Wetland 1 contained mature and young shining willow and Arroyo willow trees, and is thereby classified according to the Cowardin classification system as a

Palustrine Forested wetland (PFO). The area around the remainder of Wetland 1 (western extent) was dominated by shrubs and is thereby classified according to Cowardin classification system as Palustrine Scrub-Shrub (PSS) (FGDC 2013). Wetland 1 consisted of saturated soil with hydrophytic vegetation adjacent to the ponded water. The vegetation was characterized by Arroyo willow (FACW), Himalayan blackberry (*Rubus armeniacus*, FAC), and bog rush (*Juncus hesperius*, FACW). Soil in Wetland 1 consisted of a Loamy Gleyed Matrix (F2) with a top horizon (0-3") of organic material, above a horizon (3-10") of sandy silt with gravel with a matrix color of Gley1 3/10Y with no redoximorphic features.

Indicators of wetland hydrology at the site included a high water table (A2), and saturation (A3). Please see attached data form for sample point W1T1-W in **Appendix B** for additional details. Wetland 1 should not be considered under the jurisdiction of the USACE because it is constructed, it is less than one acre, and was not hydrologically connected to a navigable waterway. Wetland 1 is likely to be under the jurisdiction of the RWQCB because it is an artificial wetland that resulted from historic human activity that has become a relatively permanent part of the natural landscape and is not subject to ongoing operation and maintenance (Water of the State definition 3(c)). Wetland 1 is not within the jurisdiction of Humboldt County's Local Coastal Program or appealable to the CCC because it is outside the Coastal Zone (see Table 3-1).

3.1.2 Wetland 2 **("W2")**

Wetland 2 was observed to occupy 3,425 ft^2 and was identified along and adjacent to a gravel access road in an agricultural field formerly within the western extent of the Project Area (and currently located outside of the Project Area boundary). The Project would have no effect on Wetland 2, and therefore **details on Wetland 2 are provided for informational purposes only.**

Wetland 2 appeared as a constructed feature that has a seasonal surficial hydrological connection with the Eel River, a navigable water. No rooted woody vegetation was observed along the access road, and this area is classified according to Cowardin classification system as a Palustrine Emergent wetland with persistent vegetation (PEM1c) (FGDC 2013). Predominantly outside the Project Area, the agricultural field is largely classified as Palustrine Emergent freshwater wetland (PEM1c) according to the National Wetlands Inventory (NWI) mapper (USFWS 2021). A small area within the Project Area southwest of the interchange is included in the Palustrine Emergent freshwater wetland complex mapped by NWI.

The vegetated area around Wetland 2 contained herbaceous and hydrophytic vegetation, hydric soil and wetlands hydrology. Vegetation at the sample plot location was characterized by tall flatsedge (*Cyperus eragrostis,* FACW), waxy mannagrass (*Glyerica declinata,* FACW), hairy buttercup (*Ranunculus sardous,* FAC), pennyroyal (*Mentha pulegium,* OBL), creeping bentgrass (*Agrostis stolonifera,* FAC), and common spikerush (*Eleocharis palustris,* OBL). Wetland 2 met the criteria for the hydric soil indicator Redox Dark Surface (F6). Soil was described as very dark with redoximorphic features atop (and in some areas mixing with), an old gravel road bed. Soil consisted of a top horizon (0-2.5") of gravelly silty loam with a matrix color of 10YR 2/1 and 2% redoximorphic features with a color of 7.5YR 5/8), a very gravelly silt loam horizon (2.5-6") with the same matrix color (10YR 2/1) and 30% redoximorphic features with the same color (7.5YR 5/8), and a gravelly aggregate base (6-10") with the same matrix color (10YR 2/1) and 15% redoximorphic features of the same color (7.5YR 5/8).

Wetland hydrology indicators included Surface Water (A1), and Algal Mat or Crust (B4). It was noted that surface water was previously observed in February and March (2021), and the seasonally ponded wetland had no surface water by the April 8th delineation. Wetland 2 is ephemerally connected to Wetland 3, and drainage into Wetland 3 was observed after heavy rains on March 10, 2021. Algae was present, and it was located in a low geomorphic position between artificial berms. Please see attached data form for sample point W2T1-W in **Appendix B** for additional details.

3.1.3 Wetland 3 **("W3")**

Wetland 3 was identified in the western extent of the Project Area and was observed in a lowland agricultural field that collects water draining from the culverted ditch under Riverwalk Drive. Wetland 3 was observed within 13,644 ft^2 of the Project Area. Rooted vegetation was not observed in this area, and it may be classified according to Cowardin classification system as a Palustrine Emergent wetland with persistent vegetation (PEM1) (FGDC 2013).

Wetland 3 was observed within the low-lying agriculture field, which is classified as Palustrine Emergent freshwater wetland (PEM1c) according to the NWI mapper (USFWS 2021). Wetland 3 was also observed to be hydrologically connected to flow from Ditch 2 which drains to Wetland 3. The vegetation in Wetland 3 consisted of colonial bentgrass (*Agrostis capillaris,* FAC), Kentucky bluegrass (*Poa pratensis,* FAC), white clover (*Trifolium repens,* FAC), hairy buttercup (FAC), creeping buttercup (*Ranunculus repens,* FAC), curly dock (*Rumex crispus,* FAC), pennyroyal (OBL), bird's-foot trefoil (*Lotus corniculatus,* FAC), and wild geranium (*Geranium dissectum, UPL*). Soils met the criteria for hydric soil indicator Redox Dark Surface (F6). The upper horizon (0-4") consisted of silty loam with a matrix color of 10YR 3/1, and the lower horizon (4-13") consisted of silty loam with the same matrix color (10YR 3/1) however also contained 10% redoximorphic features which had a color of 7.5YR 3/4. Wetland hydrology was indicated by the presence of saturated soil and surface water observations during February and March 2021, however the site was dry at April 8, 2021 field visit. Secondary indicators Drainage Patters (B10) and Geomorphic Position (D2) were observed. Please see attached data forms for sample point W3T1-W and W3T2-W in **Appendix B** for additional details.

Wetland 3 was observed in a low position within the pasture south of Wetland 2. As described above, Wetland 2 is ephemerally connected to Wetland 3, as was observed after heavy rains on March 10, 2021. A drainage swale exists between Wetlands 2 and 3 which drains to the Eel River via a culvert. Therefore it can be expected that during heavy precipitation events, surface flow from Wetland 3 drains via the drainage swale to the Eel River. During dry weather or intermittent rains, its expected that surface water percolates through Wetland 3 or the adjacent agricultural pasture to the water table. Therefore, due to the intermittent connection of Wetland 3 to the Eel River, Wetland 3 is considered jurisdictional by the USACE. Wetland 3 is also likely to be considered under the jurisdiction of the RWQCB because it is an artificial wetland that resulted from historic human activity that has become a relatively permanent part of the natural landscape and is not subject to ongoing operation and maintenance (Water of the State definition 3(c)). Wetland 3 is located within the Coastal Zone and is therefore within the jurisdiction of the County's Eel River Area Plan and is appealable to the CCC (see **Table 3-1**).

3.2 Other Waters of the U.S. and/or State

3.2.1 Mill Creek

A small portion of Mill Creek is located within the northeastern extent of the Project Area, where it passes under a bridge beneath Kenmar Road. Mill Creek flows for approximately 800 feet until the confluence with Strongs Creek , located outside of the Project Area. Ordinary High Water (OHW) was mapped with a GPS in the field to define the edges of Mill Creek on both sides of Kenmar

Road based on slope-break and vegetation indicators to mark the extent of waters within the Project Area. A total of 1,245 ft^2 of perennial waters was mapped under Kenmar Road within the Project Area, and this may be classified according to the Cowardin system as Riverine Lower Perennial Unconsolidated Bottom (R2UB). Mill Creek flows into Strongs Creek and ultimately to the Eel River, and therefore is under the jurisdiction of the USACE, and RWQCB. Mill Creek is outside of the Coastal Zone and is therefore not under the jurisdiction of Humboldt County's Local Coastal Program or appealable to the CCC (see Table 3-1).

The riparian area around Mill Creek was assessed for wetland indicators (Riparian-1, Up-2). The riparian area contained hydophytic vegetation but did not contain hydric soil or hydrology indicators. The Mill Creek riparian area is dominated by Arroyo willow (FACW), shining willow (FACW), and red alder (FAC), but it was not mapped as a one-parameter wetland because it is located outside the Coastal Zone.

3.2.2 Other Intermittent Waters

Two intermittently flowing ditches that exhibited Ordinary High Water features were identified within the Project Area. The two ditches appear to flow seasonally alongide Riverwalk Drive and through a culvert under Riverwalk Drive to the wet pasture below (Wetland 3). Ditch 1 (northern) and Ditch 2 (southern) appeared to have been constructed to convey stormwater around the intersection of Riverwalk Drive and Highway 101, and they drain into the agricultural field associated with Wetland 3. Ordinary High Water was mapped with a GPS in the field on both sides of the ditches based on slope-break and vegetation indicators to mark the extent of waters within the Project Area. Ditch 1 (545 ft^2) and Ditch 2 (189 ft^2) support intermittent seasonal waters within the Project Area. Both ditches may be classified according to the Cowardin system as Riverine Intermittent Unconsolidated Bottom (R4UB). Ditch 1 and Ditch 2 are intermittently hydrologically connected to a navigable waterway via Wetland 3, and therefore are under the jurisdiction of the USACE. Ditch 1 and Ditch 2 are likely to be considered within the jurisdiction of the RWQCB because although they are artificial waterways that resulted from historic human activity that has become a relatively permanent part of the natural landscape, they are not likely subject to ongoing operation and maintenance (Water of the State definition 3(c)). Approximately 375 ft^2 of Ditch 1 and the entirety of Ditch 2 are within the Coastal Zone and are therefore within the jurisdiction of the County's Eel River Area Plan and appealable to the CCC (see **Table 3-1**).

3.3 One-Parameter Wetlands

One-parameter wetlands which overlapped the Project Area within the Coastal Zone include the shining willow alliance (FACW), and the upper margins of wet pasture (FAC species). Areas with FAC or wetter dominant vegetation may be regulated under the Eel River Area Plan as one-parameter wetlands and are appealable to the CCC. Vegetated one parameter wetlands are not considered Waters of the U.S. or Waters of the State and therefore are not under the jurisdiction of the USACE or RWQCB (see Table 3-1).

3.3.1 Shining Willow Groves

Shining willow (FACW) alliance was observed along the boundary of the agriculture pasture concentrated near the intersection of Riverwalk Drive and the Highway 101 southbound on ramp, located along the western extent of the Project Area in Wetland A and Wetland B (**Appendix A, Figure 3**). The shining willow alliance contained a diverse mixture of willows at approximately even dominance, with approximately 25% shining willow cover, 22% arroyo willow cover, and 18% Sitka willow cover. Red alder (*Alnus rubra*, FAC) and other trees also occurred in the area. The shining willow alliance was concentrated along the slope above the wet pasture and around Ditch 1, where stormwater runoff collects from southern Riverwalk Drive, Highway 101 and culvert outflows. Shining willow, Arroyo willow and Sitka willow are all Facultative Wetland indicator species, meaning they usually occur in wetlands, but are occasionally found in non-wetlands. Shining willow, Arroyo willow and Sitka willow dominate the canopy along the edge of the agricultural field up to approximately 475 feet west of the Riverwalk Drive and Highway 101 intersection. Associated understory vegetation included high cover (50%) of invasive Himalayan blackberry (FAC), with poison hemlock (*Conium maculatum,* FAC), spiny sowthistle (*Sonchus asper,* FACU), creeping buttercup (FAC), Kentucky bluegrass (FAC), and creeping bentgrass (FAC). As discussed above, three-parameter wetlands Wetland 2 and Wetland 3 were mapped within the shining willow alliance canopy along the agricultural field (**Appendix A Figure 3**). The shining willow alliance was observed to be growing close to the margins of proposed roads and ground disturbance areas, and select trees may need to be removed under the Project. The shining willow alliance is rated as "Vulnerable" in the state (S3 G4) and it is considered a Sensitive Natural Community. Within the Coastal Zone and Eel River Area Plan, shining willow is expected to be considered a one-parameter wetland.

3.3.2 Non-native Pasture

The grazed agricultural field west of the interchange was observed to be primarily dominated by facultative non-native pasture species in both 3-parameter and 1-parameter wetland areas, including colonial bentgrass (FAC), Kentucky bluegrass (FAC), and white clover (FAC). No visible change in species dominance occured along the elevational change between 3-parameter and 1-parameter wet pasture areas.

3.4 Other Non-Jurisdictional Features

3.4.1 Impoundments

Two impoundments are located adjacent to remnant train tracks in the central eastern portion of the Project Area. The impoundments are surrounded by gravel and collect seasonal stormwater runoff from Eel River Drive. There was no observation of surface hydrologic connectivity to a creek, wetland or other waterway. An investigation of soils and vegetation along Impoundment 1 showed that the area did not meet 3-parameter wetland criteria. The impoundments do not have any regulatory status (see Table 3-1).

Table 3-1. Wetlands and Other Waters within the Delineated Area and Potential Jurisdiction

Aquatic Resource Name	Location (lat/long) of point or center of polygon	Aquatic Resource Size (ft^2)	Jursidiction		
			USACE	RWQCB	CCC
Wetland 1 (W1T1-W)	40.576114, -124.147984; 40.575926, -124.148328	1,128	No	Likely	N/A
Wetland 2 (W2T1-W)	40.575466, -124.151100	3,425	N/A	N/A	N/A
Wetland 3 (W3T1-W, W3T2-W)	40.575926, -124.148328	13,644	Yes	Likely	Yes

Aquatic Resource Name	Location (lat/long) of point or center of polygon	Aquatic Resource Size (ft^2)	Jurisdiction		
			USACE	RWQCB	CCC
Mill Creek (OHW)	40.576252, -124.14747; 40.576433, -124.147678	1,245	Yes	Yes	N/A
Ditch 1 (OHW)	40.574722, -124.149895	545	Yes	Likely	Yes
Ditch 2 (OHW)	40.574286, -124.149774	189	Yes	Likely	Yes
Impoundment A	40.574952, -124.148307	2,063	No Jurisdictional Status		
Impoundment B	40.574952, -124.148153	109	No Jurisdictional Status		
Wetland A	40.574369, -124.150027	22,087	No	No	Yes
Wetland B	40.574992, -124.150257	6,672	No	No	Yes
Total Wetlands and Other Waters in Project Area		**47,682 ft^2 (1.09 acres)**			

3.5 Uplands Sampling Points

Upland sampling points were also collected to characterize areas that are likely to be affected by the Project. No wetlands were detected within the areas characterized by the following upland points, which are also located outside of the Coastal Zone (**Table 3.2**).

3.5.1 Upland 1

The Upland 1 sample point was located in the northeastern extent of the Project Area. This area is a low point in a shallow swale near the Kenmar Road and Fortuna Boulevard intersection, and contains willows and California blackberry (*Rubus ursinus)*. The site was dominated by Arroyo willow (FACW), California blackberry (FACU), western sword fern (*Polystichum munitum,* FACU), and stinging nettle (*Urtica dioica,* FAC). Soils did not show hydric soil characteristics, and contained a matrix color of 10YR 3/1 and 2.5Y 3/2 with approximately 2% redoximorphic features located greater than 12 inches from the surface. The site did not show any primary indicators of wetland hydrology.

3.5.2 Upland 2

The Upland 2 sample point was located approximately three feet from the OHWM on the south side of the Kenmar Road bridge atop Mill Creek. The sample point was dominated by red alder (FAC), Himalayan blackberry (FAC), and California blackberry (FACU). The soil consisted of loam with a color of 10YR 3/2 with no redoximorphic features, and it did not show hydric soil indicators. No hydrological indicators were present.

3.5.3 Upland 3

The Upland 3 sample point was located in the center of a constructed drainage ditch in the northern segment of the Project Area, between the Highway 101 northbound on ramp and Eel River Drive. The sample point was dominated by California blackberry (FACU), with a minor amount of coast twinberry (*Lonicera involucrata,* FAC), and Robert's geranium (*Geranium robertianum,* FACU). The soil consisted of clay loam, and hydric soil indicators were observed due to the presence of indicator F7 (Depleted Dark Surface); however, no primary hydrology indicators were present.

3.5.4 Upland 4

The Upland 4 sample point was within a ditch located west of the Highway 101 southbound off ramp. Vegetation in the upland ditch included some hydrophytic species but did not pass the Dominance Test. Vegetation at Upland 4 included shining willow (FACW), California blackberry (FACU), Himalayan blackberry (FAC), common mustard (*Brassica rapa,* FACU), posion hemlock (FAC), wild teasle (FAC), and bullthistle (*Cirsium vulgare,* FACU). The soil consisted of silty clay loam with a color of 2.5Y 3/1 with less than 1% of redoximorphic features, and is not considered a hydric soil. Hydrological indicators were present, including saturation (A3) approximately 4 inches from the surface, and secondary indicators including water-stained leaves (B9) and geomorphic position (D2) were present.

Table 3.2 Upland Sampling Point Locations

Sampling Point Name	Location (lat/long)
Upland 1 (Up1)	40.576293, -124.147537
Upland 2 (Up2)	40.576293, -124.147537
Upland 3 (Up3)	40.575743, -124.148573
Upland 4 (Up4)	40.574764, -124.149742

4. Conclusions

The wetland delineation for the City of Fortuna's Kenmar Road/Highway 101 Interchange Project, completed on February 24, 2021 with follow up visits on March 10, 2021, April 8, 2021 and April 27, 2021, determined the extent of wetlands and other waters within the Project Area based on hydrophytic vegetation, hydric soils, and wetland hydrology using methods and indicators outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region* (USACE 2010). Mill Creek, a perennial water of the U.S. and state, flows through a bridge under Kenmar Road within the Project Area. A total of 18,197 ft^2 (0.42 acres) of thee-parameter wetlands have been maped for this Project, with 14,772 ft^2 (0.34 acres) of three-parameter wetlands occur within the Project Area, of which one has intermittent surficial hydrological connection to the Eel River (W3) and one does not (W1) (**Appendix A Figure 3**). Wetland 3 (and Ditches 1 and 2 which drain to Wetland 3) are anticipated to be under the jurisdiction of the USACE due to the intermittent surficial hydrologic connection with the Eel River.Data forms are attached showing sample plot data collected in transects across wetland boundaries and additional upland sampling points (**Appendix B**).

Vegetation communities with FAC or wetter dominant vegetation are subject to Humboldt County and CCC jurisdiction as one-parameter wetlands under the Coastal Act and the Eel River Area Plan. One-parameter wetlands overlapping the Project Area are shown as Wetland A and B on Figure 3 (Appendix A) and include shining willow groves, and non-native pasture. A total of 28,759 ft^2 (0.66 acres) of one-parameter wetlands and 564 ft^2 (0.01 acres) of intermittent waters (Ditch 1 and Ditch 2) occur within the Coastal Zone. All one- to three-parameter wetlands and other waters within the Coastal Zone fall within the jurisdiction of Humboldt County, and are appealable to the CCC within the Appeals Jurisdiction (see Figure 4).

5. Special Terms and Conditions

5.1 Purpose of this Report

GHD prepared this report for the City of Fortuna (City), and the City may only use and rely on this report for the purpose agreed upon between GHD and the City, as set out in the scope and contract for work effort reported herein. GHD Inc. is not liable for any action arising out of the reliance of any third party on the information contained within this report. GHD otherwise disclaims responsibility to any entity other than the City arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

5.1 Scope and Limitations

This report does not authorize any individuals to develop, fill, or alter the delineated wetlands. Verification of the delineation by jurisdictional agencies is necessary prior to the use of this report for planning and development purposes. A USACE, agency-stamped, delineation map, and a jurisdictional approval letter are required to signify confirmation of delineation results. In situations where a field investigation determines that no jurisdictional wetlands occur, jurisdictional concurrence with these findings is recommended.

The delineation conclusions were based on the information available during the period of the investigation, which took place February 24th, March 10th, April 8th, and April 27th, 2021. The opinions, conclusions, and any recommendations in this report are based on conditions encountered and information reviewed by the date of preparation of the report. Site conditions may change after the date of this report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change unless contracted to do so.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions, and any recommendations in this report are based on the information obtained from and testing undertaken at or in connection with specific sample points. Conditions at other locations of the site may be different from the conditions found at the specific sample points.

6. References

Baldwin, B. D. 2012. The Jepson Manual, Second Edition. University of California Press. Berkeley, CA.

California Coastal Commission (CCC). 2011. Definition and Delineation of Wetlands in the Coastal Zone. Briefing, San Francisco, CA: State of California—Natural Resources Agency.

California Coastal Commission (CCC). 2013. LCP Update Guide, Section 4. Environmentally Sensitive Habitats and Other Natural Resources. San Francisco, CA: State of California—Natural Resources Agency.

COLOR, M., 2000. Munsell Soil Color Charts. Year 2000 revised washable edition. GretagMacbeth

Federal Emergency Management Agency (FEMA). 2021. FEMA Flood Map Service Center. Accessed February 2021. https://msc.fema.gov/portal/home

Federal Geographic Data Committee. 2013. Classification of Wetlands and Deepwater Habitats of the United States. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC. http://fws.gov/wetlands/Documents/Wetlands-and-Deepwater-Habitats-Classification-chart.pdf

Humboldt County Planning Department. 2014. Eel River Area Plan of the Humboldt County Local Coastal Program. Certified by the State Coastal Commission April 8, 1982, date of this edition: December 2014. Available at: https://humboldtgov.org/DocumentCenter/View/50843/Eel-River-Area-Local-Coastal-Plan

Lichvar et al. 2016. The National Wetland Plant List: 2016 wetland ratings. United States Army Corps of Engineers. http://acwc.sdp.sirsi.net/client/search/asset:asset?t:ac=$N/1012381.

NOAA Regional Climate Centers. 2021. AgCIS. Accessed April 2021. http://agacis.rcc-acis.org/

NRCS, Natural Resources Conservation Service. 2021. Web Soil Survey. Accessed April 2021. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

NWI, National Wetlands Inventory. 2021. National Wetlands Inventory mapper. Accessed February 2021. https://www.fws.gov/wetlands/data/Mapper.html.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evans. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society. Sacramento, CA.

SWRCB, State Water Resources Control Board. 2019. "Procedures for Discharges of Dredged or Fill Material to Waters of the State." Procedures, Sacramento, CA. https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/procedures_conformed.pdf.

SWRCB, State Water Resources Control Board. 2020. Draft Guidance for the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State. Guidance, Sacramento, CA: State Water Resources Control Board. https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/guidance_02142020.pdf.

USACE. 1987. Wetlands Delineation Manual, Tech. Rep 4-87-1. Waterways Experiment Station, United States Department of the Army Corps of Engineers (USACE).

USACE. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0). U.S. Army Corps of Engineers.

USACE. U.S. Army Corps of Engineers. 2020. The Navigable Waters Protection Rule: Definition of “Waters of the United States”. Final Rule, Environmental Protection Agency

USDA/NRCS. 2018. Field Indicators of Hydric Soils in the United States, Version 8.2. L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz (eds). United States Department of Agriculture (USDA) and Natural Resources Conservation Service (NRCS) in cooperation with the National Technical Committee for Hydric Soils.

