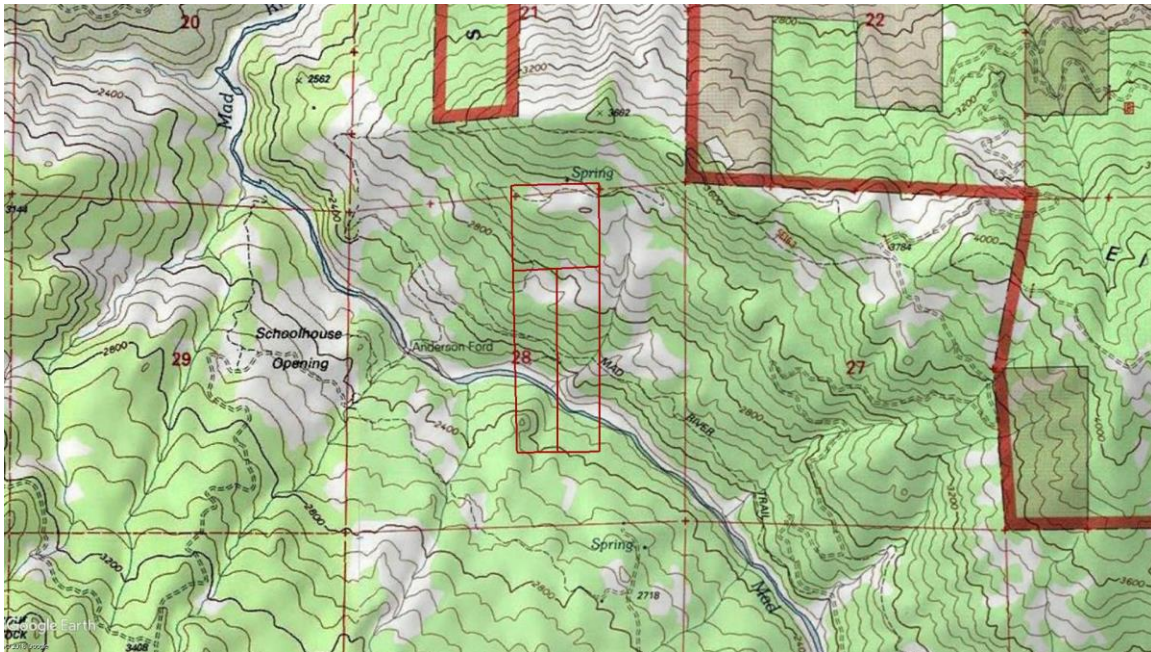


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# *Biological Resource Report*

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Mad River Family Farms  
APNs 208-221-008, 208-221-015, 208-221-016  
West River Road, Mad River, California



April, 2019

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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 at 8, 15, and 16 West River Road, Mad River, California, near the eastern border of Humboldt County, California (40.529846°, -123.614979°). The property encompasses 115-acres on three parcels (APN Numbers 208-221-009, 208-221-015, and 228-221-016), 35 miles inland from the Pacific Ocean (**Figure 1**).

