



## TECHNICAL MEMORANDUM

DATE: April 26, 2019  
TO: Steve and Lesley Doyle  
FROM: Dennis Halligan, Stillwater Sciences  
SUBJECT: Big River Farm Wildlife Assessment

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### 1 INTRODUCTION

The consulting firm Humble Servants of the Mattole contracted with Stillwater Sciences to perform a wildlife assessment on the Big River Farms property (APN 108-023-008) located at 9320 Wilder Ridge Road, Humboldt County, California (Figure 1). The property is situated in the Jewitt Creek watershed, which is tributary to Bear Creek, which flows into the Mattole River. The wildlife assessment was in response to a request by the California Department of Fish and Wildlife (CDFW), dated February 28, 2019, for a qualified biologist to determine the presence or absence of nesting and roosting habitat for northern spotted owls (*Strix occidentalis caurina*). CDFW was also concerned that the project had the potential to affect other sensitive wildlife resources such as Townsend big-eared bat (*Corynorhinus townsendii*), foothill yellow-legged frog (*Rana boylei*), northern red-legged frog (*Rana aurora*), Pacific tailed frog (*Ascaphus truei*), southern torrent salamander (*Rhyacotriton variegatus*), northwestern salamander (*Ambystoma gracile*), coastal giant salamander (*Dicamptodon tenebrosus*), and other amphibians, reptiles, aquatic invertebrates, mammals, birds, and other aquatic and riparian species.

Big River Farms is proposing to conduct cannabis cultivation within greenhouses on their property using mixed-light and full sun (Project). Once natural light exceeds 12 hours per day, all artificial lighting will be discontinued. The property is served by public water and electricity, which precludes the need for water diversions and generator use. No vegetation removal will occur as part of the Project.

The purpose of this technical memorandum is to provide an assessment of wildlife species that have the potential to be present on or near the Project property and to propose measures to avoid, minimize, or mitigate project-related impacts on special-status wildlife species.