Appendices

Appendix A – Figures

Paper Size ANSI A

0 300 600 900

Feet

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Fortuna
Kenmar Road/ US 101 Interchange Project

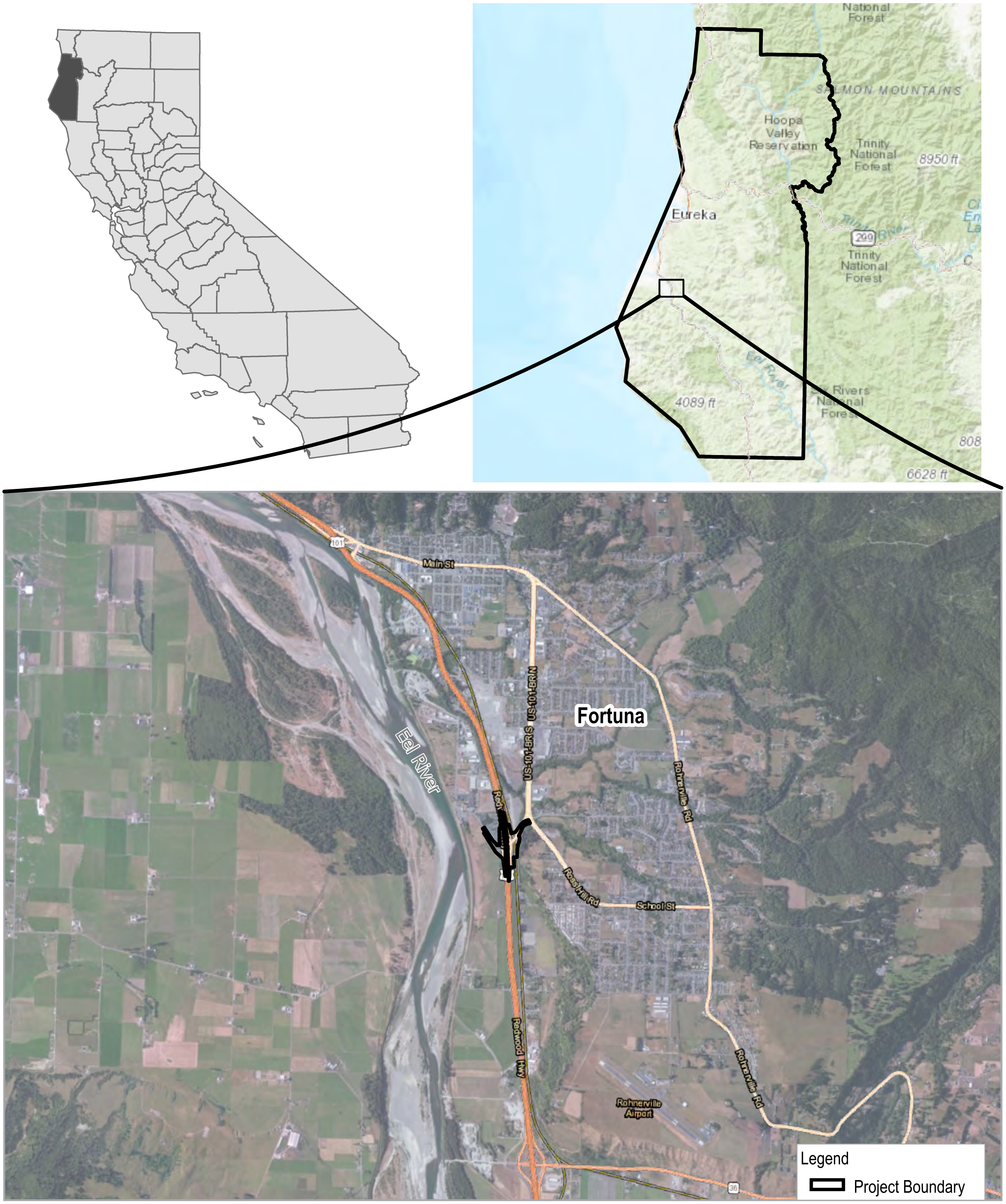
Project No. **11214735**
Revision No. **-**
Date **2/15/2021**

Regional Map

FIGURE 2

\\ghdnet\ghd\US\Eureka\Projects\561\11214735\GIS\Maps\Deliverables\11214735_PES\11214735_P - 11214735_001_Regional

Data source: CNDDB, November 5th, 2018; World_Transportation: Esri, HERE, Garmin, (c) OpenStreetMap contributors
World Imagery (Clarity): Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: jlopez4



Paper Size ANSI A

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Feet

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

City of Fortuna
Kenmar Road/ US 101 Interchange Project

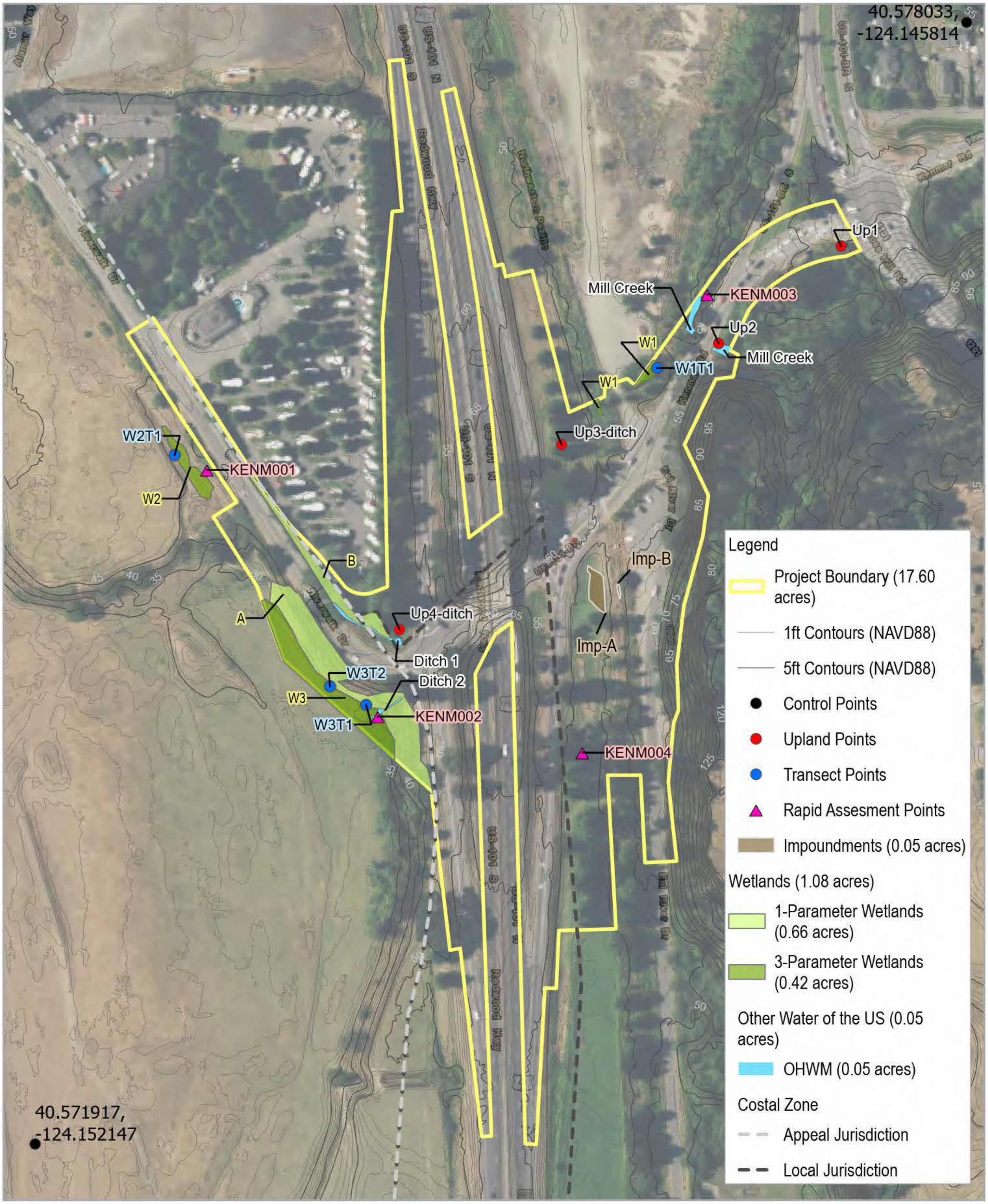
Project No. **11214735**
Revision No. **-**
Date **2/15/2021**

Project Location Map

FIGURE 1

\ghdnet\ghd\US\Eureka\Projects\561\11214735\GIS\Maps\Deliverables\11214735_PES\11214735_P - 11214735_002_Project_Location

Data source: World_Transportation: Esri, HERE, Garmin, (c) OpenStreetMap contributors
World Imagery (Clarity): Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
World_Topo_Map: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong),



Paper Size ANSI A

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Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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City of Fortuna
Kenmar Road/ US 101 Interchange Project

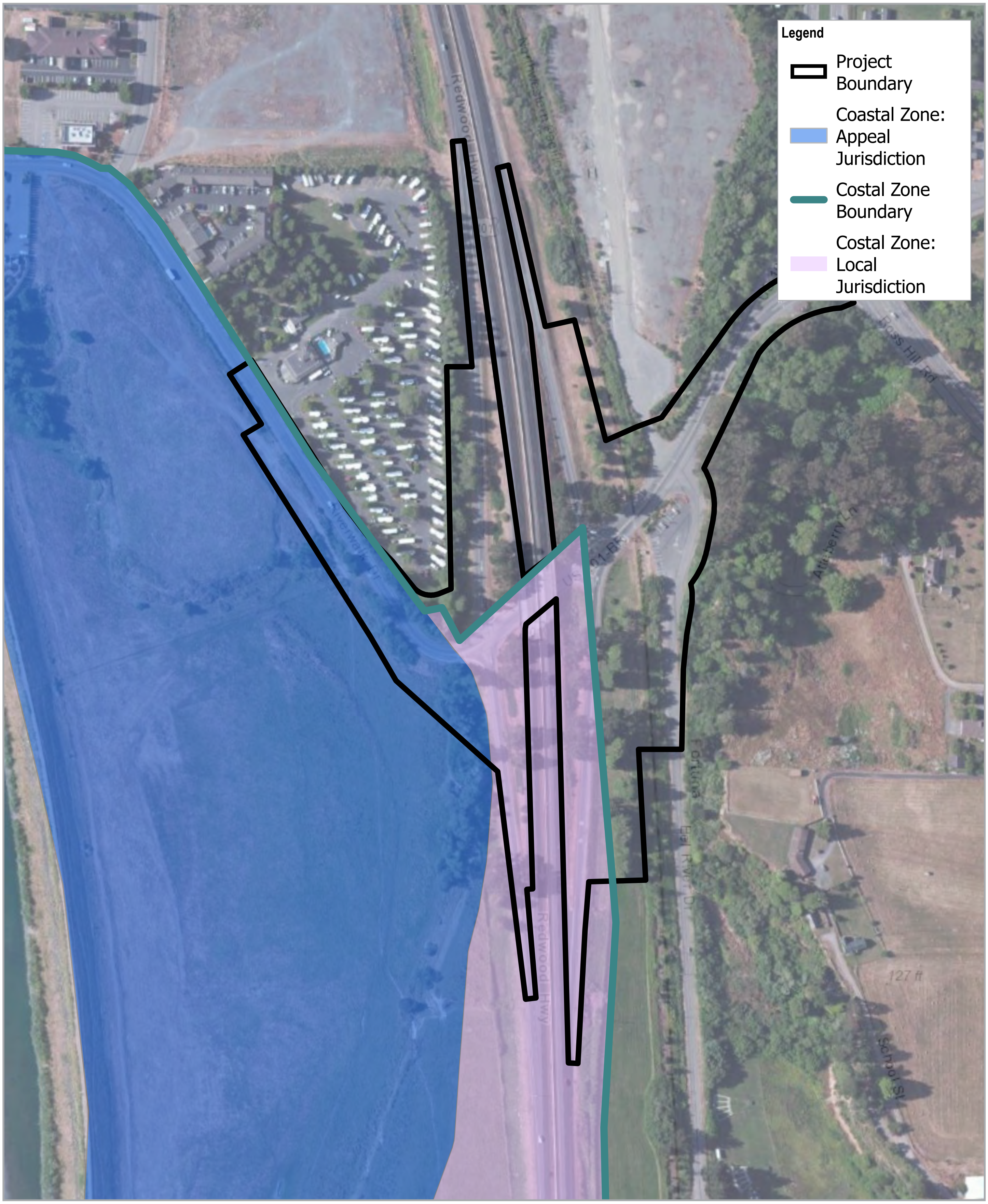
Wetland Delineation

Project No. **11214735**
Revision No. **-**
Date **April 2021**

FIGURE 3

\\ghdnet\ghd\US\Eureka\Projects\561\11214735\GIS\Maps\Deliverables\11214735_Wetland_Del\11214735_Kenmar_Wetland_Del_RevB.aprx
Print date: 12 Sep 2022 - 11:00

Data source: NAIP 2020, World_Transportation: Esri, HERE, GeoTechnologies, Inc.. Created by: jlopez4



Paper Size ANSI A
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Feet

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Fortuna
Kenmar Road/ US 101 Interchange Project

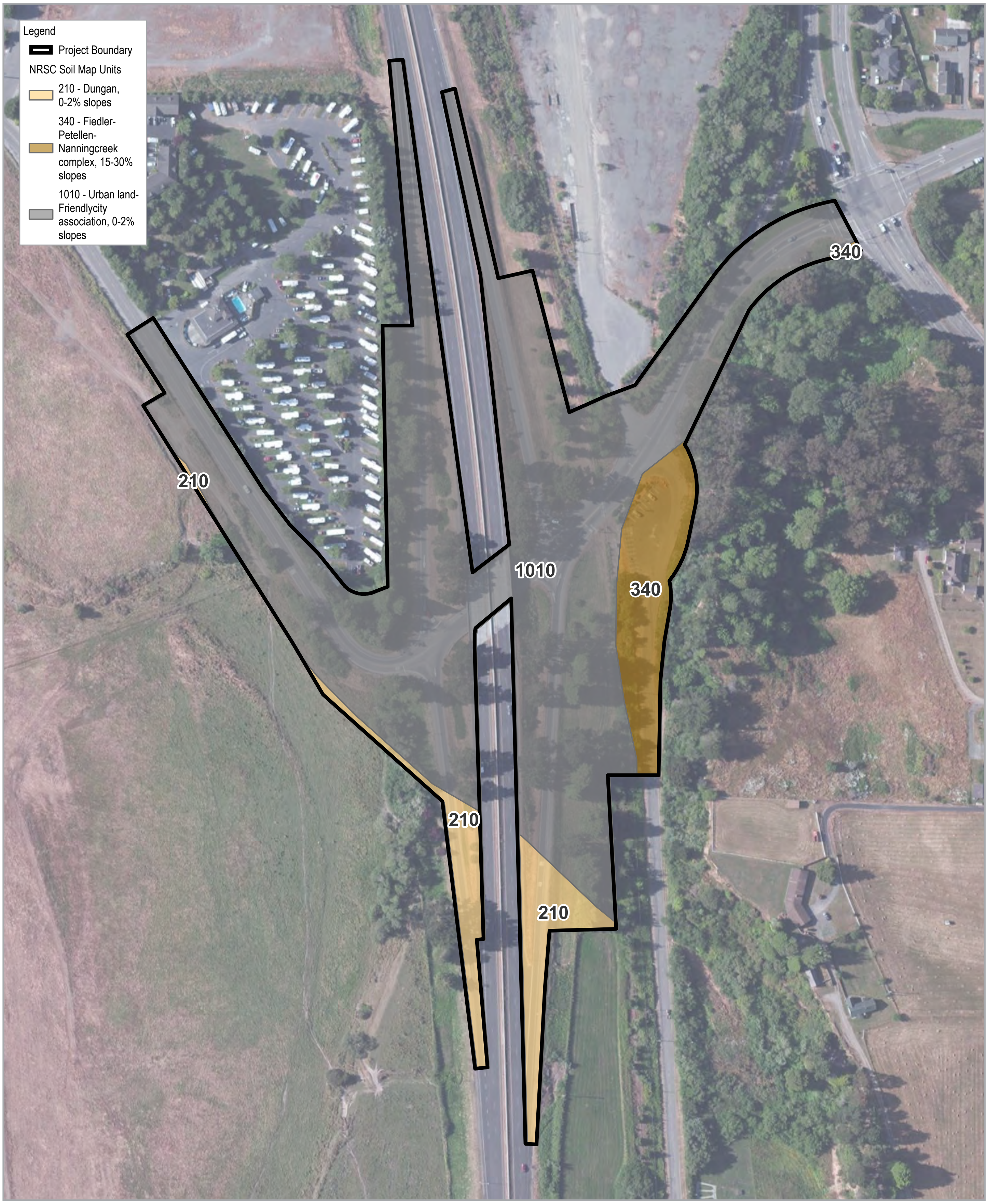
Coastal Zone Boundary

Project No. **11214735**
Revision No. **-**
Date **2/15/2021**

FIGURE 4

\ghdnet\ghd\US\Eureka\Projects\561\11214735\GIS\Maps\Deliverables\11214735_PES\11214735_P - 11214735_007_Location CCC

Data source: CNDDB, November 5th, 2018; World Imagery (Clarity): Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
World_Topo_Map: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community. Created by: jlopez4



Paper Size ANSI A

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Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Fortuna
Kenmar Road/ US 101 Interchange Project

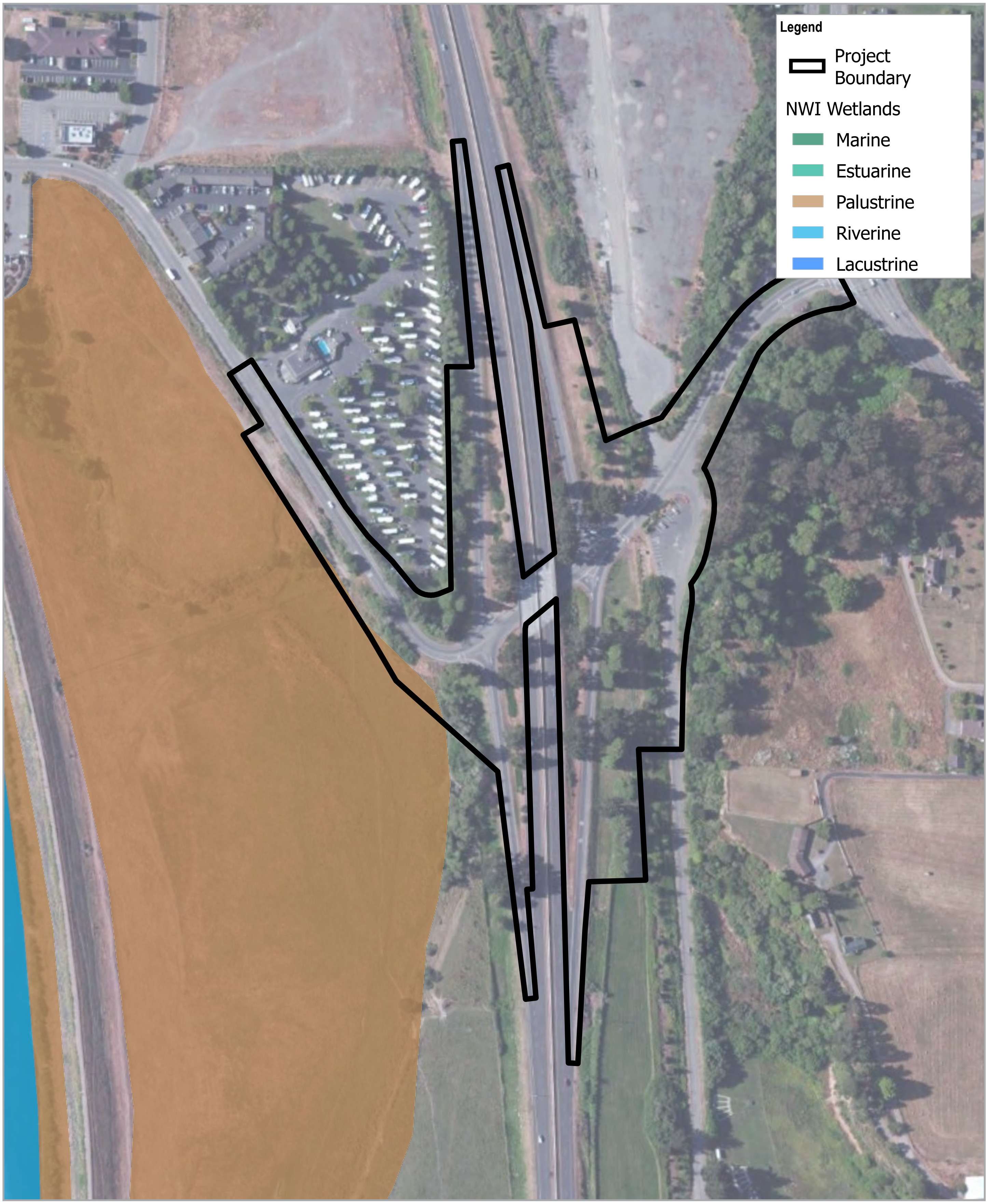
Project No. **11214735**
Revision No. **-**
Date **April 2021**

NRCS Soils Map

FIGURE 4

\\ghdnet\ghd\US\Eureka\Projects\561\11214735\GIS\Maps\Deliverables\11214735_Wetland_Del\112
Print date: 30 Apr 2021 - 13:53

Data source: World Imagery (Clarity): Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: jlopez4



Paper Size ANSI A

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Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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GHD

City of Fortuna
Kenmar Road/ US 101 Interchange Project

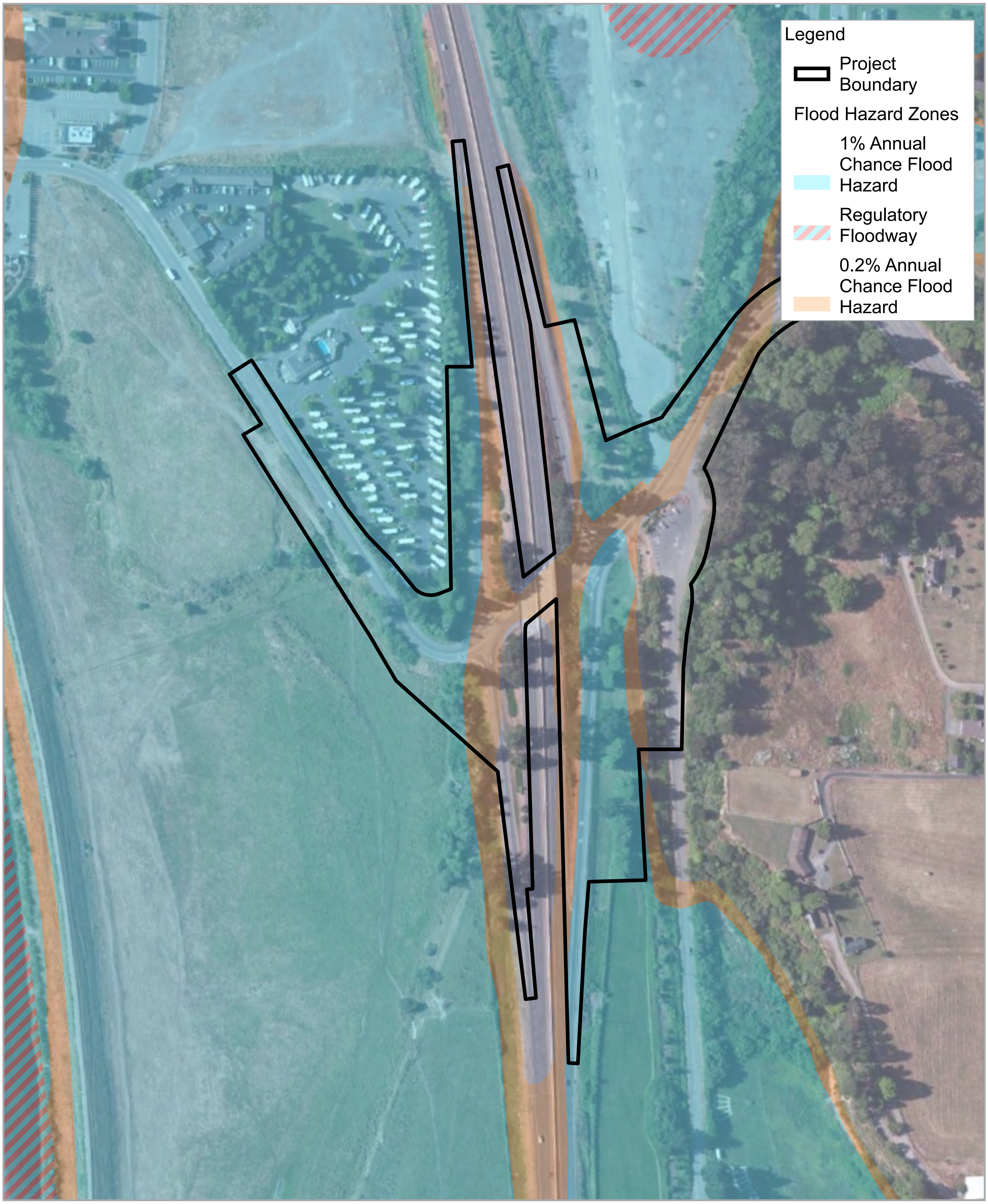
Project No. **11214735**
Revision No. **-**
Date **2/15/2021**

