
Biological Resource Report

Hard-in Produce & Farms, LLC.
APN 208-241-002
Mad River, California

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This report was prepared by Emerald Hills Environmental LLC with biological assistance from Olson Environmental, Inc.

List of Abbreviated Terms

CCLUO Humboldt County Commercial Cannabis Land Use Ordinance
CDFW California Department of Fish and Wildlife
CESA California Endangered Species Act
CEQA California Environmental Quality Act
CNDDDB California Natural Diversity Data Base
CNPS California Native Plant Society
DPS Distinct Population Segment
EFH Essential Fish Habitat
ESA Endangered Species Act
ESU Evolutionary Significant Unit
FMP Fishery Management Plans
LSA Lake and Streambed Alteration
MBTA Migratory Bird Treaty Act
MMRP Mitigation Monitoring and Reporting Program
MSA Magnuson-Stevens Fishery Conservation and Management Act
NMFS National Marine Fisheries Service
NOAA National Oceanic and Atmospheric Administration
USFWS United States Fish and Wildlife Service

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1. Introduction

Project Location

The project is located on a 46-acre parcel of land (APN 208-241-002) off County Line Creek Rd. near the town of Mad River, in Humboldt County, California. The property lies just north of the Mad River, 40 miles inland from the Pacific Ocean, and less than 0.5 mile from the Humboldt-Trinity County line (**Figure 1**).

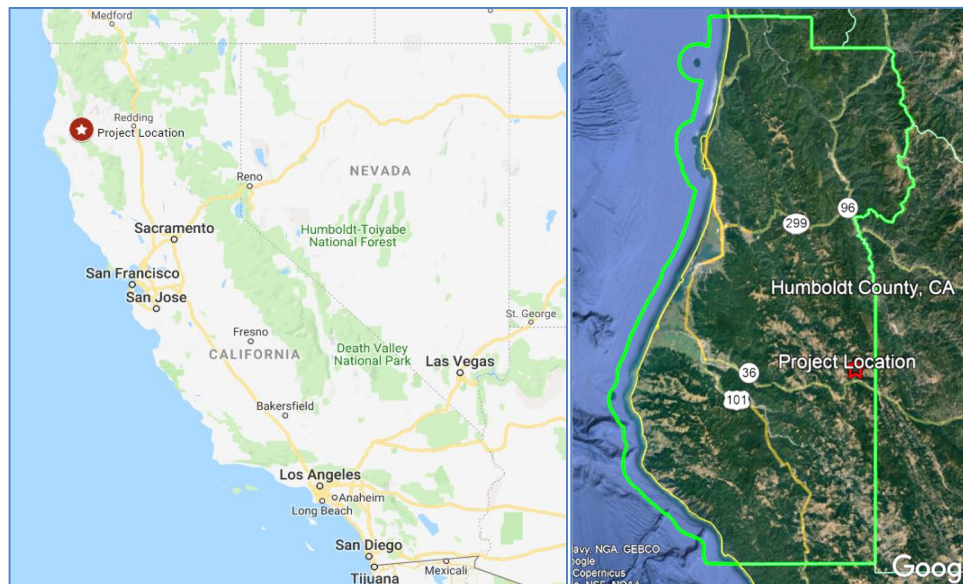
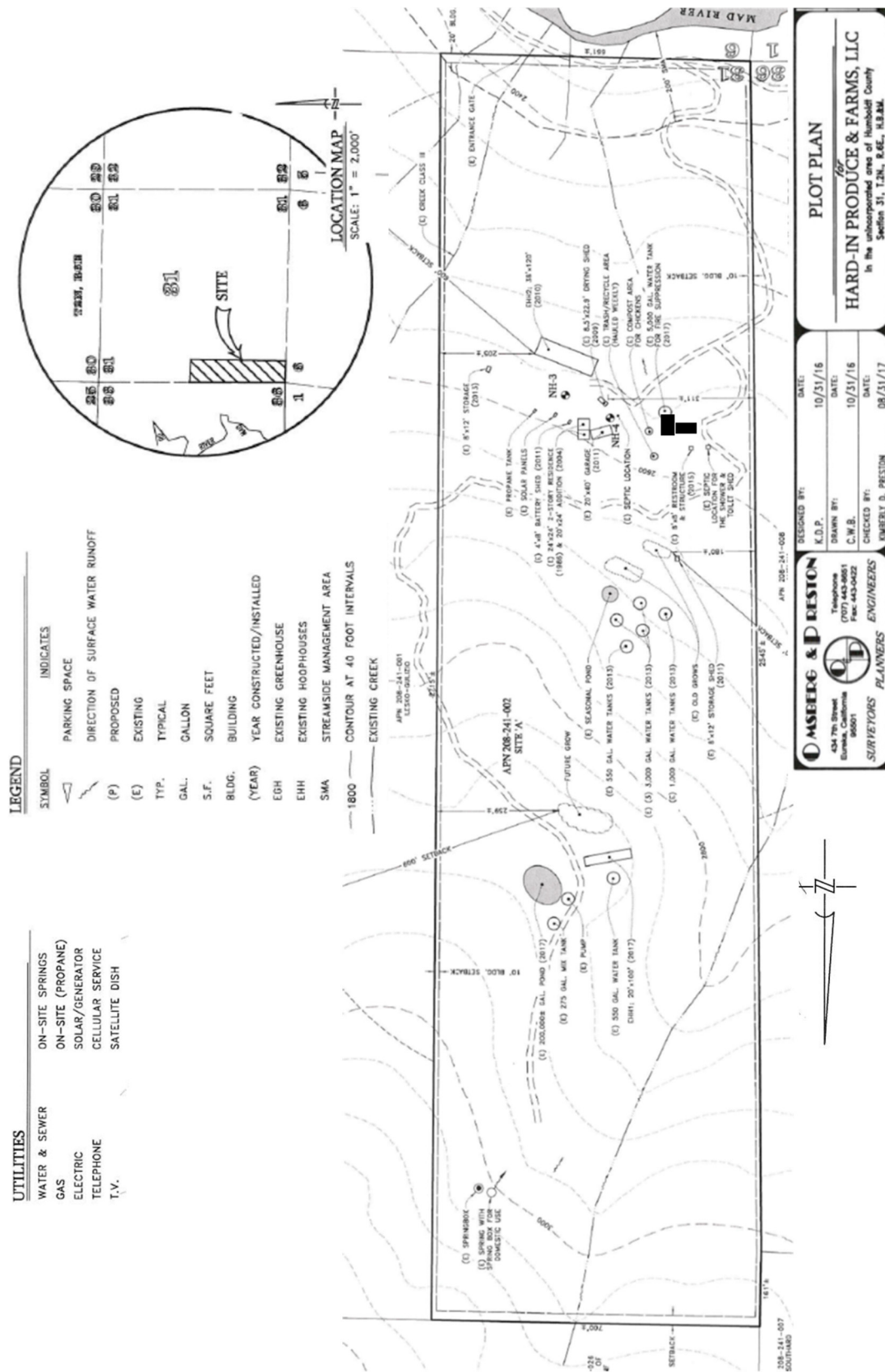


Figure 1. Location of project within California and within Humboldt County

Project Description

The proposed project consists of 9,800 sq. ft. of outdoor cultivation and a 300 sq. ft. greenhouse used as a propagation facility. Several historic cultivation sites are proposed for relocation to a new location in an existing clearing. Water is obtained from an on-site spring and rain-catchment pond and stored in HDPE water Storage tank (11,500 gal.) for domestic use and a 200,000 gal. pond for cannabis irrigation. Annual water usage for cannabis irrigation is projected to be 85,000 gal. With the exception of relocating the existing cultivation sites and very minor grading around the new proposed site, no further development or disturbance of potential habitat is proposed. Relocation of the historic cultivation sites to the proposed new grow area will not require the removal of trees or presence of construction crews.

Information about the operation used when considering potential impacts to special status species is contained in the Operations Map (**Figure 2**) and the Cultivation and Operations Plan (**Appendix A**), with additional information provided by the client. It is assumed that the operation will implement required best practices and comply with all environmental laws.



Scope of Report

This report assesses the potential for special status species and habitats to occur within the Study Area, which in this case is defined to be the property boundary, and be adversely affected by the project construction and/or operation. Using the California Wildlife Habitat Relationship (CSHR) System, the report includes lists of habitat types with ranges encompassing the Study Area, and habitat-associated special status species and habitats that have been reported in the literature in the surrounding nine-USGS quad geographic area. When available, site-specific information including topographic maps, satellite imagery, and site photographs is used to refine the list of potential habitats and special status species and habitats to those with greatest potential presence. Knowledge of the proposed operation obtained from the operator is used to assess the likelihood of adverse effects occurring to noted species and habitats, and methods to avoid or reduce adverse effects and protect biological resources are provided wherever possible.

This report is not a protocol-level species survey or inventory for any species or habitat and is based on information available at the time of the study. Further field investigations would be necessary to determine habitat quality or confirm the presence of species in the Study Area.

2. Methods

Background literature and database searches were conducted to determine the potential occurrence of special-status species and biological communities within the Study Area based on presence of unique habitat features, proximity to reported occurrences, and geographic range of subject species. The search focused on reported occurrences for the Blake Mountain 7.5-minute USGS quadrangle, where the project is located, and the surrounding quads, including Board Camp Mountain, Sims Mountain, Hyampom Mountain, Showers Mountain, Hyampom, Larabee Valley, Dinsmore, and Sportshaven (**Figure 3**). General references were also consulted to evaluate the potential for unique biological communities and special-status animal species. The review included, but was not limited to, the following sources:

- A Guide to Wildlife Habitats in California (CDFW 1988)
- A Manual of California Vegetation, 2nd Edition (Sawyer et al. 2009)
- California Department of Fish and Wildlife (CDFW) Natural Diversity Database (CNDDB) (CDFW 2018a)
- CNDDB/Spotted Owl Viewer on-line database for the reported sightings of northern spotted owl (CDFW 2018b)
- CNPS Inventory of Rare and Endangered Vascular Plants of California on-line inventory (CNPS 2018)
- Calscape web application of CNPS
- CalFlora on-line database
- Jepson eFlora on-line database
- NRCS Web Soil Survey
- USFWS Information Planning and Consultation (IPaC) website (USFWS 2018)
- The National Marine Fisheries Service (NOAA 2018)

From these sources, initial lists of potential habitats and special-status species were developed and considered for potential co-occurrence of suitable habitat and species/communities within the Study Area. The lists of potential habitats and special-status species/biological communities are provided in **Appendices B, C, and D**. The potential for each possible species/community to occur within the Study Area is reported using the following criteria:

- **Unlikely:** Species or biological community is not expected to occur at the study area. Habitat is unsuitable and/or species is presumed extirpated.
- **Potentially Present:** Species or biological community may possibly occur at the Study Area. Further field investigations and/or more detailed site information are required to assess habitat quality and/or species presence.

Where a species was determined to possibly occur at the study area, additional analysis was conducted, considering known information about the operation and any proposed construction or other activities, and recommendations for avoiding or mitigating impacts were provided. In some, but not all, cases, this might include conducting protocol-level species-specific surveys.



Figure 3. . Area included in Data Search for Biological Resources - the nine USGS 1:20,000 (7½- minute) Topographic Map areas including and surrounding the Blake Mountain Quad.

3. Environmental Setting

The Study Area is located just north of the Mad River near the town of Mad River, California. The site is 40 miles inland from the Pacific Ocean (**Figure 1**). The property lies on a south facing slope with elevations ranging from approximately 3,100 ft. on the northern boundary to 2,300 ft. near Mad River on the south. A single Class II stream cuts diagonally from northeast to southwest across the northern third of the property, well above areas developed and used for the operation. A man-made pond is present in the northern area, and three small Class III drainages are present on the southern quarter of the property. The Mad River, a Class I (fish-bearing) river, abuts the southern end of the study area. All areas developed for cannabis cultivation lay outside of the riparian setbacks of natural watercourses.

The region has a Hot-summer Mediterranean climate (Köppen climate classification system), with average summer high temperatures in the 90s (°F) and winter lows in the mid 30s (°F). Average annual precipitation is 39 inches (StreamStats).

Soils on the northern, higher elevation portion of the property are mapped as the Pasturerock-Coyoterock-Maneze complex (NRCS/UC ANR), which are typically moderately to well drained colluvium, primarily derived from sandstone and mudstone. Vegetation associated with these soils includes Douglas-fir, Sierra gooseberry, oceanspray, common snowberry, rose, western swordfern, western brackenfern, miniature lupine, and perennial and annual grasses, including native Alaska oniongrass, blue wildrye, and California brome, and introduced (non-native) orchardgrass, bristly dogstail grass, tall oatgrass, and common velvetgrass. Soils on the lower elevations are mapped as the Chalkmountain-Hoagland Complex. In addition to Douglas fir, these soils are associated with Pacific madrone, tanoak, California bay, California live oak, Cascade Oregon grape, California huckleberry, oval-leaf blueberry, and sword hollyfern.