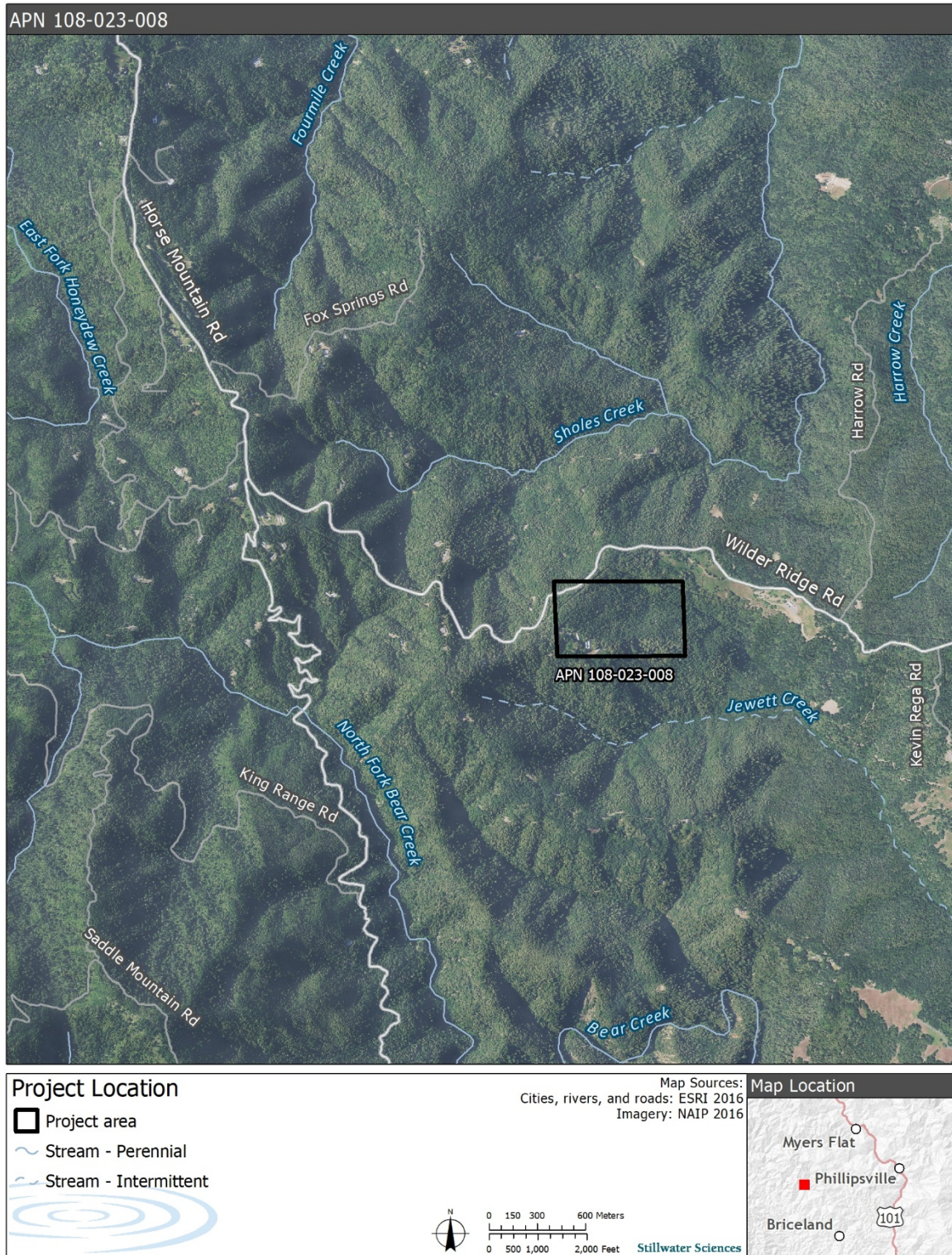


Figure 1. Project location



## 2 METHODS

CDFW required that a qualified biologist conduct the wildlife assessment. Stillwater Sciences assigned Dennis Halligan (Fisheries Biologist) to conduct the assessment at Big River Farms. Mr. Halligan has over 27 years of experience surveying for fish and wildlife species including northern spotted owls, southern torrent salamanders, foothill yellow-legged frogs, coastal giant salamanders, Pacific tailed frogs, Pacific fishers, western pond turtles, and a wide variety of other fish and wildlife species.

A desktop assessment was conducted within a 5-mile radius of parcel APN 108-023-008 to identify the potential presence of special-status wildlife species and designated critical habitat. This desk assessment was conducted using aerial imagery, site photos, and querying the following data sources in April 2019:

- CDFW's California Natural Diversity Database within a 5-mile buffer (<https://map.dfg.ca.gov/bios/?bookmark=327>)
- United States Fish and Wildlife Service site-specific query (<https://ecos.fws.gov/ipac/>)
- National Marine Fisheries Service Honeydew quadrangle ([https://www.westcoast.fisheries.noaa.gov/maps\\_data/california\\_species\\_list\\_tools.html](https://www.westcoast.fisheries.noaa.gov/maps_data/california_species_list_tools.html))

A field assessment of the Project site and a 300-foot surrounding buffer was conducted on April 3, 2019. The biologist assessed the area for northern spotted owls nesting and roosting habitat and made note of any wildlife observations in the area. Preferred nesting habitat for the owls includes a moderate to high canopy closure (60 to 80 percent); a multi-layered, multi-species canopy with large (generally greater than 30 inches (76 centimeters) diameter at breast height overstory trees; a high incidence of large trees with various deformities (e.g., large cavities, broken tops, mistletoe infections, and other platforms); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for northern spotted owls to fly. Roosting habitat is similar to nesting habitat; however, it does not need to provide specific structural features used for nesting (e.g., large cavities, broken tops, mistletoe platforms, and other platforms) (73 FR47326).

While on site, the biologist also made note of watercourses, tree cavities, operational activities, potential amphibian and other wildlife habitat, and other observations. Numerous photographs were taken to document site conditions.

## 3 RESULTS

The cultivation area on the parcel is located on the top of a relatively gentle (~15% slope) ridge above a steeper forested slope. The cultivation area is located in a former grassland and is fully developed. The area beyond the grassland is bordered with early successional conifers that transition to mid- to late-successional hardwood/conifer forest farther down the slope.

The following species were identified during the database scoping process of having the potential to be in the Project area or included in the CDFW request (Table 1). Based on habitat present at and near the Project, the following species with moderate or high potential to occur are discussed further.

Table 1. Wildlife species with the potential to be present within and adjacent to the Project area.

