

## Galbreath Special Status Species Assessment – Birds

*Before I worked on this project, I had no idea how to apply GIS to basic ecological concepts.*  
– Christoph Schopfer, Geography Major

### Project Summary

A team of students and Center staff mapped potential habitat for 110 special status plants and animals on the Galbreath Wildlands Preserve. We identified special status species with potential to occur in the Galbreath Preserve using existing agency databases and publications. These included fungi, bryophytes, plants, invertebrates, amphibians, reptiles, birds and mammals. For each species, we collected biological information, undertook GIS-based habitat suitability analysis, and assessed the likelihood of occurrence within preserve boundaries. The project created professional experience for Biology and Geography undergraduates and graduate students who worked on an interdisciplinary team to develop assessment techniques and methods. See [Methods \(PDF\)](#) and [Species List \(PDF\)](#) for additional information.



**Project Lead:** Claudia Luke

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**Funding:** Robert and Sue Johnson Family

**Students:** Neal Ramus (Business), Emily Harvey (Biology), Kandis Gilmore (Biology), Linden Schneider (Biology), Christoph Schopfer (Geography), James Sherwood (Geography)

### Birds

These results are part of a larger assessment of all special status species with potential to occur at the Galbreath Wildlands Preserve. Assessments were conducted as planning exercise and do not constitute evidence of occurrence.

## Appodiformes

### Apodidae

*Chaetura vauxi*, Vaux's Swift: [CHVA Text](#), [CHVA Map](#)

### Trochilidae

*Selasphorus rufus*, Rufous Hummingbird: [SERU Text](#), [SERU Map](#)

## Ciconiiformes

### Accipitridae

*Accipiter cooperii*, Cooper's Hawk: [ACCO Text](#), [ACCO Map](#)

*Accipiter gentilis*, Northern Goshawk: [ACGE Text](#), [ACGE Map](#)

*Accipiter striatus*, Sharp-Shinned Hawk: [ACST Text](#), [ACST Map](#)

\**Aquila chrysaetos*, Golden Eagle: [AQCH Text](#), [AQCH Map](#)

*Circus cyaneus*, Northern Harrier: [CICY Text](#), [CICY Map](#)

*Elanus leucurus*, White-Tailed Kite: [ELLE Text](#), [ELLE Map](#)

\**Haliaeetus leucocephalus*, Bald Eagle: [HALE Text](#), [HALE Map](#)

*Pandion haliaetus*, Osprey: [PAHA Text](#), [PAHA Map](#)

### Alcidae

*Brachyramphus marmoratus*, Marbled Murrelet: [BRMA Text](#), [BRMA Map](#)

### Ardeidae

*Ardea Herodias*, Great Blue Heron: [ARHE Text](#), [ARHE Map](#)

*Nycticorax nycticorax*, Black-Crowned Night Heron: [NYNY Text](#), [NYNY Map](#)

### Falconidae

*Falco columbarius*, Merlin: [FACO Text](#), [FACO Map](#)

*Falco mexicanus*, Prairie Falcon: [FAME Text](#), [FAME Map](#)

*Falco peregrinus anatum*, American Peregrine Falcon: [FAPE Text](#), [FAPE Map](#)

## Passeriformes

### Alaudidae

*Eremophila alpestris actia*, California Horned Lark: [ERAL Text](#), [ERAL Map](#)

### Emberizidae

*Ammodramus savannarum*, Grasshopper Sparrow: [AMSA Text](#), [AMSA Map](#)

*Spizella passerina*, Chipping Sparrow: [SPPA Text](#), [SPPA Map](#)

### Hirundinidae

*Progne subis*, Purple Martin: [PRSU Text](#), [PRSU Map](#)

### Icteridae

*Agelaius tricolor*, Tricolored Blackbird: [AGTR Text](#), [AGTR Map](#)

### Laniidae

*Lanius ludovicianus*, Loggerhead Shrike: [LALU Text](#), [LALU Map](#)

### Paridae

*Baeolophus inornatus*, Oak Titmouse: [BAIN Text](#), [BAIN Map](#)

### Parulidae

*Dendroica occidentalis*, Hermit Warbler: [DEOC Text](#), [DEOC Map](#)

*Dendroica petechia brewsteri*, Yellow Warbler: [DEPE Text](#), [DEPE Map](#)