Photographs of the property (**Figures 4-7**) show presence of oak woodland, Douglas fir and/or other conifers, and grasslands, potentially including California fescue (*Festuca californica*) and/or blue wildrye (*Elymus glaucus*).

A review of the California Wildlife Habitat Relationship (CWHR) maps (CDFW-CIWTG 1988) showed the Study Area to be within the geographic range of 17 habitat types (**Appendix B**)¹. Of the potential habitats, Coastal Oak Woodland (COW), Montane Hardwood-Conifer (MHC), Perennial Grassland (PGS) and Annual Grassland (AGS) are most abundant. Additional information regarding these habitats is provided in **Appendix C**.

¹ The CWHR habitat maps show limits of distribution only; any given habitat type does not occur evenly or at all throughout its mapped range.



Figure 4. Oak woodland and grassland in Study Area



Figure 5: Oak, Grassland and a Class II (non-fish bearing) stream in Study Area.



Figure 6. Oak and grassland, grading into mixed conifer at higher elevation



Figure 5. Grassland, Oak Forest, Doug Fir and/or other conifers.

4. Biological Resources

Biological resources include special status species, habitats, and biological communities. The following biological resources were determined to potentially occur in the Study Area.

4.1 Special-Status Species

In California, special-status species include those plants and animals that are afforded legal protection under the federal and California Endangered Species Acts (ESA and CESA, respectively) and other regulations. Consideration of these species must be included during project evaluation to comply with CEQA and in consultation with state and federal resource agencies.

Special-status species of California include, but may not be limited to:

- Species listed or proposed for listing as threatened or endangered under the federal ESA.
- Species listed or proposed for listing as threatened or endangered under CESA.
- Species that are recognized as candidates for future listing by agencies with resource management responsibilities such as USFWS, NMFS, and CDFW.
- Species defined by CDFW as California Species of Special Concern.
- Species classified as Fully Protected by CDFW (California Fish and Game Code 3511).
- Plant species, subspecies, and varieties defined as rare or threatened by the California Native Plant Protection Act (California Fish and Game Code 1900).
- Plant species listed by the California Native Plant Society (CNPS) as List 1 and 2.
- Species that otherwise meet the definition of rare, threatened, or endangered pursuant to 15380 of the CEQA Guidelines.

A full listing of special-status species documented within the nine-quad area (as described in the methods section, above) is included in **Appendix D**. Special-status species identified as potentially occurring in the Study Area based on site conditions or other information are presented below. Should there be potential for negative impact on special status species, mitigation measures should follow Table 4.1 of the “Mitigation Monitoring and Reporting Program – Proposed Amendments to Humboldt County Code Regulating Commercial Cannabis” (MMRP).

4.1.1 Animal Species

Fifteen special-status animal species have been documented within the project nine-quad area. Based on conditions at the site (including site elevation), Fourteen of the fifteen species may potentially occur in the Study Area. Based on current and proposed cultivation activities and development, the potential for negative impact on these species is low. Current cultivation activities and proposed development do not infringe on potential habitat, create stresses, or create the potential for incidental take of these species. Species are listed below, and additional information is in **Appendix D**.

Mammals

- **Fisher - West Coast DPS (*Pekania pennanti*):** The fisher is a small mustelid mammal that is listed as a California State Threatened species and a US Forest Service Sensitive species. Fishers typically prefer dense coniferous or mixed forests, including early successional forests with

dense cover. They are primarily ground-dwelling mammals and are generalized predators, eating mainly small to medium-sized mammals, birds, and carrion.

Potential for negative impact: Low, potential habitat for the fisher exists within the study area, however, no new development within potential habitat is proposed. Existing cultivation activities have a low probability of negatively impacting this species. Should development of wooded areas become necessary, Mitigation Measure 3.4-1j of the CCLUO MMRP should be implemented.

- **Sonoma tree vole:** The Sonoma tree vole is a red-furred rodent, 158-186 mm long, with a long, well-furred tail, curved claws, and ears partly concealed in the fur. Predators include spotted owls and probably other owls, raccoons, and fishers. It is listed on the IUCN Red List as Near Threatened and is S3, vulnerable, in California. It is potentially present in the north coast fog belt from Oregon border to Sonoma County, in Douglas-fir, redwood & montane hardwood-conifer forests, where it feeds almost exclusively on Douglas-fir needles but will occasionally take needles of grand fir, hemlock or spruce.

Potential for negative impact: Low, potential habitat for the Sonoma tree vole exists within the study area, however, no new development within potential habitat is proposed. Existing cultivation activities have a low probability of negatively impacting this species. Should development of wooded areas become necessary, Mitigation Measure 3.4-1l of the CCLUO MMRP should be implemented.

- **Townsend's Big-eared Bat (*Corynorhinus townsendii*):** Townsend's big-eared bats are medium-sized bats with long ears that are listed as a Species of Special Concern in California. They live in a variety of habitats, including coniferous forests, riparian communities, active agricultural areas, and coastal habitats. Their distribution is strongly correlated with the presence of caves. During nesting season, these bats roost in large maternity colonies. Townsend's big-eared bats are potentially present on site because the site falls within IUCN habitat distribution and they have been observed within the Blake Mountain quadrangle.

Potential for negative impact: Low, potential roosting habitat for the Townsend's big-eared bat exists within the study area, however, no new development resulting in the disturbance of potential roosting sites is proposed. Existing cultivation activities have a low probability of negatively impacting this species. Existing cannabis cultivation activities comply with black sky standards. Should development of wooded areas become necessary, Mitigation Measure 3.4-1k of the CCLUO MMRP should be implemented.

Birds

- **American peregrine falcon (*Falco peregrinus anatum*):** American peregrine falcon is a fully protected species by the state of California. They are the largest falcon over most of the continent with long, pointed wings, and a long tail. Adults are blue-gray above with barred underparts and a dark head with thick "sideburns," while juveniles are heavily marked with vertical streaks on the breast. American peregrine falcons can be observed throughout North America but most commonly along coasts. They perch and nest on water towers, cliffs, and other human-made structures. They are potentially present on site due to their nesting behavior and wide habitat suitability.

Potential for Negative Impact: Low, potential nesting habitat for the American peregrine falcon exists within the study area, however no new development resulting in the disturbance of potential nesting sites is proposed. Existing cultivation activities have a low probability of negatively impacting this species. Should development of wooded areas, removal of trees, or areas

around potential nesting sites become necessary or result in sustained increases of noise or presence of construction crews/ heavy equipment mitigation measure 3.4-1d of the CCLUO MMRP should be implemented.

- **Bald eagle (*Haliaeetus leucocephalus*):** Bald eagle is an endangered species listed by the state of California. They are one of the largest birds in North America measuring about 27.9-37.8 inches in length with an average wingspan of 80.3 inches. Adult bald eagles have white heads and tails with dark brown bodies and wings and bright yellow legs. Juveniles have mostly dark heads and tails, brown bodies and wings mottled with white in varying amounts. Bald eagles can be found near lakes, rivers, marshes, and coasts. Bald eagles are potentially present in the study area because the site falls within their distribution range and has riverine habitat that provides great nesting opportunities.

Potential for negative impact: Low, potential nesting habitat for the bald eagle exists within the study area, however no new development resulting in the disturbance of potential nesting sites is proposed. Existing cultivation activities have a low probability of negatively impacting this species. Should development of wooded areas, removal of trees, or areas around potential nesting sites become necessary or result in sustained increases of noise or presence of construction crews/ heavy equipment mitigation measure 3.4-1d of the CCLUO MMRP should be implemented.

- **Northern Goshawk (*Accipiter gentilis*):** The northern goshawk is a species on the CDFW Watch List and is considered a California Bird Species of Special Concern. It is a large, bulky raptor with a grey cap, white eyebrows, and red eyes. In flight, the goshawk can be differentiated from other buteos by its broad, rounded wings and long tail. This species breeds in coniferous forests throughout the North Coast Ranges and hunts in wooded areas, using tree snags for perching and observation. They generally avoid developed areas, so are impacted by new development in forests.

Potential for negative impact: Low, potential nesting habitat for the northern goshawk exists within the study area, however no new development resulting in the disturbance of potential nesting sites is proposed. Existing cultivation activities have a low probability of negatively impacting this species. Should development of wooded areas, removal of trees, or areas around potential nesting sites become necessary or result in sustained increases of noise or presence of construction crews/ heavy equipment mitigation measure 3.4-1d of the CCLUO MMRP should be implemented.

- **Northern spotted owl (*Strix occidentalis caurina*):** The northern spotted owl is listed as threatened under the Endangered Species Act. They are found in northern California and require forests with dense canopy cover of old growth trees. They are a brown, medium-sized owl, with dark eyes. They hunt small forest mammals by perching and pouncing on their prey. They are potentially present where this suitable habitat is nearby, or in close proximity to established Critical Habitat for the species.

Potential for negative impact: Low; although there does not appear to be old growth trees in the study area, established Critical Habitat lays immediately to the north and south of the study area and observations have been recorded within 0.25 miles. However, proposed development will not result in the removal of trees, disturbance of potential nesting habitat, or sustained increases in noise levels. As specified in Humboldt County Ordinance No. 2599 Section 55.4.12.6.b "Performance Standards for Noise at Cultivation Sites", "Where located within one (1) mile of mapped habitat for Marbled Murrelet or Spotted Owls where timberland is present,

maximum noise exposure from the combination of background and cultivation related noise may not exceed 50 decibels measured at a distance of 100 feet from the noise source or the edge of habitat, whichever is closer. Where ambient noise levels, without including cultivation-related noise, exceed 50 decibels within 100 feet from the cultivation-related noise source or the edge of habitat, cultivation-related noise sources may exceed 50 decibels provided no increase over ambient noise levels would result". This performance standard should be observed. Existing cultivation activities meet dark sky standards, and do not involve the application of rodenticide. Should future development resulting in the removal of trees, disturbance of potential habitat, or sustained increases in ambient noise levels Mitigation Measure 3.4-1e of the MMRP should be implemented.

Reptiles and Amphibians

- **Foothill yellow-legged frog (*Rana boylei*):** The foothill yellow-legged frog is a medium-sized frog (1.5-3.2 inches in length) and a California Species of Special Concern and State Candidate for Threatened Species. Their coloring is gray or brown and typically matches the surrounding background of its habitat. They are found in rocky streams, riparian habitats, or isolated pools, all of which could be affected by activities on nearby developed lands. They are potentially present onsite because the site falls within the frog's historical range, a mapped range exists within 0.6 miles of the site and they are found in streams, rivers, wet areas, or riparian habitat.

Potential for negative impact: Low, potential habitat for the foothill yellow-legged frog exists within the study area, however, no new development for cannabis-related activities within potential habitat is proposed. Existing cultivation activities have a low probability of negatively impacting this species. Should development resulting in the disturbance of streams, ponds, or riparian habitat be proposed mitigation measure 3.4-1b of the MMRP should be implemented.

- **Northern red-legged frog (*Rana aurora*):** The northern red-legged frog is a California Species of Special Concern. It is a medium-sized frog with a slender body, smooth skin, distinct dorso-lateral folds, and a dark eye mask. The dorsal color is tan, brown or olive-brown with varying amounts of black spotting and speckling. They are potentially present in lowland moist forested habitats and riparian forest in the vicinity of standing or flowing waters.

Potential for negative impact: Low, potential habitat for the foothill yellow-legged frog exists within the study area, however, no new development for cannabis-related activities within potential habitat is proposed. Existing cultivation activities have a low probability of negatively impacting this species. Should development resulting in the disturbance of streams, ponds, or riparian habitat be proposed mitigation measure 3.4-1b should be implemented.

- **Pacific tailed frog (*Ascaphus truei*):** Pacific tailed frogs (1-2 inches in length) are endemic to the Pacific Northwest and are a California Species of Special Concern. The male frogs have tails that are used for reproduction through internal fertilization. These frogs are colored to blend with rocks found near streams. Pacific tailed frogs are potentially present on site because the site falls within IUCN habitat distribution and they are found in ponds and riparian habitat.

Potential for negative impact: Low, potential habitat for the foothill yellow-legged frog exists within the study area, however, no new development for cannabis-related activities within potential habitat is proposed. Existing cultivation activities have a low probability of negatively im-

pacting this species. Should development resulting in the disturbance of streams, ponds, or riparian habitat be proposed mitigation measure 3.4-1b should be implemented.

- **Southern torrent salamander (*Rhyacotriton variegatus*):** Southern torrent salamander is a California Species of Special Concern and Federally Sensitive Species. It is a medium sized salamander (1.5 - 2.4 inches in length) with slim body, short tail, and small head with large protuberant eyes. The coloring ranges from olive to brown dorsally with dark and light speckling. Their ventral surface is yellowish and sometimes speckled. Habitats include Lower montane coniferous forest; Old growth; Redwood; Riparian forest. They are occasionally found in riparian vegetation adjacent to water or in contact with water. They are potentially present onsite because suitable habitat exists in the study area.