Species name	Status <sup>1</sup> Federal/ State	Distribution and habitat associations	Likelihood of occurrence in Project Area
<b>Fish</b>			
Coho salmon, southern Oregon/northern California coast Evolutionarily Significant Unit ( <i>Oncorhynchus kisutch</i> )	FT, CH/ST	Spawn in coastal streams and large mainstem rivers (i.e., Klamath/Trinity rivers) in riffles and pool tails-outs and rear in pools ≥ 1 m (3 ft) deep with overhead cover with high levels oxygen and temperatures between 10–15°C (50–59°F).	<b>None:</b> No fishbearing stream or river habitat present.
Chinook salmon, California coastal Evolutionarily Significant Unit ( <i>Oncorhynchus tshawytscha</i> )	FT, CH/None	Wild coastal, spring, and fall-run Chinook found in streams and rivers between Redwood Creek, Humboldt County to the north and the Russian River, Sonoma County to the south.	<b>None:</b> No fishbearing stream or river habitat present.
Steelhead, northern California coast Distinct Population Segment ( <i>Oncorhynchus mykiss</i> )	FT, CH/None	Inhabits small coastal streams to large mainstem rivers with gravel-bottomed, fast-flowing habitat for spawning. However, habitat criteria for different life stages (spawning, fry rearing, juvenile rearing) are can vary significantly.	<b>None:</b> No fishbearing stream or river habitat present.
<b>Amphibians</b>			
Northern red-legged frog ( <i>Rana aurora</i> )	None/SSC	Humid forests, woodlands, grasslands, and stream sides usually near dense cover. Generally near permanent water but can be found far from water in damp woods and meadows during non-breeding season.	<b>Low:</b> No permanent or temporary ponded water present. May disperse into the Project area during wet periods and non-breeding season.
Foothill yellow-legged frog ( <i>Rana boylei</i> )	None/SSC, CT	Associated with partially shaded, shallow streams, and riffles with rocky substrate. Some cobble-sized substrate required for egg laying. Adults move into smaller tributaries after breeding.	<b>None:</b> No stream or river habitat present.
Red-bellied newt ( <i>Taricha rivularis</i> )	None/SSC	Ranges from southern Humboldt to Sonoma counties. Found in streams during breeding season. Moist habitats under woody debris, rocks, and animal burrows.	<b>Low:</b> No permanent or temporary ponded water present. Adults may disperse into the Project area during wet periods.
Coastal giant salamander ( <i>Dicamptodon tenebrosus</i> )	None/None	Northern Humboldt County to British Columbia. Wet coastal forests in or near clear, cold permanent and semi-permanent streams and seepages.	<b>Low:</b> No semi-permanent or permanent water present. Adults may disperse into the Project area during wet periods.

Species name	Status <sup>1</sup> Federal/ State	Distribution and habitat associations	Likelihood of occurrence in Project Area
Southern torrent salamander ( <i>Rhyacotriton variegatus</i> )	None/SSC	Seeps and small streams in coastal redwood, Douglas-fir, mixed conifer, montane riparian, and montane hardwood-conifer habitats. Seeps and springs need to be relatively unembedded with fine sediment.	<b>None:</b> No stream habitat present.
Northwestern salamander ( <i>Ambystoma gracile</i> )	None/None	Pacific coast from Sonoma County, California into British Columbia. Breeding occurs in semi-permanent and permanent lakes, ponds, wetlands, and slow-flowing streams. Moist habitats under woody debris, rocks, and animal burrows.	<b>Low:</b> No semi-permanent or permanent water present. Adults may disperse into the Project area during wet periods.
Pacific tailed frog ( <i>Ascaphus truei</i> )	None/SSC	Associated with high-gradient, perennial and montane streams in hardwood conifer, redwood, Douglas-fir, and ponderosa pine habitats. Tadpoles require water temperatures below 15°C (59°F).	<b>None:</b> No stream habitat present.
Boreal toad ( <i>Anaxyrus boreas boreas</i> )	None/None	Northern California to southeast Alaska. Breeding occurs in still or barely moving waters of seasonal pools, ponds, streams, and small lakes. In the spring and early summer, toads are often found at the edge of water. At other times of the year they may be found away from the water in moist terrestrial habitats. Toads use rodent holes, rock chambers, and root system hollow as refuges from heat and cold.	<b>Low:</b> No seasonal pools, semi-permanent or permanent water present. Adults may disperse into the Project area during wet periods.
<b>Birds</b>			
Northern spotted owl ( <i>Strix occidentalis caurina</i> )	FT/ST	Typically found in large, contiguous stands of mature and old-growth coniferous forest with dense multi-layered structure.	<b>High:</b> Designated critical habitat and suitable nesting and roosting habitat present adjacent to the Project area.
<b>Mammals</b>			
Sonoma tree vole ( <i>Arborimus pomio</i> )	None/SSC	Associated nearly exclusively with Douglas-fir trees and occasionally grand fir trees within the North Coast fog belt between the northern Oregon border and Sonoma County. Eats Douglas-fir needles exclusively.	<b>High:</b> Suitable habitat present within and adjacent to the Project site.
Pacific fisher, West Coast DPS ( <i>Pekania pennanti</i> )	None/SSC	Associated with dense advanced-successional conifer forests, with complex forest structure and high percent canopy closure; den in hollow trees and snags.	<b>Moderate:</b> Suitable habitat is present adjacent to the Project site.