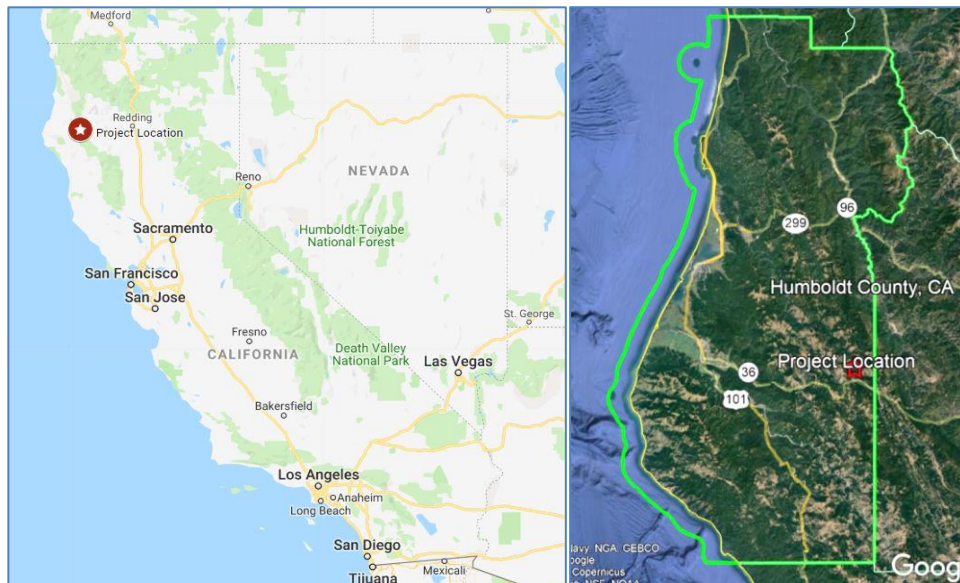


Figure 1. Location of project within [California](#) and within Humboldt County

## Project Description

The proposed project consists of 66,371 sq. ft. of light deprivation canopy area and a propagation facility spread between six sites (**Figure 2**). Currently, 46,406 sq. ft. is existing and developed, the remaining 19,965 sq. ft. is planned to be added to existing sites. Proposed additions will take place on existing flats and not require grading, removal of trees, presence of construction crews/ heavy machinery, or periods of sustained increases in noise. Water is sourced from two wells and a 250,000 gal. rainwater catchment pond, total annual water usage is estimated at 500,000 gal. 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 1**), with additional information provided by the client.

Parcel 208-221-008 (**Figure 3**) houses five light deprivation greenhouses totaling 10,760 square feet of cultivation area. This parcel has 13,901 square feet of pre-existing cultivation that has been verified by the county. Mad River Family Farms LLC is applying for 13,901 square feet of outdoor cultivation but only currently utilizes 10,760 square feet. An expansion for the remaining 3,141 sq. ft. is planned on another flat area of this parcel once approved. Water is sourced on the parcel from a single permitted well and a 275,000 gal. rainwater catchment pond. Water

is stored in five 20,000 gal water bladders and two water tanks providing an additional 8,000 gal. of storage. Current water usage is estimated at 160,000 gal. per year on the parcel.

Parcel 208-221-015 currently houses four light deprivation greenhouses totaling 6,816 square feet of cultivation area. This parcel has 23,640 square feet of pre-existing cultivation that has been verified by the county. Mad River Family Farms LLC is applying for 23,640 square feet of outdoor cultivation but currently only utilizes 6,816 square feet. An expansion is planned on an existing flat for the remaining 16,824 sq. ft. once approved. Water is sourced from the permitted well and the rainwater catchment pond on parcel 208-221-008. Water storage on the parcel consists of three water tanks providing 6,000 gal. of water storage. Water Usage is estimated at 90,000 gal. per year.

Parcel 208-221-016 is currently housing 10 light deprivation greenhouses totaling 26,160 square feet. It also has one 750 square foot propagation greenhouse and one 1,920 square foot greenhouse that may be removed or used as a propagation greenhouse if allowed by the county. Water is sourced from a permitted well on this parcel. Water is stored in a series of water tanks spread throughout the parcel. Water usage is estimated at 250,000 gal. per year.