Potential for negative impact: Low, potential habitat for the foothill yellow-legged frog exists within the study area, however, no new development for cannabis related activities within potential habitat is proposed. Existing cultivation activities have a low probability of negatively impacting this species. Should development resulting in the disturbance of streams, ponds, or riparian habitat be proposed mitigation measure 3.4-1b should be implemented.

- **Western pond turtle (*Emys marmorata*):** Western pond turtle is the only native freshwater turtle along the West Coast and are listed as a California Species of Special Concern. In the Humboldt region, these turtles have been found in mixed oak-fir forests, open prairies, and riparian habitats. Western pond turtles are also potentially present in riparian corridors adjacent to open water. Western pond turtles are potentially present on site because of suitable habitat exists in the study area

Potential for negative impact: Low, potential habitat for the western pond turtle exists within the study area, however, no new development for cannabis related activities within potential habitat is proposed. Existing cultivation activities have a low probability of negatively impacting this species. Should development resulting in the disturbance of streams, ponds, or riparian habitat be proposed mitigation measure 3.4-1c should be implemented.

Fish

- **Summer-run steelhead trout (*Oncorhynchus mykiss irideus* pop. 36):** Steelhead are a salmonid species and a California Species of Special Concern. The northern California Distinct Population Segment is federally listed as threatened. Adult steelhead can reach 25 inches in length and during spawning season are iridescent pink around their lateral line. Steelhead are the anadromous form of rainbow trout, with significant gene flow between resident trout and steelhead. Activities on land that affect adjacent waters are potentially detrimental to steelhead populations. Steelhead are assumed present in the portion of the Mad River running through the study area.

Potential for negative impact: Low, summer-run steelhead trout are assumed present in the Mar River within the study area however no development within this area or surrounding riparian zones is proposed. Sediment and erosion control measures are being implemented across the study area to prevent sediment discharge to surrounding watersheds that could have a negative impact to spawning beds.

4.1.2 Other Protected Birds

All nesting native bird species are protected under both federal and state law. Federal regulations protect migratory birds, and their nests, eggs, and nestlings, under the Migratory Bird

Treaty Act (MBTA). Birds and their nests are also protected under California Fish and Game Code 3503 and 3503.5.

Any project activities during the bird breeding season (typically February 1 to August 31) may require measures to protect native nesting birds, including preconstruction surveys, avoidance measures, and monitoring.

4.2 Special-Status Habitats and Biological Communities

Sensitive biological communities and protected habitats that are potentially present in the Study Area are discussed below.

4.2.1 Designated Critical Habitat

Critical habitat is defined in Section 3(5)A of the federal ESA as the specific geographic areas that contain features essential to the conservation of an endangered or threatened species and that may require special management and protection. Critical habitat may also include areas that are not currently occupied by the species but will be needed for its recovery.

The Study Area abuts designated critical habitat for north coast steelhead and northern spotted owl.

North Coast Steelhead Critical Habitat

Within the nine-quad area there is designated critical habitat for north coast steelhead on the Mad River, which has been designated as important habitat for the recovery of North Coast steelhead populations. The southern boundary of the property abuts the Mad River.

Northern Spotted Owl Critical Habitat

Within the nine quad area there is designated critical habitat for the northern spotted owl. An area of northern spotted owl designated critical habitat abuts the southern boundary of the property within which the study area lies. Northern spotted owls live in forests characterized by dense canopy of mature and old growth trees. Compliance with the ESA will require consultation with U.S. Fish and Wildlife Service to ensure project activities would not adversely affect critical habitat.

Compliance with the ESA may require further evaluation to ensure that project activities would not adversely affect critical habitat for these species.

4.2.2 Essential Fish Habitat

Under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), regional fishery management councils establish Essential Fish Habitat (EFH) for federally managed species covered under regional Fishery Management Plans (FMP). EFH is defined as “those waters or substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (MSA Section 3). Impacts on EFH can result from the reduction in the quality and quantity of habitat, direct effects (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), and site-specific or habitat-wide impacts.

The Mad River, which abuts the southern edge of the property, is an EFH for Chinook and coho salmon. Habitat and fish life history descriptions may be viewed on the web at www.pcountcil.org/wp-content/uploads/99efh2.pdf.

Compliance with the MSA is accomplished through consultation with NMFS. Federal agencies that fund, permit, or implement activities that may adversely affect EFH are required to consult with NMFS regarding potentially adverse effects of their actions on EFH.

4.2.3 Sensitive Natural Communities

Sensitive Natural Communities are listed by CDFW in the CNDDDB due to the rarity of the community in the state or throughout its entire range (globally). Additionally, habitats identified by CDFW as Areas of Significant Biological Importance are included as a sensitive natural community.

The Study Area does not contain designated Sensitive Natural Communities; no additional considerations are required.

4.2.4 Jurisdictional Waters

Jurisdictional waters are regulated by the U.S. Army Corps of Engineers (Section 404 Clean Water Act and Section 10 Rivers and Harbors Act) and the Regional Water Quality Control Board (Section 401 of the Clean Water Act and the Porter-Cologne Water Quality Control Act). A delineation to determine the precise locations and boundaries of jurisdictional waters was not performed for the purposes of this report.

The Mad River and connected tributaries and wetlands are likely to be considered jurisdictional waters and any impacts to the waterway will be regulated by Army Corps of Engineers.

4.2.5 California Lakes and Streambeds

Streams and lakes, as habitat for fish and wildlife species, are subject to jurisdiction by CDFW under Sections 1600-1616 of California Fish and Game Code. The Lake and Streambed Alteration (LSA) Program reviews projects that would alter any river, stream, or lake and conditions projects to conserve existing fish and wildlife resources.

Project activities within or adjacent to the Mad River would require a 1602 Lake and Streambed Alteration Agreement.

4.2.6 Streamside Management Area (SMA) Ordinance of the County of Humboldt

Pursuant to Humboldt County's Streamside Management Area Ordinance, SMAs are sensitive habitat and need to be identified in relation to proposed developments. The ordinance provides standards pertaining to development within streamside management areas and other wet areas. SMAs are defined as "a natural resource area along both sides of streams containing the channel and adjacent land." The ordinance identifies allowed development and prohibited activities within SMAs, stream channels, and other wet areas. No development is allowed within the SMA unless the County determines, based on specific factual findings, that such development would not result in significant adverse impacts to fish, wildlife, riparian habitat, or soil stability.

Some project activities may require determination from the County, which will require factual findings in a biological report, identifying potential impacts and incorporating mitigation measures that reduce potential impacts to a less than significant level. Development within the SMA or buffer is permitted by obtaining concurrence from CDFG and the County that the biological report mitigates impacts to a level of less than significant; upon such a determination, the County issues a special permit for the proposed development.

5. Recommendations

The assessments and recommendations in this reconnaissance-level biological survey are based on desktop-level research and a brief site visit in the winter of 2018. Species-specific recommendations, where possible, were included in the 4.4.1-4.1.3. Following are more general recommendations to help protect wildlife and habitat.

5.1 General Wildlife Recommendations

The following recommendations are at the taxon-group level and apply to species that may potentially be found at the Study Area.

5.1.1 Mammals

Project activities that may negatively affect sensitive mammal species should be avoided. Greenhouse lights and other light sources should be constructed and used so that they do not interfere with nighttime activities of mammals, including bats. If roosting bats are found on site, species-appropriate exclusion buffers should be determined and implemented. Mature forests or rocky outcrops, if any, in the project area may be used by bats and should be protected.

5.1.2 Birds

Activities that may cause disturbance should be avoided during the breeding season, from February 1 to September 1. If construction must occur during the breeding season, nesting bird surveys should be conducted no more than one week prior to commencement of project activities to determine whether any birds are nesting on site. If nesting birds are found on site, species-appropriate exclusion buffers shall be determined, and project activities will not occur within the buffer until the nest is no longer active, as determined by a biologist.

5.1.3 Fish

Project activities that may negatively affect the quality of the water should be avoided. Measures to control erosion and stream sedimentation should be employed, e.g. placement of coir logs, proper culvert design. Any proposed work that may affect streambeds or water quality will require consultation with permitting agencies, e.g. Army Corps of Engineers, NOAA, CDFW, and local jurisdictions.

5.1.4 Amphibians and reptiles

If there is the potential to affect surface water bodies, dip-net and egg mass surveys should be conducted in permanent and ephemeral bodies of water to determine the presence of sensitive frog and salamander species, and of bull frogs, which prey on other species. Roads and pathways should be constructed to not present barriers to travel to migrating amphibians. Culverts should be constructed to not entrap amphibians or reptiles.

5.1.5 Plants and sensitive vegetation communities

Plant surveys may be conducted to determine species and habitats present. If sensitive species or habitats are identified at the Study Area, activities should avoid disturbance of the vegetation and soils in the area.

5.2 General Resource Recommendations

5.2.1 Protection of Watershed and Nearby Habitat

Operations should be located in stable areas and implement appropriate management actions to prevent irrigation runoff. Efforts should be made to prevent groundwater contamination through irrigation runoff. Pesticides should be applied only when winds are low to minimize drift that could affect sensitive habitats. Consultation with CDFW and regulatory agencies may be required to be compliant with specific mitigation efforts to protect stream habitats.

5.2.2 Site Drainage

Erosion control measures should be implemented to avoid runoff that could negatively impact habitat and sensitive species. This includes implementing measures at cultivation sites, roads, and water crossings. A Site Management Plan that includes water quality protection strategies must be prepared and implemented to protect resources and comply with permit agency requirements.

5.2.3 Pest Management Plan

To reduce the potential for pest organisms to adversely affect habitat or protected species, the Site Management Plan should include pest management measures, including proper cleaning of cultivation equipment to prevent spread of weeds or pathogens, proper plant spacing and pruning, and other measures necessary to keep pest numbers low. When pests are found, a plan using approved cultural, manual, and/or biological control methods should be implemented.

5.2.4 Hazardous Materials Storage and Usage Plan

To reduce risk to important habitat or protected species, the Site Management Plan must include a hazardous materials management plan, and should ensure avoidance of pesticide runoff, groundwater contamination, and drift that could negatively impact surrounding sensitive habitats.

5.2.5 Permitting Agencies

If the proposed project may impact sensitive biological communities, including wetland habitats and waterways, the project may require permit authorization from the regulatory agencies, and may include:

- Section 404 Nationwide Permit from the Corps of Engineers
- Section 1602 Streambed Alteration Agreement from the CDFW
- Section 7 consultation with USFWS for impacts to ESA listed species and their habitat
- Section 7 consultation with NMFS for impacts to fish species, critical habitat, and EFH
- Streamside Management Area Ordinance from Humboldt County

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APPENDIX A:
CULTIVATION OPERATIONS AND SECURITY PLAN

CULTIVATION, OPERATIONS, AND SECURITY PLAN
APN 208-241-002 / APP. # 12063

PROJECT DESCRIPTION

Applicant proposes to permit 9,800 square feet of existing outdoor cultivation on a parcel in the Mad River area of Humboldt County, and amend the original application to request a permit for outdoor cultivation only (originally applied for mixed light, 9,800 square feet). Supplemental lighting is used in one (1) 12'x25' greenhouse, for mothering and starts only; therefore, no mixed-light cultivation is present at the site.

OPERATIONS PLAN

1. Water Source, Storage, Irrigation Plan & Projected Water Usage

WATER SOURCE & STORAGE: The primary source of irrigation water is an on-site spring and rainwater catchment pond. Applicant will be submitting a Water Management Plan ("WMP"), prepared by Natural Resource Management Corporation (NRM), which will outline the forbearance and bypass flow requirements for the surface water diversion. Applicant is working with NRM to develop his WMP and Water Resources Protection Plan ("WRPP") per the North Coast Regional Water Quality Control Board's Order No. R1-2015-0023. NRM is also filing necessary Lake and Streambed Alteration Agreements ("LSAAs") with California Department of Fish and Wildlife ("CDFW").

Presently, Applicant has approximately 11,500 gallons of water storage on-site for their home. Applicant has sufficient water storage in a 200,000-gallon pond on-site to meet water requirements throughout the forbearance period.

IRRIGATION PLAN: Irrigation water will be applied at agronomic rates to minimize over watering cannabis plants and reducing the risk of irrigation runoff. Applicant anticipates watering cannabis plants every other day during the growing season. Irrigation is applied through a traditional drip irrigation and by hand watering using a spray stick or wand. Applicant will water in the morning/early evening hours to reduce evaporative loss. Ground cover and weed barrier will be used to minimize weed growth, which reduces water loss during watering. Applicant will use natural soil amendments to aid in soil moisture retention as part of irrigation plan.