Species name	Status <sup>1</sup> Federal/ State	Distribution and habitat associations	Likelihood of occurrence in Project Area
Townsend's big-eared bat ( <i>Corynorhinus townsendii</i> )	None/SSC	Found throughout California in all but subalpine and alpine habitats. Roosts in cavernous habitats, usually in tunnels, caves, buildings, mines, and basal hollows of trees, but also rock shelters, preferentially close to water. Caves near water's edge are favored. Forages in riparian zone and follows creeks and river drainages on foraging bouts. Feeds primarily on moths. Drinks at stream pools.	<b>Moderate:</b> May be present in some of the basal hollows in old trees adjacent to the Project area.
<b>Reptiles</b>			
Western pond turtle ( <i>Emys marmorata</i> )	None/SSC	Ponds, marshes, rivers, streams, and irrigation ditches with abundant vegetation and either rocky or muddy bottoms; also found in woodland forest and grasslands. Below 1,829 m (6,000 ft) elevation. Basking sites are required. Egg-laying sites are located on suitable upland habitats (grassy open fields) up to 500 m (1,640 ft) from water.	<b>None:</b> No stream or river habitat present within 500 m of the Project.

<sup>1</sup> **Status:**  
**Federal**  
 FT Federal Threatened  
 CH Designated critical habitat within the Project vicinity  
**State**  
 ST Threatened  
 CT Candidate Threatened  
 SSC CDFW species of special concern

### 3.1 Northern Spotted Owl

The biologist identified nesting habitat (as described in Section 2) as being present approximately 150 feet south of the southernmost greenhouse and immediately south of the Big River Farms southern property line (Figure 2). The area south of the southern property line is designated critical habitat for northern spotted owls by the USFWS (Figure 3). The suitable nesting habitat was characterized by having a relatively closed canopy of old-growth Douglas-fir (36–60-inch diameter at breast height) and large hardwoods with an open understory. The trees contained reticulated branches, platforms, and other structures suitable for nesting (Figure 4). This area was also suitable for roosting by northern spotted owls. There are other areas on adjacent parcels that were unmapped, but appeared on aerial photographs as being suitable for nesting and roosting.

Suitable roosting and foraging habitat was also located to the west of the greenhouses. However, the trees in this area were smaller, compared to those documented in the area south of the project area, and lacked the structure that owls use for nesting.

The biologist conducted a survey of individual trees to locate owl pellets (coughed-up hair and bone balls), white wash (owl feces) on trees, and plucking perches, which would indicate potential northern spotted owl activity. Even though the time of day was not according to

protocol, the biologist also hooted several times within the stand to see if there would be a response. No evidence of northern spotted owl activity was recorded.

An old northern spotted owl activity center HUM0240 is located approximately 1,500 ft southeast of parcel (Figure 3). The last known protocol survey and activity recorded at this site was a pair (adult male and subadult female) in May 2002 (CDFW 2019).



Figure 2. Multi-layered canopy structure within northern spotted owl nesting and roosting habitat.