*Icteria virens*, Yellow-Breasted Chat: [ICVI Text](#), [ICVI Map](#)

### Tyrannidae

*Contopus cooperi*, Olive-Sided Flycatcher: [COCO Text](#), [COCO Map](#)

## Piciformes

### Picidae

*Melanerpes lewis*, Lewis' Woodpecker: [MELE Text](#), [MELE Map](#)

## Strigiformes

### Strigidae

*Asio flammeus*, Short-Eared Owl: [ASFL Text](#), [ASFL Map](#)

*Asio otus*, Long-Eared Owl: [ASOT Text](#), [ASOT Map](#)

*Athene cunicularia*, Burrowing Owl: [ATCU Text](#), [ATCU Map](#)

*Otus flammeolus*, Flammulated Owl: [OTFL Text](#), [OTFL Map](#)

*Strix occidentalis caurina*, Northern Spotted Owl: [STOC Text](#), [STOC Map](#)



*Aves (Birds): Apodiformes, Apodidae*  
**Vaux's Swift (*Chaetura vauxi*)**  
**Potential Occurrence: Nesting Likely To Occur**

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**Status:** (Nesting)

Federal: none

State: SSC

Other: G5 S3

**Species Description:** Small, short-tailed swift with long, narrow wings, a blackish body and a whitish throat. The body length is 4.75 inches and the wingspan is 12 inches. In flight, Vaux's Swift resembles a "cigar with wings" (Sibley 2000).

**Distribution:** Vaux's Swift is a migratory bird whose breeding range extends from southern British Columbia to northern California and whose winter range is in central Mexico south to Venezuela (Hammerstien 1994). It is a summer resident of northern California in the narrow redwood forested coastal zone from Del Norte to Santa Cruz counties (Sterling 1996).

**Life History & Threats:** Nests are built of sticks and small twigs adhered with sticky saliva, inside vertically-oriented cavities such as hollow snags, burned out trees, and chimneys (Bull 2007). The clutch size varies from 3-7 eggs, which are incubated by both parents, and hatch after 18-20 days. Nestlings can leave the nest after 20-21 days, and will perch on the interior wall the nest is built on, taking up to a week to fly freely. (Hammerstein 1994)

Heavy logging of mature and old-growth forest in British Columbia, the Pacific Northwest of the United States, and coastal redwoods in the latter part of the 20th century have in all likelihood reduced the species' habitat significantly. Steep population declines are evident in the Pacific Northwest over the past twenty years. ... Classified as a "species of special concern" in California in 1994. Considered a priority species for conservation in the Partners in Flight planning process for the southern Pacific rainforests physiographic region. (From Paige 2000)

**Habitat & Habitat Associations:**

Roost and nest in cavities with a vertical entry, such as hollow trees and chimneys (Sibley 2000). The range for diameter at breast height of roost trees was 47-100 cm (Bull 2007).

In North America, prefers late seral stages of coniferous and mixed deciduous/coniferous forests; more abundant in old-growth forests than in younger stands. The multi-layered broken overstory of old-growth forests may also provide easier access to aerial insects than closed, continuous canopies of younger forests. In northern California, uses Douglas-fir forests but highest densities are in coastal redwood (*Sequoia sempervirens*) habitats (From Hammerson 1994)

**Vegetation Types:** Redwood or Douglas-fir forests (Hammerson 1994; Sterling 2006)



*Other Special Habitat Features:* Extensive use of hollow snags and burned-out trees for nesting

**Conceptual Basis for GIS Model Development:** Potential habitat was mapped as:

- Coniferous forest (i.e., redwood-Douglas fir or Douglas-fir forest vegetation types)
- Possible best habitat was mapped as areas in the above vegetation types with:
  - multi-story canopy, and
  - trees > 11” (28 cm) DBH. Note that Vaux Swifts are found in forested areas with trees with a DBH of 47-100 cm. The two largest size classes in the Study Area for DBH are 28 – 61 cm (11 -24 in) and > 61 cm (> 24 in). We include both these size classes to ensure that we map all potential habitats for this species.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for Vaux’s Swift applies to nesting individuals.