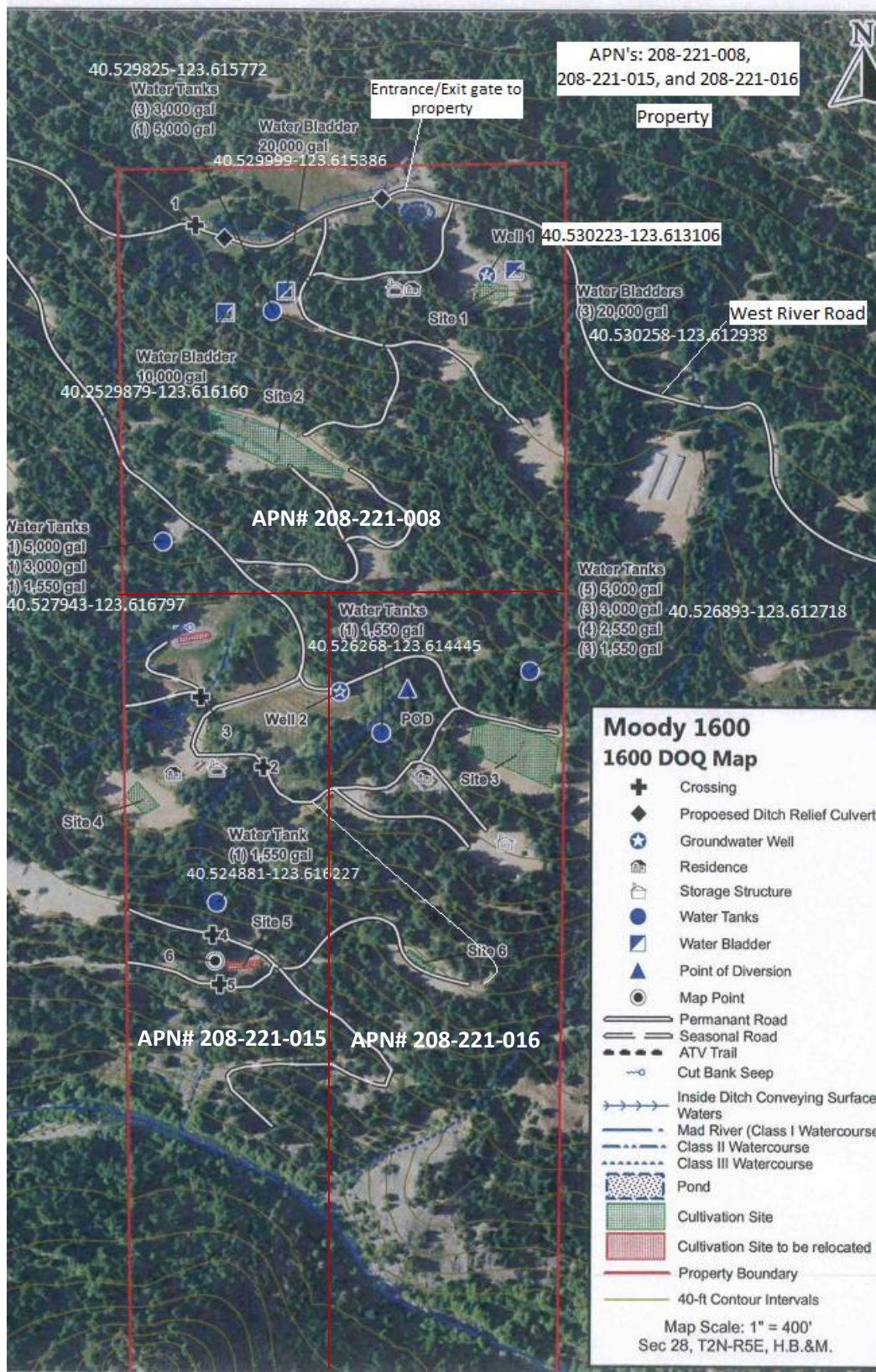


Figure 2. Map of cultivation operation. This view shows all three parcels; additional details for each parcel are in figures 3-5.