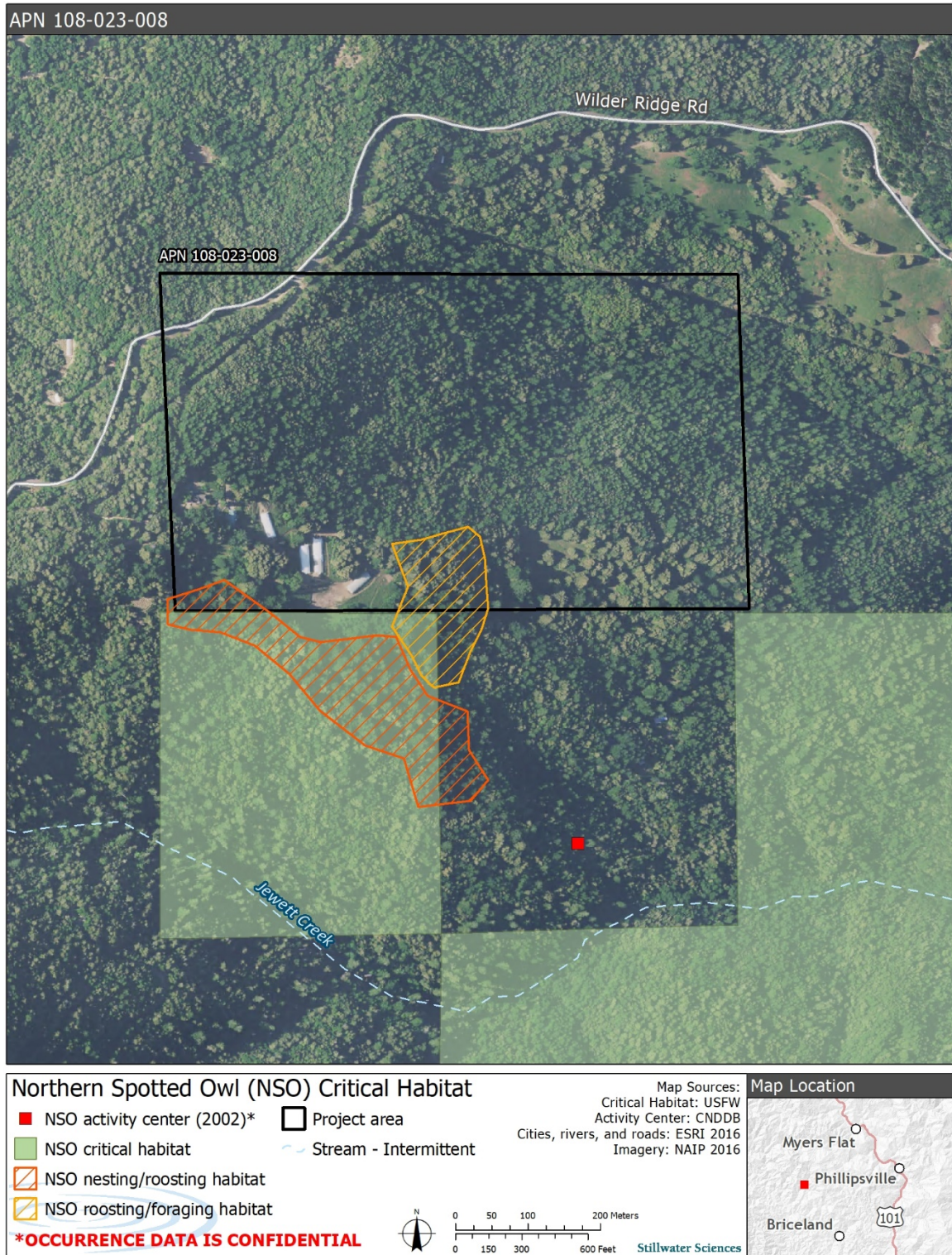


Figure 3. Northern spotted owl designated critical habitat and nesting and roosting habitat.