PROJECTED WATER USAGE: Applicant will be cultivating approximately 9800 sq. ft. of outdoor cannabis, pursuant to a Special Use Permit. Based on California Department of Fish and Wildlife (CDFW) estimates for cannabis irrigation needs, and Applicant's irrigation practice of watering every other day, CDFW estimates that Applicant will be using 85,000 gallons of water ((169 days

÷ 2) x 980 gallons) during the forbearance period required by the ordinance. Based on a 180-day growing cycle, Applicant's total yearly water usage is estimated by CDFW to be 90,000 gallons.

The above figures are weather dependent and are only estimated water usage totals. Applicant will install flow meters at all critical points to measure actual yearly water usage upon implementation of the project.

2. Site Drainage, Runoff & Erosion Control Measures

SITE DRAINAGE: The site drains to the South. There are no significant waterways on the site, and drainage is not a significant issue with this project at this time. All road and graded surfaces will have maintained spillways in good working order, so as to avoid any sediment transport to surface waters. All drainage issues will be corrected through the application of proper erosion control techniques, and will be performed so as to minimize any sediment transport to surface waters.

Applicant will consult with, and implement recommendations from, Omsberg & Preston and Natural Resource Management Corporation to improve site drainage on an as needed basis.

EROSION CONTROL MEASURES: Applicant has performed minimal grading work on-site, and has not had any issues with sediment discharge into surface waters. The site does not have runoff issues, and is well vegetated with forest and perennial grasses.

The roads on the property have been rocked to reduce damage from storm events. Applicant will consult with, and implement recommendations from Omsberg & Preston and Natural Resources Management Corporation to improve erosion control measures on an as needed basis.

RUNOFF CONTROL MEASURES: There is no current runoff from any cultivation activities. Applicant will use drip irrigation and raised beds, will water at agronomic rates, and use timers to avoid overwatering. In addition, Applicant will maintain vegetation around cultivation and riparian areas to minimize runoff and sediment transport to receiving waters. Applicant will cultivate outdoors and provide appropriate runoff and sediment mitigation measures to deal with any concentrated storm water runoff from any cultivation areas. Applicant will re-seed and re-vegetate any exposed soils around the cultivation areas and install straw bales and sediment control fencing on slopes or discharge points that may transport sediment to receiving waters.

Applicant will consult with, and implement recommendations from, Omsberg & Preston and Natural Resources Management Corporation to improve runoff control measures on an as needed basis.

3. Measures Taken to Ensure Protection of Watershed & Nearby Habitat

PROTECTION OF WATERSHED & HABITAT: The site has been developed for cultivation, and will continue to be utilized during the 2017 season. All cultivation areas shall be located outside of all SMA's on the property and native vegetation buffers shall be maintained between cultivation sites and riparian areas. Applicant's surface diversion is appropriately screened to minimize harm to organisms within habitat and riparian zones. Applicant's WMP will address water storage and water conservation and develop a plan that meets irrigation needs while observing forbearance periods and bypass flow requirements to promote and maintain in stream flows.

CULTIVATION RELATED WASTE PROTOCOLS: Applicant will implement measures to reduce and/or eliminate cultivation related waste. All plant related material will be composted in bins to prevent nutrient transport and will be reused as part of Applicant's soils management plan. Pots containing starts and clones will be washed, rinsed, and reused between seasons and recycled at the end of their useful life. Applicant will recycle pesticide and fertilizer containers per California pesticide regulations. Cultivation will occur in raised beds, and using bio-amendments (cover crops) to re-amend soils, resulting in minimal soil waste on site. All waste soils will be placed in a refuse pile outside of streamside management areas and will be covered with a tarp and surrounded with straw waddles to contain any discharge that may occur. All other associated waste will be placed in garbage cans with lids and placed on concrete surfaces to prevent nutrients from being leached to groundwater or transported to watercourses. Applicant will dispose of site cultivation refuse on an as needed basis.

REFUSE DISPOSAL: The site generates little human refuse, only associated with the residence on-site which is currently occupied. Applicant will take site refuse to the local dump on an as-needed basis.

HUMAN WASTE: There is a septic system on-site that will handle all human waste generated on-site.

4. Protocols for Proper Storage & Use of Fertilizers, Pesticides & Other Regulated Products

PESTICIDES: Pesticides shall be stored in an on-site shed equipped with a non-permeable floor liner to prevent leaching of pesticides into groundwater or transport to surface waters. Pesticides will be kept in original containers with labels affixed and kept in secondary containment totes to further minimize spills from being transported to groundwater or surface waters. Approved spill proof containers with appropriate warning and information labels will be used to transport pesticides to and from site.

Applicant shall maintain and keep personal protective equipment required by the pesticide label in good working order. All proper pesticide application protocols will be followed.

All required warning signs will be posted and material safety data sheets (MSDS) will be kept in the area where pesticides are stored. Emergency contact information in the event of pesticide

poisoning shall also be posted at the work site including the name, address and telephone number of emergency medical care facilities.

Before making a pesticide application, operators will evaluate equipment, weather conditions, and the property to be treated and surrounding areas to determine the likelihood of substantial drift or harm to non-target crops, contamination, or the creation of a health hazard.

FERTILIZERS & SOIL AMENDMENTS: Fertilizers and other amendments will be stored in the on-site shed which is equipped with a non-permeable floor liner to prevent leaching and transport to surface waters. Applicant will store and use fertilizers according to the protocols used for pesticide storage and use. Fertilizers will be kept in secondary containment totes to further prevent leaching. Applicant will use all fertilizers according to the label and use personal protective equipment as required by the label.

Before making a fertilizer or soil amendment application, operators will evaluate equipment, weather conditions, and the property to be treated and surrounding areas to determine the likelihood of substantial drift or harm to non-target crops, contamination, or the creation of a health hazard.

PETROLEUM PRODUCTS & STORAGE: All petroleum products stored on-site will be properly stored and managed to prevent any discharge of contaminants into the surrounding landscape. Secondary containment, as required by law, will be utilized on-site.

5. Cultivation Activities (e.g. outdoor, indoor, mixed light)

CULTIVATION ACTIVITIES: Applicant is proposing to permit an existing outdoor cultivation site with cultivation area of 9,800 square feet. Applicant will irrigate cultivation from a surface water diversion pursuant to agreement with DFW. Applicant will be cultivating in raised beds to prevent excess irrigation runoff and promote soil moisture retention. Cover crops will be planted at the end of the year in beds to promote soil regeneration. Applicant anticipates hiring some employees at the site for cultivation activities.

Applicant will follow all performance standards outlined in Humboldt County's Commercial Medical Marijuana Land Use Ordinance ("CMMLUO") with respect to cultivation activities, including developing employee safety protocols which include: 1) an emergency action response plan and spill prevention protocols; 2) employee accident reporting and investigation policies; 3) fire prevention policies; 4) maintenance of Material Safety Data Sheets (MSDS); 5) materials handling policies; 6) job hazard analyses; and 7) personal protective equipment policies. Applicant will ensure that all safety equipment is in good and operable condition, and provide employees with training on the proper use of safety equipment.

Applicant will post and maintain an emergency contact list which includes: 1) operation manager contacts; 2) emergency responder contacts; and 3) poison control contacts. All cultivation activities will be charted and calendared and visibly posted in the cultivation facilities.

6. Tentative Schedule of Activities During Each Month of the Growing & Harvesting Season

January, February, March

- Clean greenhouses and make necessary repairs
- Prepare beds for planting
- Maintenance of mother plants and clone prep
- Apply mulch
- Pot clones and starts at end of March
- Till cover crops and amend soils

April

- Planting and irrigation begins
- Apply nutrient feed with every watering
- Construct trellis system for plants

May

- Apply nutrient feed with every watering
- Applicant continues to re-pot starts and clones
- Nursery activities
- Mulch soil

June

- Top dress first run
- Irrigation continues
- Apply nutrient feed with every watering
- General landscape and bed maintenance

July

- Irrigation continues
- Apply nutrient feed with every watering
- General landscape and bed maintenance

August

- Irrigation continues
- Apply nutrient feed with every other watering

September

- Irrigation continues

- Apply nutrient feed with every third watering

October

- Begin harvesting plants
- De-leaf plants

November, December

- Trim and manicure harvested plants
- End of year reporting
- Cleanup/Winterize cultivation site
- Prepare mother plants for next year

PROCESSING PLAN & ACTIVITIES

PLAN: Processing will occur on-site, unless it is found to be more economical to take product to a licensed processing facility. In that case, Applicant will identify permitted processing facility once permits for such facilities have been issued by the County.

SECURITY FEATURES

Applicant will implement security measures to safeguard the product and prevent nuisance from occurring on the property. T-post and metal fencing will be established around some cultivation. The parcel has a locking gate and two access driveways onto the parcel. All doors and windows on all buildings and cultivation facilities shall remain locked when the parcel is not occupied. Security cameras shall be utilized along the outer perimeter of the cannabis garden. All finished product shall be stored under lock and key and away from processing activities. A prominent “No Trespassing” sign shall be displayed at the parcel’s entrance. To ensure the non-diversion of product, Applicant will enroll in a track and trace program upon the implementation of those programs at the state and local level. Applicant will comply with SB 420 and the Attorney General Guidelines for the Security and Non-Diversion of Medical Cannabis (2007).

APPENDIX B:
POTENTIAL HABITATS AT GEOGRAPHIC LOCATION

Potentially Present Habitats

Habitat Name	Code	Habitat Description
Annual Grassland	AGS	Annual grassland habitat occurs throughout the state in patches of various sizes. They are described as habitats of open grassland that are composed primarily of annual plant species including wild oats, ripgut brome, red brome, and foxtail fescue. Species composition is related to precipitation and are found in moist lightly grazed areas. Annual grasslands occupy what was once pristine native grassland consisting of perennial bunchgrasses. Many wildlife species use annual grasslands for foraging. Common species include burrowing owl, coyote, and common garter snake.
Barren	BAR	Barren habitat, defined by the permanent absence of vegetation, occurs throughout California at every elevation. Any habitat with <2% total vegetation cover by herbaceous, desert, or nonwildland species and <10% cover by tree or shrub species is defined this way. It includes rocky intertidal and subtidal zones, sandy beaches, mudflats, vertical river banks and canyon walls, exposed alpine rock, and even pavement and buildings. Because there is little or no vegetation, the structure of the substrate is the critical component for wildlife considerations. For example, rock ledges provide nesting habitat for cormorants and many hawks and falcons. Open gravel or sand is nesting habitat for some wading birds, gulls, terns, and nightjars. Vertical areas of friable soils are bank swallow nesting habitat, while rocky river canyon walls provide foraging habitat for some bats.
Coastal Oak Woodland	COW	Coastal live oak woodlands occur in mesic areas from the coastal California foothills of Trinity and Humboldt counties and extent south to coastal Baja California. A variety of oak species form dense canopies with variable understories. The understory is dominated by coastal shade tolerant shrub species. Coastal woodlands are comprised of slow growing, long lived trees that require 60 to 80 years to mature and fully grow. Coastal oak woodlands provide habitat for a variety of wildlife species. At least 60 species of mammals may use coastal oak habitats (Barrett, 1980). In addition, 110 species of birds have been observed during breeding season in California coastal oak woodlands (Verner, 1980).
Closed-Cone Pine-Cypress	CPC	Closed-cone pine-cypress habitats occur in patches of forest along coastal California. They are found at lower elevations and are typically in more rocky and infertile soils. The habitat is dominated by a single species of one of the closed-cone pines or cypress. The habitat is characterized by evergreen, needle-leaved trees that can reach heights of 30 meters. Numerous species use this habitat for foraging and cover. Great horned owl and red-tailed hawk will nest in closed-cone pine forests.
Douglas Fir	DFR	Douglas-fir habitat occurs in the north Coast Range from Sonoma County north to the Oregon border and in the Klamath Mountains of California and Oregon. This habitat usually occurs at elevations from 150 to 600 m (500 to 2000 ft) in the Coast Range and from 300 to 1200 m (1000 to 4000 ft) in the Klamath Mountains. It can occur at higher elevations if abundant precipitation is present (Sawyer 1980). This habitat forms a complex mosaic of forest expression due to the geologic, topographic, and successional variation typical within its range. Douglas Fir habitat supports abundant wildlife species including birds, amphibians, and small mammals. Bird species typical of this habitat include spotted owl, western flycatcher, chestnut-backed chickadee, golden-crowned kinglet, Hutton's vireo, solitary vireo, hermit warbler, and varied thrush. Among amphibians and reptiles, the distributions of northwestern salamander, Pacific giant salamander, Olympic salamander, Del Norte salamander, black salamander, clouded salamander, tailed frog, and northwestern garter snake are largely coincident with the distribution of Douglas Fir habitat. Typical mammals include fisher, deer mouse, dusky-footed woodrat western redbacked vole, creeping vole, Douglas' squirrel, Trowbridge's shrew, and shrew-mole.