NWI Wetlands

FIGURE 6

\\ghdnet\ghd\US\Eureka\Projects\561\11214735\GIS\Maps\Deliverables\11214735_PES\11214735_P - 11214735_005_NWI

Data source: CNDDB, November 5th, 2018; NWI Wetlands: Source: US Fish and Wildlife Service, Esri
World Imagery (Clarity): Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: jlopez4



Paper Size ANSI A

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Feet

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Fortuna
Kenmar Road/ US 101 Interchange Project

Project No. **11214735**
Revision No. **-**
Date **2/15/2021**

FEMA Flood Zones

FIGURE 7

\ \ghdnet\ghd\US\Eureka\Projects\561\11214735\GIS\Maps\Deliverables\11214735_PES\11214735_P - 11214735_004_FEMA

Data source: CNDDB, November 5th, 2018; World Imagery (Clarity): Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
Created by: jlopez4

Appendix B – Data Sheets

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Kenmar Interchange City/County: Fortuna Sampling Date: 2/24/21

Applicant/Owner: Caltrans State: CA Sampling Point: W1T1w

Investigator(s): K. McDonald, K. McNamee Section, Township, Range: ______

Landform (hillslope, terrace, etc.): constructed swale Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): ______ Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	Is the Sampled Area within a Wetland? Yes ✓ No ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	

Remarks: Wetland constructed along road - may overflow into ditch in storms. Appears to collect runoff from surrounding pavement.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 1m²)			
1. Salix lasiandra	20	Y	FACW
2.			
3.			
4.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: 1m²)			
1. Salix lasiandra	5	Y	FACW
2. Rubus armeniacus	8	Y	FAC
3.			
4.			
5.			
	13 = Total Cover		
Herb Stratum (Plot size: 1m²)			
1. Juncus cf. hesperius	4	N	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	4 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum 80 duff

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

SOIL

Sampling Point: W1 T1-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	Organics		–	–	–	–		
3-10	Gl 3/10Y	100%	None				sandy silt w/gravel	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ✓ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- __ 2 cm Muck (A10)
- __ Red Parent Material (TF2)
- __ Very Shallow Dark Surface (TF12)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- __ Salt Crust (B11)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Stunted or Stressed Plants (D1) **(LRR A)**
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ✓ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- __ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- __ Raised Ant Mounds (D6) **(LRR A)**
- __ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes __ No __ Depth (inches): ____

Water Table Present? Yes ✓ No __ Depth (inches): 9in

Saturation Present? (includes capillary fringe) Yes ✓ No __ Depth (inches): 4in

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Kenmar Interchange City/County: Fortuna Sampling Date: 2/24/21

Applicant/Owner: CalTrans State: CA Sampling Point: W1TH

Investigator(s): K.McDonald, K.McNamee Section, Township, Range: ______

Landform (hillslope, terrace, etc.): constructed swale Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ✓		
Hydric Soil Present? Yes ____ No ✓	Is the Sampled Area within a Wetland?	Yes ____ No ✓
Wetland Hydrology Present? Yes ____ No ✓		

Remarks: upland around impoundment

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: —)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 1m²)			
1. Rubus armeniacus	20	Y	FAC
2. Baccharis pilularis	15	Y	UPL
3.			
4.			
5.			
	35	= Total Cover	
Herb Stratum (Plot size: ______)			
1. Cardamine oligosperma	15	Y	FAC
2. Geranium robertianum	15	Y	FACU
3. Galium aparine	1		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	31	= Total Cover	
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 40% duff & gravel

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: W1-T1-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	Organic							
3-8	10YR 3/2	100	—					sand & gravel
8+	compacted gravel							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) **(LRR A)**
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) **(LRR A)**
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Kenmar Interchange City/County: Fortuna Sampling Date: 2/24/21

Applicant/Owner: CalTrans State: CA Sampling Point: Up1

Investigator(s): K. McDonald, K. McNamee Section, Township, Range: ______

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No ✓	Is the Sampled Area within a Wetland?	Yes ___ No ✓
Hydric Soil Present?	Yes ___ No ✓		
Wetland Hydrology Present?	Yes ___ No ✓		

Remarks: lowpoint in shallow swale with willows & blackberry near Kenmar + Fortuna Blvd intersection

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 1m2)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	60	Y	FACW
2.			
3.			
4.			
	60 = Total Cover		
Sapling/Shrub Stratum (Plot size: 1m2)			
1. Rubus ursinus	20	Y	FACU
2.			
3.			
4.			
5.			
	20 = Total Cover		
Herb Stratum (Plot size: ___)			
1. Polystichum munitum	5	Y	FACU
2. Urtica dioica	2	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	7 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 50 duff/gravel

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

SOIL

Sampling Point: Up 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1	Organic							
1-14	10YR 3/1	100					sandy loam w/ gravel	
14-16	2.5Y 3/2	98	7.5YR 4/6	2%	C	M	"	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: —

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks: Redox >12" from surface

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Kenmar Interchange City/County: Fortuna Sampling Date: 2/24/21
Applicant/Owner: CalTrans State: CA Sampling Point: Upl 2
Investigator(s): K. McDonald, K. McNamee Section, Township, Range: ____
Landform (hillslope, terrace, etc.): Riparian slope Local relief (concave, convex, none): Concave Slope (%): 30
Subregion (LRR): A Lat: ____ Long: ____ Datum: ____
Soil Map Unit Name: ____ NWI classification: ____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____		
Hydric Soil Present? Yes ____ No ✓	Is the Sampled Area within a Wetland?	Yes ____ No ✓
Wetland Hydrology Present? Yes ____ No ✓		

Remarks: 3ft from OHW @ S side culvert for Mill Creek

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 1m²)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	45	Y	FAC
2.			
3.			
4.			
	45	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1. Rubus armeniacus	20	Y	FAC
2. Rubus ursinus	80	Y	FACU
3.			
4.			
5.			
	100	= Total Cover	
Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Overlapping thicket

SOIL

Sampling Point: Up-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 3/2	100	—				clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1) **(except MLRA 1)**
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

__ 2 cm Muck (A10)
__ Red Parent Material (TF2)
__ Very Shallow Dark Surface (TF12)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
__ Salt Crust (B11)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Tilled Soils (C6)
__ Stunted or Stressed Plants (D1) **(LRR A)**
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
__ Drainage Patterns (B10)
__ Dry-Season Water Table (C2)
__ Saturation Visible on Aerial Imagery (C9)
✓ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ FAC-Neutral Test (D5)
__ Raised Ant Mounds (D6) **(LRR A)**
__ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Does not pass FAC-Neutral

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Kenmar Interchange City/County: Fortuna Sampling Date: 2/24/21

Applicant/Owner: CalTrans State: CA Sampling Point: Up-3

Investigator(s): K. McDonald, K. McNamee Section, Township, Range: ______

Landform (hillslope, terrace, etc.): ditch Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): ______ Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No ✓	Is the Sampled Area within a Wetland? Yes ___ No ✓
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ___ No ✓	

Remarks: center of ditch

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1. Rubus ursinus	80	Y	FACU
2. Lonicera involucrata	1		
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ______)			
1. Geranium robertianum	1		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover			
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ______	x 1 = ______
FACW species ______	x 2 = ______
FAC species ______	x 3 = ______
FACU species ______	x 4 = ______
UPL species ______	x 5 = ______
Column Totals: ______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

SOIL

Sampling Point: Up 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	Organics	100						
2-7	5Y 3/1	100					clay loam	
7-12	5Y 3/1	80	10YR 5/6	20	C	PL/M	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ✓ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______

Water Table Present? Yes ___ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

Wetland Hydrology Present? **Yes** ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Kenmar Interchange City/County: Fortuna Sampling Date: 2/24/21

Applicant/Owner: CalTrans State: CA Sampling Point: UP4

Investigator(s): K. McDonald, K. McNamee Section, Township, Range: ______

Landform (hillslope, terrace, etc.): ditch/swale Local relief (concave, convex, none): concave Slope (%): 20

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No ___	Is the Sampled Area within a Wetland?	Yes ___ No ✓
Hydric Soil Present? Yes ___ No ___		
Wetland Hydrology Present? Yes ___ No ___		

Remarks: Ditch at N off-ramp

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		
Sapling/Shrub Stratum (Plot size: 1m²)			
1. Salix lasiandra	10	Y	FACW
2. Rubus ursinus	15	Y	FACU
3. Rubus armeniacus	5		FAC
4.			
5.			
	30 = Total Cover		
Herb Stratum (Plot size: 1m²)			
1. Brassica rapa	10	Y	FACU
2. Conium maculatum	3		FAC
3. Dipsacus sp.	5	Y	FAC
4. Cirsium vulgare	1		
5. Galium aparine	1		
6.			
7.			
8.			
9.			
10.			
11.			
	20 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum 60%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

SOIL

Sampling Point: Up-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	Organics							
3-14	2.5Y 3/1	99.9	10YR 5/6	.1	C	M	silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- __ 2 cm Muck (A10)
- __ Red Parent Material (TF2)
- __ Very Shallow Dark Surface (TF12)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No ✓

Remarks: Tiny specks of redox

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- ✓ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- __ Salt Crust (B11)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Stunted or Stressed Plants (D1) **(LRR A)**
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ✓ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- __ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)
- __ Raised Ant Mounds (D6) **(LRR A)**
- __ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______

Water Table Present? Yes ___ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 4

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Kenmar Interchange City/County: Fortuna Sampling Date: 2/24/21

Applicant/Owner: CalTrans State: CA Sampling Point: Imp T-1

Investigator(s): K. McDonald, K. McNamee Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Impoundment Local relief (concave, convex, none): concave Slope (%): <5

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No ✓	Is the Sampled Area within a Wetland? Yes ___ No ✓
Hydric Soil Present?	Yes ✓ No ✓	
Wetland Hydrology Present?	Yes ✓ No ___	

Remarks: Seasonal impoundment road drainage - no hydrological connection to a creek. Located along railroad tracks. Surrounded by gravel.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 1m²)			
1. Salix hookeriana	30	Y	FACW
2. Rubus ursinus	25	Y	FACU
3.			
4.			
5.			
= Total Cover	55		
Herb Stratum (Plot size: 1m²)			
1. Galium aparine	2	N	
2. Raphanus sativa	1	N	
3. Vicia sativa	<1	N	
4. Daucus carota	1	N	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	<5		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 40

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Sampling Point: Imp-T1

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	Organics							
3-9	2.5Y 3/2	100	none				sandy silt	w/gravel + cobble
9-13	5Y 4/2	100	none				"	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________________

Depth (inches): ______________________

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
✓ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) **(LRR A)**
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
✓ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
✓ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) **(LRR A)**
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ______
Water Table Present? Yes ✓ No ___ Depth (inches): 13"
Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 1"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Kenmar Interchange City/County: Fortuna Sampling Date: 4/8/21

Applicant/Owner: ______ State: CA Sampling Point: WRT1-W

Investigator(s): K. McDonald Section, Township, Range: ______

Landform (hillslope, terrace, etc.): unmaintained gravel road Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ______ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___		Is the Sampled Area within a Wetland? Yes ✓ No ___
Hydric Soil Present? Yes ✓ No ___		
Wetland Hydrology Present? Yes ✓ No ___		

Remarks: Appears to be the result of runoff collecting in old unmaintained gravel road

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 1m)			
1. Cyperus eragrostis	20	Y	FACW
2. Glyceria declinata	7		FACW
3. Ranunculus sardous	18	Y	FAC
4. Mentha pulegium	14		OBL
5. Agrostis stolonifera	25	Y	FAC
6. Eleocharis palustris	1		OBL
7.			
8.			
9.			
10.			
11.			
= Total Cover	85		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 15

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ______

Remarks:

SOIL

Sampling Point: W2T1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2.5	10YR 2/1	98	7.5 YR 5/8	2%	C	M	gravelly silty loam	overlain on road
2.5-6	10YR 2/1	70	7.5 YR 5/8	30%	C	M	very gravelly silt loam	
6-10+	10YR 2/1	85	7.5 YR 5/8	15%	C	M	70% gravel	agg base

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes ✓ No ___

Remarks: Very dark soil with redox overlain on old gravel road bed, aggregate base, mixing w/hydric soil

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): ______

Water Table Present? Yes ___ No ___ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ______

Wetland Hydrology Present? Yes ___ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Surface water previously observed in Feb & March currently dry (moist). Algae present. Low spot between artificial berms, collects water.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Kenmar Interchange City/County: ______ Sampling Date: 4/8/21

Applicant/Owner: ______ State: ______ Sampling Point: W2-T1-U

Investigator(s): K. McDonald Section, Township, Range: ______

Landform (hillslope, terrace, etc.): artificial berm Local relief (concave, convex, none): convex Slope (%): 25

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ______ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______ No ✓	Is the Sampled Area within a Wetland? Yes ______ No ✓
Hydric Soil Present?	Yes ______ No ✓	
Wetland Hydrology Present?	Yes ______ No ✓	

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 1M)			
1. Trifolium subterraneum	55	Y	UPL
2. Bellis perennis	10		UPL
3. Plantago lanceolata	4		FACU
4. Helminthotheca echioides	4		
5. Holcus lanatus	8		
6. Poa pratensis	20	Y	FAC
7. Geranium dissectum	<1		
8. Agrostis stolonifera	3		
9. Hypochaeris radicata	2		
10. Cerastium vulgare	<1		
11. Rumex crispus	1		
= Total Cover (overlapping veg)	100+		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover	<1		
% Bare Ground in Herb Stratum ______			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ______	x 1 = ______
FACW species ______	x 2 = ______
FAC species ______	x 3 = ______
FACU species ______	x 4 = ______
UPL species ______	x 5 = ______
Column Totals: ______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

N 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No ✓

Remarks:

SOIL

Sampling Point: W2T1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/2	99	5YR 3/4	1	CS		very gravelly sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- __ 2 cm Muck (A10)
- __ Red Parent Material (TF2)
- __ Very Shallow Dark Surface (TF12)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ____ No X

Remarks: Dark soils, very small amount of coated sand grains, does not meet indicator F6.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- __ Salt Crust (B11)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Stunted or Stressed Plants (D1) **(LRR A)**
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- __ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)
- __ Raised Ant Mounds (D6) **(LRR A)**
- __ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Artificial berm, well drained

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Kenmar Interchange City/County: ______ Sampling Date: 4/8/21

Applicant/Owner: ______ State: ______ Sampling Point: W3 TPW

Investigator(s): K. McDonald Section, Township, Range: ______

Landform (hillslope, terrace, etc.): out sloped bottoms Local relief (concave, convex, none): none Slope (%): 10

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ______ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ______
Hydric Soil Present?	Yes ✓	No ______
Wetland Hydrology Present?	Yes ✓	No ______

Is the Sampled Area within a Wetland? Yes ✓ No ______

Remarks: Ditch outlet in pasture. ditch hydrology comes out in pasture and runs south along willows (seasonal - currently dry).

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 1 m²)			
1. Agrostis capillaris	22	Y	FAC
2. Poa pratensis	20	Y	FAC
3. Trifolium cf. repens (veg)	50	Y	FAC
4. Ranunculus sardous	4		
5. Ranunculus repens	1		
6. Rumex crispus	2		
7. Mentha pulegium	1		
8.			
9.			
10.			
11.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum <1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ✓ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- __ 3 - Prevalence Index is ≤3.0[1]
- __ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- __ 5 - Wetland Non-Vascular Plants[1]
- __ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ______

Remarks:

SOIL

Sampling Point: W3T1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/1	100	—	—	—	—	silty loam	
4-13	10YR 3/1	90	7.5YR 3/4	10	C	M,PL	silty loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ___

Remarks: redox somewhat masked by dark soil

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______

Water Table Present? Yes ___ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: saturation previously observed in Feb/March currently dry.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Kenmar Interchange City/County: Fortuna Sampling Date: 4/7/21

Applicant/Owner: ______ State: CA Sampling Point: W3T1-U

Investigator(s): K. McDonald Section, Township, Range: ______

Landform (hillslope, terrace, etc.): bottoms Local relief (concave, convex, none): outsloped, none Slope (%): 8%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ______ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	Is the Sampled Area within a Wetland?	Yes ___ No ✓
Hydric Soil Present?	Yes ___ No ✓		
Wetland Hydrology Present?	Yes ___ No ✓		

Remarks: ~20ft NW of ditch outlet. Low gradient, ~ 6ft from wetland line 1-par pasture based on veg.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1M)			
1. Agrostis capillaris	30	Y	FAC
2. Silybum marianum	10		
3. Sonchus asper	1		
4. Bellis perennis	6		
5. Trifolium repens	30	Y	FAC
6. Cerastium vulgare	2		
7. Linum bienne	2		
8. Geranium dissectum	3		
9. Poa pratensis	TT		FAC
10. Rumex crispus	2		
11. Taraxacum officinale	2		
	100	= Total Cover	
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ______

Remarks:

SOIL

Sampling Point: W3T1-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 3/2	100	—	—	—	—	silty loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Kenmar Interchange City/County: ______ Sampling Date: 4/8/21

Applicant/Owner: ______ State: ______ Sampling Point: W3T2-W

Investigator(s): K. McDonald Section, Township, Range: ______

Landform (hillslope, terrace, etc.): bottoms Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ______ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ______	Is the Sampled Area within a Wetland? Yes ✓ No ______
Hydric Soil Present?	Yes ✓ No ______	
Wetland Hydrology Present?	Yes ✓ No ______	

Remarks: 3-per wet pasture in low geomorphic position 1
3-ft from transect band.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 1m)			
1. Agrostis capillaris	26	Y	FAC
2. Poa pratensis	22	Y	FAC
3. Trifolium repens	45	Y	FAC
4. Ranunculus sardous	10		FAC
5. Rumex crispus	1		
6. Lotus corniculatus	1		
7. Geranium dissectum	1		
8.			
9.			
10.			
11.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ______

Remarks:

SOIL

Sampling Point: WST2W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR3/2	98	7.5YR3/4	2	C	M,PL	silty loam	
4-12	10YR 32	90	7.5YR3/4	10	C	M	"	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology inferred from soil conditions

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Kenmar Interchange City/County: Fortuna Sampling Date: 4/8/21

Applicant/Owner: ______ State: ______ Sampling Point: W3T2-U

Investigator(s): Ki McDonald Section, Township, Range: ______

Landform (hillslope, terrace, etc.): bottoms Local relief (concave, convex, none): convex Slope (%): 20

Subregion (LRR): ______ Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ______ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ~~✓~~
Hydric Soil Present?	Yes ______	No ✓
Wetland Hydrology Present?	Yes ______	No ✓

Is the Sampled Area within a Wetland? Yes ______ No ✓

Remarks: Weedy slope west of willows down to pasture
1 par. [illegible] 3 ft from transect band

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 1m)			
1. Ranunculus sardous	20	Y	FAC
2. Agrostis capillaris	26	Y	FAC
3. Poa pratensis	12		
4. Raphanus sp.	5		
5. Geranium dissectum	12		
6. Silybum marrubium	5		
7. Trifolium cf. repens (veg)	15	Y	FAC
8. Plantago lanceolata	2		
9.			
10.			
11.			
= Total Cover	99		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- __ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- __ 3 - Prevalence Index is ≤3.0[1]
- __ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- __ 5 - Wetland Non-Vascular Plants[1]
- __ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ______

Remarks:

SOIL

Sampling Point: L3T2U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8.5	10YR3/2	100	-	-	-	-	Silty loam	
8.5-14	10YR3/2	95	7.5YR3/4	5	C	M,PL	"	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No ✓

Remarks: Redox starts @>8" - does not meet F6

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______

Water Table Present? Yes ___ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix C – On-site Plant List

Scientific Name	Common Name	Status	Family	Status
Acer macrophyllum	Bigleaf maple	native	Sapindaceae	FACU
Agrostis stolonifera	creeping bentgrass	invasive non-native	Poaceae	FAC
Alnus rubra	Red alder	native	Betulaceae	FAC
Anthoxanthum odoratum	Sweet vernal grass	invasive non-native	Poaceae	FACU
Artemisia douglasiana	California mugwort	native	Asteraceae	FACW
Athyrium filix-femina	Common ladyfern	native	Woodsiaceae	FAC
Baccharis pilularis	Coyote brush	native	Asteraceae	
Bellis perennis	English lawn daisy	non-native	Asteraceae	
Brassica rapa	Common mustard	invasive non-native	Brassicaceae	FACU
Briza maxima	Rattlesnake grass	invasive non-native	Poaceae	
Bromus diandrus	Ripgut brome	invasive non-native	Poaceae	
Cardamine oligosperma	Idaho bittercress	native	Brassicaceae	FAC
Carduus pycnocephalus	Italian thistle	invasive non-native	Asteraceae	
Carex obnupta	Slough sedge	native	Cyperaceae	OBL
Ceanothus thyrsiflorus	Blueblossom	native	Rhamnaceae	
Cedrus sp.	cedar cultvar	non-native	Pinaceae	
Cerastium glomeratum	Large mouse ears	non-native	Caryophyllaceae	FACU
Cirsium vulgare	Bullthistle	invasive non-native	Asteraceae	FACU
Conium maculatum	Poison hemlock	invasive non-native	Apiaceae	FAC
Cortaderia jubata	Andean pampas grass	invasive non-native	Poaceae	FACU
Cotoneaster pannosus	Woolly cotoneaster	invasive non-native	Rosaceae	
Cyperus eragrostis	Tall cyperus	native	Cyperaceae	FACW
Daucus carota	Carrot	non-native	Apiaceae	FACU
Dipsacus fullonum	wild teasel	invasive non-native	Dipsacaceae	FAC
Epilobium ciliatum	Slender willow herb	native	Onagraceae	FACW
Equisetum telmateia ssp. braunii	Giant horsetail	native	Equisetaceae	
Erodium cicutarium	coastal heron's bill	invasive non-native	Geraniaceae	
Eucalyptus globulus	Blue gum	invasive non-native	Myrtaceae	
Euphorbia lathyris	Gopher plant	invasive non-native	Euphorbiaceae	
Festuca arundinacea	Reed fescue	invasive non-native	Poaceae	
Foeniculum vulgare	Fennel	invasive non-native	Apiaceae	
Frangula purshiana	Cascara sagrada	native	Rhamnaceae	FAC
Galium aparine	Cleavers	native	Rubiaceae	FACU
Genista monspessulana	French broom	invasive non-native	Fabaceae	UPL
Geranium dissectum	Wild geranium	invasive non-native	Geraniaceae	
Geranium robertianum	Robert's geranium	non-native	Geraniaceae	FACU
Hedera helix	English ivy	invasive non-native	Araliaceae	FACU
Helminthotheca echioides	Bristly ox-tongue	invasive non-native	Asteraceae	FAC
Heracleum maximum	Common cowparsnip	native	Apiaceae	FAC

Scientific Name	Common Name	Status	Family	Status
Holcus lanatus	Common velvetgrass	invasive non-native	Poaceae	FAC
Holodiscus discolor	Oceanspray	native	Rosaceae	FACU
Hypochaeris radicata	Hairy cats ear	invasive non-native	Asteraceae	FACU
Juncus effusus	Common bog rush	native	Juncaceae	FACW
Juncus hesperius	Coast or bog rush	native	Juncaceae	
Juncus patens	Rush	native	Juncaceae	FACW
Lamium purpureum	Purple dead nettle	non-native	Lamiaceae	
Leucanthemum vulgare	Oxe eye daisy	invasive non-native	Asteraceae	FACU
Linum bienne	Flax	non-native	Linaceae	
Lonicera hispidula	Pink honeysuckle	native	Caprifoliaceae	FACU
Lonicera involucrata	Coast twinberry	native	Caprifoliaceae	FAC
Lotus corniculatus	bird's-foot trefoil	invasive non-native	Fabaceae	FAC
Lupinus rivularis	Riverbank lupine	native	Fabaceae	FAC
Myosotis latifolia	Wide leaved forget me not	invasive non-native	Boraginaceae	
Oemleria cerasiformis	Oso berry	native	Rosaceae	FACU
Oenanthe sarmentosa	Water parsley	native	Apiaceae	OBL
Pentagramma triangularis	Gold back fern	native	Pteridaceae	
Picea sitchensis	Sitka spruce	native	Pinaceae	FAC
Pinus muricata	Bishop pine	native	Pinaceae	
Pinus radiata	Monterey pine	rare, native	Pinaceae	
Plantago lanceolata	English plantain	invasive non-native	Plantaginaceae	FACU
Poa pratensis	Kentucky bluegrass	invasive non-native	Poaceae	FAC
Polypodium glycyrrhiza	Licorice fern	native	Polypodiaceae	
Polystichum munitum	Western sword fern	native	Dryopteridaceae	FACU
Poterium sanguisorba	Garden burnet	non-native	Rosaceae	UPL
Pseudotsuga menziesii	Douglas fir	native	Pinaceae	FACU
Ranunculus repens	creeping buttercup	non-native	Ranunculaceae	FAC
Ranunculus sardous	Hairy buttercup	non-native	Ranunculaceae	FAC
Raphanus sativus	Jointed charlock	invasive non-native	Brassicaceae	
Ribes sanguineum	Flowering currant	native	Grossulariaceae	FACU
Rosa rubiginosa	Sweet brier	non-native	Rosaceae	UPL
Rubus armeniacus	Himalayan blackberry	invasive non-native	Rosaceae	FAC
Rubus parviflorus	Thimbleberry	native	Rosaceae	FACU
Rubus ursinus	California blackberry	native	Rosaceae	FACU
Rumex acetosella	Sheep sorrel	invasive non-native	Polygonaceae	FACU
Rumex crispus	Curly dock	invasive non-native	Polygonaceae	FAC
Salix hookeriana	Coastal willow	native	Salicaceae	FACW
Salix lasiandra	Pacific willow	native	Salicaceae	FACW
Salix lasiolepis	Arroyo willow	native	Salicaceae	FACW
Salix sitchensis	Coulter willow	native	Salicaceae	FACW
Scirpus microcarpus	Mountain bog bulrush	native	Cyperaceae	OBL