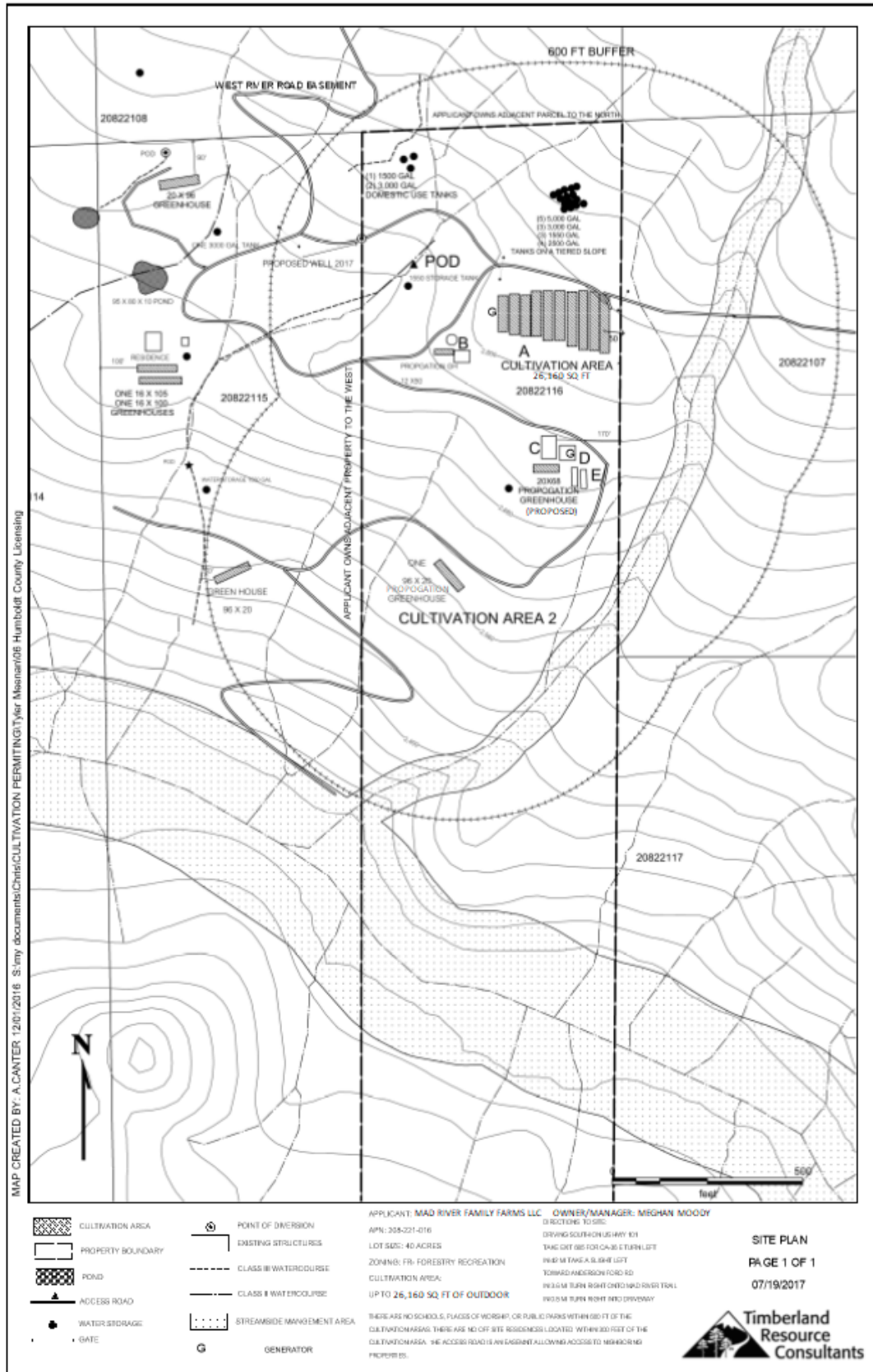


Figure 5: APN 208-221-016 Site Plan

## Scope of Report

This report assesses the potential for special status species and habitats to occur within the Study Area and be adversely affected by the project construction and/or operation. For the purposes of this assessment, the Study Area is defined to include the area within the property boundary. 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. Limited site-specific information, including topographic maps, satellite imagery, and site photos and videos obtained during a field visit, 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

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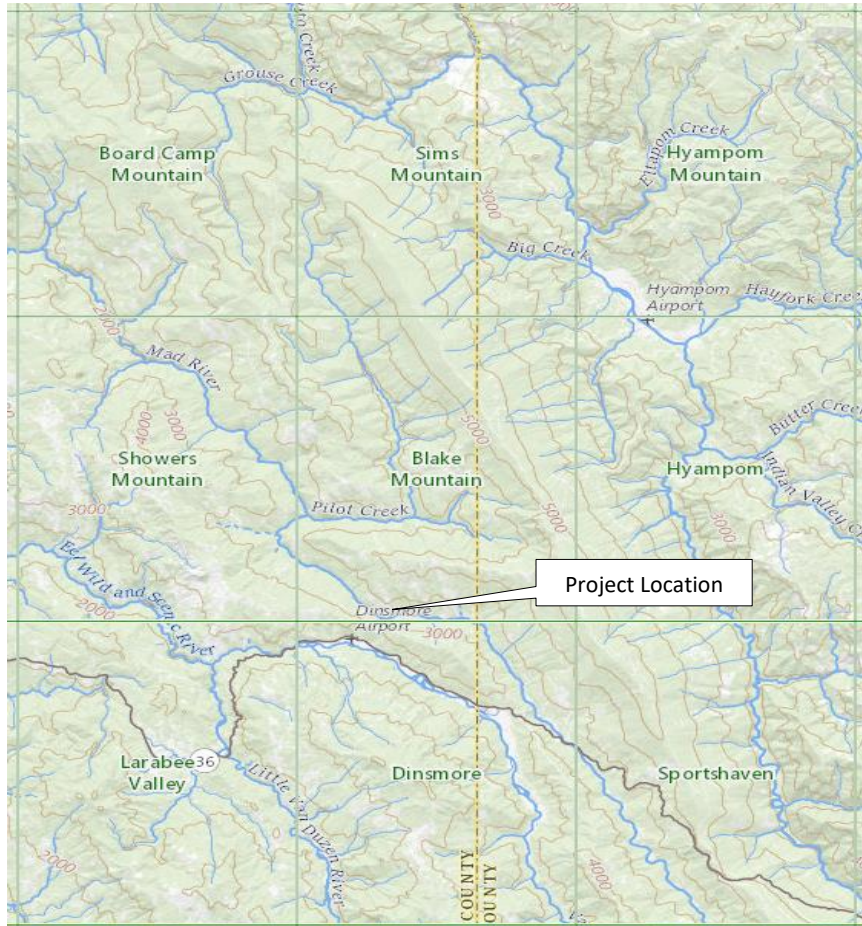
Background literature and database searches were conducted to determine the potential occurrence of special-status species and biological communities within the Study Area based on presence of unique habitat features, proximity to reported occurrences, and geographic range of subject species. The search 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 6**). 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 (CNDDDB) (CDFW 2018a)
- CNDDDB/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 **Appendix 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 6. [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

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The Study Area is situated on the Mad River near the town of Dinsmore, California. The site is 40 miles inland from the Pacific Ocean (**Figure 1**). The property lies on south & north facing slopes with elevations ranging from approximately 3,200 ft. on the northern edge of the study area to 2,200 ft. in the Mad River basin. The Study Area includes land on north and south sides of the Mad River, although no cultivation activities will occur on the south side of the river or within 550 ft. on the north side.