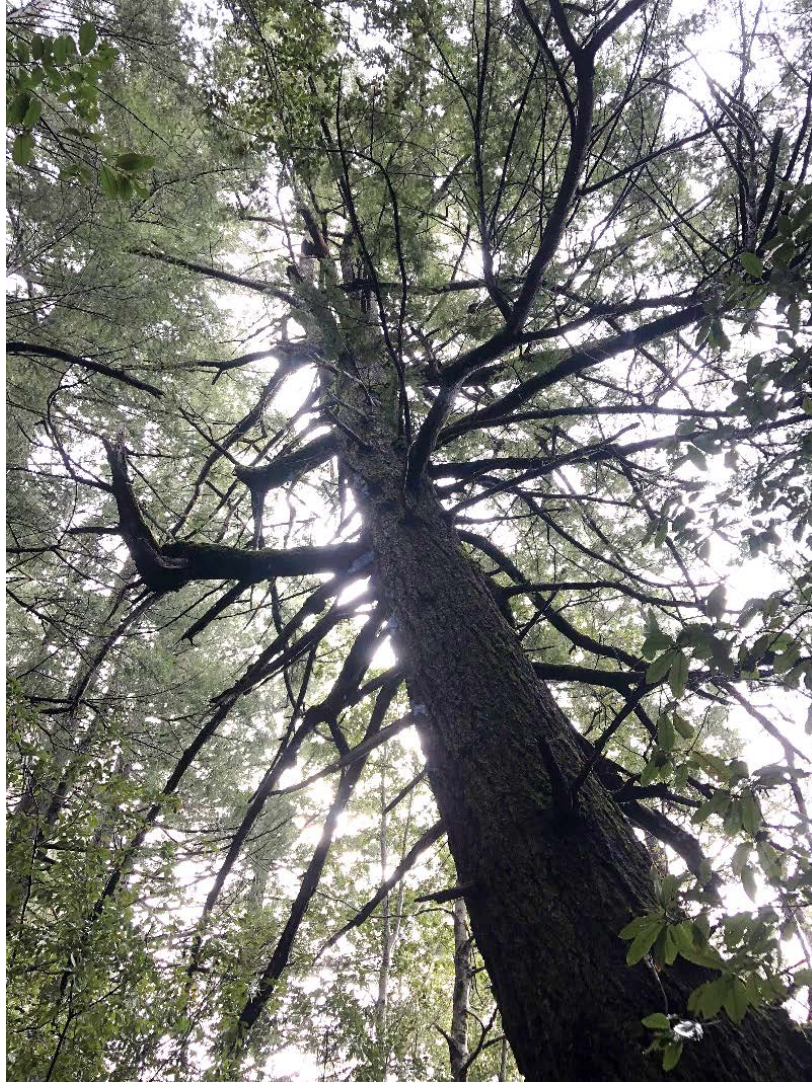


Figure 4. Suitable northern spotted owl nesting structure in a Douglas-fir.

### 3.2 Sonoma Tree Vole

The Sonoma tree vole is a California species of special concern. In California, the Sonoma tree vole is restricted to coastal forests in the humid fog belt from Sonoma County north to the Klamath mountains (Williams 1986, Jameson and Peeters 2004, Adam and Hayes 1998). The Sonoma tree vole is a nocturnal rodent that is active year-round. This species lives, nests, and feeds within the forest canopy. The home range usually consists of one or more trees. Both sexes construct nests made of Douglas-fir needles, typically located 20–60 ft above the ground in branches or against trunks of Douglas-fir trees (Williams 1986) and have also been documented in grand fir and redwood stands where their branches interlock with Douglas-fir. The diet of the Sonoma tree vole consists of needles, buds, and the tender bark of twigs of Douglas-fir, western hemlock, grand fir, and Bishop pine. Needle resin ducts are removed before the remaining part is eaten. Tree voles obtain water from food or by licking dew or rainwater from coniferous trees. Where present, tree voles are a common component of spotted owl diets (Forsman et al. 2004).

The Douglas-fir stands around and within the Project area contain suitable habitat for Sonoma tree voles. The biologist conducted a search for resin ducts on the ground beneath several large Douglas-fir trees, but none were observed.

### 3.3 Pacific Fisher

The Pacific fisher is a California species of special concern within the north coast area and is listed as threatened under the California Endangered Species Act in the southern Sierra Nevada mountains. The fisher has a fragmented and patchy distribution along the north coast and Klamath Province of California at elevations ranging from 83 to 3,300 ft (Zielinski et al. 1997).

Common habitats for fishers are landscapes dominated by old-growth forests with complex vertical and horizontal structure (Aubry and Raley 2006). Pacific fishers in California are typically associated with mixed conifer, Douglas-fir, and ponderosa pine forests with at least 50 percent canopy cover (Zielinski et al. 1997). Breeding and resting activities are often associated with large tracts of dense habitat with substantial snag and large downed wood. Small fisher home ranges have been reported in California and include areas with mast-producing hardwoods (e.g., tanoak and madrone) as a major forest component, presumably resulting in abundant prey, since such tree species provide substantial food sources for potential fisher prey species. Cavities located in the upper portions of living trees or snags are often used for dens (Powell and Zielinski 1994). Large hardwoods may provide enhanced natal and maternal cavities (Thompson et al. 2007).

The timber stands around and within the Project area contain suitable habitat for the Pacific fisher. The old-growth timber stand adjacent to the Project area contains a substantial amount of downed wood and tree cavities that could provide denning opportunities.