Scientific Name	Common Name	Status	Family	Status
Scrophularia californica	California bee plant	native	Scrophulariaceae	FAC
Senecio vulgaris	Common groundsel	non-native	Asteraceae	FACU
Sequoia sempervirens	Coast redwood	native	Cupressaceae	
Silybum marianum	Milk thistle	invasive non-native	Asteraceae	
Sonchus asper	Spiny sowthistle	non native	Asteraceae	FACU
Stachys rigida	Rough hedgenettle	native	Lamiaceae	FACW
Stellaria media	Chickweed	non-native	Caryophyllaceae	FACU
Taraxacum officinale	Red seeded dandelion	non-native	Asteraceae	FACU
Tellima grandiflora	Fringe cups	native	Saxifragaceae	FACU
Toxicodendron diversilobum	Poison oak	native	Anacardiaceae	FAC
Trifolium repens	White clover	non-native	Fabaceae	FAC
Umbellularia californica	California bay	native	Lauraceae	FAC
Urtica dioica	Stinging nettle	native	Urticaceae	FAC
Veronica sp.				
Vicia sativa	Spring vetch	non-native	Fabaceae	UPL
Vinca major	Vinca	invasive non-native	Apocynaceae	

Appendix D – Rapid Assessment Forms

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised March 27, 2018)

For Office Use:	Final database #:	Final vegetation type:	Alliance Association

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION circle: Relevé or RA

Database #:	Date:	Name of recorder: K. McDonald
KENM001	4/8/21	Other surveyors:
	UID:	Location Name: KenMar Interchange

GPS name: Arrow For Relevé only: Bearing°, left axis at ID point ____ of Long / Short side

UTME ______ UTMN ______ Zone: 11 NAD83 GPS error: ft./ m./ PDOP ____

Decimal degrees: LAT __ . ______ LONG ___ . ______

GPS within stand? Yes / No If No, cite from GPS to stand: distance (m) ____ bearing ° ____ inclination ° ____

and record: Base point ID ________ Projected UTMs: UTME ______ UTMN ______

Camera Name: iphone Cardinal photos at ID point: NESW

Other photos:

Stand Size (acres): <1, 1-5, >5 | Plot Area (m²): 100 / ____ | Plot Dimensions ___ x ___ m | RA Radius 10 m

Exposure, Actual °: ____ NE NW SE SW Flat Variable | Steepness, Actual °: ____ 0° 1-5° > 5-25° > 25

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating

Geology code: ______ Soil Texture code very gravelly loam Upland or Wetland/Riparian (circle one)

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H_2O: 0 BA Stems: 90 Litter: 1 Bedrock: Boulder: 1 Stone: Cobble: 2 Gravel: 2 Fines: 4 =100%

% Current year bioturbation ____ Past bioturbation present? Yes / No | % Hoof punch ____

Fire evidence: Yes / No (circle one) If yes, describe in Site history section, including date of fire, if known.

Site history, stand age, comments: Disturbed roadside berm highly invaded. Characterizing thin strip of non-native shrubland, alternates Himalayan blackberry & French broom dominance along road.

Disturbance code / Intensity (L,M,H): ___/___ ___/___ ___/___ ___/___ ___/___ "Other" ______/___

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 multi-layered (T3 or T4 layer under T5, >60% cover)

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), S4 decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), H2 (>12" ht.)

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Rubus armeniacus - Genista monspessulana SNA

Field-assessed Association name (optional): ______

Adjacent Alliances/direction: ______/___, ______/___

Confidence in Alliance identification: L M H Explain: ______

Phenology (E,P,L): Herb ___ Shrub ___ Tree ___ Other identification or mapping information:

Combined Vegetation Rapid Assessment and Relevé Field Form
(Revised March 27, 2018)
SPECIES SHEET

Database #: KENMCC1

IV. VEGETATION DESCRIPTION

% NonVasc cover:____ Total % Vasc Veg cover: 100

% Cover - Conifer tree / Hardwood tree: ____/____ Regenerating Tree: ____ Shrub: 65 Herbaceous: 35

Height Class - Conifer tree / Hardwood tree: ____/____ Regenerating Tree: ____ Shrub: 4 Herbaceous: 1-3

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	Species	% cover	C	Final species determination
S	Rubus armeniacus (FAC)	35		
S	Genista monspessulana (UPL)	30		
H	Foeniculum vulgare (UPL)	10		
	Dipsacus fullonum (FAC)	12		
	Conium maculatum	2		
	Rumex crispus	1		
	Plantago lanceolata	2		
	Geranium dissectum	1		
	Vicia sativa	<1		
	Carduus pycnocephalus	<1		
	Bellis perennis	1		
	Poa pratensis (FAC)	8		
	Erodium cicutarium	1		
	Holcus lanatus	5		
	Other grass sp. (veg)	5		

Unusual species: ____

Combined Vegetation Rapid Assessment and Relevé Field Form
(Revised March 27, 2018)

For Office Use:	Final database #:	Final vegetation type:	Alliance ___ Association ___

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION circle: Relevé or RA

Database #:	Date:	Name of recorder: L. McDonald
KENM002	4/8/21	Other surveyors:
	UID:	Location Name:

GPS name: Arrow For Relevé only: Bearing°, left axis at ID point ____ of Long / Short side

UTME __ __ __ __ __ __ UTMN __ __ __ __ __ __ __ Zone: 11 NAD83 GPS error: ft./ m./ PDOP ____

Decimal degrees: LAT __ __ . __ __ __ __ __ __ LONG __ __ __ . __ __ __ __ __ __

GPS within stand? Yes / No If No, cite from GPS to stand: distance (m) ____ bearing ° ____ inclination ° ____

and record: Base point ID ____ Projected UTMs: UTME __ __ __ __ __ __ UTMN __ __ __ __ __ __ __

Camera Name: iphone Cardinal photos at ID point: NESW

Other photos:

Stand Size (acres): <1, 1-5, >5 | Plot Area (m²): 100 / ____ | Plot Dimensions ___ x ___ m | RA Radius 10 m

Exposure, Actual °: ____ NE NW SE SW Flat Variable | Steepness, Actual °: ____ 0° 1-5° >5-25° >25

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating

Geology code: ____ Soil Texture code: ____ | Upland or Wetland/Riparian (circle one)

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H_2O: 1 BA Stems: 35 Litter: 30 Bedrock: 0 Boulder: 0 Stone: 0 Cobble: 1 Gravel: 3 Fines: 30 =100%

% Current year bioturbation 1 Past bioturbation present? Yes / No | % Hoof punch 1

Fire evidence: Yes / No (circle one) If yes, describe in Site history section, including date of fire, if known.

Site history, stand age, comments: Strip of willows between road & pasture

Disturbance code / Intensity (L,M,H): ___/___ ___/___ ___/___ ___/___ ___/___ "Other" ____/___

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 multi-layered (T3 or T4 layer under T5, >60% cover)

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), S4 decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), H2 (>12" ht.)

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Salix lasiandra Alliance

Field-assessed Association name (optional): Salix lasiandra-S. lasiolepis-S. sitchensis

Adjacent Alliances/direction: ____/____, ____/____

Confidence in Alliance identification: L M H Explain: Species approximately even dominance

Phenology (E,P,L): Herb ___ Shrub ___ Tree P Other identification or mapping information:

Combined Vegetation Rapid Assessment and Relevé Field Form
(Revised March 27, 2018)
SPECIES SHEET

Database #: KENMC02

IV. VEGETATION DESCRIPTION

% NonVasc cover: ___ **Total % Vasc Veg cover:** 99

% Cover - **Conifer tree / Hardwood tree:** 0 / 70 **Regenerating Tree:** — **Shrub:** 55 **Herbaceous:** 8

Height Class - **Conifer tree / Hardwood tree:** ___ / 6 **Regenerating Tree:** ___ **Shrub:** 4 **Herbaceous:** 1

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular
% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	Species	% cover	C	Final species determination
T	Salix lasiandra (FACW)	25		
T	Alnus rubra (FAC)	6		
T/S	Salix sitchensis (FACW)	18		mostly S. sitchensis to S., S. lasiolepis to N.
S	Rubus armeniacus (FAC)	50		high overlap
H	Conium maculatum	1		
	Sonchus asper	1		
	Ranunculus repens	1		
	Poa pratensis	2		
	Agrostis stolonifera	2		
S	Crataegus - Eng. hawthorne	1		
T/S	Salix lasiolepis	22		

Unusual species: ___

Combined Vegetation Rapid Assessment and Relevé Field Form
(Revised March 27, 2018)

For Office Use:	Final database #:	Final vegetation type:	Alliance / Association

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION circle: Relevé or RA

Database #:	Date:	Name of recorder: h. McDonald
KENM003	4/8/21	Other surveyors:
	UID:	Location Name:

GPS name: Arrow For Relevé only: Bearing°, left axis at ID point____ of Long / Short side

UTME ___ UTMN ___ Zone: 11 NAD83 GPS error: ft./ m./ PDOP ____

Decimal degrees: LAT ___.___ LONG ___.___

GPS within stand? Yes / No If No, cite from GPS to stand: distance (m) ____ bearing ° ____ inclination ° ____

and record: Base point ID ______ Projected UTMs: UTME ______ UTMN ______

Camera Name: iphone Cardinal photos at ID point: NESW

Other photos:

Stand Size (acres): <1, 1-5, >5 | Plot Area (m²): 100 / ___ | Plot Dimensions ___ x ___ m | RA Radius 10 m

Exposure, Actual °: _____ NE NW SE SW Flat Variable | Steepness, Actual °: _____ 0° 1-5° >5-25° >25

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating

Geology code: ______ Soil Texture code: ______ | Upland or Wetland/Riparian (circle one)

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H_2O: 10 BA Stems: 42 Litter: 25 Bedrock: 0 Boulder: 0 Stone: 1 Cobble: 2 Gravel: 10 Fines: 10 =100%

% Current year bioturbation _____ Past bioturbation present? Yes / No | % Hoof punch _____

Fire evidence: Yes / No (circle one) If yes, describe in Site history section, including date of fire, if known.

Site history, stand age, comments: Mill Creek Riparian. Characterizing from downstream of Kenmar Rd. crossing.

Disturbance code / Intensity (L,M,H): ___/___ ___/___ ___/___ ___/___ ___/___ "Other" ______/___

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 multi-layered (T3 or T4 layer under T5, >60% cover)

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), S4 decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), H2 (>12" ht.)

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Salix lasiolepis Alliance

Field-assessed Association name (optional):

Adjacent Alliances/direction: ______/______, ______/______

Confidence in Alliance identification: L M H Explain: >10m, high diversity

Phenology (E,P,L): Herb ___ Shrub ___ Tree ___ Other identification or mapping information:

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised March 27, 2018)

SPECIES SHEET

Database #: KENM003

IV. VEGETATION DESCRIPTION

% NonVasc cover:____ Total % Vasc Veg cover: 99

% Cover - Conifer tree / Hardwood tree: /55 Regenerating Tree: 1 Shrub: 40 Herbaceous: 30

Height Class - Conifer tree / Hardwood tree: /6 Regenerating Tree: 4 Shrub: 4 Herbaceous: 2

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	Species	% cover	C	Final species determination
T	Salix lasiandra (FACW)	15		
	Salix lasiolepis (FACW)	30		
	Alnus rubra (FAC)	8		
	Eucalyptus globulus	5		
	Frangula purshiana	1		
	~~Salix sitchensis~~			
S	Rubus armeniacus (FAC)	30		
	Rubus parviflorus	8		
	Lonicera involucrata	2		
H	Urtica dioica (FAC)	15		
	Scrophularia californica	2		
	Galium aparine	1		
	Holcus lanatus	1		
	Heracleum maxima	2		
	Rumex crispus	1		
	Polystichum munitum	1		
	Oenanthe sarmentosa	2		
	Ranunculus repens	1		
	Nasturtium officinale	2		
	Athyrium filix femina	1		

Unusual species: ____

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised March 27, 2018)

For Office Use:	Final database #:	Final vegetation type:	Alliance ___ Association ___

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION circle: Relevé or RA

Database #:	Date: 4/8/21	Name of recorder: K. McDonald
KENMC04		Other surveyors:
	UID:	Location Name: Kenmar Interchange

GPS name: Arrow For Relevé only: Bearing°, left axis at ID point ___ of Long / Short side

UTME ___ UTMN ___ Zone: 11 NAD83 GPS error: ft./ m./ PDOP ___

Decimal degrees: LAT ___ LONG ___

GPS within stand? Yes / No If No, cite from GPS to stand: distance (m) ___ bearing ° ___ inclination ° ___

and record: Base point ID ___ Projected UTMs: UTME ___ UTMN ___

Camera Name: Iphone Cardinal photos at ID point: NESW

Other photos:

Stand Size (acres): <1, 1-5, >5 | Plot Area (m²): 100 / ___ | Plot Dimensions ___ x ___ m | RA Radius 30 m

Exposure, Actual °: ___ NE NW SE SW Flat Variable | Steepness, Actual °: ___ 0° 1-5° >5-25° >25

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating

Geology code: ___ Soil Texture code: ___ | Upland or Wetland/Riparian (circle one)

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud) remainder paved

H_2O: 0 BA Stems: 40 Litter: 40 Bedrock: 0 Boulder: 0 Stone: 0 Cobble: 1 Gravel: 2 Fines: 10 =100%

% Current year bioturbation ___ Past bioturbation present? Yes / No | % Hoof punch ___

Fire evidence: Yes / No (circle one) If yes, describe in Site history section, including date of fire, if known.

Site history, stand age, comments: Redwoods & Monterey pine may have been planted along rail line. Monterey pine is prevalent on all sides of interchange, as well as redwoods, which were planted in a straight line east of the interchange.

Disturbance code / Intensity (L,M,H): ___/___ ___/___ ___/___ ___/___ ___/___ "Other" ___/___

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 multi-layered (T3 or T4 layer under T5, >60% cover)

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), S4 decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), H2 (>12" ht.)

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Sequoia sempervirens Alliance

Field-assessed Association name (optional): ___

Adjacent Alliances/direction: ___/___, ___/___

Confidence in Alliance identification: L M H Explain: ___

Phenology (E,P,L): Herb ___ Shrub ___ Tree ___ Other identification or mapping information:

Combined Vegetation Rapid Assessment and Relevé Field Form

(Revised March 27, 2018)

SPECIES SHEET

Database #: KENMOCH

IV. VEGETATION DESCRIPTION

% NonVasc cover: ___ Total % Vasc Veg cover: 75

% Cover - Conifer tree / Hardwood tree: 30/13 Regenerating Tree: 6 Shrub: 10 Herbaceous: 40

Height Class - Conifer tree / Hardwood tree: 8/5 Regenerating Tree: 0 Shrub: 2 Herbaceous: 1

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	Species	% cover	C	Final species determination
T	Pinus radiata	15		
	Sequoia sempervirens	10		
	Alnus rubra	3		
	Prunus sp cultivars	2		
S	Frangula purshiana	1		
	Ribes sanguineum	1		
	Rubus armeniacus	5		
	Toxicodendron diversilobum	1		
	Baccharis pilularis	1		
	Salix lasiolepis	1		
H	Bromus diandrus	2		
	Taraxacum officinale	2		
	Holcus lanatus	5		
	Agrostis capillaris	20		
	Trifolium repens	10		
	Bellis perennis	2		
	Daucus carota	1		
	Plantago lanceolata	1		
	Hypochaeris radicata	2		
	Anthoxanthum odoratum	5		
S/V	Hedera helix	1		

Unusual species: ___

Appendix E – Site Photographs

All photographs taken February 24, 2021

Photo 1. Representative upland conditions, taken along the Highway 101 off ramp.

Photo 2. Representative upland conditions, taken along Highway 101.

Photo 3. A downstream view of Ditch 1 located within the Coastal Zone.

Photo 4. An upstream view of Ditch 1 located within the Coastal Zone.

Photo 5. Mill Creek, considered a Water of the U.S., shown flowing beneath Kenmar Road in the eastern extent of the Project Area.

Photo 6. Downstream Mill Creek, adjacent to the interchange road between Kenmar Road and South Fortuna Blvd.

Photo 7. Mill Creek, on right, looking upstream towards Kenmar Road.

Photo 8. Wetland 1 contained ponding water and strongly hydric soil and vegetation. Wetland 1 was located along a constructed roadside ditch.

Appendix F – NRCS Custom Soil Resource Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Humboldt County, Central Part, California

Kenmar Road/US 101 Interchange Project

April 12, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

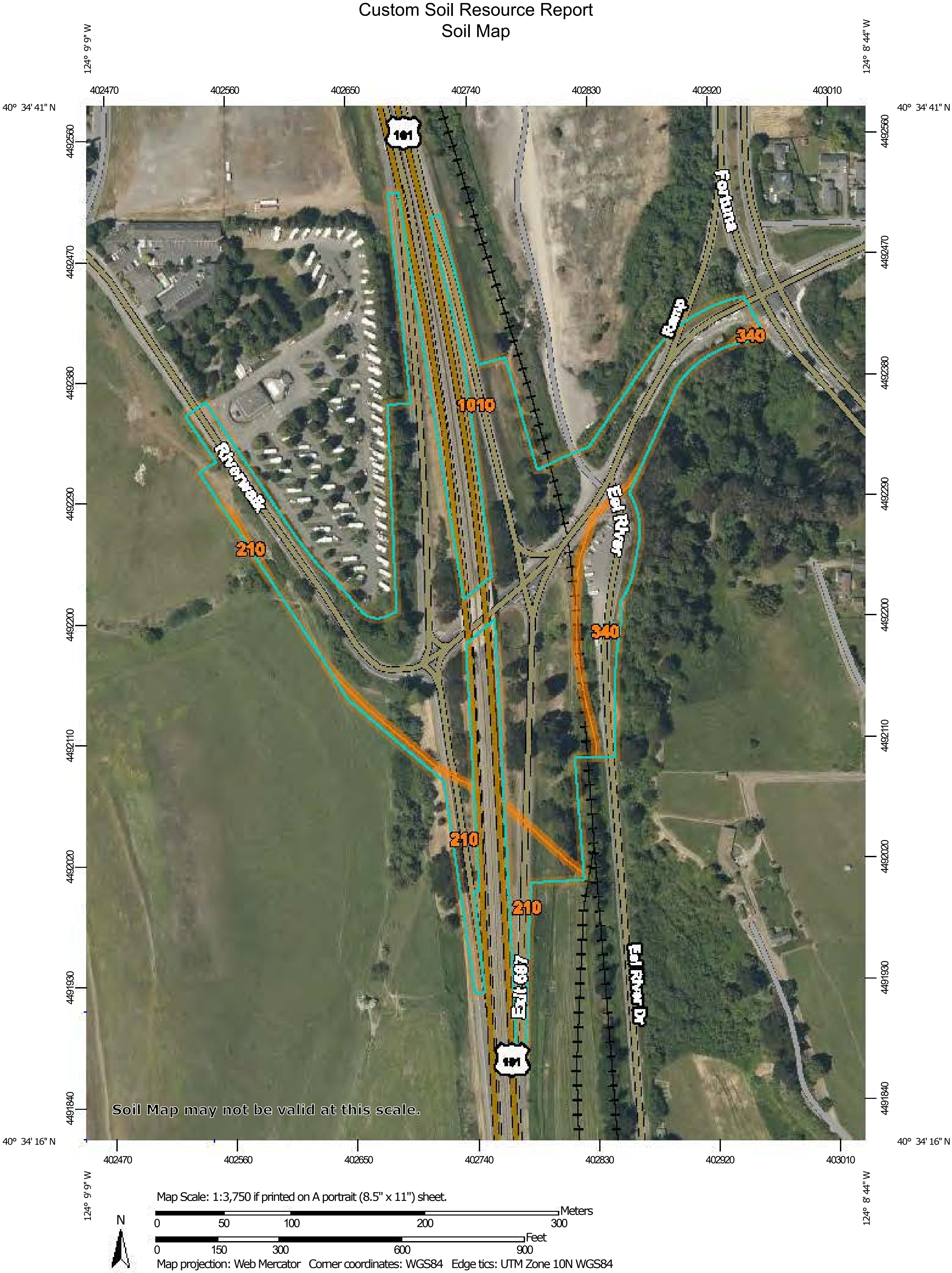
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


124° 9' 9" W
124° 8' 44" W
402470
402560
402650
402740
402830
402920
403010
40° 34' 41" N
40° 34' 16" N
4492560
4492470
4492380
4492290
4492200
4492110
4492020
4491930
4491840
101
Fortuna
Ramp
340
1010
Riverwalk
Eel River
210
Exit 687
Eel River Dr
Soil Map may not be valid at this scale.
Map Scale: 1:3,750 if printed on A portrait (8.5" x 11") sheet.
Meters
0
50
100
200
300
Feet
0
150
300
600
900
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Humboldt County, Central Part, California
Survey Area Data: Version 6, Jun 1, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 8, 2019—Jun 21, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
210	Dungan, 0 to 2 percent slopes	1.5	9.4%
340	Fiedler-Petellen-Nanningcreek complex, 15 to 30 percent slopes	1.5	9.0%
1010	Urban land-Friendlycity association, 0 to 2 percent	13.2	81.6%
Totals for Area of Interest		**16.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Humboldt County, Central Part, California

210—Dungan, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hs2j
Elevation: 10 to 160 feet
Mean annual precipitation: 35 to 80 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 275 to 330 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Dungan and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dungan

Setting

Landform: Fan remnants, alluvial fans, flood-plain steps
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium derived from mixed sources

Typical profile

Ap1 - 0 to 3 inches: silt loam
Ap2 - 3 to 13 inches: silt loam
Bw - 13 to 29 inches: silt loam
C1 - 29 to 37 inches: fine sandy loam
C2 - 37 to 61 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 39 to 61 inches
Frequency of flooding: RareNone
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Ferndale

Percent of map unit: 7 percent

Landform: Flood-plain steps
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Arlynda

Percent of map unit: 5 percent
Landform: Backswamps, depressions, flood-plain steps, meander scars
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: Yes

Russ

Percent of map unit: 3 percent
Landform: Natural levees
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

340—Fiedler-Petellen-Nanningcreek complex, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 1j78q
Elevation: 50 to 1,480 feet
Mean annual precipitation: 45 to 60 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 240 to 330 days
Farmland classification: Not prime farmland

Map Unit Composition

Fiedler and similar soils: 32 percent
Petellen and similar soils: 28 percent
Nanningcreek and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fiedler

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Colluvium derived from conglomerate and/or residuum weathered from conglomerate

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 12 inches: loam
Bt1 - 12 to 20 inches: loam
Bt2 - 20 to 41 inches: clay loam
Bt3 - 41 to 60 inches: clay loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Petellen

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Colluvium derived from conglomerate and/or residuum weathered from conglomerate

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 9 inches: gravelly loam
Bt1 - 9 to 20 inches: very gravelly loam
Bt2 - 20 to 48 inches: very cobbly loam
Cd - 48 to 60 inches: very cobbly loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 30 to 79 inches to densic material
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Nanningcreek

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium derived from sandstone and/or residuum weathered from sandstone

Typical profile

A - 0 to 6 inches: loam
Bt1 - 6 to 20 inches: loam
Bt2 - 20 to 30 inches: sandy clay loam
Bt3 - 30 to 60 inches: sandy clay loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 20 to 39 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Rootcreek

Percent of map unit: 10 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Salmoncreek

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountainflank

Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: Yes

1010—Urban land-Friendlycity association, 0 to 2 percent

Map Unit Setting

National map unit symbol: 2w91d
Elevation: 20 to 160 feet
Mean annual precipitation: 44 to 48 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 300 to 360 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Urban land, residential: 65 percent
Friendlycity and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Residential

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Description of Friendlycity

Setting

Landform: Terraces, alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock

Typical profile

Ap - 0 to 6 inches: silt loam
A - 6 to 13 inches: silty clay loam
A/B - 13 to 24 inches: silty clay loam
Bw1 - 24 to 35 inches: silty clay loam

Bw2 - 35 to 55 inches: silty clay loam
C - 55 to 67 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 20 to 39 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Canalschool

Percent of map unit: 4 percent
Landform: Flood-plain steps
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Carlotta

Percent of map unit: 3 percent
Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Ferndale

Percent of map unit: 3 percent
Landform: Flood-plain steps
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix G – Record of Climatological Observations and WETS Table

WETS Table

WETS Station: EUREKA WFO WOODLEY ISLAND, CA

Requested years: 2001 - 2021

Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	55.4	40.8	48.1	6.16	3.71	7.47	11	0.0
Feb	55.1	40.9	48.0	5.26	3.15	6.38	10	0.0
Mar	56.1	42.5	49.3	5.81	4.03	6.91	11	0.0
Apr	57.5	44.4	50.9	3.68	2.40	4.42	8	0.0
May	59.9	48.0	54.0	1.54	0.65	1.88	4	0.0
Jun	62.5	50.6	56.5	0.67	0.18	0.74	2	0.0
Jul	63.6	52.8	58.2	0.16	0.04	0.16	0	0.0
Aug	64.4	53.4	58.9	0.15	0.05	0.17	0	0.0
Sep	64.4	50.8	57.6	0.77	0.19	0.89	2	0.0
Oct	62.0	47.2	54.6	2.53	0.83	3.02	5	0.0
Nov	58.3	43.4	50.8	4.65	3.23	5.54	9	0.0
Dec	54.9	40.5	47.7	8.41	4.80	10.24	13	0.0
Annual:					33.71	44.70		
Average	59.5	46.3	52.9	-	-	-	-	-
Total	-	-	-	39.79			75	0.1

GROWING SEASON DATES

Years with missing data:	24 deg = 1	28 deg = 1	32 deg = 1
Years with no occurrence:	24 deg = 20	28 deg = 17	32 deg = 0
Data years used:	24 deg = 20	28 deg = 20	32 deg = 20
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	No occurrence	No occurrence	2/17 to 12/7: 293 days
70 percent *	No occurrence	No occurrence	2/8 to 12/16: 311 days

* Percent chance of the growing season occurring between the Beginning and Ending dates.