In addition to the Mad River, a class I water course, one unnamed class II stream, two unnamed class III streams, and a manmade rainwater catchment pond exist in the study area.

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 at the higher site elevations 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 at the lower site elevations are mapped as the Chalkmountain-Hoagland Complex. In addition to Douglas fir, these soils are also associated with Pacific madrone, tanoak, California bay, California live oak, Cascade Oregongrape, California huckleberry, oval-leaf blueberry, and sword hollyfern.

Photographs of the property (**Figures 7-12**) show presence of Douglas fir and possibly other conifers, tanoak, *Quercus* Sp., madrone, huckleberry, blackberry, swardfern, grasslands, and various indiscernible shrubs.

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**)<sup>1</sup>. Of the potential habitats, Montane Hardwood-Conifer (MHC), Montane Riparian (MRI), Perennial Grassland (PGS) and Annual Grassland (AGS) are most abundant. Additional information regarding these habitats is provided in **Appendix C**.

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<sup>1</sup> 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 7. Representative habitat on Mad River Family Farms. Mixed hardwood and conifers, with grasslands. Seep or drainage visible in foreground.**



**Figure 8. Representative habitat. Oak, blackberries, swordfern , fir.**





Figure 9: Montane Hardwood-Conifer habitat.



Figure 10: Mixed Oak, Conifer and Grassland

**Figure 11: Oak and Grassland**



**Figure 12: Mad River and Surrounding Riparian Habitat**

## 4. Biological Resources

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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. Current cultivation activities do not take place within potential habitat and have a low probability of negatively effecting the 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. Current cultivation activities do not take place within potential habitat and have a low probability of negatively effecting the 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. Current cultivation activities do not take place within potential habitat and have a low probability of negatively effecting the species. Existing cannabis cultivation activities comply with black sky standards. Should development of wooded areas or removal of trees 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. Current cultivation activities do not take place within potential habitat and have a low probability of negatively effecting the 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. Current cultivation activities do not take place within potential habitat and have a low probability of negatively effecting the 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. Current cultivation activities do not take place within potential habitat and have a low probability of negatively effecting the 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, it is approximately 0.2 miles from established Critical Habitat and one or more observations have been recorded within 0.5 mile. 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, 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. Current cultivation activities do not take place within potential habitat and have a low probability of negatively effecting the species. Should development resulting in the disturbance of streams, ponds, or riparian habitat be proposed mitigation measure 3.4-1b 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. Current cultivation activities do not take place within potential habitat and have a low probability of negatively effecting the 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 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. Current cultivation activities do not take place within potential habitat and have a low probability of negatively effecting the 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. Current cultivation activities do not take place within potential habitat and have a low probability of negatively effecting the 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. Current cultivation activities do not take place within potential habitat and have a low probability of negatively effecting the 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.

### *Invertebrates*

#### 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 overlaps with or is close proximity to the designated critical habitat for four special-status species: north coast steelhead, Coho salmon, Chinook salmon, 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.

#### *Northern Spotted Owl Critical Habitat*

There is designated critical habitat for the northern spotted owl within the nine quad area surrounding the Study Area. An area of northern spotted owl designated critical habitat lies 0.2 mile northwest of the norther parcel (APN 208-221-008). 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.

If new construction or other activity is to be undertaken, 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 flows through the property, is an EFH for Chinook and Coho salmon. Habitat and fish life history descriptions may be viewed on the web at [www.pcouncil.org/wp-content/uploads/99efh2.pdf](http://www.pcouncil.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

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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 and Operations Plan