*Habitat:* This species nests in snags and burned out trees in coniferous forests. Nesting habitat on the Preserve may be moderate to good quality (Figure 67). Coniferous forests with large trees is abundant throughout the Preserve, and snags, the preferred nesting substrate are relatively common. Logging on the Galbreath Wildlands Preserve was discontinued in 2000 and large snags can be seen scattered throughout the Preserve. Multi-story habitats preferred by these species while feeding their young are not as abundant but are found at scattered locations in the Preserve.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented in the Study Area. To our knowledge, no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: The Vaux’s Swift has not been reported to occur in USGS quads adjacent to the Study Area. However, its breeding range is known to occur in areas to the north and south of the Preserve

*Summary:* Nesting individuals are “Likely to Occur” in the Galbreath Wildlands Preserve. Nesting habitat quality is moderate to good and relatively abundant, and the species widespread, mobile and known to nest in this region of the California coast.

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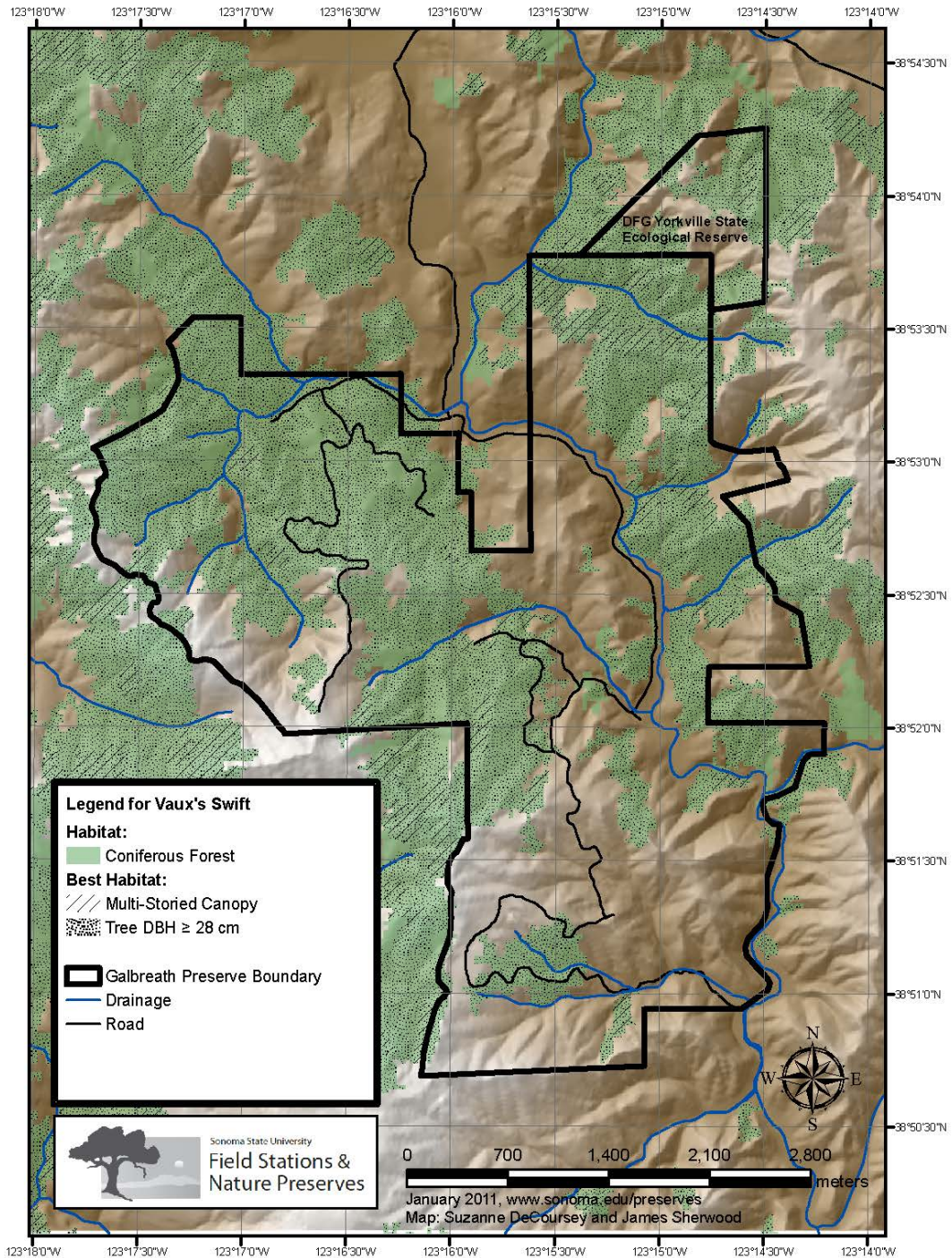
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**Species Account Description:** Kandis Gilmore & Emily Harvey