STATS TABLE - total precipitation (inches)

Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1886												9.78	9.78
1887	8.86	9.00	2.28		3.51	1.92	0.06	0.07	0.21	0.55	2.66	5.43	34.55
1888	12.95	1.98	4.09		0.76	4.66	0.44	0.00	0.06	1.15	3.41	5.93	35.43
1889	4.25	1.93	5.91		7.27	0.37	0.15	0.13	0.32	8.36	3.71	12.88	45.28
1890	18.26	13.88	11.57	1.43	1.71	0.90	0.08	0.02	0.79	0.44	0.18	5.48	54.74
1891	3.33	9.81	5.83	6.37	1.55	1.53	0.28	0.31	1.45	1.64	2.72	10.97	45.79
1892	3.29	2.53	5.32		3.63	0.45	0.00	0.09	0.99	2.90	8.19	6.55	33.94
1893	3.65	6.27	10.59	2.99	2.43	0.33	0.00	0.00	2.39	4.33	9.87	6.69	49.54

1894	12.38	6.13	7.46	M1.28	1.31	1.67	0.02	0.04	1.84	3.12	2.03	12.31	49.59
1895	9.37	3.60	5.31	2.88	5.39	0.06	0.23	0.11	3.14	0.05	3.88	7.50	41.52
1896	8.14	4.61	6.93	6.88	6.22	0.51	0.00	0.70	1.60	2.37	8.00	9.41	55.37
1897	3.04	11.23	9.85	1.36	0.75	1.60	0.03	0.15	1.05	2.63	5.44	6.18	43.31
1898	3.23	8.00	1.80	1.82	2.62	1.21	0.00	0.06	1.48	2.13	4.43	3.17	29.95
1899	6.50	5.03	8.53	1.91	1.73	0.75	0.00	0.42	0.88	4.28	14.80	7.05	51.88
1900	6.63	6.04	3.42	4.43	2.08	1.70	T	0.07	0.21	7.07	8.01	5.27	44.93
1901	9.93	7.41	3.86	4.08	1.50	0.12	0.03	T	4.26	2.46	3.96	4.43	42.04
1902	1.95	19.49	7.85	4.56	2.70	0.27	0.25	T	0.14	2.34	10.88	8.33	58.76
1903	16.07	3.80	7.42	1.23	0.70	0.57	0.06	0.53	0.28	2.42	10.79	4.03	47.90
1904	5.24	16.10	19.05	5.14	1.02	0.55	0.75	T	1.36	2.67	4.41	8.18	64.47
1905	4.81	0.99	7.41	0.78	1.99	0.12	0.02	0.00	0.38	1.50	3.93	4.32	26.25
1906	7.63	6.27	7.72	2.14	3.57	1.56	0.01	0.01	0.76	0.67	3.13	7.59	41.06
1907	10.40	10.57	11.83	3.30	1.69	0.58	T	2.66	0.63	1.48	2.38	8.59	54.11
1908	7.23	6.59	2.82	0.85	2.57	0.19	T	0.16	0.02	5.09	3.97	3.91	33.40
1909	14.41	11.54	2.72	0.24	0.76	0.14	0.55	T	0.61	3.78	12.60	4.29	51.64
1910	7.26	7.33	1.97	0.83	0.64	0.49	0.00	0.00	0.01	0.82	6.86	3.43	29.64
1911	8.63	3.75	1.45	3.39	3.52	0.23	T	0.08	0.29	1.68	2.09	4.74	29.85
1912	10.17	5.73	4.73	5.92	1.98	1.29	0.05	0.04	2.40	1.55	6.86	5.83	46.55
1913	8.10	0.87	3.61	3.41	1.67	1.60	0.28	0.03	0.48	0.88	5.29	7.58	33.80
1914	9.75	4.20	3.13	3.27	0.70	1.73	0.01	T	1.82	3.79	2.42	7.09	37.91
1915	9.75	12.39	1.65	1.38	2.07	0.05	0.26	0.00	0.11	0.79	6.15	5.19	39.79
1916	13.02	5.18	4.83	1.98	1.48	1.00	1.34	0.12	0.38	0.47	3.13	5.47	38.40
1917	5.53	5.10	5.01	3.78	1.02	0.00	0.00	0.02	0.66	0.00	6.43	1.17	28.72
1918	2.55	6.29	5.84	1.15	0.29	0.02	0.22	0.21	1.42	1.00	4.74	4.29	28.02
1919	7.84	8.18	6.25	4.03	1.48	0.14	0.01	0.01	1.52	0.24	2.99	4.33	37.02
1920	1.87	2.11	5.79	3.12	0.04	1.92	0.13	0.49	2.47	4.11	6.35	10.83	39.23
1921	8.37	7.45	3.04	1.67	2.54	1.30	0.00	0.01	0.27	1.59	6.21	4.48	36.93
1922	2.54	9.75	6.43	2.39	0.95	0.14	0.00	0.03	0.37	3.38	3.32	7.62	36.92
1923	3.88	0.50	0.80	2.95	1.26	1.07	0.03	0.02	1.54	2.55	2.86	4.93	22.39
1924	1.95	3.19	2.85	0.67	0.08	0.05	0.02	1.03	0.41	6.84	6.37	4.07	27.53
1925	3.97	6.49	2.02	7.47	2.57	0.24	T	0.25	3.56	0.95	3.71	4.84	36.07
1926	4.69	6.64	0.07	0.94	1.13	T	0.01	0.54	0.43	3.49	13.65	6.47	38.06
1927	5.83	10.30	3.95	3.32	1.68	0.91	0.00	0.02	0.86	1.17	5.89	3.10	37.03

1928	3.40	2.78	7.01	5.86	0.12	0.32	0.02	0.05	M0.58	2.21	4.90	7.82	35.07
1929	4.31	2.06	2.31	2.61	0.14	2.39	T	0.01	0.00	0.21	T	7.13	21.17
1930	6.32	4.92	1.23	2.54	1.04	0.13	T	T	1.12	1.21	3.20	2.50	24.21
1931	4.09	2.39	3.35	1.61	0.49	1.33	0.01	0.01	0.54	2.28	5.75	9.06	30.91
1932	6.84	1.20	4.54	4.87	1.41	0.11	0.14	0.03	0.01	1.32	5.11	5.54	31.12
1933	7.04	M2.93	7.20	0.97	4.23	0.30	T	0.05	0.70	2.08	0.38	6.50	32.38
1934	3.83	2.31	3.61	1.68	1.23	0.29	T	0.01	0.47	3.98	8.63	5.28	31.32
1935	7.25	2.73	5.60	4.86	0.30	0.27	0.09	T	1.10	3.02	1.35	6.79	33.36
1936	8.84	5.89	1.77	2.13	2.23	1.34	0.09	T	0.04	0.49	0.01	3.97	26.80
1937	4.27	5.41	7.19	6.55	0.88	1.35	0.03	0.05	0.19	4.33	10.95	4.26	45.46
1938	6.28	13.94	13.97	2.23	0.31	0.01	T	T	1.74	3.34	3.12	5.97	50.91
1939	4.49	4.41	5.03	0.37	1.85	0.56	0.23	0.06	0.05	1.82	0.91	12.13	31.91
1940	4.37	9.62	7.47	0.81	2.54	0.32	0.00	0.00	0.91	4.03	2.29	8.87	41.23
1941	11.37	6.68	4.31	4.49	3.61	1.52	0.06	0.18	0.48	2.64	3.91	12.87	52.12
1942	4.08	6.22	1.77	4.05	5.43	0.57	0.07	0.06	0.06	1.21	8.60	8.52	40.64
1943	5.23	3.51	5.83	3.23	4.25	0.47	0.04	0.21	0.01	4.61	3.59	1.67	32.65
1944	2.92	3.62	2.25	4.25	3.49	1.19	0.10	0.19	0.19	2.79	9.11	5.92	36.02
1945	3.64	9.55	6.03	2.27	3.43	T	T	0.10	1.09	3.38	9.47	9.93	48.89
1946	4.32	5.10	4.68	0.42	1.26	0.30	0.12	0.01	0.32	2.26	4.36	1.56	24.71
1947	3.93	1.33	3.91	1.84	0.17	1.58	1.20	0.10	0.59	6.50	1.72	3.09	25.96
1948	8.23	5.20	6.16	6.53	2.16	0.77	0.25	0.13	1.71	3.33	3.19	7.35	45.01
1949	1.63	6.09	6.94	0.41	2.56	0.06	0.16	0.02	0.50	2.03	3.23	4.49	28.12
1950	13.79	4.61	7.71	1.93	1.30	1.03	0.05	0.07	0.35	13.04	3.43	5.99	53.30
1951	8.47	7.56	3.94	2.05	1.38	T	0.05	0.02	0.79	3.88	7.80	9.10	45.04
1952	10.67	6.22	3.78	1.34	1.77	1.98	T	0.01	0.73	0.62	2.13	11.87	41.12
1953	12.63	3.44	5.95	3.18	5.83	1.24	T	0.41	0.61	3.84	9.57	3.62	50.32
1954	11.78	3.29	3.76	2.78	0.16	2.57	0.04	1.24	0.87	1.47	5.09	9.65	42.70
1955	5.73	1.83	1.82	5.56	0.03	0.11	0.21	T	1.18	2.64	5.77	11.63	36.51
1956	11.51	7.47	2.36	0.31	1.58	1.71	0.06	T	0.33	5.47	0.49	7.18	38.47
1957	4.22	4.36	8.77	1.96	3.42	0.30	0.34	0.02	1.37	6.00	4.44	5.69	40.89
1958	8.57	10.80	6.09	3.67	1.26	0.71	0.05	T	0.78	1.17	3.71	4.06	40.87
1959	7.23	10.65	3.37	0.52	0.91	0.25	T	0.01	1.54	0.74	0.28	3.64	29.14
1960	3.87	7.48	8.13	2.92	6.05	T	0.02	0.04	0.01	1.31	9.87	5.08	44.78
1961	4.54	7.53	7.90	3.49	3.97	0.50	0.03	0.30	0.53	2.28	5.65	3.44	40.16

1962	3.26	6.08	4.04	2.62	0.60	0.11	T	1.92	0.71	6.49	6.77	2.58	35.18
1963	1.70	4.74	6.28	10.68	1.74	0.33	0.11	0.07	0.68	5.41	6.91	3.20	41.85
1964	11.13	1.20	5.91	0.67	1.59	0.72	0.83	0.03	0.07	1.82	12.11	10.96	47.04
1965	5.82	1.36	1.23	5.60	0.44	0.35	T	0.36	T	0.70	5.20	5.22	26.28
1966	9.44	3.12	6.57	1.34	0.06	0.30	0.25	0.50	1.33	1.02	9.86	6.52	40.31
1967	8.87	1.47	7.44	5.29	1.52	0.32	0.00	T	1.32	2.15	4.40	4.34	37.12
1968	7.59	2.93	3.85	0.40	1.04	0.20	0.04	1.98	0.60	2.81	5.88	8.32	35.64
1969	13.92	7.82	1.56	3.22	1.01	0.34	0.05	T	0.36	3.20	3.49	9.60	44.57
1970	12.46	3.15	2.70	1.54	1.38	0.29	T	T	0.32	2.11	13.20	10.24	47.39
1971	5.41	3.28	7.91	2.92	1.28	1.51	0.16	0.55	2.08	0.92	6.36	6.38	38.76
1972	7.96	5.93	5.08	2.27	1.11	0.88	0.01	0.07	1.06	1.97	5.41	7.42	39.17
1973	6.47	3.85	7.10	0.35	0.85	0.23	T	0.08	2.35	4.14	16.58	7.02	49.02
1974	6.02	5.98	6.98	3.15	0.42	0.33	0.11	0.32	T	1.76	2.75	6.40	34.22
1975	5.20	7.68	10.73	3.29	1.05	0.58	0.10	0.58	0.01	6.77	4.72	5.38	46.09
1976	1.88	7.51	3.12	2.80	0.54	0.14	0.20	1.70	0.04	0.28	2.98	0.52	21.71
1977	1.90	2.24	4.33	1.20	2.10	0.07	T	0.20	3.35	2.79	4.51	6.60	29.29
1978	4.52	6.06	2.88	4.10	0.82	0.34	0.03	0.59	2.72	0.04	2.39	1.16	25.65
1979	3.82	6.26	1.70	3.94	2.25	0.05	0.31	0.13	1.15	6.14	6.19	3.75	35.69
1980	3.19	4.67	6.14	4.18	1.70	0.42	T	0.07	0.14	1.38	2.49	6.10	30.48
1981	7.67	3.72	4.64	0.71	2.02	0.57	T	0.01	0.97	3.71	9.39	9.88	43.29
1982	4.75	5.76	7.06	5.97	0.07	0.78	0.08	0.03	0.62	4.89	7.83	10.30	48.14
1983	8.48	9.18	10.73	5.47	1.12	0.65	0.89	3.42	0.87	1.87	10.40	14.13	67.21
1984	0.76	5.18	4.70	2.76	2.51	1.07	0.03	0.05	0.55	3.67	15.15	4.27	40.70
1985	0.66	3.69	4.68	0.45	1.14	0.89	0.15	0.52	1.06	4.07	2.98	2.78	23.07
1986	7.19	10.08	6.12	1.46	2.34	0.21	0.02	T	2.70	1.75	1.85	3.83	37.55
1987	6.48	3.38	6.10	1.15	0.41	0.26	0.20	0.06	0.02	1.05	4.23	10.92	34.26
1988	7.13	0.54	1.18	2.06	2.70	2.22	0.05	T	0.12	0.41	8.93	6.26	31.60
1989	4.71	2.88	7.63	2.01	1.67	0.21	0.08	0.13	0.85	2.90	1.60	0.80	25.47
1990	7.20	4.50	3.30	1.41	3.74	0.32	0.22	0.71	0.19	1.73	3.07	2.91	29.30
1991	1.65	2.75	6.94	2.52	2.16	0.26	1.13	0.37	T	1.06	1.95	2.36	23.15
1992	3.99	3.80	3.51	2.42	0.06	1.27	0.25	0.01	0.33	2.08	2.21	9.33	29.26
1993	7.15	5.93	4.72	5.94	4.44	1.23	0.37	0.54	0.03	0.56	1.35	7.12	39.38
1994	5.09	7.12	2.06	3.30	1.10	0.71	0.08	T	0.06	0.54	8.21	7.00	35.27
1995	12.74	1.40	11.18	7.47	1.21	1.85	0.08	0.22	0.69	0.53	2.26	11.56	51.19

1996	10.74	8.11	3.51	4.64	2.40	0.05	0.03	T	1.21	3.50	5.16	21.26	60.61
1997	8.81	2.55	2.73	3.06	0.90	1.25	T	0.84	2.05	2.73	7.39	4.73	37.04
1998	13.42	13.95	7.83	2.23	3.12	0.33	0.16	0.01	0.08	3.06	14.09	5.40	63.68
1999	4.37	10.32	8.94	1.79	1.62	0.15	0.04	0.30	0.05	1.60	7.36	3.02	39.56
2000	9.71	7.00	2.81	2.15	1.86	0.54	0.04	T	0.55	2.99	3.51	1.97	33.13
2001	3.79	3.60	2.45	2.54	0.71	0.69	0.20	0.21	0.28	1.00	7.71	11.56	34.74
2002	6.37	5.76	4.32	2.42	0.55	0.28	0.03	0.01	0.06	0.06	2.66	23.31	45.83
2003	5.51	3.84	4.91	11.25	1.74	0.04	0.02	0.49	0.35	0.55	5.78	11.35	45.83
2004	6.29	8.12	2.38	1.68	1.37	0.06	0.06	0.43	0.68	5.71	1.87	9.43	38.08
2005	5.91	2.41	6.24	4.70	3.90	3.08	0.05	0.07	0.08	2.40	8.52	12.72	50.08
2006	12.09	6.34	11.11	4.08	1.03	0.35	0.04	T	0.09	0.58	7.41	7.09	50.21
2007	1.86	11.86	2.51	2.72	0.86	0.46	0.97	0.08	0.60	4.92	2.33	7.30	36.47
2008	9.70	2.73	3.16	2.12	0.04	0.24	0.02	0.47	0.05	0.93	4.05	6.66	30.17
2009	1.58	6.20	5.45	1.23	2.93	0.18	0.06	0.02	1.03	1.95	4.15	4.17	28.95
2010	9.29	4.20	6.06	7.76	3.51	2.31	0.04	0.15	1.39	4.26	4.69	10.08	53.74
2011	2.23	3.62	11.88	4.07	1.43	1.29	0.17	0.04	0.37	4.21	3.86	2.22	35.39
2012	7.76	2.63	12.02	4.76	0.77	2.00	0.67	0.07	0.04	2.72	6.36	10.97	50.77
2013	2.57	1.78	3.09	2.44	1.17	0.43	0.00	0.08	3.14	0.05	1.29	0.56	16.60
2014	1.35	6.09	6.25	1.37	0.58	0.35	0.02	0.02	3.09	4.74	3.89	9.75	37.50
2015	1.36	5.04	3.21	2.57	0.07	0.04	0.15	0.41	0.27	1.18	4.88	14.66	33.84
2016	12.06	2.98	8.11	2.84	0.76	0.02	0.54	0.04	0.01	10.92	6.98	7.87	53.13
2017	10.51	11.10	7.97	5.46	1.31	0.59	0.07	0.05	1.01	1.64	7.40	1.94	49.05
2018	7.86	2.87	8.50	5.02	0.79	0.70	0.03	0.05	0.19	0.85	4.94	4.95	36.75
2019	6.67	14.43	4.79	2.51	2.61	0.00	0.00	0.18	1.92	1.51	1.75	7.63	44.00
2020	7.50	0.60	3.69	2.05	4.73	0.20	0.03	0.08	0.74	0.41	2.55	3.96	26.54
2021	7.10	4.32	3.93	M0.00									15.35
Notes: Data missing in any month have an "M" flag. A "T" indicates a trace of precipitation.													
Data missing for all days in a month or year is blank.													
Creation date: 2016-07-22													

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Appendix G

Botanical Report

Kenmar Road/Highway 101 Interchange Project

City of Fortuna

Botanical Report

September 2021

Table of Contents

Appendices

1. Introduction

1.1 Summary

GHD prepared this botanical survey report and accompanying appendices on behalf of the City of Fortuna, in support of the proposed Kenmar Road/Highway 101 Interchange Project (Project) (**Appendix A Figures 1-2**). Botanical studies consisted of seasonally appropriate floristic surveys for special status plants and assessment of Sensitive Natural Communities (SNC). No special status plants were detected in the Project Area. Shining willow groves, a SNC, occur to the west of Highway 101. Please see the Kenmar Road Wetland Delineation Report (GHD 2021) for complete results of the delineation of wetlands and other waters. GHD conducted surveys for special status plant species and vegetation assessments during the spring and summer of 2021 (April 7 and July 30). This report supports the Project's environmental documentation, permitting, and construction planning. Upland Environmentally Sensitive Habitat Areas will be addressed in the Natural Environmental Study.

1.2 Project Description

The proposed Project will replace the existing intersections of US 101 and Kenmar Road at the interchange with two roundabouts, improving traffic, pedestrian, and bicycle operations. The Project also includes modifications to the US 101 on-ramps and off-ramps and the realignment of Eel River Drive. In addition to the proposed motor vehicle-related roadway safety improvements, the Project includes a segment of Class I bike path through the Project Area in addition to other at-grade pedestrian and bicycle improvements to enhance pedestrian connections and promote regional bicycle network continuity. The Project will simplify and improve navigation and traffic operations on Kenmar Road and Eel River Drive, including the Kenmar Road and US 101 interchange.

1.3 Location

The Project is located in the City of Fortuna in Humboldt County, California, on the Fortuna USGS quadrangle (**Appendix A Figure 1**). The Project Area encompasses the Highway 101 Kenmar Road interchange and adjacent areas (**Appendix A Figure 2**). The Project Area intersects the California Coastal Zone, with primary permitting jurisdiction or Humboldt County under the Eel River Area Plan (**Appendix A Figure 3**).

1.4 Regulatory Background

1.4.1 Federally Listed Species

Special status plant species under Federal jurisdiction include those listed as endangered, threatened, or as candidate species by the Fish and Wildlife Service (USFWS) under the U.S. Endangered Species Act (ESA).

1.4.2 State Listed Species

Special status plant species under California Department of Fish and Wildlife (CDFW) jurisdiction include the following:

- Endangered, Threatened, or Candidate plant species listed under the California Endangered Species Act (CESA),
- Plants listed as Rare under California Native Plant Protection Act (Fish & G. Code, § 1900 et seq.), and
- California Rare Plant Ranking (CRPR) rare plants on the California Native Plant Society's (CNPS) Lists 1 and 2.

Plant species on CNPS Lists 1 and 2 are considered eligible for state listing as Endangered or Threatened pursuant to the California Fish and Game Code, and CDFW has oversite of these special status plant species as a trustee agency. Such species are considered during the CEQA process because they meet the definition of Threatened or Endangered under Sections 2062 and 2067 of the California Fish and Game Code. Plants on CNPS Lists 3 and 4 do not have formal protection under CEQA but may merit consideration in certain circumstances. CDFW publishes and periodically updates lists of special status species which include all taxa of concern that are tracked by CDFW. Additionally, locally significant plants (CEQA Guidelines, § 15125, subd. (c)), or as designated in local or regional plans, policies, or ordinances) are considered special status plant species (CDFW 2018).