208-221-008, 208-221-015, 208-221-016



**Mad River Family Farms LLC**

1. Mad River Family Farms LLC is a sun grown (using light deprivation greenhouses) cannabis farm doing business at 8, 15, and 16 West River Road in Mad River, California. This property consists of three parcels, all of which have their own cultivation areas. Parcel 208-221-008 houses five light deprivation greenhouses totaling 10,760 square feet of cultivation area. This parcel has 13,901 square feet of pre-existing cultivation that has been verified by the county. Mad River Family Farms LLC is applying for 13,901 square feet of outdoor cultivation but only currently utilizes 10,760 square feet. An expansion is planned on another flat area of this parcel if allowed by the county (see parcel map). Parcel 208-221-015 currently houses four light deprivation greenhouses totaling 6,816 square feet of cultivation area. This parcel has 23,640 square feet of pre-existing cultivation that has been verified by the county. Mad River Family Farms LLC is applying for 23,640 square feet of outdoor cultivation but currently only utilizes 6,816 square feet. Parcel 208-221-016 is currently still in discussions with the county regarding pre-existing square footage. This parcel currently houses 10 light deprivation greenhouses totaling 26,160 square feet. It also has one 750 square foot propagation greenhouse and one 1,920 square foot greenhouse that may be removed or used as a propagation greenhouse if allowed by the county.
2. Mad River Family Farms LLC consists of three parcels which share existing resources for the purposes of running smoothly and effectively. In this document, Mad River Family Farms will be known as the farm from this point forward.
3. Cannabis Cultivation is at a unique moment in time with ever changing legislation and management practices. The farm strives to stay current with changing legislation and permitting, as well current best management practices.
4. The farm currently operates organically under current circumstances. Once organic certification becomes available for cannabis cultivators the farm intends to apply for such certification.
5. Cannabis Cultivation at Mad River Family Farms is conducted in compliance with all State and County laws and ordinances. The Farm gives its consent to onsite

inspections of the farm by licensing and permitting bodies with at least 24 hours' notice Mondays thru Fridays between the hours of eight AM and five PM

6. The farm is run under the direct supervision of the owner and operator, Meghan Moody. The farm will hire independent contractors when needed for help with different aspects of running and maintenance of the farm.
  7. If hiring employees becomes necessary in the future, all employees of the farm will operate under the direct supervision of the manager and shall be trained on all operations of the farm. All employees shall be provided access to the farm manual upon employment and continuously during tenure at the farm.
8. Regarding Water on Mad River Family Farms, please see:
- i. Water Resource Protection Plan and 1600 Notification documents for a detailed account of water usage:

**a. Parcel 208-221-008:**

- There is one permitted well (documentation included), which supplies water to parcels 208-221-008 and 208-221-015 during the forbearance period.
- There is one 275,000-gallon rain catchment pond on this parcel which may be used to supplement water usage during the forbearance period.
- There are five 20,000-gallon bladders located on parcel 208-221-008 that are continuously being filled from the well located on this parcel.
- There are two 3,000-gallon water tanks and one 5,000-gallon water tank receiving water from the well located on this parcel and are supplying water to cultivation site A on this parcel.

**Current water usage per month for this parcel is estimated as follows (in gallons) and is supplied solely from the well:**

January: 0

July: 28,800

February: 0

August: 31,573

March: 0

September: 30,400

April: 13,227

October: 8,000

May: 20,800

November: 0

June: 27,200

December: 0

**Current Annual water usage for this parcel is estimated at 160,000 gallons/year**

**b. Parcel 208-221-015:**

- There is one permitted well (documentation included) located on parcel 208-221-008 (coordinates: 40.530223-123.613106), which supplies water to parcel 208-221-015, during the forbearance period.
- There is one 275,000-gallon rain catchment pond on parcel 208-221-008 which may be used to supplement water usage during the forbearance period.
- There is a 5,000-gallon water tank located at the bottom of parcel 208-221-008 (coordinates: 40.527943-123.616797) that supplies water to the cabin located on this parcel.
- There is a 1,550-gallon water tank located at the bottom of parcel 208-221-008 (coordinates: 40.527943-123.616797) supplying water to the 20 x 96 greenhouse above the cabin (site 7).
- There is a 3,000-gallon water tank located on parcel 208-221-015 that supplies water to the 16 x 102 and 16 x 84 greenhouses located below the cabin (site 4).
- There is a 1,550-gallon water tank (coordinates: 40.524881-123.616227) that supplies water to the 20 x 96 greenhouse (site 5).

**Current water usage per month for this parcel is estimated as follows (in gallons) and is supplied solely from the well:**

January: 0

July: 16,200

February: 0

August: 17,760

March: 0

September: 17,100

April: 7,440

October: 4,500

May: 11,700

November: 0

June: 15,300

December: 0

**Current Annual water usage for this parcel is estimated at 90,000 gallons/year**

**c. Parcel 208-221-016:**

- There is one permitted well located on this parcel (documentation included), which supplies water to this parcel
- In an emergency this parcel may receive water from the well located on parcel 208-221-016 or, in rare cases, from the water diversion located on this parcel (see 1600 notification).
- There is abundant water storage located on this parcel (see parcel map).