Figure 67. Potential habitat for Vaux's Swift, *Chaetura vauxi*





*Aves (Birds): Apodiformes, Trochilidae*  
**Rufous Hummingbird (*Selasphorus rufus*)**  
**Potential Occurrence: Nesting Not Expected To Occur**

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**Status:** (Nesting)

Federal: None

State: None

Other: G4 S2S4 USFWS:BCC



Photo: William Zittrich

**Species Description:**

Nearly identical to Allen's Hummingbird. Male is mostly rufous with a white breast, black tips on the tail feathers, and a bright orange-red throat patch (known as a "gorget"). In rare cases, adult males have varying degrees of green on their backs that can be confused with the orange-backed forms of the Allen's. A metallic whine is emitted from the male's wings when in flight. Adult females and juveniles have a green iridescent back, less red on their underparts than males, and a white throat, with or without red or green spots or streaks. Rufous can be seen at the base of the tail in adult females. Females will rarely have a red central throat patch similar to the gorget of adult males. A notch on the tip of the second tail feather is a nearly diagnostic mark for Rufous Hummingbirds. Range also helps identify Rufous Hummingbird as they occur farther north and east than the Allen's Hummingbird. (From Audubon 2002)

Rufous Hummingbird is among the hummingbirds that can be identified by the aerial display of males in courtship. The Rufous Hummingbird makes a series of steep, J-shaped dives that end at the same point, but begin at points progressing around a circle. The descents are rapid and the upward movements that connect the bottom of the J to the starting points around the circle are slow. During descent, the male emits a stuttering dit-dit-dit-deer sound, similar but of lower pitch than the Allen's. (From Audubon 2002)

**Distribution:**

Rufous Hummingbirds have the northernmost range of any hummingbird species. They breed from the northern California north and east through Idaho, Oregon, Washington, and Montana, and north through British Columbia and Alberta to southern Alaska and Yukon. Their 1500 plus km migration takes them to southern California, southern Texas and east along the Gulf Coast to western Florida in the United States. The wintering range extends south through much of Mexico, including Baja California, central Mexico, and along the coasts. Patzcuaro and Reserva de la Biosfera Sierra Gorda are two Mexican IBAs that support the Rufous Hummingbird on its wintering range. (From Audubon 2002)

A common migrant and uncommon summer resident of California. A rare, but probably regular, winter resident in southern California (Garrett and Dunn 1981). A common breeder in Oregon and Washington, and breeding in the Trinity Mts. of Trinity and Humboldt cos. has been confirmed in recent years (McCaskie et al. 1979, 1988). Many postbreeders migrate south through the Cascade Range and Sierra Nevada in summer, although spring migration mostly is through the lowlands and foothills (Grinnell and Miller 1944). (From Green 1990)

**Life History & Threats:**

Takes nectar from many species of flowering plants; also eats insects, spiders and tree sap. Hovers while taking nectar and insects, which it gleans from foliage and flowers; also hawks insects from air... Merlins sometimes prey on this species (Bent 1940). Owls, other hawks, and weasels are suspected predators. Greatest danger probably unseasonable cold that kill nectar sources and insects. Hummingbirds are important pollinators of specially adapted plants. (From Green 1990)

In courtship, the male attracts the female with an aerial display. He dives close to a female, his feathers making a loud whining sound near the bottom of an oval trajectory. Rufous Hummingbirds are highly territorial, defending feeding territories not only while breeding but also during migration. Rufous Hummingbirds do not sing but make warning chips in response to perceived threats. Their wings make a whine much like the sound of a cicada. (From Birdweb 2008)

Nesting recently confirmed in northwestern mt. ranges. In Oregon, the breeding season extends from late April through July. Perhaps less promiscuous than other North American hummingbirds; males have been observed incubating (Johnsgard 1983). Female sometimes nests close to others in favorable areas. Usually 2 eggs laid; occasionally 1 or 3. No reports of double-brooding found. Incubation period unknown, but probably close to other Selasphorus (16-22 days for Allen's hummingbird). Altricial young tended by female until fledging at 22 days. Female performs most nesting duties. (From Green 1990)