1.4.3 Sensitive Natural Communities

Natural vegetation communities listed as Sensitive in the California Natural Diversity Database (CNDDB) and on the California SNC List are to be addressed within the CEQA review process (CDFW 2021a). Sensitive Natural Communities (SNCs) are primarily classified at the Alliance level according to A Manual of California Vegetation (Sawyer et al. 2009). Legacy SNCs are listed in CNDDB according to the Holland classification system (1986), and Holland types may be used when a current Alliance-level classification does not exist (CDFW 2021a). CDFW considers alliances with a NatureServe State Rank of S1 to S3 to be SNCs, and therefore these alliances are considered during the CEQA process (CDFW 2021a).

2. Methods

2.1 Pre-Survey Investigations

A scoping list of special-status plant species and habitats with recorded occurrences in the Project vicinity (defined by the 9-quad area) was compiled prior to surveys by consulting the *California Natural Diversity Database* (CNDDB) (CDFW 2021b), the CNPS *Inventory of Rare and Endangered Vascular Plants* (CNPS 2021), and the U.S. Fish and Wildlife Service Information for Planning and Consulting (IPaC) database (USFWS 2021). The scoping list includes special-status plants that occur in habitat similar to the Project Area with documented occurrences on the Fortuna USGS quadrangle or adjacent quadrangles. CDFW and CNPS searches included nine USGS quadrangles with the survey area located in the central quad (**Appendix A Figure 4**). The 9-quad query yielded 30 special status plant species of CRPR ranking 1 to 3, and a table of scoping results is provided in **Appendix B**. All species were reviewed and classified by their potential to occur in the Project Area (**Appendix A Figure 2**) prior to field surveys. Of the species identified during scoping, two have a moderate probability of occurring within the Project Area: Howell's montia (*Montia howellii,* 2B.2) and Siskiyou checkerbloom (*Sidalcea malviflora* ssp. *patula,* 1B.2). Two survey visits are recommended to observe potentially occurring plants within the peak blooming periods, including one in early spring, and one in early-to-mid-summer.

2.2 Floristic Surveys

GHD botanists Kelsey McDonald and Rose Dana conducted seasonally appropriate floristic surveys for special status plants and evaluated the area for SNCs according to CDFW protocol. The special status plant surveys followed *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* by the California Natural Resource Agency (CDFW 2018) and *General Rare Plant Survey Guidelines by the Endangered Species Recovery Program* (USFWS 2002). The special status plant survey was conducted by walking the site and identifying all plant species encountered to the lowest taxonomic level necessary for rare plant identification. Nomenclature follows *The Jepson Manual* (Baldwin et al 2012).

GHD Botanist Kelsey McDonald has a M.S. in Environmental and Natural Resource Sciences from Humboldt State University, and she is a CNPS Certified Consulting Botanist with over six years of experience conducting special-status plant surveys. GHD Botanist Rose E. Dana has a degree in Plant Ecology from Humboldt State University, with over 10 years of experience conducting biological and botanical surveys. Kelsey McDonald conducted the initial spring botanical survey on April 7, 2021. The weather was overcast and approximately 50 degrees Fahrenheit. Rose Dana conducted the summer survey for later-blooming plants on July 30, 2021. The weather was sunny and approximately 72 degrees Fahrenheit. The total survey effort was 9 person-hours. A list of species observed within the Project Area is provided (**Appendix C**).

2.3 Vegetation Mapping and Assessment

Vegetation communities onsite were documented in the field and classified at the alliance level according to the Manual of California Vegetation (Sawyer et al. 2009) using the Rapid Assessment method. Kelsey McDonald assessed potential Sensitive Natural Communities according to protocol (CDFW 2018) on April 8, 2021. Vegetation Rapid Assessment forms (**Appendix D**) are used to characterize dominant vegetation and evaluate habitat quality, and these assessments provide the basis for designating vegetation as SNCs per CDFW. Photo documentation of habitats observed onsite can be found in **Appendix E**. Vegetation communities were mapped using points collected in the field with an Eos Arrow 100 Submeter Global Navigation Satellite System (GNSS) Receiver and an iPad running ArcGIS Collector software in the WGS84 datum. Vegetation community boundaries were then digitized with GIS from aerial imagery based on field observations and visible vegetation signatures. A Natural Resources Conservation Service (NRCS) soils map was consulted prior to conducting surveys (**Appendix A Figure 5**), as is required by CDFW's protocols for surveying and evaluating impacts to special status native plant populations and sensitive natural communities (CDFW 2018).

3. Results

3.1 Special Status Plants

No special status plant species were observed during floristic surveys of the Project Area. Seasonally appropriate surveys for special status plants have been completed, including reconnaissance an early season survey April, and a summer survey in July. Surveys were timed to observe potentially occurring special status species during the blooming period. The observe early blooming potentially occurring plants such as Howell's montia (*Montia howellii*), which may occur in compacted wet roadside habitats. The July survey was suitably timed to observe later blooming species such as Siskiyou checkerbloom (*Sidalcea malviflora* ssp. *patula*), which may also occur in similar roadside edge habitats.

3.2 Sensitive Natural Community and Habitat Assessment

Vegetation communities were documented using the rapid assessment method as needed to classify them at the alliance level and evaluate potential Sensitive Natural Communities (SNCs) and other sensitive habitats. The Project Area contains a vegetation community characterized by Pacific willow (*Salix lasiandra* var. *lasiandra*), also known as shining willow in a Manual of California Vegetation (syn. *Salix lucida* ssp*. lasiandra)* (Sawyer et al. 2009), a SNC. The Shining Willow SNC was mapped within the Project Area (Project Boundary) as shown in **Appendix A Figure 3**. Other vegetation communities discussed below were characterized by rapid assessment and did not meet criteria for SNCs.

3.2.1 Shining Willow Groves (*Salix lasiandra* var. *lasiandra* Alliance, G4 S3.2)

Shining willow groves are an SNC based on the state ranking of S3.2 (Sawyer at al. 2009, CDFW 2021). The shining willow alliance was observed along the boundary of the agriculture pasture concentrated near the intersection of Riverwalk Drive and the Highway 101 southbound on ramp, located along the western extent of the Project Area (**Appendix A Figure 3**). The shining willow alliance contained a diverse mixture of willows at approximately even dominance, with approximately 25% shining willow cover, 22% arroyo willow (*Salix lasiolepis*) cover, and 18% Sitka willow (*Salix sitchensis*) cover. Shining willow, arroyo willow and Sitka willow are all Facultative Wetland (FACW) indicator species, meaning they usually occur in wetlands, but are occasionally found in non-wetlands (Lichvar et al. 2016). Red alder (*Alnus rubra*, FAC) and other trees also occurred in the area. The shining willow alliance was concentrated along the slope above the wet pasture and around a ditch where stormwater runoff collects from southern Riverwalk Drive and Highway 101. Shining willow, arroyo willow and Sitka willow dominate the canopy along the edge of the agricultural field up to approximately 475 feet west of the Riverwalk Drive and Highway 101 intersection. Associated understory vegetation included high cover (50%) of invasive Himalayan blackberry (*Rubus armeniacus*) (FAC), with poison hemlock (*Conium maculatum*, FAC), spiny sow thistle (*Sonchus asper*, FACU), creeping buttercup (*Ranunculus repens,* FAC), Kentucky bluegrass (*Poa pratensis,* FAC), and creeping bentgrass (*Agrostis stolonifera,* FAC). The strip of willows occurs on an anthropogenic slope in highly altered landscape and the understory is dominated by invasive Himalayan blackberry. Because the SNC is dominated by wetland indicator species and within the Coastal Zone, it was mapped as a Coastal Commission 1-parameter wetland. Please see the Wetland Delineation Report (GHD 2021) for additional details on wetlands that may be subject to Coastal Commission, state water board, and United States Army Corps of Engineers (USACE) jurisdiction.

3.2.2 Arroyo Willow Riparian (*Salix lasiolepis* Alliance, G4 S4)

Arroyo willow thickets are currently ranked as "Apparently Secure" in the state (S4), and are not considered an SNC. Arroyo willow dominated the Mill Creek riparian area (approximately 30% cover in the tree layer) along Kenmar Road with lesser amounts of shining willow (15% cover), red alder (8% cover), and blue gum (*Eucalyptus globulus*, 8% cover). The understory was dominated by invasive Himalayan blackberry (*Rubus armeniacus*) and stinging nettle (*Urtica dioica*). The arroyo-willow dominated Mill Creek riparian area is outside of the Coastal Zone. Riparian areas are subject to Streamside Management Area policy for the City of Fortuna and CDFW jurisdiction. Please see **Appendix D** Rapid Assessment data form for KENM003 for additional details.

3.2.3 Landscaped Monterey Pine-Redwood (Not Rated)

Monterey pine (*Pinus radiata*) and coast redwood (*Sequoia sempervirens*) appear to have been planted along the railroad that runs north to south, parallel to Highway 101. Most of the understory consisted of mowed grass, with some brush overgrowing the rail. The landscaped area is not a naturally occurring community and is not ranked as an alliance in *A Manual of California Vegetation*. Please see **Appendix D** Rapid Assessment data form for KENM004 for additional details.

3.2.4 Invasive Himalayan Blackberry (*Rubus armeniacus*) and French Broom (*Genista monspessulana*) Thickets (Not Rated)

Himalayan blackberry and French broom have invaded the western edge of Riverwalk Drive and established dense overlapping thickets. Both Himalayan blackberry and French broom are rated by Cal-IPC as highly invasive (Cal-IPC 2021). These aggressive non-native species have the potential to spread and outcompete native species, especially in disturbed areas. Removal of these species may be suitable mitigation for potential disturbance of the shining willow SNC or Mill Creek riparian area. Please see **Appendix D** Rapid Assessment data form for KENM001 for additional details.

4. Conclusions

The purpose of this evaluation was to conduct seasonally appropriate surveys for state, federal, and other sensitive listed plant species, and to evaluate potential SNCs within the Project Area. Floristic surveys were completed according to protocol (CDFW 2018), and no special status plant species were detected. The southwestern slope of the Project Area is classified according as the shining willow alliance, a SNC. The shining willow alliance is located within the Coastal Zone and mapped as a one-parameter wetland. The arroyo willow-dominated Mill Creek riparian area is not considered an SNC, but riparian habitats are subject to City of Fortuna Streamside Management Area policies and CDFW jurisdiction. Please see the accompanying Wetland Delineation Report for details on wetlands and other waters within the Project Area (GHD 2021). Planted redwoods and Monterey pines occurring in the Project Area have not been classified as an SNC. Dense thickets of invasive Himalayan blackberry and French broom along Riverwalk Drive are recommended for removal as mitigation for disturbance to the shining willow SNC, Mill Creek riparian area, or other sensitive resources. No Critical Habitat for plants occurs within the Project Area. Surveys were seasonally appropriate, and conditions were suitable for surveying. No additional rare plant surveys are needed within the designated Project Area at this time. Additional surveys and on-site impact/mitigation evaluation might be needed if it is determined that the project has the potential to significantly impact the SNC or other sensitive resources as mapped and discussed in this report.

5. Special Terms and Conditions

5.1 Purpose of this Report

GHD prepared this report for the Caltrans Kenmar Road/Highway 101 Interchange Project, and Caltrans and the City of Fortuna may only use and rely on this report for the purpose agreed upon between GHD and Caltrans, as set out in the scope and contract for work effort reported herein. GHD Inc. is not liable for any action arising out of the reliance of any third party on the information contained within this report. GHD otherwise disclaims responsibility to any entity other than Caltrans arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

6. References

Baldwin, B. D. 2012. The Jepson Manual, Second Edition. University of California Press. Berkeley, CA.

Cal-IPC. 2021. The Cal-IPC Inventory. California Invasive Plant Council, Berkeley, CA. 2006-2021. https://www.cal-ipc.org/plants/inventory/

California Coastal Commission [CCC] 2013. LCP Update Guide, Section 4. Environmentally Sensitive Habitats and Other Natural Resources. San Francisco, CA: State of California—Natural Resources Agency.

CDFW. 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. Sacramento, CA.

CDFW. 2021a. Natural Communities. California Department of Fish and Wildlife website. https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities/List.

CDFW. 2021b. BIOS California Natural Diversity Database (CNDDB) Quickview 9-Quad Species List. California Department of Fish and Wildlife (CDFW). Sacramento, California. https://apps.wildlife.ca.gov/bios/

CNPS. 2021. Inventory of Rare and Endangered Plants. California Native Plant Society (CNPS). Sacramento, CA. Developed by Rincon Consultants, Inc. https://rareplants.cnps.org/Search/Advanced

GHD. 2021. Kenmar Road/Highway 101 Interchange Project Wetland Delineation Report. Prepared for Caltrans, August 2021.

Humboldt County Planning Department. 2014. Eel River Area Plan of the Humboldt County Local Coastal Program. Certified by the State Coastal Commission April 8, 1982, date of this edition: December 2014. Available at: https://humboldtgov.org/DocumentCenter/View/50843/Eel-River-Area-Local-Coastal-Plan

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 v733X. Available at https://cwbi-app.sec.usace.army.mil/nwpl_static/v34/home/home.html

Natural Resources Conservation Service [NRCS]. 2021. Web Soil Survey https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

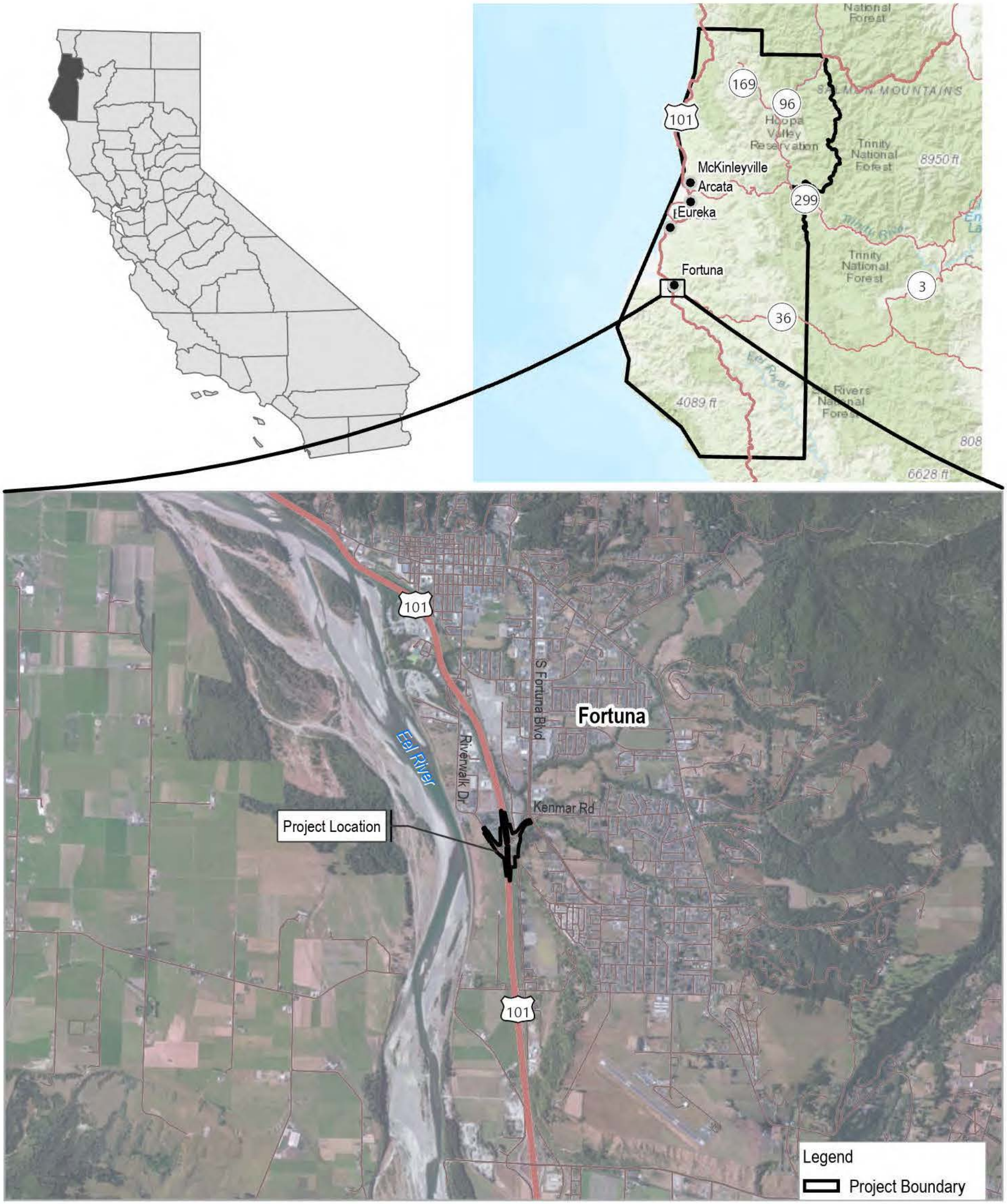
Sawyer, J.O., T. Keeler-Wolf, and J.M. Evans. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society. Sacramento, CA. https://vegetation.cnps.org/

USFWS. 2002. General Rare Plant Survey Guidelines by the Endangered Species Recovery Program.

USFWS. 2021. IPaC-Information for Planning and Consultation. U.S. Fish & Wildlife Service, Department of the Interior. https://ecos.fws.gov/ipac/

Appendices

Appendix A – Figures



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City of Fortuna
Kenmar Road/ US 101 Interchange Project

Project No. **11214735**
Revision No. -
Date **August 2021**

Project Location Map

FIGURE 1

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City of Fortuna
Kenmar Road/ US 101 Interchange Project

Project No. **11214735**
Revision No. **-**
Date **August 2021**

Project Area

FIGURE 2

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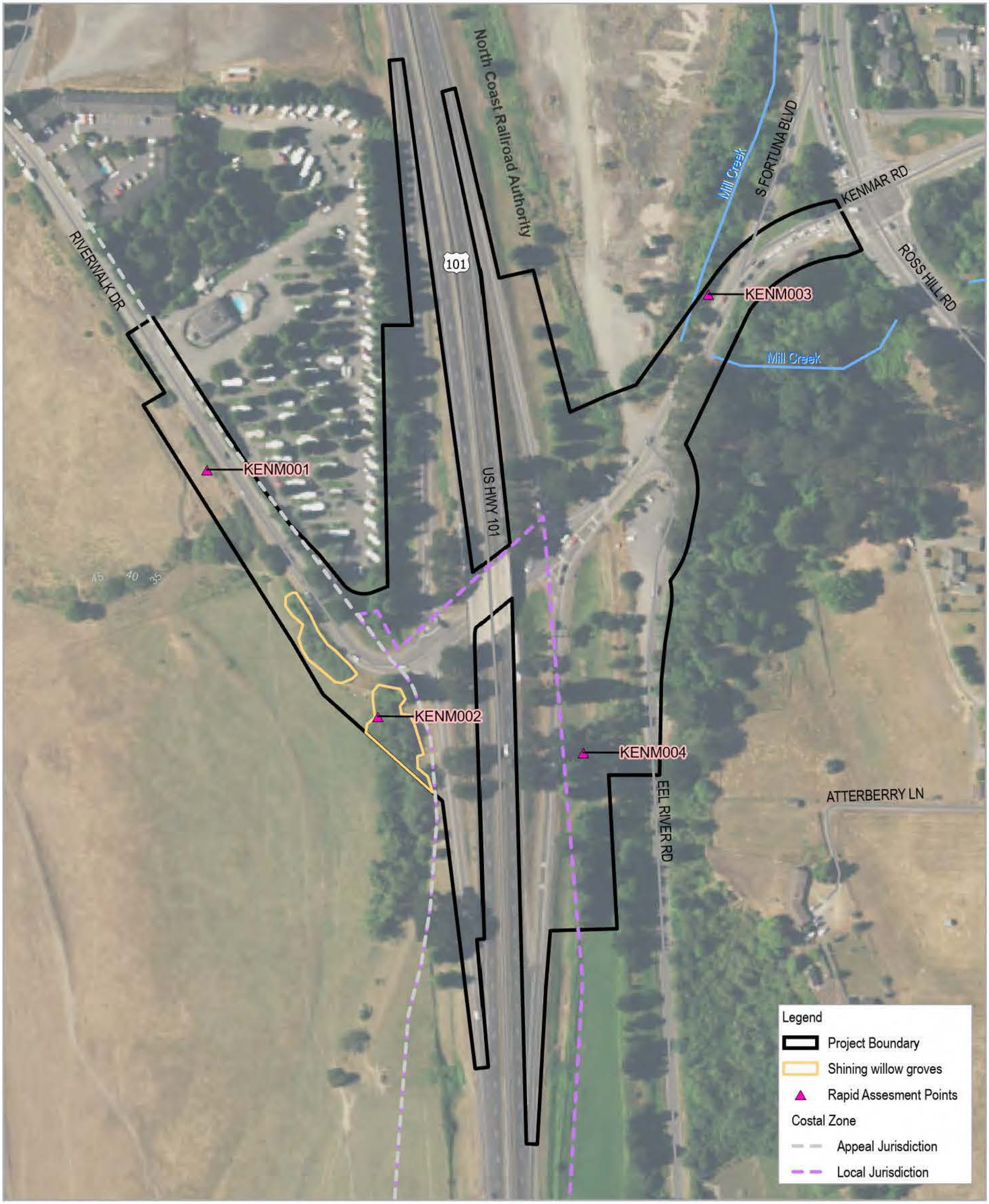

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Kenmar Road/ US 101 Interchange Project

Vegetation Mapping

Project No. **11214735**
Revision No. **-**
Date **August 2021**

FIGURE 3

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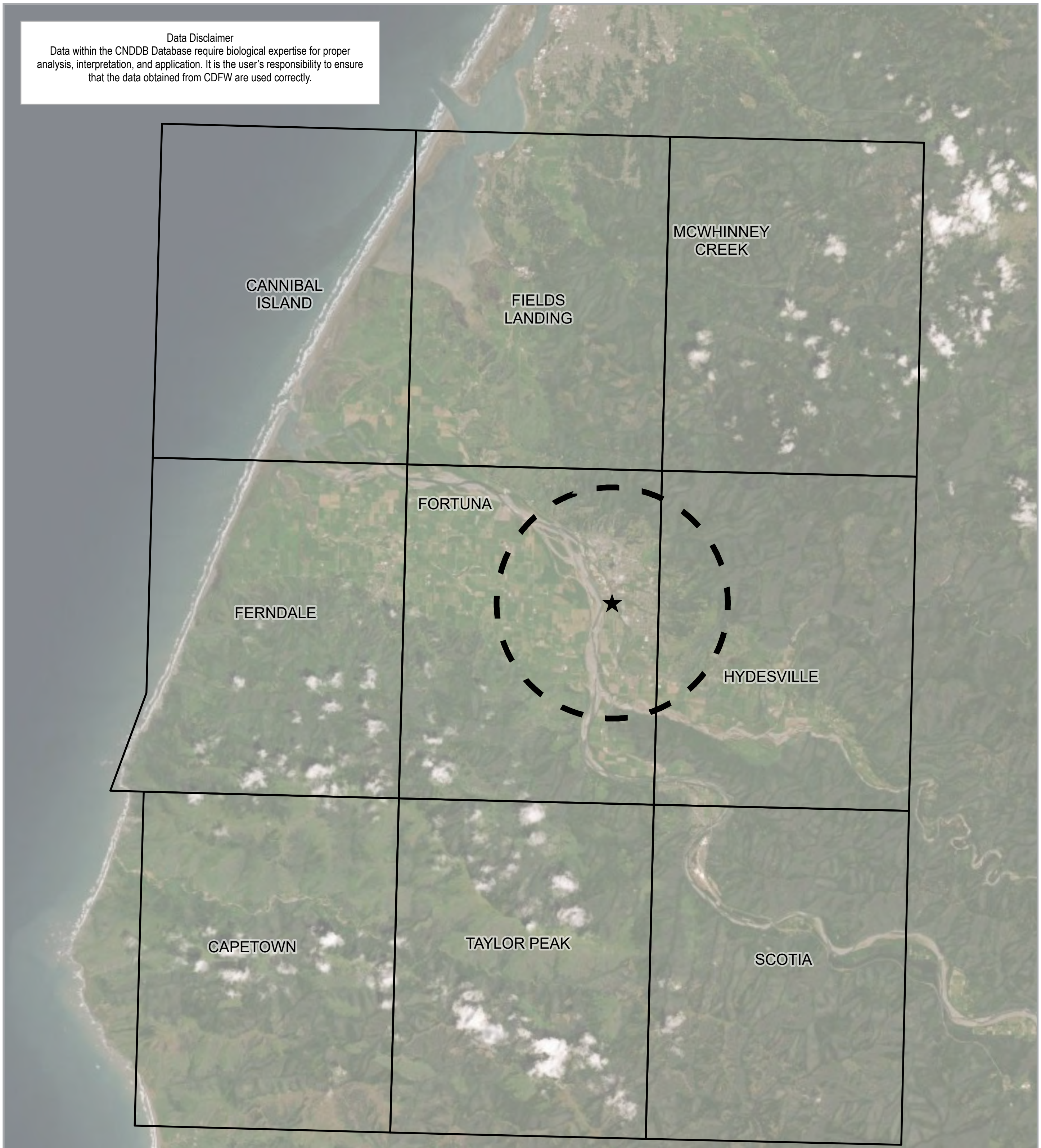