**Current water usage per month for this parcel is estimated as follows (in gallons) and is supplied solely from the well located on parcel 208-221-016:**

January: 0	July: 45,000
February: 0	August: 49,334
March: 0	September: 47,500
April: 20,667	October: 12,500
May: 32,500	November: 0
June: 42,500	December: 0

**Total annual water usage on this parcel is estimated to be 250,000 gallons/year**

9. Drainage at the farm is appropriate and runoff is prevented using the drip irrigation system utilized for watering the cultivated areas. The proper steps have been taken to control erosion in any cultivated areas.
10. Electricity used on the farm is sourced using solar panels and generators. The generators have proper containment and have been wired up to code.
  - i. Electricity is used on the farm to provide supplemental lighting in the nursery (propagation) areas during spring months, to power fans in the greenhouses as needed during the summer months, and to power fans and dehumidifiers during times of high humidity in the storage areas, See Processing Policies and Procedures
  - ii. Lighting of work spaces as needed.

11. Pesticide, Fertilizers and Amendments Use, See:
  - i. Storage of Fertilizers, Amendments, and Pesticides Policies and Procedures
  - ii. Pest Management
  - iii. Water Resource Protection Plan
12. Site Planning: The farm strives to cultivate in a manner that promotes healthy and vigorous growth while reducing the risk of pests, molds and mildews. We accomplish this is through the use of integrated pest management and increased air flow in the greenhouses via fans
13. Security of the site:
  - i. See Security Protocols and Plan
14. Marketing of Farm Products: The farm complies with all state and local regulations regarding the sale of cannabis products within a “closed-loop system”. Mad River Family Farms is a member of the Humboldt Sun Growers Guild and markets its products under the True Humboldt Brand to legally operating dispensaries within the State of California.
15. Monthly Schedule of Activities (All schedules are approximate and highly dependent on seasonal and farm conditions) (Subject to update and change):
  - i. January:
    - Farm Cleanup and Preparation.
    - Clone research and pricing.
    - Documentation with track and trace
    - Cultivation planning for following season with track and trace.
    - Infrastructure Repair and Improvement.
    - Continued processing of previous seasons crop as needed utilizing offsite independent contractors as needed. See Processing Plan.
    - Ongoing site inspection for problems and improvements related to all aspects of the farm.
  - ii. February:
    - Farm Cleanup and Preparation.
    - Clone research and pricing.
    - Cultivation planning for following season with track and trace.
    - Infrastructure Repair and Improvement.
    - Ongoing site inspection for problems and improvements related to all aspects of the farm. Implementation of improvements.
    - Clone sourcing and documentation with track and trace

## iii. March:

- Farm Cleanup and Preparation.
- Clone research and pricing.
- Cultivation planning for following season with track and trace.
- Infrastructure Repair and Improvement.
- Ongoing site inspection for problems and improvements related to all aspects of the farm. Implementation of improvements.
- Clone sourcing and documentation with track and trace.
- Plant care as needed including watering, transplanting, pruning, fertilization, pesticide management, quarantine for incoming and contaminated plants.
- Cleaning and Preparation for light deprivation.
- Soil testing.
- Needs assessment for light deprivation season.
- Site preparation for light deprivation season based upon needs assessment.
- In the future, start utilizing nursery for vegging plants. This propagation area is for ancillary use to operation (not yet built).

## iv. April:

- Continued care for onsite plants including watering, transplanting, pruning, fertilization, pesticide management, quarantine for incoming and contaminated plants, and other plant care duties as needed (all necessary documentation done with track and trace).
- Farm Cleanup and Preparation.
- Infrastructure Repair and Improvement.
- Ongoing site inspection for problems and improvements related to all aspects of the farm. Implementation of improvements.
- Continued cloning preparation with documentation with track and trace
- Cleaning and Preparation for light deprivation.
- Site preparation for light deprivation season based upon needs assessment.
- Continued use of propagation area for vegging plants.
- Supplemental lighting utilized in cultivation areas for vegging purposes



## v. May:

- Finalization of light deprivation infrastructure repair and changes.
- Soil preparation (amendments and turning) for light deprivation.
- Irrigation setup, main lines, attachments, emitters, timers installation and testing.
- Clone sorting for light deprivation (healthy plants chosen for final planting and documented with track and trace).
- Planting of light deprivation plants into final sites and mulching of planted sites (documented with track and trace).
- In some years, onset of blackout tarping for light deprivation.
- Clone research and pricing if needed.
- Cultivation planning for following season.
- Ongoing site inspection for problems and improvements related to all aspects of the farm. Implementation of improvements.
- Plant care as needed including watering, transplanting, pruning, fertilization, pesticide management, quarantine for incoming and contaminated plants and plant sexing for seedlings at appropriate growth stage.

## vi. June:

- Depending on year, onset or continuation of blackout tarping for light deprivation.
- Ongoing site inspection for problems and improvements related to all aspects of the farm. Implementation of improvements.
- Plant care as needed including watering, transplanting, pruning, fertilization, pesticide management, quarantine for incoming and contaminated plants and plant sexing for seedlings at appropriate growth stage.
- Clone sorting for second run if applicable (healthy plants chosen for final planting) (documented with track and trace)
- Changing of plant care techniques for flowering light deprivation plants as needed (changes in nutrient needs, pesticide treatments, etc.)