### 3.4 Townsends Big-eared Bat

Townsend's big-eared bat is a state species of special concern. This species occurs throughout California and is associated with caves and structures in a variety of habitats from deserts to coastal scrub to montane forests. This cavity-dwelling species roosts and hibernates in caves (commonly limestone or basaltic lava), mines, buildings, bridges (with a cave-like understructure), rock crevices, tunnels, basal hollows in large trees, and cave-like attics (Pierson and Fellers 1998, Pierson and Rainey 2007, Pierson et al. 2001, Pierson and Rainey 1996, Sherwin et al. 2000, Sherwin and Piaggio 2005). Townsend's forage on terrestrial insect species along upland areas including meadows and wooded habitats. Townsend's big-eared bat is a moth specialist with over 90% of its diet composed of lepidopterans. Snags and large trees may be important roosts for this species. In northwestern California, these bats have been documented using tree hollows created by fire or rot in very large redwood (*Sequoia sempervirens*) and California bay trees (*Umbellularia californica*). A nursery colony was found using the basal hollows of large redwood trees in northwestern California (Mazurek 2004 as cited in Woodruff and Ferguson 2005).

The old-growth forest stand located south of the parcel contained trees with cavities suitable for occupancy by Townsends big-eared bats. The biologist sifted through the duff contained within the rotted center of a large tanoak and no bat guano was documented (Figure 5). However, there were numerous cavities farther up in the tree where branches broke off and their centers rotted away that may provide roosting habitat.





Figure 5. Large tanoak containing bole and branch cavities that may provide habitat for Townsend's big-eared bats.

## 4 POTENTIAL EFFECTS AND MINIMIZATION MEASURES

### 4.1 Northern Spotted Owl

The closest northern spotted owl activity center (last documented in 2002) to the Project is nearly 1,500 feet (0.25 mi) south east of the Project area. No trees proposed for removal as part of this project. Therefore, there will not be any direct impacts on northern spotted owls or their habitat.

The Project is planning to use mixed light in the late spring and early summer for cultivation. Once natural light exceeds 12 hours per day, all artificial lighting will be discontinued. The Project will incorporate light blocking material over the greenhouses at night to minimize to potential for artificial light to leak into the night sky and affect adjacent northern spotted owl habitat.

The Project uses electricity provided by the Pacific Gas and Electric Company and will not be using generators. Noise disturbance as a result of the Project include fans to help cool and circulate the air in the greenhouses. Potential impact of noise generated by the fans on northern spotted owls was evaluated using the northern spotted owl and marbled murrelet harassment guidelines (USFWS 2006). The purpose of the USFWS (2006) document was to set guidelines for the delineation of buffers around an activity that was in close proximity to northern spotted owl and murrelet habitat. The buffer distances are based on the ambient background noise in the area coupled with the noise generated by the activity. Although there are no specific decibel levels in the USFWS document for greenhouse fans, an air conditioning unit would generate a



similar decibel level (~54 dB at 50 ft), which is very low. A very low sound level like this would not require a buffer exceeding 50 ft, and likely less. There are no northern spotted owl nests within this buffer and the nearest activity center (possibly abandoned) is 1,500 ft away. Therefore, noise resulting from the Project is not anticipated to impact northern spotted owls .

#### **4.2 Sonoma Tree Vole**

Sonoma tree vole habitat is present within and adjacent to the Project area. The nearest recorded detection is approximately 5 miles to the southwest. The Project will not remove any trees and affect habitat or individual Sonoma tree voles. Therefore, no minimization or mitigation measures are recommended.

#### **4.3 Pacific Fisher**

Pacific fisher habitat is present within and adjacent to the Project area. However, there have not been any detections within 10 miles of the Project area. In addition, the Project will not remove any trees and affect habitat or individual fishers. Therefore, no minimization or mitigation measures are recommended.

#### **4.4 Townsends Big-eared Bat**

There is no Townsend's big-eared bat habitat within the Project area. However, there are large trees that contain basal hollows suitable for roosting within the old-growth stand adjacent to the Project area. The Project will not remove any trees, so there would be no impact on roosting bats. In addition, the greenhouses will be tarped at night to minimize light leakage and impacts on foraging would not occur. Therefore, the Project is not anticipated to impact Townsends big-eared bats.