Fresh Emergent Wetland	FEW	Fresh emergent wetland habitats are non-tidal waters characterized by emergent herbaceous hydrophytes that prosper in an anaerobic environment (Kramer 1988). They occur on virtually all exposures and slopes where a basin or depression that is saturated or at least periodically flooded is present. Fresh emergent wetlands can be found at all elevations in California but are typically below 2270 m (7500 ft). They are some of the most highly productive habitats in California, housing mammals, reptiles, amphibians, and more than 160 species of birds. The acreage of fresh emergent wetlands has decreased dramatically across California due to drainage and conversion to agriculture (Humboldt Regional Transportation Plan 2014).
Lacustrine	LAC	Lacustrine habitats are found throughout California at all elevations. Lacustrine habitats are inland depressions or dammed riverine channels containing standing water (Cowardin 1979). This habitat can vary from large lakes to small ponds less than one hectare. This includes permanent lacustrine systems that support fish to intermittent types. Phytoplankton is found in open water in lacustrine habitats and is responsible for primary productivity in this habitat. Lacustrine systems provide habitats for many fish as well as 18 mammals, 101 birds, 9 reptiles and 22 amphibians.
Montane Chaparral	MCP	Montane chaparral is associated with mountainous terrain from mid to high elevation from southern California to the North Coast Ranges and Klamath mountains. (Barbour and Major 1977). Montane chaparral is dominated by large dense woody shrubs that vary from treelike to prostrate. Mature montane chaparral habitats are impenetrable to large mammals. Species composition varies by elevation and geographical ranges but usually consist of manzanitas, huckleberry oak, mountain mahogany, and other woody shrubs. Montane chaparral provide habitat for many species including deer and rodent species. Many birds find habitat in montane chaparral by nesting and feeding on the seeds, fruits, and insects found there.
Montane Hardwood-Conifer	MHC	Montane Hardwood-Conifer occurs throughout California and is somewhat continuous from Santa Cruz County northward through outer coast range into Oregon, usually some distance inland from the coast (Cheatham and Haller 1975). It can also be found on north facing slopes of the inner north coast ranges, the Santa Lucia Mountains, as well as small patches extending to Santa Barbara County (Cheatham and Haller 1975). Montane Hardwood-Conifer also occurs somewhat continuously down the Sierra Nevada to the transverse ranges. Elevations range from 300 to 10 m (1000 to 4000 ft) in the north to 605 to 1760 m (2000 to 00 ft) in the south. Isolated patches of MHC can be found throughout the transverse and peninsular ranges of southern California. Geographically and biologically, Montane Hardwood-Conifer is transitional between dense coniferous forests and montane hardwood, mixed chaparral, or open woodlands and savannahs. Montane Hardwood-Conifer provides habitat for a variety of wildlife species. Moreover, mast crops are an important food source for many birds as well as mammals. Canopy cover and understory vegetation are variable which makes the habitat suitable for numerous species. In mesic areas, many amphibians are found in the detrital layer.
Montane Hardwood	MHW	The Montane Hardwood habitat ranges throughout California mostly west of the Cascade-Sierra Nevada crest, ranging from 100 m (300 fl) near the Pacific Ocean to 2745 m (9000 ft) in southern California. Typically, MHW is composed of a pronounced hardwood tree layer with an infrequent and poorly developed shrub stratum and a sparse herbaceous layer. In the Coast Range and Klamath Mountains, canyon live oak often forms pure stands on steep canyon slopes and rocky ridge tops, replaced at higher elevations by huckleberry oak (Parker and Matyas 1981). Acorns are a major resource that MHW habitats provide to wildlife that includes scrub and Steller's jays, acorn woodpecker, western gray squirrel, wild turkey, mountain quail, band-tailed pigeon, California ground squirrel, dusky-footed woodrat, black bear, and mule deer. The forest floor provides habitat for many amphibians and reptiles, including Mount Lyell salamander, ensatina, relictual slender salamander, western fence lizard, and sagebrush lizard. Snakes include rubber boa, western rattlesnake, California mountain kingsnake, and sharp tailed snake.

Montane Riparian	MRI	Montane riparian habitats are found in the Klamath, Coast and Cascade ranges and in the Sierra Nevada south to about Kern County, usually below 2440 m (8000 ft). Water may be permanent or ephemeral (Marcot 1979). MRI generally occurs as a dense grove of broad-leaved deciduous trees up to 30 m tall, with a sparse understory. West of the Klamath Mountains, black cottonwood is a dominant hardwood, or it may be codominant with bigleaf maple. Along the immediate coast north of San Luis Obispo county, MRI consists mostly of red alder. Like other riparian habitats, MRI has exceptionally high value for many wildlife species (Thomas 1979, Marcot 1979, Sands 1977), providing water, thermal cover, migration corridors and diverse nesting and feeding opportunities for amphibians, reptiles, birds and mammals. The southern rubber boa and Sierra Nevada red fox are among the rare, threatened or endangered wildlife that use MRI habitats during their life cycles.
Perennial Grassland	PGS	Perennial grassland habitat occurs along the California coast from Monterey County northward. Perennial grassland habitats are dominated by annual grasses and forbs and can be variable depending upon the mix of plant species at a site. Species composition is determined by factors such as grazing which will change the vertical habitat structure found at a site. In Humboldt County, common species include California oatgrass, American dunegrass, and Kentucky bluegrass. Perennial grassland provides habitat for many species including small mammals including western harvest mouse and California vole. Perennial grasslands also provide feeding habitat for turkey, red-tailed hawk and western bluebird.
Ponderosa Pine	PPN	Ponderosa pine habitat is found on mountain and foothill sites throughout California in the 800-5000 ft elevation ranges. Ponderosa Pine habitat must include at least 50% ponderosa pine. Other species can be variable based on location and elevation. Tree spacing can be sparse to extremely close. Shrubs such as manzanita and Pacific dogwood form the understory along with grasses and forbs. Ponderosa pine habitat can be migratory habitat for deer and provide important nutrition in migration holding areas. Ponderosa pine habitat also forms important riparian habitats that benefit aquatic species.
Redwood	RDW	Redwood habitats are distributed in relatively mesic environments along the coast of California ranging from the California-Oregon border to San Luis Obispo County, up to approximately 50 km (31 mi) inland from the coast. In the north, the habitat intermingles with the Douglas-fir (DFR) and Klamath-Enriched Mixed Conifer (KMC) habitats. Virgin old growth redwood stands are characterized by tall (70-120 m, 230-400 ft) trees and very dense understory shrubs. Second-growth stands are characterized by even-aged trees and a more open understory. Other trees associated with RDW in the north coast region are Sitka spruce, grand fir, red alder, and Douglas fir. Understory associates include several ferns, berries, and other shrubs. Redwood habitats provide food, cover, or special habitat elements (for at least one season) for 193 wildlife species (Marcot 1979), including multiple sensitive species, such as red-legged frog, ensatina, osprey, ringtail, fisher and marbled murrelet, and to a lesser extent, peregrine falcon, pileated woodpecker, spotted owl, northern flying squirrel, and uncommonly, bald eagle.
Riverine	RIV	Riverine habitats occur throughout California - usually from sea level to 2438 m (8000 ft) - and include all wetlands and deepwater habitats within a channel that periodically or continuously contains moving water (Cowardin et al 1979). They often provide connectivity between two bodies of standing water (Humboldt Regional Transportation Plan 2014). Healthy riverine systems support a variety of invertebrate species, including the nymphs of mayflies, caddisflies, and stoneflies (Grenfell 1988). Additionally, riverine systems provide important hunting, resting, and foraging habitat for waterfowl, insectivorous birds, bald eagles, and mammals including river otters.

Urban	URB	The urban habitat occurs throughout California and is the result of modifying presettlement vegetation and introducing new species. The structure of urban vegetation varies, including tree groves with continuous canopy, street strips with variable tree spacing, lawns with and without shade trees, and shrub cover. Urban wildlife habitat is often a mixture of native and exotic species, both of which may provide valuable food or other resources. Monoculture is commonly observed within individual design units; however, the overall mosaic may be more valuable as wildlife habitat than the individual units. Moving outward from the urban downtown area, through urban residential, to suburbia, there is a progression outward of decreasing development and increasing vegetative cover. Wildlife diversity also increases while species density decreases (Thomas and DeGraaf 1975) and proportionately greater numbers of native species occur.
Valley Foothill Riparian	VRI	Valley-foothill riparian habitats occur in the Central Valley as well as the foothills of the Sierra Nevada and Coast Ranges. Valley-foothill riparian habitats are found in valleys bordered by sloping alluvial fans, slightly dissected terraces, lower foothills, and coastal plains. Valley foothill riparian are characterized by hot, dry summers and mild, wet winters. Dominant species in the canopy are cottonwood and valley oak. In the sub-canopy, white alder and Oregon ash dominate. California blackberry, poison oak, and poison-hemlock are a few species that dominate the understory. Valley foothill riparian habitats provide food, water, and migration corridors for wildlife. 147 species of birds have been recorded as nesters or winter visitors in valley foothill riparian habitats (Laymon 1985).
Wet Meadow	WTM	Wet Meadows occur throughout virtually every forest type of the Sierra and Pacific Northwest floristic provinces and as inclusions in the northern coastal prairie and sagebrush steppe (Barbour and Major 1977). Where conditions are favorable, Wet Meadows occur in the Transverse and Peninsular ranges of Southern California. In the Sierra Nevada and Cascade ranges, Wet Meadows usually occur above 1200 m (3940 ft) in the north and above 1800 m (5900 ft) in the south. In the Klamath Mountains, Wet Meadows occur in the California red fir zone at 1400 m (4600 ft) to 1950 m (6400 ft) elevation. In late summer, small mammals may visit Wet Meadows that have dried. However, the meadows are generally too wet to provide suitable habitat for small mammals. Mule deer and elk may feed in Wet Meadows, seeking especially forbs and palatable grasses. Waterfowl, especially mallard ducks, frequent streams flowing through Wet Meadows. Yellow-headed and red-winged blackbirds occasionally nest in Wet Meadows with tall vegetation and with adequate water to discourage predators (Storer and Usinger 1963). The striped racer is the common snake of Wet Meadows in the Sierra Nevada and Cascade Range. Various frog species are abundant in Wet Meadows throughout California. Six species of trout (Brown, cutthroat, golden, rainbow, eastern brook, and Mackinaw) inhabit streams of the Sierra Nevada (Storer and Usinger 1963), and presumably may occur in perennial streams of wet meadows. In the southern Sierra Nevada, the golden trout is the important fish of meadow habitats at high elevations.

APPENDIX C: PRIMARY HABITAT DETAIL

**California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group**

Coastal Oak Woodland

V. L. Holland

Updated by: CWHR Staff, April 2005

Vegetation

Structure. Coastal oak woodlands are extremely variable. The overstory consists of deciduous and evergreen hardwoods (mostly oaks 4.5-21 m (15 to 70 ft) tall sometimes mixed with scattered conifers. In mesic sites, the trees are dense and form a closed canopy. In drier sites, the trees are widely spaced, forming an open woodland or savannah. The understory is equally variable. In some instances, it is composed of shrubs from adjacent chaparral or coastal scrub which forms a dense, almost impenetrable understory. More commonly, shrubs are scattered under and between trees. Where trees form a closed canopy, the understory varies from a lush cover of shade-tolerant shrubs, ferns, and herbs to sparse cover with a thick carpet of litter. When trees are scattered and form an open woodland, the understory is grassland, sometimes with scattered shrubs. The interrelationships of slope, soil, precipitation, moisture availability, and air temperature cause variations in structure of coastal oak woodlands. These factors vary along the latitudinal, longitudinal and elevational gradients over which coastal oak woodlands are found.

Composition. Composition of both overstory trees and understory of coastal oak woodland varies and reflects the environmental diversity over which this habitat occurs. In the North Coast Range south to Sonoma County, coast live oak often does not dominate. Where Oregon white oak, California black oak, canyon live oak, madrone and interior live oak dominate, the habitat is generally considered Montane Hardwood (MHW).

From Sonoma County south, the coastal oak woodlands are usually dominated by coast live oak. In many coastal regions, coast live oak is the only overstory species. In mesic sites, trees characteristic of mixed evergreen forests mix with coast live oak, such as California bay, madrone, tanbark oak, and canyon live oak. On drier, interior sites, coast live oak mixes with valley oak, blue oak, and foothill pine.

Typical understory plants in dense coast live oak woodlands are shade tolerant shrubs such as California blackberry, creeping snowberry, toyon, and herbaceous plants such as bracken fern, California polypody, fiesta flower, and miner's lettuce. In drier areas where oaks are more widely spaced, the understory may consist almost entirely of grassland species with few shrubs, although a diversity of shrubs can occur under and between the trees with a sparse herbaceous cover. Where coast live oak woodlands intergrade with chaparral, species such as greenleaf manzanita, chamise, gooseberries, currants, and ceanothus species form the understory. Where the habitat intergrades with coastal scrub,

typical understory species are bush monkeyflower, coyote brush, black sage, and California sagebrush.