Legend

- ★ Project Location
- 7.5 min USGS Quads
- 3 mile Buffer

CNDDB Plant Occurrences within 3 miles

- Cascade downingia
- Oregon polemonium
- Pacific gilia
- Siskiyou checkerbloom
- Whitney's farewell-to-spring
- Minute pocket moss

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City of Fortuna
Kenmar Road/ US 101 Interchange Project

Project No. **11214735**
Revision No. **-**
Date **9/23/2021**

CNDDB Map

FIGURE 4

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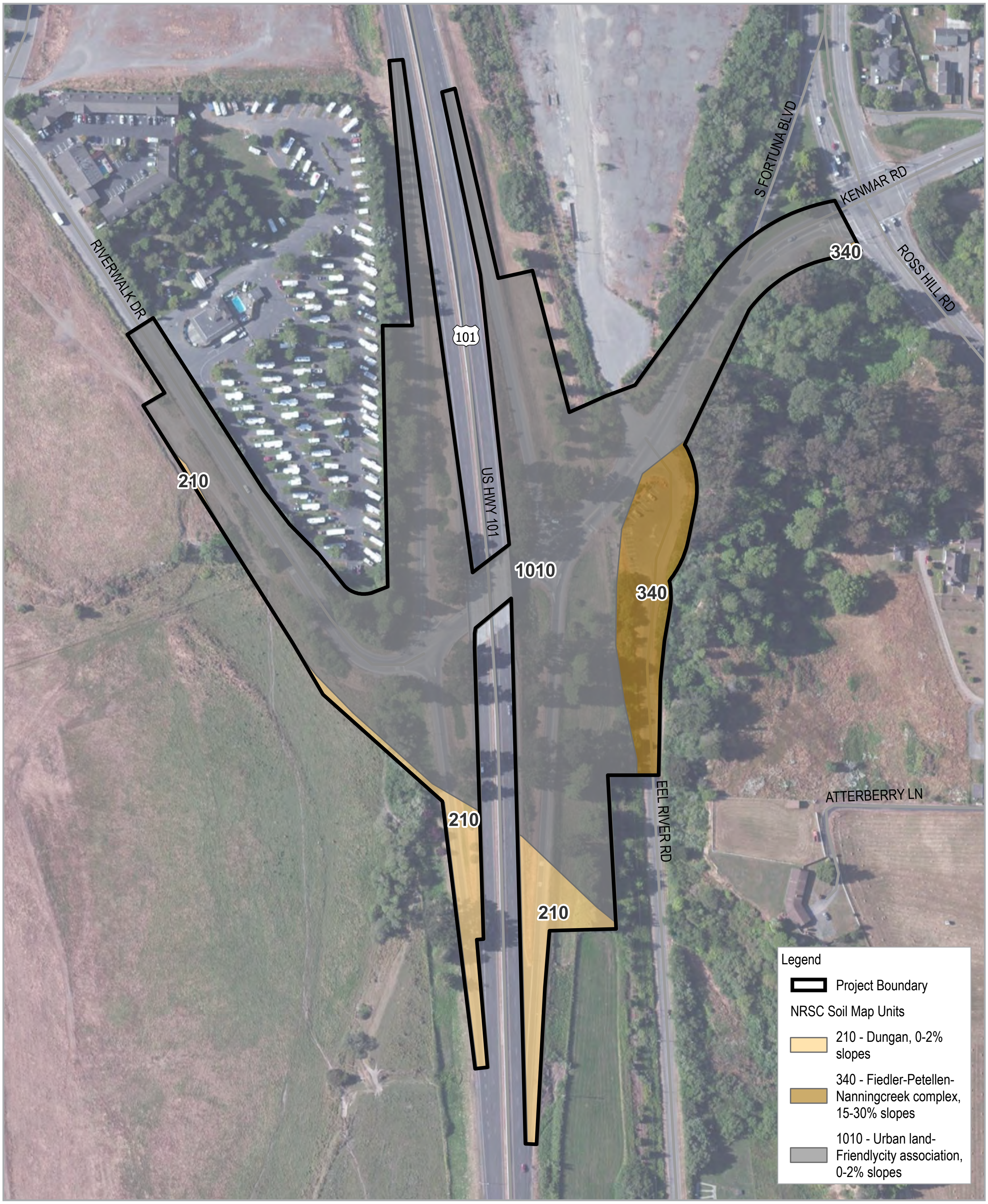

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City of Fortuna
Kenmar Road/ US 101 Interchange Project

Project No. **11214735**
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Date **Sep 2021**

NRCS Soils Map

FIGURE 5

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Appendix B – 9 Quad Scoping Table

Scientific Name	Common Name	FESA	CESA	CRPR	GRank	SRank	Blooming Period	Habitat Requirements	Potential to Occur in the Project Area
Abronia umbellata var. breviflora	pink sand-verbena	None	None	1B.1	G4G5T2	S2	Jun-Oct	Coastal dunes	**No Potential.** Dune and beach habitats do not occur in the Project Area.
Astragalus pycnostachyus var. pycnostachyus	coastal marsh milk-vetch	None	None	1B.2	G2T2	S2	(Apr) Jun-Oct	Coastal dunes (mesic), Coastal scrub, Marshes, and swamps (coastal salt, streamside)	**No Potential.** Dune and coastal marsh habitats do not occur in the Project Area.
Cardamine angulata	seaside bittercress	None	None	2B.1	G4G5	S3	(Jan) Mar-Jul	North coast coniferous forest, lower montane coniferous forest. Wet areas, streambanks.	**Low Potential.** Marginal wet areas may occur in the Project Area.
Carex leptalea	bristle-stalked sedge	None	None	2B.2	G5	S1	Mar-Jul	Bogs and fens, Meadows and seeps (mesic), Marshes and swamps	**Low Potential**. Marginal wetland habitat may occur in the Project Area.
Carex lyngbyei	Lyngbye's sedge	None	None	2B.2	G5	S3	Apr-Aug	Marshes and swamps (brackish or freshwater)	**No Potential.** Coastal marshes do not occur in the Project Area.
Castilleja ambigua var. humboldtiensis	Humboldt Bay owl's-clover	None	None	1B.2	G4T2	S2	Apr-Aug	Marshes and swamps (coastal salt)	**No Potential.** Coastal salt marshes do not occur in the Project Area.
Castilleja litoralis	Oregon coast paintbrush	None	None	2B.2	G3	S3	Jun-Jul	Coastal bluff scrub, Coastal dunes, Coastal scrub; sandy	**No Potential.** Sandy coastal bluff and dune habitats do not occur in the Project Area.
Chloropyron maritimum ssp. palustre	Point Reyes bird's-beak	None	None	1B.2	G4?T2	S2	Jun-Oct	Marshes and swamps (coastal salt)	**No Potential.** Coastal salt marshes do not occur in the Project Area.

Scientific Name	Common Name	FESA	CESA	CRPR	GRank	SRank	Blooming Period	Habitat Requirements	Potential to Occur in the Project Area
Clarkia amoena ssp. whitneyi	Whitney's farewell-to-spring	None	None	1B.1	G5T1	S1	Jun-Aug	Coastal bluff scrub, Coastal scrub	**Low Potential.** Marginal scrub habitat may occur in the Project Area. Previously documented 1.5 miles west of Fortuna.
Downingia willamettensis	Cascade downingia	None	None	2B.2	G4	S2	Jun-Jul (Sep)	Cismontane woodland (lake margins), Valley and foothill grassland (lake margins), Vernal pools	**Low Potential.** Marginal seasonally wet areas and grasslands may occur in the Project Area. Previously documented in the area 0.5 miles south of Fortuna in 1937.
Erysimum menziesii	Menzies wallflower	FE	CE	1B.1	G1	S1	Mar-Sep	Coastal dunes	**No Potential.** Coastal dunes do not occur in the Project Area.
Erythronium oregonum	giant fawn lily	None	None	2B.2	G4G5	S2	Mar-Jun (Jul)	Cismontane woodland, Meadows and seeps; sometimes serpentinite, rocky, openings	**Low Potential.** Marginal wet meadows, seeps, and woodlands may occur in the Project Area.
Erythronium revolutum	coast fawn lily	None	None	2B.2	G4G5	S3	Mar-Jul (Aug)	Bogs and fens, Broadleafed upland forest, North Coast coniferous forest; Mesic, streambanks	**Low Potential.** Marginal wet and mesic areas may occur in the Project Area.
Fissidens pauperculus	minute pocket moss	None	None	1B.2	G3?	S2		North Coast coniferous forest (damp coastal soil)	**No Potential.** No coniferous forest occurs in the Project Area.
Gilia capitata ssp. pacifica	Pacific gilia	None	None	1B.2	G5T3	S2	Apr-Aug	Coastal bluff scrub, Chaparral (openings), Coastal prairie, Valley and foothill grassland	**Low Potential.** Known occurrences within 3 miles of the Project Area. Marginal scrub and

Scientific Name	Common Name	FESA	CESA	CRPR	GRank	SRank	Blooming Period	Habitat Requirements	Potential to Occur in the Project Area
									grassland habitat may occur in the Project Area.
Gilia millefoliata	dark-eyed gilia	None	None	1B.2	G2	S2	Apr-Jul	Coastal dunes	**No Potential.** Coastal dunes do not occur in the Project Area.
Hesperevax sparsiflora var. brevifolia	short-leaved evax	None	None	1B.2	G4T3	S2	Mar-Jun	Coastal bluff scrub (sandy), Coastal dunes, Coastal prairie	**Low Potential.** Marginal scrub habitat may occur in the Project Area.
Hesperolinon adenophyllum	glandular western flax	None	None	1B.2	G2G3	S2S3	May-Aug	Chaparral, Cismontane woodland, Valley and foothill grassland; usually serpentinite	**No Potential.** No serpentine habitat occurs in the Project Area.
Layia carnosa	beach layia	FE	CE	1B.1	G2	S2	Mar-Jul	Coastal dunes, Coastal scrub (sandy)	**No Potential.** Coastal dunes do not occur in the Project Area.
Lilium occidentale	western lily	FE	CE	1B.1	G1	S1	Jun-Jul	Bogs and fens, Coastal bluff scrub, Coastal prairie, Coastal scrub, Marshes and swamps (freshwater), North Coast coniferous forest (openings)	**Low Potential.** Marginal scrub and wetland habitat may occur in the Project Area.
Montia howellii	Howell's montia	None	None	2B.2	G3G4	S2	(Jan-Feb) Mar-May	Meadows and seeps, North Coast coniferous forest, Vernal pools; vernally mesic, sometimes roadsides	**Moderate Potential.** Seasonally wet roadsides are likely to occur in the Project Area.
Oenothera wolfii	Wolf's evening-primrose	None	None	1B.1	G2	S1	May-Oct	Coastal bluff scrub, Coastal dunes, Coastal prairie, Lower montane coniferous	**Low Potential.** Marginal scrub and grassland habitat may occur in the Project Area.

Scientific Name	Common Name	FESA	CESA	CRPR	GRank	SRank	Blooming Period	Habitat Requirements	Potential to Occur in the Project Area
								forest; sandy, usually mesic	
Packera bolanderi var. bolanderi	seacoast ragwort	None	None	2B.2	G4T4	S2S3	(Jan-Apr) May-Jul (Aug)	Coastal scrub, North Coast coniferous forest; Sometimes roadsides	**Low Potential**. Marginal scrub and roadside habitat occur in the Project Area.
Piperia candida	white-flowered rein orchid	None	None	1B.2	G3	S3	(Mar) May-Sep	Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest; sometimes serpentinite	**Low Potential.** The Project Area is largely developed.
Polemonium carneum	Oregon polemonium	None	None	2B.2	G3G4	S2	Apr-Sep	Coastal prairie, Coastal scrub, Lower montane coniferous forest	**Low Potential.** Known occurrences within 3 miles of the Project Area. Marginal scrub and grassland habitat may occur in the Project Area.
Puccinellia pumila	dwarf alkali grass	None	None	2B.2	G4?	SH	Jul	Marshes and swamps (coastal salt)	**No Potential.** Coastal salt marshes do not occur in the Project Area.
Sidalcea malviflora ssp. patula	Siskiyou checkerbloom	None	None	1B.2	G5T2	S2	(Apr) May-Aug	Coastal bluff scrub, Coastal prairie, North Coast coniferous forest; often roadcuts	**Moderate Potential.** Known to occur within 3 miles of the Project Area. Scrub and open roadside habitats occur in the Project Area.
Sidalcea oregana ssp. eximia	coast checkerbloom	None	None	1B.2	G5T1	S1	Jun-Aug	Lower montane coniferous forest, Meadows and seeps, North Coast coniferous forest	**Low Potential.** Marginal habitat may occur, not documented in Fortuna area.

Scientific Name	Common Name	FESA	CESA	CRPR	GRank	SRank	Blooming Period	Habitat Requirements	Potential to Occur in the Project Area
Sisyrinchium hitchcockii	Hitchcock's blue-eyed grass	None	None	1B.1	G2	S1	Jun	Cismontane woodland (openings), Valley and foothill grassland	**Low Potential.** Marginal grasslands and openings occur in the Project Area.
Spergularia canadensis var. occidentalis	western sand-spurrey	None	None	2B.1	G5T4	S1	Jun-Aug	Marshes and swamps (coastal salt)	**No Potential.** Coastal salt marshes do not occur in the Project Area.

Appendix C – Plant Observations

Scientific Name	Common Name	Status	Family	Date	Indicator
Acer macrophyllum	Bigleaf maple	native	Sapindaceae	4/7/2021	FACU
Acmispon americanus	American bird's foot trefoil	native	Fabaceae	7/30/2021	FACU
Alnus rubra	Red alder	native	Betulaceae	4/7/2021	FAC
Anthoxanthum odoratum	Sweet vernal grass	invasive non-native	Poaceae	4/7/2021	FACU
Arctostaphylos uva-ursi	Kinnikinnick	native	Ericaceae	7/30/2021	FACU
Artemisia douglasiana	California mugwort	native	Asteraceae	4/7/2021	FACW
Athyrium filix-femina	Common ladyfern	native	Woodsiaceae	4/7/2021	FAC
Avena barbata	Slim oat	invasive non-native	Poaceae	7/30/2021	UPL
Baccharis pilularis	Coyote brush	native	Asteraceae	4/7/2021	UPL
Bellis perennis	English lawn daisy	non-native	Asteraceae	4/7/2021	UPL
Brassica rapa	Common mustard	invasive non-native	Brassicaceae	4/7/2021	FACU
Briza maxima	Rattlesnake grass	invasive non-native	Poaceae	4/7/2021	UPL
Bromus diandrus	Ripgut brome	invasive non-native	Poaceae	4/7/2021	UPL
Cardamine oligosperma	Idaho bittercress	native	Brassicaceae	4/7/2021	FAC
Carduus pycnocephalus	Italian thistle	invasive non-native	Asteraceae	4/7/2021	UPL
Carex obnupta	Slough sedge	native	Cyperaceae	4/7/2021	OBL
Ceanothus thyrsiflorus	Blueblossom	native	Rhamnaceae	4/7/2021	UPL
Cedrus sp.	cedar cultvar	non-native	Pinaceae	4/7/2021	UPL
Centaurium tenuiflorum	Slender centaury	non-native	Gentianaceae	7/30/2021	FACW
Cerastium glomeratum	Large mouse ears	non-native	Caryophyllaceae	4/7/2021	FACU
Cirsium vulgare	Bullthistle	invasive non-native	Asteraceae	4/7/2021	FACU
Conium maculatum	Poison hemlock	invasive non-native	Apiaceae	4/7/2021	FAC
Cortaderia jubata	Andean pampas grass	invasive non-native	Poaceae	4/7/2021	FACU
Cotoneaster pannosus	Woolly cotoneaster	invasive non-native	Rosaceae	4/7/2021	UPL
Cyperus eragrostis	Tall cyperus	native	Cyperaceae	4/7/2021	FACW
Dactylis glomerata	Orchardgrass	invasive non-native	Poaceae	7/30/2021	FACU
Daucus carota	Carrot	non-native	Apiaceae	4/7/2021	FACU
Dipsacus fullonum	Wild teasel	invasive non-native	Dipsacaceae	7/30/2021	FAC
Epilobium ciliatum	Slender willow herb	native	Onagraceae	4/7/2021	FACW
Equisetum telmateia ssp. braunii	Giant horsetail	native	Equisetaceae	4/7/2021	UPL
Erodium botrys	Big heron bill	non-native	Geraniaceae	7/30/2021	FACU
Eucalyptus globulus	Blue gum	invasive non-native	Myrtaceae	4/7/2021	UPL
Euphorbia lathyris	Gopher plant	invasive non-native	Euphorbiaceae	4/7/2021	UPL
Festuca arundinacea	Reed fescue	invasive non-native	Poaceae	4/7/2021	UPL
Festuca perennis	Italian rye grass	invasive non-native	Poaceae	7/30/2021	UPL
Foeniculum vulgare	Fennel	invasive non-native	Apiaceae	4/7/2021	UPL

Scientific Name	Common Name	Status	Family	Date	Indicator
Frangula purshiana	Cascara sagrada	native	Rhamnaceae	4/7/2021	FAC
Galium aparine	Cleavers	native	Rubiaceae	4/7/2021	FACU
Genista monspessulana	French broom	invasive non-native	Fabaceae	4/7/2021	UPL
Geranium dissectum	Wild geranium	invasive non-native	Geraniaceae	4/7/2021	UPL
Geranium robertianum	Robert's geranium	non-native	Geraniaceae	4/7/2021	FACU
Hedera helix	English ivy	invasive non-native	Araliaceae	4/7/2021	FACU
Helminthotheca echioides	Bristly ox-tongue	invasive non-native	Asteraceae	4/7/2021	FAC
Heracleum maximum	Common cowparsnip	native	Apiaceae	4/7/2021	FAC
Holcus lanatus	Common velvetgrass	invasive non-native	Poaceae	4/7/2021	FAC
Holodiscus discolor	Oceanspray	native	Rosaceae	4/7/2021	FACU
Hordeum murinum	Foxtail barley	invasive non-native	Poaceae	7/30/2021	FAC
Hypericum perforatum	Klamathweed	invasive non-native	Ericaceae	7/30/2021	FACU
Hypochaeris radicata	Hairy cats ear	invasive non-native	Asteraceae	4/7/2021	FACU
Juncus effusus	Common bog rush	native	Juncaceae	4/7/2021	FACW
Juncus hesperius	Coast or bog rush	native	Juncaceae	4/7/2021	UPL
Juncus patens	Rush	native	Juncaceae	4/7/2021	FACW
Lamium purpureum	Purple dead nettle	non-native	Lamiaceae	4/7/2021	UPL
Lathyrus latifolius	Sweet pea	non-native	Fabaceae	7/30/2021	UPL
Leucanthemum vulgare	Oxe eye daisy	invasive non-native	Asteraceae	4/7/2021	FACU
Linum bienne	Flax	non-native	Linaceae	4/7/2021	UPL
Lonicera hispidula	Pink honeysuckle	native	Caprifoliaceae	4/7/2021	FACU
Lonicera involucrata	Coast twinberry	native	Caprifoliaceae	4/7/2021	FAC
Lotus corniculatus	Bird's foot trefoil	non-native	Fabaceae	7/30/2021	FAC
Lupinus rivularis	Riverbank lupine	native	Fabaceae	4/7/2021	FAC
Mentha pulegium	Pennyroyal	invasive non-native	Lamiaceae	7/30/2021	OBL
Myosotis latifolia	Wide leaved forget me not	invasive non-native	Boraginaceae	4/7/2021	UPL
Oemleria cerasiformis	Oso berry	native	Rosaceae	4/7/2021	FACU
Oenanthe sarmentosa	Water parsley	native	Apiaceae	4/7/2021	OBL
Oenothera glazioviana	Red sepaled evening primrose	non-native	Onagraceae	7/30/2021	UPL
Pentagramma triangularis	Gold back fern	native	Pteridaceae	4/7/2021	UPL
Phalaris aquatica	Harding grass	invasive non-native	Poaceae	7/30/2021	FACU
Picea sitchensis	Sitka spruce	native	Pinaceae	4/7/2021	FAC
Pinus muricata	Bishop pine	native	Pinaceae	4/7/2021	UPL
Pinus radiata	Monterey pine	rare, native	Pinaceae	4/7/2021	UPL
Plantago lanceolata	English plantain	invasive non-native	Plantaginaceae	4/7/2021	FACU
Polypodium glycyrrhiza	Licorice fern	native	Polypodiaceae	4/7/2021	UPL
Polystichum munitum	Western sword fern	native	Dryopteridaceae	4/7/2021	FACU
Populus trichocarpa	Black cottonwood	native	Salicaceae	7/30/2021	FAC
Poterium sanguisorba	Garden burnet	non-native	Rosaceae	4/7/2021	UPL

Scientific Name	Common Name	Status	Family	Date	Indicator
Pseudotsuga menziesii	Douglas fir	native	Pinaceae	4/7/2021	FACU
Ranunculus sardous	Hairy buttercup	non-native	Ranunculaceae	4/7/2021	FAC
Raphanus raphanistrum	Jointed charlock	non-native	Brassicaceae	7/30/2021	UPL
Raphanus sativus	Jointed charlock	invasive non-native	Brassicaceae	4/7/2021	UPL
Ribes sanguineum	Flowering currant	native	Grossulariaceae	4/7/2021	FACU
Rosa rubiginosa	Sweet brier	non-native	Rosaceae	4/7/2021	UPL
Rubus armeniacus	Himalayan blackberry	invasive non-native	Rosaceae	4/7/2021	FAC
Rubus parviflorus	Thimbleberry	native	Rosaceae	4/7/2021	FACU
Rubus ursinus	California blackberry	native	Rosaceae	4/7/2021	FACU
Rumex acetosella	Sheep sorrel	invasive non-native	Polygonaceae	4/7/2021	FACU
Rumex crispus	Curly dock	invasive non-native	Polygonaceae	4/7/2021	FAC
Salix hookeriana	Coastal willow	native	Salicaceae	4/7/2021	FACW
Salix lasiandra	Pacific willow	native	Salicaceae	4/7/2021	FACW
Salix lasiolepis	Arroyo willow	native	Salicaceae	4/7/2021	FACW
Salix sitchensis	Sitka willow	native	Salicaceae	4/7/2021	FACW
Sambucus racemosa	Red elderberry	native	Adoxaceae	7/30/2021	FACU
Scirpus microcarpus	Mountain bog bulrush	native	Cyperaceae	4/7/2021	OBL
Scrophularia californica	California bee plant	native	Scrophulariaceae	4/7/2021	FAC
Senecio vulgaris	Common groundsel	non-native	Asteraceae	4/7/2021	FACU
Sequoia sempervirens	Coast redwood	native	Cupressaceae	4/7/2021	UPL
Silybum marianum	Milk thistle	invasive non-native	Asteraceae	4/7/2021	UPL
Stachys rigida	Rough hedgenettle	native	Lamiaceae	4/7/2021	FACW
Stellaria media	Chickweed	non-native	Caryophyllaceae	4/7/2021	FACU
Taraxacum officinale	Red seeded dandelion	non-native	Asteraceae	4/7/2021	FACU
Tellima grandiflora	Fringe cups	native	Saxifragaceae	4/7/2021	FACU
Toxicodendron diversilobum	Poison oak	native	Anacardiaceae	4/7/2021	FAC
Trifolium repens	White clover	non-native	Fabaceae	4/7/2021	FAC
Umbellularia californica	California bay	native	Lauraceae	4/7/2021	FAC
Urtica dioica	Stinging nettle	native	Urticaceae	4/7/2021	FAC
Veronica sp.	veronica		Plantaginaceae	4/7/2021	UPL
Vicia sativa	Spring vetch	non-native	Fabaceae	4/7/2021	UPL
Vinca major	Vinca	invasive non-native	Apocynaceae	4/7/2021	UPL

Appendix D – Rapid Assessment Forms

Combined Vegetation Rapid Assessment and Relevé Field Form
(Revised March 27, 2018)

For Office Use: | Final database #: | Final vegetation type: Alliance ____ Association ____

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION circle: Relevé or RA

Database #: KENM001 | **Date:** 4/8/21 | **UID:** | **Name of recorder:** K. McDonald | **Other surveyors:** | **Location Name:** KenMar Interchange

GPS name: Arrow For Relevé only: Bearing°, left axis at ID point____ of Long / Short side

UTME ____ UTMN ____ Zone: 11 NAD83 GPS error: ft./ m./ PDOP ____

Decimal degrees: LAT ____ . ____ LONG ____ . ____

GPS within stand? Yes / No If No, cite from GPS to stand: distance (m) ____ bearing ° ____ inclination ° ____

and record: Base point ID ____ Projected UTMs: UTME ____ UTMN ____

Camera Name: iphone **Cardinal photos at ID point:** NESW

Other photos:

Stand Size (acres): <1, 1-5, >5 | **Plot Area (m²):** 100 / ____ | **Plot Dimensions** ____ x ____ m | **RA Radius** 10 m

Exposure, Actual °: ____ NE NW SE SW Flat Variable | **Steepness, Actual °:** ____ 0° 1-5° >5-25° >25

Topography: Macro: top upper mid lower bottom | **Micro:** convex flat concave undulating

Geology code: ____ **Soil Texture code** Very gravelly loam **Upland or Wetland/Riparian** (circle one)

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H₂0: ( ) **BA Stems:** 90 **Litter:** 1 **Bedrock:** **Boulder:** 1 **Stone:** **Cobble:** 2 **Gravel:** 2 **Fines:** 4 =100%

% Current year bioturbation ____ **Past bioturbation present? Yes / No** | **% Hoof punch** ____

Fire evidence: Yes / No (circle one) If yes, describe in Site history section, including date of fire, if known.