## vii. July:

- Continuation and culmination of blackout tarping for light deprivation.

- Harvesting of light deprivation plants as needed depending on ripeness assessments (performed by loupe or other microscopic assessment of flower trichomes) (documented with track and trace)
- Hanging and processing of harvested light deprivation flowers as per Processing Plan (documented with track and trace)
- Processing of flowers utilizing offsite independent contractors as needed (documented with track and trace). See Processing Policies and Procedures.
- Cleanup and storage of light deprivation areas and tools.
- Ongoing site inspection for problems and improvements related to all aspects of the farm. Implementation of improvements.
- Plant care as needed including watering, transplanting, pruning, fertilization, and pesticide management.

viii. August:

- Ongoing site inspection for problems and improvements related to all aspects of the farm. Implementation of improvements.
- Plant care as needed including watering, transplanting, pruning, fertilization, and pesticide management.
- Continued processing of flowers utilizing offsite independent contractors as needed (documented with track and trace). See Processing Plan.
- Changing of plant care techniques for flowering plants as needed (changes in nutrient needs, pesticide treatments, etc.)
- In some years harvesting of flowering plants as needed depending on ripeness assessments (performed by loupe or other microscopic assessment of flower trichomes) (documented with track and trace).
- Disconnection of unused irrigation as plants are harvested unless utilizing a second run.

ix. September:

- Ongoing site inspection for problems and improvements related to all aspects of the farm. Implementation of improvements.
- Plant care as needed including watering, transplanting, pruning, fertilization, and pesticide management.

- Ongoing harvesting of flowering plants as needed depending on ripeness assessments (performed by loupe or other microscopic assessment of flower trichomes) (documented with track and trace).
  - Continued processing of flowers utilizing offsite independent contractors as needed (documented with track and trace). See Processing Plan.
  - Disconnection of unused irrigation as plants are harvested.
- x. October:
- Ongoing site inspection for problems and improvements related to all aspects of the farm. Implementation of improvements.
  - Plant care as needed including watering, transplanting, pruning, fertilization, and pesticide management.
  - Ongoing harvesting of flowering plants as needed depending on ripeness assessments (performed by loupe or other microscopic assessment of flower trichomes) (documented with track and trace).
  - Continued processing of flowers utilizing offsite independent contractors as needed (documented with track and trace). See Processing Plan.
  - Disconnection of unused irrigation as plants are harvested.
- xi. November:
- Ongoing site inspection for problems and improvements related to all aspects of the farm. Implementation of improvements.
  - Final harvesting of flowering plants as needed (documented with track and trace).
  - Continued processing of flowers utilizing offsite independent contractors as needed (documented with track and trace). See Processing Plan.
  - Infrastructure Repair and Improvement.
  - Final disconnection of any remaining irrigation systems, cleanup and storage of main lines, attachments, emitters, timers as needed.
- xii. December:
- Year-end review of farm activities.
  - Year-end inspection for problems and improvements related to all aspects of the farm. Implementation of improvements.

- Infrastructure Repair and Improvement.
- Continued processing of flowers utilizing offsite independent contractors as needed (documented with track and trace). See Processing Plan.

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, riggut 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.



<p>Montane Riparian</p>	<p>MRI</p>	<p>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.</p>
<p>Perennial Grassland</p>	<p>PGS</p>	<p>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.</p>
<p>Ponderosa Pine</p>	<p>PPN</p>	<p>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.</p>
<p>Redwood</p>	<p>RDW</p>	<p>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.</p>
<p>Riverine</p>	<p>RIV</p>	<p>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.</p>

<p>Urban</p>	<p>URB</p>	<p>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.</p>
<p>Valley Foothill Riparian</p>	<p>VRI</p>	<p>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).</p>
<p>Wet Meadow</p>	<p>WTM</p>	<p>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.</p>

APPENDIX C:  
PRIMARY HABITAT DETAIL



California Wildlife Habitat Relationships System  
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## Annual Grassland

John G. Kie

Updated by: CWHR Staff, April 2005

## 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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## 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 (16in)) (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 Wildlife Habitat Relationships System**  
**California Department of Fish and Game**  
**California Interagency Wildlife Task Group**

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## 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 savannahs. 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 m the coast (Cheatham and Haller 1975). The habitat typically lows 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.

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.

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</i> pop. 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
summer-run steelhead trout	<i>Oncorhynchus mykiss irideus</i> pop. 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.