Both the breeding and wintering ranges are subject to extensive logging. The spring migration route (through the Pacific Coast areas of California, Oregon, and Washington) is subject to extensive human development. (From Audubon 2010)

### **Habitat & Habitat Associations:**

#### *Foraging Sites/Migration:*

Found in a wide variety of habitats that provide nectar-producing flowers; uses valley foothill hardwood, valley foothill hardwood-conifer, riparian, and various chaparral habitats in both northward and southward migration; montane riparian, aspen, and high mountain meadows (to tree-line and above) used in southward migration. (From Green 1990)

#### *Nesting Sites:*

Breeding areas north of California in coniferous forests (Johnsgard 1983); nest variously placed in berry tangles, shrubs, and conifers. Nest is an open cup, usually on a sloping branch near ground (Harrison 1978). Probably uses similar sites in northwestern California. May rebuild on old nest. (From Green 1990)

Nests hidden in layers of shrub or drooping branches of oaks and conifers. Has been reported to nest in colonies (up to 20 nests within a few yards of each other). (From Audubon 2002)

**Conceptual Basis for GIS Model Development:** Potential habitat for this species occurs throughout the Study Area. We identified potential nesting habitat as coniferous forest (i.e., Redwood-Douglas fir mix (*Sequoia sempervirens*-*Pseudotsuga menziesii*) and Pacific Douglas fir (*Pseudotsuga menziesii* var. *menziesii*) vegetation types.)

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* The quality of nesting habitat for this species is good in the Preserve (Figure 68). Coniferous forests are high quality and abundant throughout the Preserve.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented nesting on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: Allen's Hummingbirds commonly breed in Oregon and Washington and have only recently been documented to breed in Trinity and Humboldt counties, over 80 miles north of the Preserve.

*Summary:* Nesting this common migrant is "Not Expected to Occur" in the Preserve. While nesting habitat appears to be abundant, the Preserve is over 80 miles south of the southernmost documented occurrence of breeding individuals.

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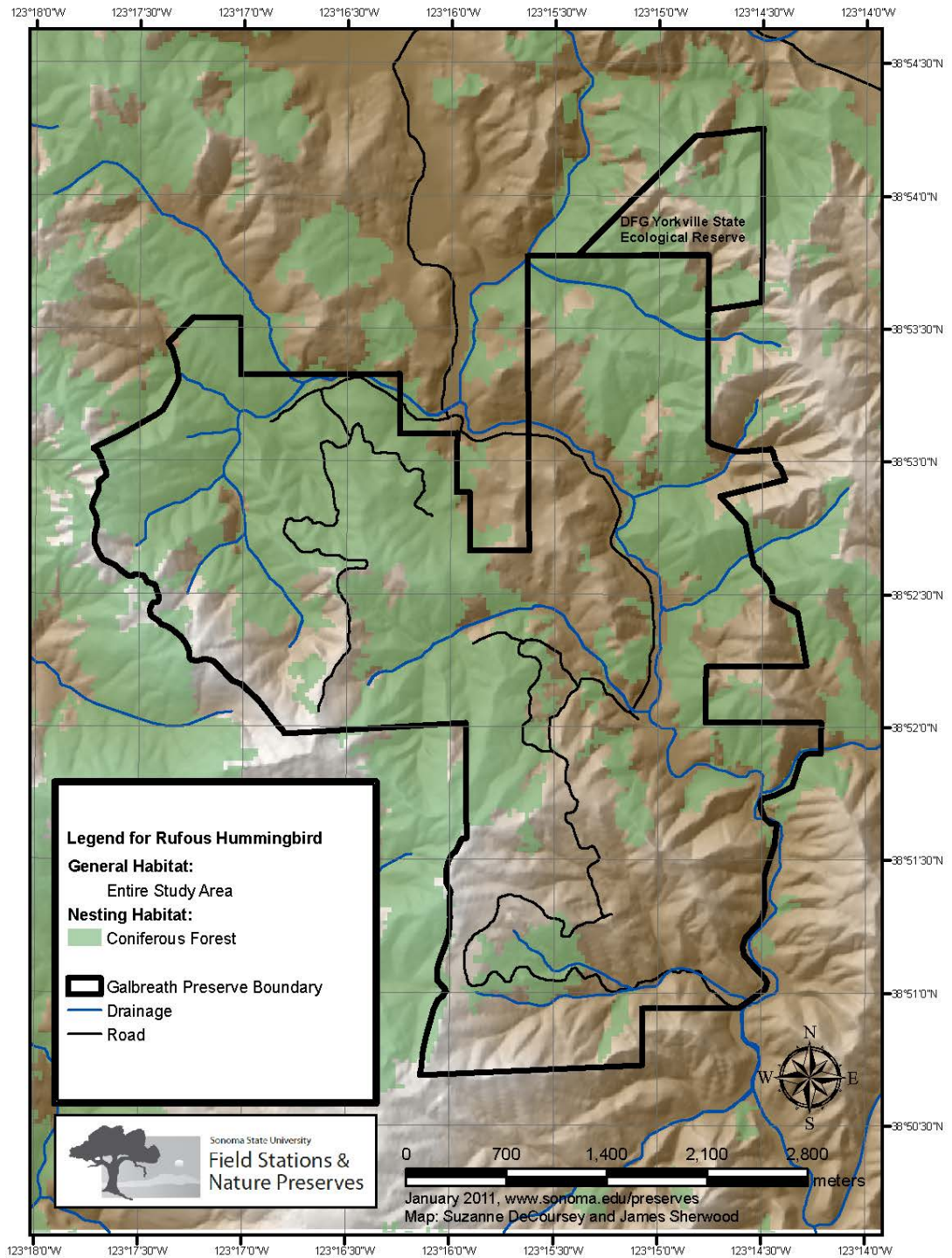
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**Species Account Description:** Emily Harvey