Site history, stand age, comments: Disturbed roadside berm highly invaded. Characterizing thin strip of non-native shrubland, alternates Himalayan blackberry & French broom dominance along road.

Disturbance code / Intensity (L,M,H): ___/___ ___/___ ___/___ ___/___ ___/___ "Other" ____/___

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), **T5** (>24" dbh), **T6** multi-layered (T3 or T4 layer under T5, >60% cover)

Shrub: S1 seedling (<3 yr. old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), **H2** (>12" ht.)

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Rubus armeniacus - Genista monspessulana SNA

Field-assessed Association name (optional): ____

Adjacent Alliances/direction: ____/____, ____/____

Confidence in Alliance identification: L M H Explain: ____

Phenology (E,P,L): Herb ____ Shrub ____ Tree ____ Other identification or mapping information:

Combined Vegetation Rapid Assessment and Relevé Field Form

Database #: KENMOC1

(Revised March 27, 2018)
SPECIES SHEET

IV. VEGETATION DESCRIPTION

% NonVasc cover: ____ Total % Vasc Veg cover: 100

% Cover - Conifer tree / Hardwood tree: ____/____ Regenerating Tree: ____ Shrub: 65 Herbaceous: 35

Height Class - Conifer tree / Hardwood tree: ____/____ Regenerating Tree: ____ Shrub: 4 Herbaceous: 3+

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular
% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	Species	% cover	C	Final species determination
S	Rubus armeniacus (FAC)	35		
S	Genista monspessulana (UPL)	30		
H	Foeniculum vulgare (UPL)	10		
	Dipsacus fullonum (FAC)	12		
	Conium maculatum	2		
	Rumex crispus	1		
	Plantago lanceolata	2		
	Geranium dissectum	1		
	Vicia sativa	<1		
	Carduus pycnocephalus	<1		
	Bellis perennis	1		
	Poa pratensis (FAC)	8		
	Erodium cicutarium	1		
	Holcus lanatus	5		
	Other grass sp. (veg)	5		

Unusual species: ____

Combined Vegetation Rapid Assessment and Relevé Field Form
(Revised March 27, 2018)

For Office Use:	Final database #:	Final vegetation type:	Alliance / Association

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION circle: Relevé or RA

Database #:	Date: 4/8/21	Name of recorder: K. McDonald
KENM002		Other surveyors:
	UID:	Location Name:

GPS name: Arrow — For Relevé only: Bearing°, left axis at ID point ____ of Long / Short side

UTME ______ UTMN ______ Zone: 11 NAD83 GPS error: ft./ m./ PDOP ____

Decimal degrees: LAT ___.______ LONG ___.______

GPS within stand? Yes / No If No, cite from GPS to stand: distance (m) ____ bearing ° ____ inclination ° ____

and record: Base point ID ______ Projected UTMs: UTME ______ UTMN ______

Camera Name: iphone Cardinal photos at ID point: NESW

Other photos:

Stand Size (acres): <1, 1-5, >5 | Plot Area (m²): 100 / ____ | Plot Dimensions ___ x ___ m | RA Radius 10 m

Exposure, Actual °: ____ NE NW SE SW Flat Variable | Steepness, Actual °: ____ 0° 1-5° >5-25° >25

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating \

Geology code: ______ Soil Texture code: ______ | Upland or Wetland/Riparian (circle one)

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H_2O: \ BA Stems: 35 Litter: 30 Bedrock: 0 Boulder: 0 Stone: 0 Cobble: 1 Gravel: 3 Fines: 30 =100%

% Current year bioturbation | Past bioturbation present? Yes / No | % Hoof punch |

Fire evidence: Yes / No (circle one) If yes, describe in Site history section, including date of fire, if known.

Site history, stand age, comments: Strip of willows between road & pasture

Disturbance code / Intensity (L,M,H): ___/___ ___/___ ___/___ ___/___ ___/___ "Other" ______/___

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 multi-layered (T3 or T4 layer under T5, >60% cover)

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), S4 decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), H2 (>12" ht.)

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Salix lasiandra Alliance

Field-assessed Association name (optional): Salix lasiandra-S. lasiolepis-S. sitchensis

Adjacent Alliances/direction: ______/______, ______/______

Confidence in Alliance identification: L M H Explain: Species approximately even dominance

Phenology (E,P,L): Herb ___ Shrub ___ Tree P Other identification or mapping information:

Combined Vegetation Rapid Assessment and Relevé Field Form
(Revised March 27, 2018)
SPECIES SHEET

Database #: KENMC02

IV. VEGETATION DESCRIPTION

% NonVasc cover: ___ Total % Vasc Veg cover: 99

% Cover - Conifer tree / Hardwood tree: 0 / 70 Regenerating Tree: — Shrub: 55 Herbaceous: 8

Height Class - Conifer tree / Hardwood tree: / 6 Regenerating Tree: ___ Shrub: 4 Herbaceous: 1

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular
% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	Species	% cover	C	Final species determination
T	Salix lasiandra (FACW)	25		
T	Alnus rubra (FAC)	6		
T/S	Salix sitchensis (FACW)	18		mostly S. sitchensis to S., S. lasiolepis to N.
S	Rubus armeniacus (FAC)	50		high overlap
H	Conium maculatum	1		
	Sonchus asper	1		
	Ranunculus repens	1		
	Poa pratensis	2		
	Agrostis stolonifera	2		
S	Crataegus - Eng. hawthorne	1		
T/S	Salix lasiolepis	22		

Unusual species: ___

Combined Vegetation Rapid Assessment and Relevé Field Form
(Revised March 27, 2018)

For Office Use:	Final database #:	Final vegetation type:	Alliance / Association

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION circle: Relevé or RA

Database #:	Date:	Name of recorder: h. McDonald
KENM003	4/8/21	Other surveyors:
	UID:	Location Name:

GPS name: Arrow For Relevé only: Bearing°, left axis at ID point____ of Long / Short side

UTME ______ UTMN ______ Zone: 11 NAD83 GPS error: ft./ m./ PDOP ____

Decimal degrees: LAT ___.______ LONG ___.______

GPS within stand? Yes / No If No, cite from GPS to stand: distance (m) ____ bearing ° ____ inclination ° ____

and record: Base point ID ______ Projected UTMs: UTME ______ UTMN ______

Camera Name: iphone Cardinal photos at ID point: NESW

Other photos:

Stand Size (acres): <1, 1-5, >5 | Plot Area (m²): 100 / ___ | Plot Dimensions ___ x ___ m | RA Radius 10 m

Exposure, Actual °: _____ NE NW SE SW Flat Variable | Steepness, Actual °: _____ 0° 1-5° >5-25° >25

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating

Geology code: ______ Soil Texture code: ______ | Upland or Wetland/Riparian (circle one)

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud)

H_2O: 10 BA Stems: 42 Litter: 25 Bedrock: 0 Boulder: 0 Stone: 1 Cobble: 2 Gravel: 10 Fines: 10 =100%

% Current year bioturbation _____ Past bioturbation present? Yes / No | % Hoof punch _____

Fire evidence: Yes / No (circle one) If yes, describe in Site history section, including date of fire, if known.

Site history, stand age, comments: Mill Creek Riparian. Characterizing from downstream of Kenmar Rd. crossing.

Disturbance code / Intensity (L,M,H): ___/___ ___/___ ___/___ ___/___ ___/___ "Other" ______/___

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 multi-layered (T3 or T4 layer under T5, >60% cover)

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), S4 decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), H2 (>12" ht.)

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Salix lasiolepis Alliance

Field-assessed Association name (optional): ______

Adjacent Alliances/direction: ______/______, ______/______

Confidence in Alliance identification: L M H Explain: >10m, high diversity

Phenology (E,P,L): Herb ___ Shrub ___ Tree ___ Other identification or mapping information:

Combined Vegetation Rapid Assessment and Relevé Field Form
(Revised March 27, 2018)
SPECIES SHEET

Database #: LENM003

IV. VEGETATION DESCRIPTION

% NonVasc cover: ___ Total % Vasc Veg cover: 99

% Cover - Conifer tree / Hardwood tree: 55 Regenerating Tree: 1 Shrub: 40 Herbaceous: 30

Height Class - Conifer tree / Hardwood tree: 6 Regenerating Tree: 4 Shrub: 4 Herbaceous: 2

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular
% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	Species	% cover	C	Final species determination
T	Salix lasiandra (FACW)	15		
	Salix lasiolepis (FACW)	30		
	Alnus rubra (FAC)	8		
	Eucalyptus globulus	5		
	Frangula purshiana	1		
	~~Salix sitchensis~~			
S	Rubus armeniacus (FAC)	30		
	Rubus parviflorus	8		
	Lonicera involucrata	2		
H	Urtica dioica (FAC)	15		
	Scrophularia californica	2		
	Galium aparine	1		
	Holcus lanatus	1		
	Heracleum maxima	2		
	Rumex crispus	1		
	Polystichum munitum	1		
	Oenanthe sarmentosa	2		
	Ranunculus repens	1		
	Nasturtium officinale	2		
	Athyrium filix femina	1		

Unusual species: ___

Combined Vegetation Rapid Assessment and Relevé Field Form
(Revised March 27, 2018)

For Office Use:	Final database #:	Final vegetation type:	Alliance / Association

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION circle: Relevé or RA

Database #:	Date: 4/8/21	Name of recorder: K. McDonald
KENMC04		Other surveyors:
	UID:	Location Name: Kenmar Interchange

GPS name: Arcgis For Relevé only: Bearing°, left axis at ID point ___ of Long / Short side

UTME ___ UTMN ___ Zone: 11 NAD83 GPS error: ft./ m./ PDOP ___

Decimal degrees: LAT ___ LONG ___

GPS within stand? Yes / No If No, cite from GPS to stand: distance (m) ___ bearing ° ___ inclination ° ___

and record: Base point ID ___ Projected UTMs: UTME ___ UTMN ___

Camera Name: iphone Cardinal photos at ID point: NESW

Other photos:

Stand Size (acres): <1, 1-5, >5 | Plot Area (m²): 100 / ___ | Plot Dimensions ___ x ___ m | RA Radius 30 m

Exposure, Actual °: ___ NE NW SE SW Flat Variable | Steepness, Actual °: ___ 0° 1-5° > 5-25° > 25

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating

Geology code: ___ Soil Texture code: ___ | Upland or Wetland/Riparian (circle one)

% Surface cover: (Incl. outcrops) (>60cm diam) (25-60cm) (7.5-25cm) (2mm-7.5cm) (Incl sand, mud) Remainder paved

H_2O: 0 BA Stems: 40 Litter: 40 Bedrock: 0 Boulder: 0 Stone: 0 Cobble: 1 Gravel: 2 Fines: 10 =100%

% Current year bioturbation ___ Past bioturbation present? Yes / No | % Hoof punch ___

Fire evidence: Yes / No (circle one) If yes, describe in Site history section, including date of fire, if known.

Site history, stand age, comments: Redwoods & Monterey pine may have been planted along rail line. Monterey pine is prevalent on all sides of interchange, as well as redwoods, which were planted in a straight line east of the interchange.

Disturbance code / Intensity (L,M,H): ___ / ___ ___ / ___ ___ / ___ ___ / ___ ___ / ___ "Other" ___ / ___

II. HABITAT DESCRIPTION

Tree DBH : T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 multi-layered (T3 or T4 layer under T5, >60% cover)

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), S4 decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), H2 (>12" ht.)

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.)

III. INTERPRETATION OF STAND

Field-assessed vegetation Alliance name: Planted - Not a naturally occurring community

Field-assessed Association name (optional): ___

Adjacent Alliances/direction: ___ / ___ , ___ / ___

Confidence in Alliance identification: L M H Explain: ___

Phenology (E,P,L): Herb ___ Shrub ___ Tree ___ Other identification or mapping information:

Combined Vegetation Rapid Assessment and Relevé Field Form
(Revised March 27, 2018)
SPECIES SHEET

Database #: KENMCCH

IV. VEGETATION DESCRIPTION

% NonVasc cover: ____ Total % Vasc Veg cover: 75

% Cover - Conifer tree / Hardwood tree: 30/3 Regenerating Tree: 6 Shrub: 10 Herbaceous: 40

Height Class - Conifer tree / Hardwood tree: 8/5 Regenerating Tree: 0 Shrub: 2 Herbaceous: 1

Height classes: 1=<1/2m, 2=1/2-1m, 3=1-2m, 4=2-5m, 5=5-10m, 6=10-15m, 7=15-20m, 8=20-35m, 9=35-50m, 10=>50m

Stratum categories: T=Tree, A = SApling, E = SEedling, S = Shrub, H= Herb, N= Non-vascular

% Cover Intervals for reference: r = trace, + = <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Stratum	Species	% cover	C	Final species determination
T	Pinus radiata	15		
	Sequoia sempervirens	10		
	Alnus rubra	3		
	Prunus sp cultivars	2		
S	Frangula purshiana	1		
	Ribes sanguineum	1		
	Rubus armeniacus	5		
	Toxicodendron diversilobum	1		
	Baccharis pilularis	1		
	Salix lasiolepis	1		
H	Bromus diandrus	2		
	Taraxacum officinale	2		
	Holcus lanatus	5		
	Agrostis capillaris	20		
	Trifolium repens	10		
	Bellis perennis	2		
	Daucus carota	1		
	Plantago lanceolata	1		
	Hypochaeris radicata	2		
	Anthoxanthum odoratum	5		
S/V	Hedera helix	1		

Unusual species: ____

Appendix E – Site Photographs

Photo 1. Looking at the western slope with the shining willow Sensitive Natural Community and wet pasture from west of the Project Area. Redwoods and Monterey pine planted around Hwy 101 can be seen in the background.

Photo 2. Redwood and Monterey pine were planted around the Highway 101 Kenmar Road Interchange.

Photo 3. The western side of the Kenmar Road Interchange.

Photo 4. The northwestern portion of the Project Area was highly invaded by Himalayan blackberry and French broom.

Photo 5. Shining willow and Himalayan blackberry along the western slope.

Photo 6. Shining willow, arroyo willow, and Sitka willow on the slope above wet pasture.

Photo 7. Arroyo willow and red alder in the Mill Creek riparian crossing.

Appendix F – NRCS Custom Soil Resource Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Humboldt County, Central Part, California

Kenmar Road/US 101 Interchange Project

April 12, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

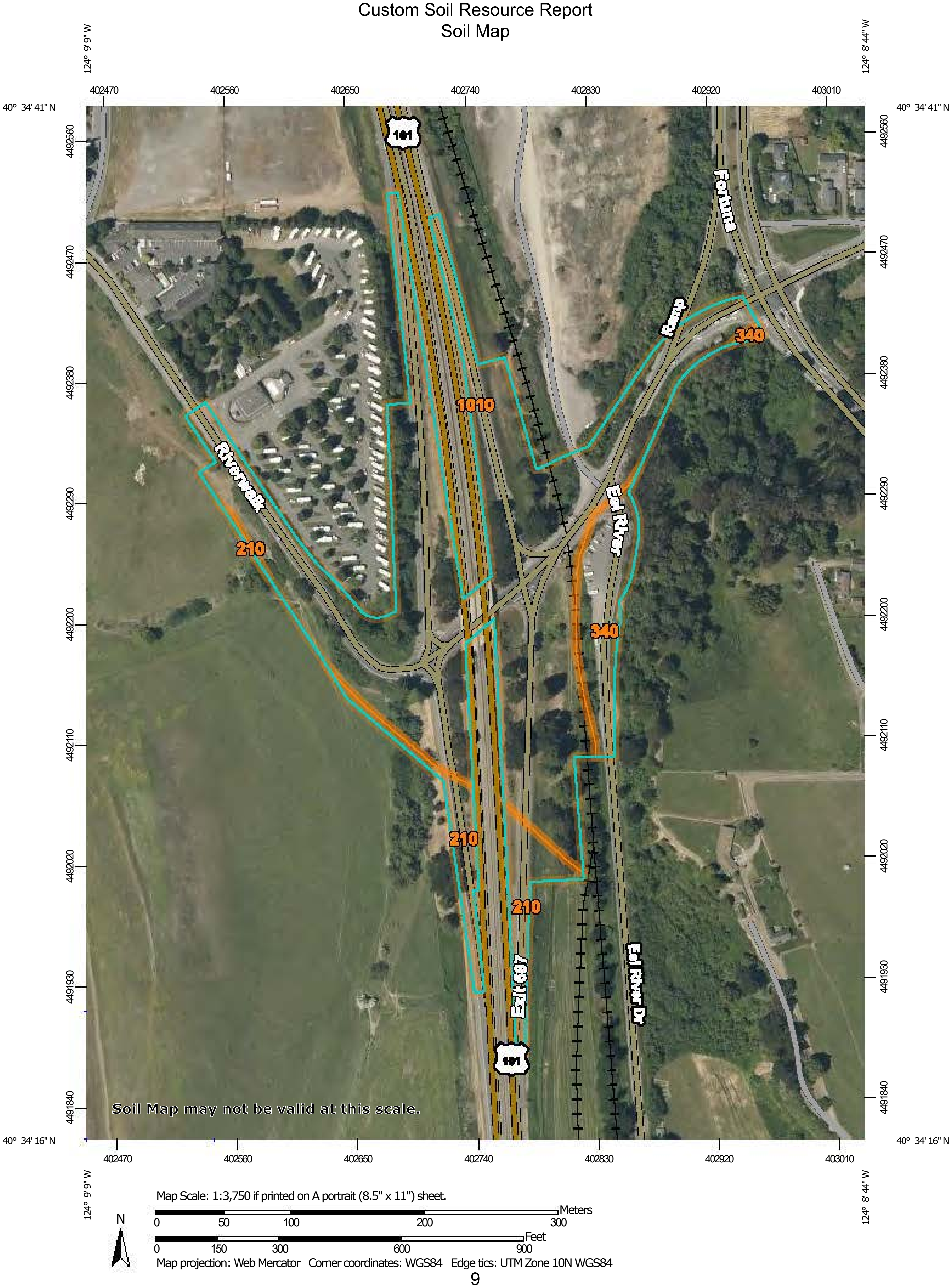
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


124° 9' 9" W
124° 8' 44" W
402470
402560
402650
402740
402830
402920
403010
40° 34' 41" N
40° 34' 16" N
4492560
4492470
4492380
4492290
4492200
4492110
4492020
4491930
4491840
101
Fortuna
Ramp
340
1010
Riverwalk
Eel River
210
340
210
210
Exit 687
Eel River Dr
101
Soil Map may not be valid at this scale.
Map Scale: 1:3,750 if printed on A portrait (8.5" x 11") sheet.
Meters
0 50 100 200 300
Feet
0 150 300 600 900
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Humboldt County, Central Part, California
Survey Area Data: Version 6, Jun 1, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 8, 2019—Jun 21, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
210	Dungan, 0 to 2 percent slopes	1.5	9.4%
340	Fiedler-Petellen-Nanningcreek complex, 15 to 30 percent slopes	1.5	9.0%
1010	Urban land-Friendlycity association, 0 to 2 percent	13.2	81.6%
Totals for Area of Interest		**16.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Humboldt County, Central Part, California

210—Dungan, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hs2j
Elevation: 10 to 160 feet
Mean annual precipitation: 35 to 80 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 275 to 330 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Dungan and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dungan

Setting

Landform: Fan remnants, alluvial fans, flood-plain steps
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium derived from mixed sources

Typical profile

Ap1 - 0 to 3 inches: silt loam
Ap2 - 3 to 13 inches: silt loam
Bw - 13 to 29 inches: silt loam
C1 - 29 to 37 inches: fine sandy loam
C2 - 37 to 61 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 39 to 61 inches
Frequency of flooding: RareNone
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Ferndale

Percent of map unit: 7 percent

Landform: Flood-plain steps
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Arlynda

Percent of map unit: 5 percent
Landform: Backswamps, depressions, flood-plain steps, meander scars
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: Yes

Russ

Percent of map unit: 3 percent
Landform: Natural levees
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

340—Fiedler-Petellen-Nanningcreek complex, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 1j78q
Elevation: 50 to 1,480 feet
Mean annual precipitation: 45 to 60 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 240 to 330 days
Farmland classification: Not prime farmland

Map Unit Composition

Fiedler and similar soils: 32 percent
Petellen and similar soils: 28 percent
Nanningcreek and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fiedler

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Colluvium derived from conglomerate and/or residuum weathered from conglomerate

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 12 inches: loam
Bt1 - 12 to 20 inches: loam
Bt2 - 20 to 41 inches: clay loam
Bt3 - 41 to 60 inches: clay loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Petellen

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Colluvium derived from conglomerate and/or residuum weathered from conglomerate

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 9 inches: gravelly loam
Bt1 - 9 to 20 inches: very gravelly loam
Bt2 - 20 to 48 inches: very cobbly loam
Cd - 48 to 60 inches: very cobbly loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 30 to 79 inches to densic material
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Nanningcreek

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium derived from sandstone and/or residuum weathered from sandstone

Typical profile

A - 0 to 6 inches: loam
Bt1 - 6 to 20 inches: loam
Bt2 - 20 to 30 inches: sandy clay loam
Bt3 - 30 to 60 inches: sandy clay loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 20 to 39 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Rootcreek

Percent of map unit: 10 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Salmoncreek

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountainflank

Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: Yes

1010—Urban land-Friendlycity association, 0 to 2 percent

Map Unit Setting

National map unit symbol: 2w91d
Elevation: 20 to 160 feet
Mean annual precipitation: 44 to 48 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 300 to 360 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Urban land, residential: 65 percent
Friendlycity and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Residential

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Description of Friendlycity

Setting

Landform: Terraces, alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock

Typical profile

Ap - 0 to 6 inches: silt loam
A - 6 to 13 inches: silty clay loam
A/B - 13 to 24 inches: silty clay loam
Bw1 - 24 to 35 inches: silty clay loam

Bw2 - 35 to 55 inches: silty clay loam
C - 55 to 67 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 20 to 39 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Canalschool

Percent of map unit: 4 percent
Landform: Flood-plain steps
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Carlotta

Percent of map unit: 3 percent
Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Ferndale

Percent of map unit: 3 percent
Landform: Flood-plain steps
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

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