From Ventura County south, floristic changes occur in coastal oak woodlands. There is little change in introduced species of forbs and grasses, but the native shrubs and herbs are more typical of southern California. The dominant trees of the southern oak woodlands are Engelmann oak, coast live oak, interior live oak, and California walnut. These occur in various mixtures, depending on location. Engelmann oak, a semi-deciduous white oak, is an ecological homologue of blue oak and replaces it in southern California. Interior live oak usually occurs at higher elevations in the interior mountains, often associated with rock outcrops. Coast live oak grows in moister sites, especially near the coast, but extends farther inland in southern California than it does elsewhere in its range. It often forms mixed stands with Engelmann oak in the foothills of the Peninsular Ranges. California walnut is locally dominant, with coast live oak between Santa Barbara and Orange Counties (Jepson 1910, Wieslander 1934 a, b, Swanson 1967). Coulter pine is sometimes a component of the coastal oak woodlands in mesic sites of southern and central California.

Other Classifications. Coastal oak woodland, as treated here, combines diverse oak-dominated vegetation types into one. For example, this habitat or portions of it are included in the Northern Oak Woodland, Southern Oak Woodland and Foothill Woodland of Munz (1973)(No Munz 1973 in Habitat Lit Cite.) and of Griffin (1977); the Southern Oak Forests of Küchler (1977); the Coast Live Oak and Engelmann Oak of Parker and Matyas (1981); the Southern Oak Woodland, Northern Oak Woodland and California Coast Live Oak Forest of Cheatham and Haller (1975); the Coast Live Oak and Engelmann Oak of Paysen, et al. (1980); the California Coast Live Oak and Mixed Forest Land of the Society of American Foresters classification (Eyre 1980); the Deciduous Forest Land, Evergreen Forest Land and Mixed Forest Land of the U.S.G.S. system (Anderson et al. 1976); and the Coastal Live Oak Woodland, Northern Oak Woodland and Southern Oak Woodland of Holland et al. (1983) and Holland and Keil (1987).

Habitat Stages

Vegetation Changes--1;2-5:S-D. Like other oak woodlands in California, successional trends in the COW have not been studied and remain largely unknown. Some species of deciduous oaks have not successfully reproduced for over 60 years (White 1966, Brooks 1971, Griffin 1971, 1976, Fieblekorn 1972, Snow 1972, Holland 1976). Evergreen oaks have been more successful and as a result appear to be gaining dominance in some areas (Griffin 1977). In other locations, it appears that coast live oak is being replaced by California bay as a result of grazing pressures and lack of successful regeneration (McBride 1974).

Jepson (1910), Cooper (1922), and Wells (1962)(Wells 1962 not in Habitat Lit Cite.) suggested that Indian burning in the past was important in maintaining some open stands of coastal oak woodland. Natural and manmade fires may still be important in some areas. Southern oak woodlands have apparently experienced an increase in

periodicity of fires in recent years. Studies indicate that Engelmann oak and coast live oak are able to survive most fires (Snow 1979).

Most coastal oak woodlands are comprised of medium to large trees with few seedlings and saplings, especially in heavily grazed areas. Regeneration of most oaks in the coastal oak woodlands has not been studied thoroughly, but it is generally considered that they do not have the serious regeneration problems found with blue oak and valley oak. However, Engelmann oak is not adequately reproducing itself for reasons similar to those of blue oak.

Duration of Stages-- Coastal oak woodlands are comprised of slow growing, long-lived trees, so succession requires a long time. The actual time is variable and depends on local environmental conditions. Development of mature, large trees requires 60 to 80 years, and most of the trees of the coastal oak woodlands are at least this old. The best information available on succession in oak woodland, is historical. Since the Mission Period (1769-1824) and especially during the last century, marked changes have occurred in the coastal oak woodlands of California due to the introduction of domestic grazing animals and accompanying land management practices. The change in herbaceous understory from perennial species to aggressive, introduced annuals may have resulted in young oaks being out-competed for limited supplies of nutrients and moisture (Twisselmann 1967, Holland 1976). These changes have resulted in retrogressive succession in which well-developed oak woodlands regress to open woodlands or savannas and eventually to disturbed grasslands. Even ubiquitous pioneer shrubs fail to become established as successfully in disturbed grassland. Woodcutting has also had an impact and in local areas has created "stump-prairies" because oaks have not successfully reinvaded after removal (Wells 1962). Land clearing and urban expansion have also destroyed extensive stands of coastal oak woodland.

Biological Setting

Habitat-- Coastal oak woodlands are common to mesic coastal foothills of California. The woodlands do not form a continuous belt, but occur in a mosaic closely associated with MCH, CSC and AGS. Where moisture conditions are more favorable, such as north facing slopes and canyons, or higher elevations, COW grades into MHC or sometimes MCN habitats. From the coast toward the hotter, drier interior portions of the north and south coast range, COW grades into foothill woodlands (BOW), forming indistinct ecotones where the two overlap.

Wildlife Considerations -- Coastal oak woodlands provide habitat for a variety of wildlife species. Barrett (1980) reports that at least 60 species of mammals may use oaks in some way. Verner (1980) reports 110 species of birds observed during the breeding season in California habitats where oaks form a significant part of the canopy or subcanopy. Quail, turkeys, squirrels, and deer may be so dependent on acorns in fall and early winter that a poor acorn year can result in significant declines in their populations (Shields and Duncan 1966, Graves 1977, Schitoskey and Woodmansee 1978). Therefore,

many wildlife managers are concerned over the continuing loss of coastal oak woodland habitats as a result of man's activities.

Physical Setting

Coastal oak woodlands occupy a variety of mediterranean type climates that vary from north to south and west to east. (The climate becomes hotter and drier toward the south and east.) Precipitation occurs in the milder winter months, almost entirely as rainfall, followed by warm to hot, dry summers. Near the coast, the summers are tempered by fogs and cool, humid sea breezes. Mean annual precipitation varies from about 100 cm (40 in) in the north to about 38 cm (15 in) in southern and interior regions. Mean minimum winter temperatures are 2 to 7 C (29 to 44 F), and the mean maximum summer temperatures are 24 to 36 C (75 to 96 F). The growing season ranges from six months (180 frost-free days) in the north to the entire year in mild coastal regions to the south. The soils and parent material on which coastal oak woodlands occur are extremely variable. In San Luis Obispo County alone they are found on over fifteen different parent materials ranging from unconsolidated siliceous sand to diatomaceous earth to serpentinite to volcanic ash and basalt (Wells 1962). Coastal oak woodlands generally occur on moderately to well-drained soils that are moderately deep and have low to medium fertility.

Distribution

Coastal oak woodlands occur in the coastal foothills and valleys from Trinity to Humboldt counties south through the coastal regions of the northern and southern coast range, the transverse and peninsular range of southern California. They extend beyond the counties of southern California into coastal Baja California, where they reach their southern limit (Griffin and Critchfield 1972). They occur at elevations from just above sea level near the immediate coast to about 1525 m (5000 ft) in the interior regions, especially in southern California.

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**California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group**

Annual Grassland

John G. Kie

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Vegetation

Structure. Annual Grassland habitats are open grasslands composed primarily of annual plant species. Many of these species also occur as understory plants in Valley Oak Woodland (VOW) and other habitats. Structure in Annual Grassland depends largely on weather patterns and livestock grazing. Dramatic differences in physiognomy, both between seasons and between years, are characteristic of this habitat. Fall rains cause germination of annual plant seeds. Plants grow slowly during the cool winter months, remaining low in stature until spring, when temperatures increase and stimulate more rapid growth. Large amounts of standing dead plant material can be found during summer in years of abundant rainfall and light to moderate grazing pressure. Heavy spring grazing favors the growth of summer-annual forbs, such as tarweed and turkey mullein, and reduces the amount of standing dead material. On good sites, herbage yield may be as high as 4900 kg/ha (4400 lb/ac) (Garrison et al. 1977).

Composition. Introduced annual grasses are the dominant plant species in this habitat. These include wild oats, soft chess, ripgut brome, red brome, wild barley, and foxtail fescue. Common forbs include broadleaf filaree, redstem filaree, turkey mullein, true clovers, bur clover, popcorn flower, and many others. California poppy, the State flower, is found in this habitat. Perennial grasses, found in moist, lightly grazed, or relic prairie areas, include purple needlegrass and Idaho fescue. Vernal pools, found in small depressions with a hardpan soil layer, support downingia, meadowfoam, and other species (Parker and Matyas 1981). Species composition is also related to precipitation (Bartolome et al. 1980). Perennial grasses are more common on northern sites with mean annual rainfall greater than 150 cm (60 in). Soft chess and broadleaf filaree are common in areas with 65-100 cm (25-40 in) of rainfall, and red brome and redstem filaree are common on southern sites with less than 25 cm (10 in) of precipitation (Bartolome et al. 1980).

Other Classifications. Annual Grassland habitat has been described as Valley Grassland (Munz and Keck 1959, Heady 1977), Valley and Foothill Grassland (Cheatham and Haller 1975), California Prairie (Küchler 1977), Annual Grasslands Ecosystem (Garrison et al. 1977), Brome grass, Fescue, Needlegrass, and Wild Oats series (Paysen et al. 1980), and Annual Grass-Forb series (Parker and Matyas 1981).

Habitat Stages

Vegetation Changes 1-2:S-D. Annual Grassland habitats occupy what was once a pristine native grassland. The native grassland likely consisted of climax stands of perennial bunchgrasses, such as purple needlegrass, on wetter sites (Bartolome 1981, Bartolome and Gemmill 1981), with annual species existing as climax communities on drier alluvial plains (Webster 1981). Today, plant succession in the classical sense does not occur in Annual Grassland habitats. However, species composition is greatly influenced by seasonal and annual fluctuations in weather patterns. Annual plants germinate with the first fall rains that exceed about 15 mm (0.6 in), growing slowly during winter and more rapidly in spring (Heady 1977). Botanical composition changes throughout the growing season because of differences in plant phenology (Heady 1958). Most annuals mature between April and June (Heady 1977), although some species, such as tarweed and turkey mullein, continue to grow into summer. Fall rains that encourage germination, followed by an extended dry period, favor the growth of deep-rooted forbs (Duncan and Woodmansee 1975), but continuing rainfall favors rapidly growing grasses (Pitt and Heady 1978). Livestock grazing favors the growth of low-stature, spring-maturing forbs, such as filaree (Freckman et al. 1979), and summer annuals, such as turkey mullein (Duncan 1976). Because these are important food plants for many wildlife species, proper levels of livestock grazing are generally beneficial in this habitat. In the absence of livestock, Annual Grassland habitats are often dominated by tall, dense stands of grasses such as ripgut brome (Freckman et al. 1979) and wild oats.

Duration of Stages-- Although Annual Grassland habitats consist largely of non-native annuals, these effectively prevent the reestablishment of native perennials over large areas and now comprise climax communities (Heady 1977). Introduced annuals should be considered naturalized plant species and so managed, rather than as invading species characteristic of poor range sites.

Biological Setting

Habitat. Annual Grassland habitat is found just above or surrounding Valley Foothill Riparian (VRI), Alkali Desert Scrub (ASC), Fresh Emergent Wetland (FEW), Pasture (PAS) and all agricultural habitat types, and below Valley Oak Woodland (VOW), Blue Oak Woodland (BOW), Blue Oak-Foothill Pine (BOP), Chamise-Redshank (CRC), and Mixed Chaparral (MCH) habitats. Annual Grassland habitat also borders Coast Oak Woodland (COW), Closed Cone-Pine-Cypress (CPC), Coastal Scrub (CSC), and Eucalyptus (EUC) habitats.

Wildlife Considerations. Many wildlife species use Annual Grasslands for foraging, but some require special habitat features such as cliffs, caves, ponds, or habitats with woody plants for breeding, resting, and escape cover. Characteristic reptiles that breed in Annual Grassland habitats include the western fence lizard, common garter snake, and western rattlesnake (Basey and Sinclear 1980). Mammals typically found in this habitat

include the black-tailed jackrabbit, California ground squirrel, Botta's pocket gopher, western harvest mouse, California vole, badger, and coyote (White et al.1980). The endangered San Joaquin kit fox is also found in and adjacent to this habitat (U.S. Fish and Wildlife Service 1983). Common birds known to breed in Annual Grasslands include the burrowing owl, short-eared owl, horned lark, and western meadowlark (Verner et al. 1980). This habitat also provides important foraging habitat for the turkey vulture, northern harrier, American kestrel, black-shouldered kite, and prairie falcon.