Figure 68. Potential habitat for Rufous Hummingbird, *Selasphorus rufus*





*Aves (Birds): Ciconiiformes, Accipitridae*  
**Cooper's Hawk (*Accipiter cooperii*)**  
**Potential Occurrence: Nesting Likely to Occur**

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**Status: (Nesting)**

Federal: None

State: Watch List

Other: G5 S3



**Species Description:**

The Cooper's Hawk is the most widespread of the three North American accipiters. Females are up to one third larger than males, one of the largest sexual dimorphism size differences of any hawk. Adults have solid gray upperparts, barred with reddish-brown. Their long tails are barred gray and black, rounded at the ends, with a white band at the tips. Their eyes are red. Immature birds are brown above with brown streaking on their white underparts; they have yellow eyes. Cooper's Hawks have short, rounded wings that are set slightly farther back on their bodies than those of the smaller, but similar-looking, Sharp-shinned Hawk. Their heads are relatively larger and their gray caps are darker and a little more prominent than those of the Sharp-shinned. The white tip of the tail of the Cooper's Hawk is usually wider than that of the Sharp-shinned Hawk, especially in the fall. All of these differences are quite subtle, and with the size difference between males and females, it can be difficult to distinguish a male Cooper's Hawk from a female Sharp-shinned Hawk. (From Birdweb 2008)

**Distribution:**

A breeding resident throughout most of the wooded portion of the state. Breeds in southern Sierra Nevada foothills, New York Mts., Owens Valley, and other local areas in southern California. Ranges from sea level to above 2700 m (0-9000 ft). (From Polite 2005)

**Life History & Threats:**

The hunting Cooper's Hawk approaches its prey stealthily, moving quietly through dense cover until it is close enough to overcome its target with a burst of speed. The secretive traits that allow the Cooper's Hawk to surprise its prey also make it difficult to observe. It is most easily seen during migration. (From Birdweb 2008)

Courtship is lengthy for Cooper's Hawks, and the male may feed the female for up to a month before she begins to lay eggs. They nest in a tree, 25-50 feet off the ground. The nest is often built on top of an old nest or clump of mistletoe. Both sexes help build the stick nest lined with pieces of bark. The female incubates the 3 to 5 eggs for 30 to 33 days. The male brings food and incubates the eggs when the female leaves the nest to eat. Once the 3 to 5 eggs hatch, the female broods for about two weeks. During this time, the male continues to bring food for the female and the young. He gives the food to the female, and she feeds it to the nestlings. The young start to climb about the nest at four weeks of age, and begin to make short flights soon after. The parents continue to feed the young for up to seven weeks. (From Birdweb 2008)