## 5 REFERENCES

- Adam, M. D., and J. P. Hayes. 1998. *Arborimus pomo*. Mammalian Species 593: 1–5.
- Aubry, K., and C. Raley. 2006. Ecological characteristics of fishers (*Martes pennanti*) in the southern Oregon Cascade Range. USDA Forest Service, Pacific Northwest Research Station Olympia Forestry Sciences Laboratory, Olympia, Washington.
- CDFW (California Department of Fish and Wildlife). 2019. California Natural Diversity Database. <https://map.dfg.ca.gov/bios/?bookmark=327>
- Forsman, E. D., R. G. Anthony, E. C. Meslow, and C. J. Zabel. 2004. Distribution and abundance of red tree voles in Oregon based on occurrence in pellets of northern spotted owls. Northwest Science 78: 294–302.
- Jameson, E. W., Jr., and H. J. Peeters. 2004, revised edition. Mammals of California. California Natural History Guides No. 66. University of California Press, Berkeley, California.
- Mazurek, M. J. 2004. A maternity roost of Townsend's big-eared bats (*Corynorhinus townsendii*) in coast redwood basal hollows in northwestern California. Northwest Naturalist: 85:60-62.
- Pierson, E. D. and G.M. Fellers. 1998. Distribution and ecology of the big-eared bat, *Corynorhinus townsendii* in California. Prepared for U.S. Geological Service, Species at Risk Program.
- Pierson, E. D., and W. E. Rainey. 1996. The distribution, status and management of Townsend's big-eared bat (*Corynorhinus townsendii*) in California. Bird and Mammal Conservation Program Report 96-7. Prepared for California Department of Fish and Game, Sacramento, California.
- Pierson, E. D., and W. E. Rainey. 2002. Bats. Pages 385–400 in J. E. Vollmar, editor. Wildlife and rare plant ecology of eastern Merced County's vernal pool grasslands. Vollmar Consulting, Berkeley, California.
- Pierson, E. D., and W. E. Rainey. 2007. Bat distribution in the forested region of northwestern California. Prepared for California Department of Fish and Game, Sacramento, California.
- Pierson, E. D., W. E. Rainey, and C. Corben. 2001. Seasonal patterns of bat distribution along an altitudinal gradient in the Sierra Nevada. Report to the California Department of Transportation, California State University at Sacramento Foundation, Yosemite Association, and Yosemite Fund.
- Powell, R. A., and W. J. Zielinski. 1994. Fisher. Pages 38–66 in L. F. Ruggiero, K. B. Aubry, S. W. Buskirk, L. J. Lyon and W. J. Zielinski, editors. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. General Technical Report RM-254. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.
- Sherwin, R., and A. Piaggio. 2005. *Corynorhinus townsendii* Townsend's big-eared bat. Species account developed for the Western Bat Working Group 1998 Reno Biennial Meeting; updated for

the 2005 Portland Biennial Meeting. Western Bat Working Group, Rapid City, South Dakota. [http://wbwg.org/species\\_accounts/vespertilionidae/coto.pdf](http://wbwg.org/species_accounts/vespertilionidae/coto.pdf).

Sherwin, R. E., D. Stricklan and D. S. Rogers. 2000. Roosting affinities of Townsend's big-eared bat (*Corynorhinus townsendii*) in northern Utah. *Journal of Mammalogy* 81: 939–947.

Thompson, J., L. Diller, R. Golightly, and R. Klug. 2007. Fisher (*Martes pennanti*) use of a managed forest in coastal northwest California. Pages 245–246 in USDA Forest Service General Technical Report PSW-GTR-194.

USFWS (U. S. Fish and Wildlife Service). 2006. Transmittal of guidance: estimating the effects of auditory and visual disturbance to northern spotted owls and marbled murrelets in northwestern California. Arcata Fish and Wildlife Office, Arcata, California.

Williams, D. F. 1986. Mammalian species of special concern in California. Wildlife Management Division Administrative Report 86-1. California Department of Fish and Game.

Zeiner, D. C., W. F. Laudenslayer Jr., K. E. Mayer, and M. White, editors. 1990. California's wildlife. Volume II, Birds. California Statewide Habitat Relationships System. California Department of Fish and Game.

Zielinski, W. J., R. L. Truex, C. V. Ogan, and K. Busse. 1997. Detection surveys for fishers and American martens in California, 1989–1994. Pages 372–392 in G. Proulx, H. N. Bryant and P. M. Woodward, editors. *Martes: taxonomy, ecology, and management*. Provincial Museum of Alberta, Edmonton, Alberta, Canada.