Physical Setting

Annual Grassland habitat occurs mostly on flat plains to gently rolling foothills. Common soil orders include Entisols and Alfisols (Garrison et al.1977). Entisols are often found at lower elevations on flood plains and swales that receive periodic deposits of alluvium (U.S. Soil Conservation Service1975), and are characterized by little or no pedogenic horizon development. Alfisols occur at higher elevations above the valley floor (Garrison et al.1977). Some Annual Grassland habitats can be found in the drier portion of the southern San Joaquin Valley on Aridisols (Garrison et al. 1977). Climatic conditions are typically Mediterranean, with cool, wet winters and dry, hot summers. The length of the frost free season averages 250 to 300 days (18 to 21 fortnights) (Garrison et al. 1977). Annual precipitation is highest in the north (Redding, 960 mm (38 in)) and north coast (Ukiah, 909 mm (36 in)), decreasing to the south (Sacramento, 430 mm (17 in); Stockton, 339 mm (13 in); Fresno, 259 mm (10 in)), and reaching a minimum in the southern San Joaquin Valley (Bakersfield, 150 mm (6 in)) (Major 1977).

Distribution

Annual Grassland habitat occurs in patches of various sizes throughout the state

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**California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group**

Perennial Grassland

John G. Kie

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Vegetation

Structure. Perennial Grassland habitats, as defined here, occur in two forms in California: coastal prairie, found in areas of northern California under maritime influence, and relics in habitats now dominated by annual grasses and forbs. The coastal prairie form is described here. Relic perennial grasslands are discussed in the chapter on Annual Grassland habitats (AGS). Species of perennial grasses are also common in Wet Meadow (WTM) and other habitats. Structure in Perennial Grassland habitat is dependent upon the mix of plant species at any particular site. For example, sites with western bracken fern exhibit a taller (to 1.5 m (5 ft)), more vertically diverse structure than those dominated by shorter grasses such as silver hairgrass (10-30 cm (0.3-1.0 ft)). Grazing by domestic livestock or wild herbivores such as Roosevelt elk can substantially alter habitat structure through reduction in plant height and removal of biomass. Average herbaceous production on nine soil series in Humboldt County was estimated to be 170013,000 kg/ha (1500-11,600 lb/ac) (Cooper and Heady 1964).

Composition. Perennial Grassland habitats are dominated by perennial grass species such as California oatgrass, Pacific hairgrass, and sweet vernalgrass. On northern sites near the ocean in Del Norte and Humboldt Counties, common species include California oatgrass, American dunegrass, goldfields, Kentucky bluegrass, and western bracken fern (Heady et al. 1977). Further inland, common species include redtop, silver hairgrass, sweet vernalgrass, English daisy, soft chess, coast carex, orchardgrass, California oatgrass, Idaho fescue, red fescue, Douglas iris, western bracken fern and red clover (Heady et al. 1977). To the south, at Point Lobos State Reserve in Monterey County, dominant species include silver hairgrass, coronaria brodiaea, soft chess, California oatgrass, Pacific hairgrass, snakeroot, gumweed, toad rush, poverty rush, common wood-rush, squawroot, and fiddle dock (Heady et al. 1977).

Other Classifications. Other classifications of Perennial Grassland are Coastal Prairie (Munz and Keck 1959, Cheatham and Haller 1975), Coastal Prairie-Scrub Mosaic (Küchler 1977), and Festuca-Danthonia grassland (Heady et al. 1977). Further, CALVEG (Parker and Matyas 1981) describes perennial grass in the North Interior, South Sierran and Southern Interior Ecological provinces. Perennial grass in each of these regions are more associated with the Wet Meadow (WTM) and Fresh Emergent Wetland (FEW) habitats in the North Interior; WTM, FEW, Lodgepole Pine (LPN), Eastside Pine (EPN), and Jeffrey Pine (JPN) in the South Sierran, and Joshua Tree (JST) and Desert Scrub

(DSC) in the South Interior. If perennial grass is encountered in any of these regions of the State, refer to the appropriate habitat description.

Habitat Stages

Vegetation Changes 1-2.S-D. Historically, factors that have affected Perennial Grassland habitats on the north coast include the introduction of non-native annual plant species, increased grazing pressure, elimination of frequent fires, and cultivation (Heady et al. 1977). Vegetation changes influenced by increased grazing, such as the spread of introduced annuals, were slower to occur on the north coast than in the central valley. Spanish missions did not extend north of Sonoma County, and the Russian settlements at Fort Ross and elsewhere on the north coast maintained few cattle and sheep. However, heavy grazing by Roosevelt elk and frequent use of fire by local Indian tribes may have influenced the successional stages of many Perennial Grassland habitats (Heady et al. 1977).

Duration of Stages. Heavily grazed Perennial Grassland habitat dominated by annual plant species returns to perennial species under reduction in grazing pressure. Heady et al. (1977) suggest a successional sequence of annual forbs, followed by annual grasses and perennial forbs, then by perennial grasses such as hairy oatgrass and common velvetgrass, and ending in a climax community dominated by sweet vernalgrass and Pacific oatgrass. On some sites, Perennial Grassland habitat may give way to Coastal Scrub habitat (CSC) dominated by coyotebush and lupine (Heady et al. 1977). Where Perennial Grassland habitat occurs on sites formerly supporting Douglas-fir (DFR), the establishment of perennial grasses may in some cases prevent succession back to the original forest cover (Gordon Huntington, pers. comm.).

Biological Setting

Habitat. Perennial Grassland habitat in the coastal prairie can be found adjacent to Douglas-fir (DFR), Redwood (RDW), Coastal Oak Woodland (COW), Closed Cone-Pine Cypress (CPC), Coastal Scrub (CSC), Saline Emergent Wildland (SEW), Estuarine (EST), Marine (MAR), Fresh Emergent Wetland (FEW), Valley-Foothill Riparian (VRI), Pasture (PAS), and all agricultural habitats.

Wildlife Considerations. Perennial Grassland provides optimum habitat for many species, including the common garter snake, western terrestrial garter snake (Houck 1979), northern harrier, barn owl, burrowing owl, western kingbird, Say's phoebe, barn swallow, western meadowlark, savannah sparrow, grasshopper sparrow (Harris and Harris 1979), Townsend mole, coast mole, Botta's pocket gopher, western harvest mouse, California vole, long-tailed vole, and Oregon vole (Mossman 1979). In addition, Perennial Grassland often serves as feeding habitat for the turkey vulture, red-tailed hawk, American kestrel, peregrine falcon, western bluebird (Harris and Harris 1979), fringe-tailed bat, big brown bat, striped skunk, coyote, black-tailed jackrabbit, brush

rabbit, Roosevelt elk, and black-tailed deer (Mossman 1979).

Physical Setting

Perennial Grassland habitat typically occurs on ridges and south-facing slopes, alternating with forest and scrub in the valleys and on north-facing slopes (Heady et al. 1977). Perennial Grassland habitats are most often found on Mollisols. These soils may grade into Inceptisols to the north, with higher precipitation allowing for leaching of the mollic horizon, and into Alfisols to the south, under drier conditions. On the north coast, Perennial Grassland habitat may occasionally be found on Ultisols which formerly supported Douglas-fir (DFR) habitats, but which have been cleared by humans (Gordon Huntington, pers. comm.).

Climatic conditions are under strong maritime influence. Crescent City in Del Norte County has one of the wettest, coolest, most vegetatively productive climates in California (Major 1977). On the north coast, the length of the frost-free season in adjacent Douglas-fir (DFR) habitat is about 200 days (14 fortnights) (Garrison et al. 1977). Annual precipitation is highest in the north (Crescent City 1777 mm (70 in)), and lower to the south (Point Reyes, 497 mm (20 in); Monterey, 465 mm (18 in)) and inland (Davis, 418 mm (16 in)) (Major 1977). Fog, which is common, reduces evapotranspiration, and greatly influences potential natural vegetation.

Distribution

Perennial Grassland habitat of the coastal prairie form occurs along the California coast from Monterey County northward (Küchler 1977). It is found below 1000 m (3280 ft) in elevation and seldom more than 100 km (62 mi) from the coast (Heady et al. 1977). Relic perennial grasses within annual grassland habitat occur in patches throughout the state.

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California Interagency Wildlife Task Group**

Montane Hardwood-Conifer

Richard Anderson

Vegetation

Structure-- Montane Hardwood-Conifer (MHC) habitat includes both conifers and hardwoods (Anderson et al. 1976), often as a closed forest. To be considered MHC, at least one-third of the trees must be conifer and at least one-third must be broad-leaved (Anderson et al. 1976). The habitat often occurs in a mosaic-like pattern with small pure stands of conifers interspersed with small stands of broad-leaved trees (Sawyer 1980). This diverse habitat consists of a broad spectrum of mixed, vigorously growing conifer and hardwood species. Typically, conifers to 65 m (200 ft) in height form the upper canopy and broad-leaved trees 10 to 30 m (30 to 100 ft) in height comprise the lower canopy (Proctor et al. 1980, Sawyer 1980). Most of the broad-leaved trees are sclerophyllous evergreen, but winter-deciduous species also occur (Cheatham and Haller 1975).

Relatively little understory occurs under the dense, bilayered canopy of MHC. However, considerable ground and shrub cover can occur in ecotones or following disturbance such as fire or logging. Steeper slopes are normally devoid of litter; however, gentle slopes often contain considerable accumulations of leaf and branch litter (Cheatham and Haller 1975).

Composition-- Common associates in MHC are ponderosa pine, Douglas-fir, incense-cedar, California black oak, tanoak, Pacific madrone, Oregon white oak, and other localized species. Species composition varies substantially among different geographic areas.

In the north coast, California black oak, Oregon white oak, golden chinquapin, and canyon live oak are commonly found with white fir, Douglas-fir, and ponderosa pine (Parker and Matyas 1981). In the Klamath Mountains and north coast from the Oregon border to Marin County, Oregon white oak, tanoak, Pacific madrone, red alder, Douglas-fir, western red cedar, western hemlock, ponderosa pine, sugar pine, and knobcone pine are common (Küchler 1977, McDonald 1980(Is it a or b Lit Cite), Parker and Matyas 1981). In the northern interior, California black oak, bigleaf maple, Pacific madrone, and tanoak are common with ponderosa pine, white fir, incense-cedar, Douglas-fir, and sugar pine forming the overstory. In the northern Sierra Nevada, common associates include California black oak, bigleaf maple, white alder, dogwood, Douglas-fir, incense-cedar and ponderosa pine. In the southern Sierra Nevada, common associates include California black oak, black cottonwood, canyon live oak, Jeffrey pine, Douglas-fir, ponderosa pine,

sugar pine, incense-cedar, and localized areas of giant sequoia (Küchler 1977, Parker and Matyas 1981). In the central coast, common associates include coast live oak, big leaf maple, Pacific madrone, tanoak, canyon live oak, Coulter pine, coastal redwood and, to a lesser extent, California black oak and ponderosa pine. In the northern central coast, Douglas-fir is found; while in the southern areas, bigcone Douglas-fir occurs. In the Tehachapi, transverse and peninsular ranges of Southern California, common associates include canyon live oak, Pacific madrone, coast live oak and, to a lesser extent, California black oak, ponderosa pine, sugar pine, and incense-cedar (Thorne 1976, Küchler 1977, Parker and Matyas 1981).

Other Classifications-- Montane Hardwood-Conifer is very diverse and has been given a variety of names in the literature including: Mixed Evergreen Forest (Munz and Keck 1973); Mixed Evergreen Zone - Second Growth Forest (Broadleaf 1.1.1H) (Mixed 1.2.31) (Proctor et al. 1980); Mixed Evergreen Forest with Chinquapin, Mixed Hardwood Forest, Mixed Hardwood and Redwood Forest, Oregon Oak Forest, Coulter Pine Forest (Küchler 1977); Mixed Evergreen Forest, Coast Range Mixed Conifer Forest, Santa Lucia Fir Forest, Coast Range Ponderosa Pine Forest, Coulter Pine Forest (Cheatham and Haller 1975); Santa Lucia Fir Series, Bigcone Douglas-fir Series, Madrone Series and Black Oak Series (Paysen 1980)(No Paysen 1980 Lit Cite. There is a Paysen et al. Cite.); Oregon White Oak (Stein 1980); California Black Oak (McDonald 1980); Douglas-fir-Tanoak-Pacific Madrone (Sawyer, 1980); Black Oak Series, Maple-Alder-Dogwood Series, Mixed Conifer-Pine Series, Madrone-Tanoak Series (Parker and Matyas 1981).

Habitat Stages

Vegetation Changes-- 1;2-5:S-D;6. This habitat is climax in most cases; however, it can occur as a seral stage of mixed conifer forests. Vegetation response following disturbance, such as fire or logging, begins with a dense shrubby stage dominated by taller broad-leaved species. The stand gradually increases in height, simultaneously developing into two canopy strata with faster growing conifers above and broad-leaved species below. On mesic sites the conifer component overtakes the hardwood component more rapidly than on xeric sites, where the hardwood component is dominant longer (McDonald 1980).

Duration of Stages-- Secondary succession following disturbance is vigorous, with shrubs and trees regenerating together. The conifer component develops into relatively large, mature trees within 30 to 50 years. The broad-leaved component normally requires 60-90 years. Eventually the conifer component overtakes the broad-leaved component. Successional sequence and timing varies geographically and differs depending on species and environmental factors such as climate, water, and soil.

Biological Setting

Habitat-- Geographically and biologically, Montane Hardwood-Conifer is transitional between dense coniferous forests and montane hardwood, mixed chaparral, or open woodlands and savannas. MHC merges with many other habitats at its upper and lower ecotones. These habitats include Valley-Foothill Hardwood (VFH), Valley-Foothill Hardwood-Conifer (VHC), Valley-Foothill Riparian (VRI), Closed-Cone Pine-Cypress (CPC), Montane Hardwood (MHW), Mixed Conifer (MCN), Douglas-fir (DFR), Redwood (RDW), Montane Riparian (MRI), Montane Chaparral (MCP), and Mixed Chaparral (MCH). The habitat is an area of vegetational and floristic diversity with large numbers of endemic species (Proctor et al. 1980).

Wildlife Considerations-- Montane Hardwood-Conifer provides habitat for a variety of wildlife species. Mature forests are valuable to cavity nesting birds. Moreover, mast crops are an important food source for many birds as well as mammals. Canopy cover and understory vegetation are variable which makes the habitat suitable for numerous species. In mesic areas, many amphibians are found in the detrital layer. Due to geographic variation in components of Montane Hardwood-Conifer, caution must be exercised when predicting wildlife species use.

Physical Setting

Montane Hardwood-Conifer generally occurs on coarse, well drained mesic soils, in mountainous terrain with narrow valleys. Slopes average approximately 57 percent with all aspects encountered. Winters are cool and wet; summers are hot and dry. Northern California Montane Hardwood-Conifer sites have less rainfall and fog than Redwood (RDW) or Mixed Conifer (MCN) habitats. In southern California, this habitat is found at higher elevations, and in moist canyons. Average rainfall is 60 to 170 mm (25 to 65 in), with some fog. The growing season is 7 to 11 months, with 200 to 300 frost-free days. Mean summer maximum temperatures are 25 to 36 C (75 to 95 F). Mean winter minima are 2 to 4 C (29 to 30 F) (Munz and Keck 1970)(No Munz and Keck 1970 Lit Cite).

Distribution

Montane Hardwood-Conifer occurs throughout California and is somewhat continuous from Santa Cruz County northward through outer coast range into Oregon, usually some distance inland from the coast (Cheatham and Haller 1975). The habitat typically follows the upper and/or inland margins of the coastal redwood (RDW) or Douglas fir (DFR) habitats. It can also be found on north facing slopes of the inner north coast ranges, the Santa Lucia Mountains, as well as small patches extending to Santa Barbara County (Cheatham and Haller 1975). Montane Hardwood-Conifer also occurs somewhat continuously down the Sierra Nevada to the transverse ranges. Elevations range from 300 to 10 m (1000 to 4000 ft) in the north to 605 to 1760 m (2000 to 00 ft) in the south. Isolated patches of MHC can be found throughout the transverse and peninsular ranges of southern California.

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APPENDIX D:
SPECIAL-STATUS SPECIES EVALUATED IN THIS
REPORT

Special Status Wildlife Species within the Project 9-Quad Area

Common Name	Scientific Name	Status: Fed/State/ CNPSrank	Habitat Type(s)	Potential for Species Occurrence in Study Area	Species Description
fisher - West Coast DPS	<i>Pekania pennanti</i>	--/ CT/	North coast coniferous forest; Oldgrowth; Riparian forest	Potentially present.	The fisher is a small mustelid mammal that is listed as a California State Threatened species and a US Forest Service Sensitive species. Fishers typically prefer dense coniferous or mixed forests, including early successional forests with dense cover. They are primarily ground-dwelling mammals and are generalized predators, eating mainly small to medium-sized mammals, birds, and carrion.
Sonoma tree vole	<i>Arborimus pomo</i>	--/SSC/	North coast coniferous forest; Oldgrowth; Redwood	Potentially present.	The Sonoma tree vole is a red-furred rodent, 158-186 mm long, with a long, well-furred tail, curved claws, and ears partly concealed in the fur. Predators include spotted owls and probably other owls, raccoons, and fishers. It is listed on the IUCN Red List as Near Threatened and is S3, vulnerable, in California. It is potentially present in the north coast fog belt from Oregon border to Sonoma County, in Douglas-fir, redwood & montane hardwood-conifer forests, where it feeds almost exclusively on Douglas-fir needles but will occasionally take needles of grand fir, hemlock or spruce.
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	--/SSC/	Broadleaved upland forest; Chaparral; Chenopod scrub; Great Basin grassland; Great Basin scrub; Joshua tree woodland; Lower montane coniferous forest; Meadow & seep; Mojavean desert scrub; Riparian forest; Riparian woodland; Sonoran desert scrub; Sonoran	Potentially present.	Townsend's big-eared bats are medium-sized bats with long ears that are listed as a Species of Special Concern in California. They live in a variety of habitats, including coniferous forests, riparian communities, active agricultural areas, and coastal habitats. Their distribution is strongly correlated with the presence of caves. During nesting season, these bats roost in large maternity colonies.

APPENDIX D: SPECIAL STATUS SPECIES

Common Name	Scientific Name	Status: Fed/State/ CNPSrank	Habitat Type(s)	Potential for Species Occurrence in Study Area	Species Description
American peregrine falcon	<i>Falco peregrinus anatum</i>	FDL/FP/	Coastal scrub; Coastal oak woodland; Annual grassland; Perennial grassland; Pasture; Douglas fir; Montane hardwood-conifer; Montane hardwood; Mixed chaparral; Chamise-redshank chaparral; Closed-cone pine-cypress	Potentially present.	American peregrine falcon is a fully protected species by the state of California. They are the largest falcon over most of the continent with long, pointed wings, and a long tail. Adults are blue-gray above with barred underparts and a dark head with thick "sideburns," while juveniles are heavily marked with vertical streaks on the breast. American peregrine falcons can be observed throughout North America but most commonly along coasts. They perch and nest on water towers, cliffs, and other human-made structures.
bald eagle	<i>Haliaeetus leucocephalus</i>	FDL/CE/	Lower montane coniferous forest; Oldgrowth	Potentially present.	Bald eagle is an endangered species listed by the state of California. They are one of the largest birds in North America measuring about 27.9-37.8 inches in length with an average wingspan of 80.3 inches. Adult bald eagles have white heads and tails with dark brown bodies and wings and bright yellow legs. Juveniles have mostly dark heads and tails, brown bodies and wings mottled with white in varying amounts. Bald eagles can be found near lakes, rivers, marshes, and coasts.
northern goshawk	<i>Accipiter gentilis</i>	--/SSC/	North coast coniferous forest; Subalpine coniferous forest; Upper montane coniferous forest	Potentially present.	The northern goshawk is a species on the CDFW Watch List and is considered a California Bird Species of Special Concern. It is a large, bulky raptor with a grey cap, white eyebrows, and red eyes. In flight, the goshawk can be differentiated from other buteos by its broad, rounded wings and long tail. This species breeds in coniferous forests throughout the North Coast Ranges and hunts in wooded areas, using tree snags for perching and observation. They generally avoid developed areas, so are impacted by new development in forests.

APPENDIX D: SPECIAL STATUS SPECIES

Common Name	Scientific Name	Status: Fed/State/ CNPSrank	Habitat Type(s)	Potential for Species Occurrence in Study Area	Species Description
northern spotted owl	<i>Strix occidentalis caurina</i>	FT/CT/	North coast coniferous forest; Subalpine coniferous forest; Lower montane coniferous forest; Oldgrowth	Potentially present.	The northern spotted owl is listed as threatened under the Endangered Species Act. They are found in northern California and require forests with dense canopy cover of old growth trees. They are a brown, medium-sized owl, with dark eyes. They hunt small forest mammals by perching and pouncing on their prey. They are potentially present where this suitable habitat is nearby, or in close proximity to established Critical Habitat for the species.
foothill yellow-legged frog	<i>Rana boylei</i>	--/CC/	Aquatic; Chaparral; Cismontane woodland; Coastal scrub; Klamath/North coast flowing waters; Lower montane coniferous forest; Meadow & seep; Riparian forest; Riparian woodland; Sacramento/San Joaquin flowing waters	Potentially present.	The foothill yellow legged frog is a medium sized frog (1.5-3.2 inches in length) and a California Species of Special Concern and State Candidate for Threatened Species. Their coloring is gray or brown and typically matches the surrounding background of its habitat. They are found in rocky streams, riparian habitats, or isolated pools, all of which could be affected by activities on nearby developed lands.
northern red-legged frog	<i>Rana aurora</i>	--/SSC/	Klamath/North coast flowing waters; Riparian forest; Riparian woodland	Potentially present.	The northern red legged frog is a California Species of Special Concern. It is a medium-sized frog with a slender body, smooth skin, distinct dorsolateral folds, and a dark eye mask. The dorsal color is tan, brown or olive-brown with varying amounts of black spotting and speckling. They are potentially present in lowland moist forested habitats in the vicinity of standing or flowing waters.

APPENDIX D: SPECIAL STATUS SPECIES

Common Name	Scientific Name	Status: Fed/State/ CNPSrank	Habitat Type(s)	Potential for Species Occurrence in Study Area	Species Description
Pacific tailed frog	<i>Ascaphus truei</i>	--/SSC/	Aquatic; Klamath/North coast flowing waters; Lower montane coniferous forest; North coast coniferous forest; Redwood; Riparian forest	Potentially present.	Pacific tailed frogs (1-2 inches in length) are endemic to the Pacific Northwest and are a California Species of Special Concern. The male frogs have tails that are used for reproduction through internal fertilization. These frogs are colored to blend with rocks found near streams. Pacific tailed frogs are potentially present in ponds and riparian habitat.
southern torrent salamander	<i>Rhyacotriton variegatus</i>	S/SSC/	Lower montane coniferous forest; Oldgrowth; Redwood; Riparian forest	Potentially present.	Southern torrent salamander is a California Species of Special Concern and Federally Sensitive Species. It is a medium sized salamander (1.5 - 2.4 inches in length) with slim body, short tail, and small head with large protuberant eyes. The coloring ranges from olive to brown dorsally with dark and light speckling. Their ventral surface is yellowish and sometimes speckled. They are occasionally found in riparian vegetation adjacent to water or in contact with water.
western pond turtle	<i>Emys marmorata</i>	--/SSC/	Aquatic; Artificial flowing waters; Klamath/North coast flowing waters; Klamath/North coast standing waters; Marsh & swamp; Sacramento/San Joaquin flowing waters; Sacramento/San Joaquin standing waters; South coast flowing waters; South coast standing water	Potentially present.	Western pond turtle is the only native freshwater turtle along the West Coast and are listed as a California Species of Special Concern. In the Humboldt region, these turtles have been found in mixed oak-fir forests, open prairies, and riparian habitats. Western pond turtles are also potentially present in riparian corridors adjacent to open water.

APPENDIX D: SPECIAL STATUS SPECIES

Common Name	Scientific Name	Status: Fed/State/ CNPSrank	Habitat Type(s)	Potential for Species Occurrence in Study Area	Species Description
chinook salmon - upper Klamath and Trinity Rivers ESU	<i>Oncorhynchus tshawytscha pop.</i> 30	--/SSC/	Aquatic; Klamath/North coast flowing waters	Unlikely.	Upper Klamath-Trinity River Chinook salmon are an Endangered Species Act Candidate and a California Species of Special Concern. Chinook are anadromous, with a complex life history in which adults spawn in rivers, juveniles migrate to saltwater to feed, grow and mature, and return to their natal river as reproductive adults. Chinook require cool, high-quality riverine waters for adults to spawn and for juveniles to mature before migrating to the ocean. Activities on land that affect adjacent waters are potentially detrimental to Chinook populations.
summer-run steelhead trout	<i>Oncorhynchus mykiss irideus pop.</i> 36	--/SSC/	Aquatic; Klamath/North coast flowing waters; Sacramento/San Joaquin flowing waters	Potentially present.	Steelhead are a salmonid species and a California Species of Special Concern. The northern California Distinct Population Segment is federally listed as threatened. Adult steelhead can reach 25 inches in length and during spawning season are iridescent pink around their lateral line. Steelhead are the anadromous form of rainbow trout, with significant gene flow between resident trout and steelhead. Activities on land that affect adjacent waters are potentially detrimental to steelhead populations.