Cooper's Hawk populations, especially in the East, declined significantly in the middle of the 20th Century, due to shooting, trapping, and pesticide contamination. They are still listed as

endangered or threatened in several eastern states, but most populations have recovered well. Intentional killing is no longer an issue in most areas, although it does still occur. Pesticide contamination has less of an impact since the banning of DDT. The Washington Gap Analysis listed Cooper's Hawks on their at-risk list, although populations in the West appear to be relatively stable. Because Cooper's Hawks are inconspicuous, especially when they are nesting, it is difficult to get a clear picture of their status. (From Birdweb 2008)

### **Habitat & Habitat Associations:**

#### *General Habitat:*

Cooper's Hawks are generally found in forested areas up to 3,000 feet, especially near edges and rivers. Unlike the Sharp-shinned Hawk, which prefers conifers, the Cooper's Hawk prefers hardwood stands when they are available, but will use conifers too. The species prefers mature forests, but can be found in urban and suburban areas where there are tall trees for nesting. During the nesting season, Cooper's Hawks are often more common in open areas than Sharp-shinned Hawks. In winter, Sharp-shinned Hawks are seen in more open areas. (From Birdweb 2008)

#### *Foraging Habitat:*

Although little research has been done on Cooper's hawk foraging habitat, breeding-season diet studies indicate that Cooper's hawk preys on small mammals such as squirrels and chipmunks as well as on birds (Bielefeldt et al. 1992, Bosakowski et al. 1992b, Estes and Mannan 2003). Open country birds such as starlings and grackles are also reported in diet studies (Bosakowski et al. 1992b) suggesting that Cooper's hawk forages in edge and open habitat as well as forested habitat. Cooper's hawk winter habitat is believed to be similar to breeding habitat (DeGraaf and Yamasaki 2001), though better quantitative data are needed. (New Hampshire Wildlife Action Plan 2005)

#### *Nesting Habitat:*

Cooper's hawk breeds in various forest types (e.g., coniferous, deciduous, and mixed woods) ranging from extensive forests to woodlots of 4 to 8 ha (Rosenfield and Bielefeldt 1993). Recently, this raptor has been found nesting successfully in suburban areas and city parks in Pennsylvania, Wisconsin, and New York City (Bielefeldt et al. 1998, McConnell 2003) as well as urban areas in Arizona (Boal and Mannan 1998). Thus, Cooper's hawk may be tolerant of human disturbance and habitat fragmentation. Cooper's hawk nests in crotches, limb axils, and limb forks high off the ground in large hardwood and conifer tree species, often under a dense canopy (Titus and Mosher 1981, Bosakowski et al. 1992a, Rosenfield and Bielefeldt 1993, Trexel et al. 1999, McConnell 2003). (New Hampshire Wildlife Action Plan 2005)

**Conceptual Basis for GIS Model Development:** To identify potential habitat for Cooper's Hawk in the Study Area, we mapped:

#### *Foraging and Nesting Habitat:*

- coniferous forest (i.e., Redwood-Douglas fir mix (*Sequoia sempervirens*-*Pseudotsuga menziesii*) and Pacific Douglas fir (*Pseudotsuga menziesii* var. *menziesii*))
- broadleaf upland forest and cismontane woodland (both of which include mixed hardwoods, montane mixed hardwoods, and single dominant hardwoods)

Possible best nesting habitat was mapped as areas with:

- trees > 61 cm DBH
- closed/high density forest ( $\geq 70\%$  canopy cover)

Possible best foraging habitat

- edges of forests and woodlands

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat (Distribution & Abundance):* Cooper's Hawks nest in mature densely canopied forests and woodlands, which are widespread in the Preserve (Figure 69). Nesting habitat quality is moderate to good. The large hardwood trees preferred for nesting are patchily distributed, occurring only in a few isolated areas. The largest area is located at the southern boundary of the Preserve. Potential foraging habitat needed to feed young in the nest is most extensive in areas surrounding the Preserve.

*Nearest Occurrence:* This species has been observed in the Preserve on multiple occasions by Preserve staff (C. Luke pers. obs. 2010).

*Summary:* The presence of potential good quality nesting habitat at several locations and the observations of Cooper's Hawks suggest that nesting by this widespread species is "Likely to Occur" in the Preserve.

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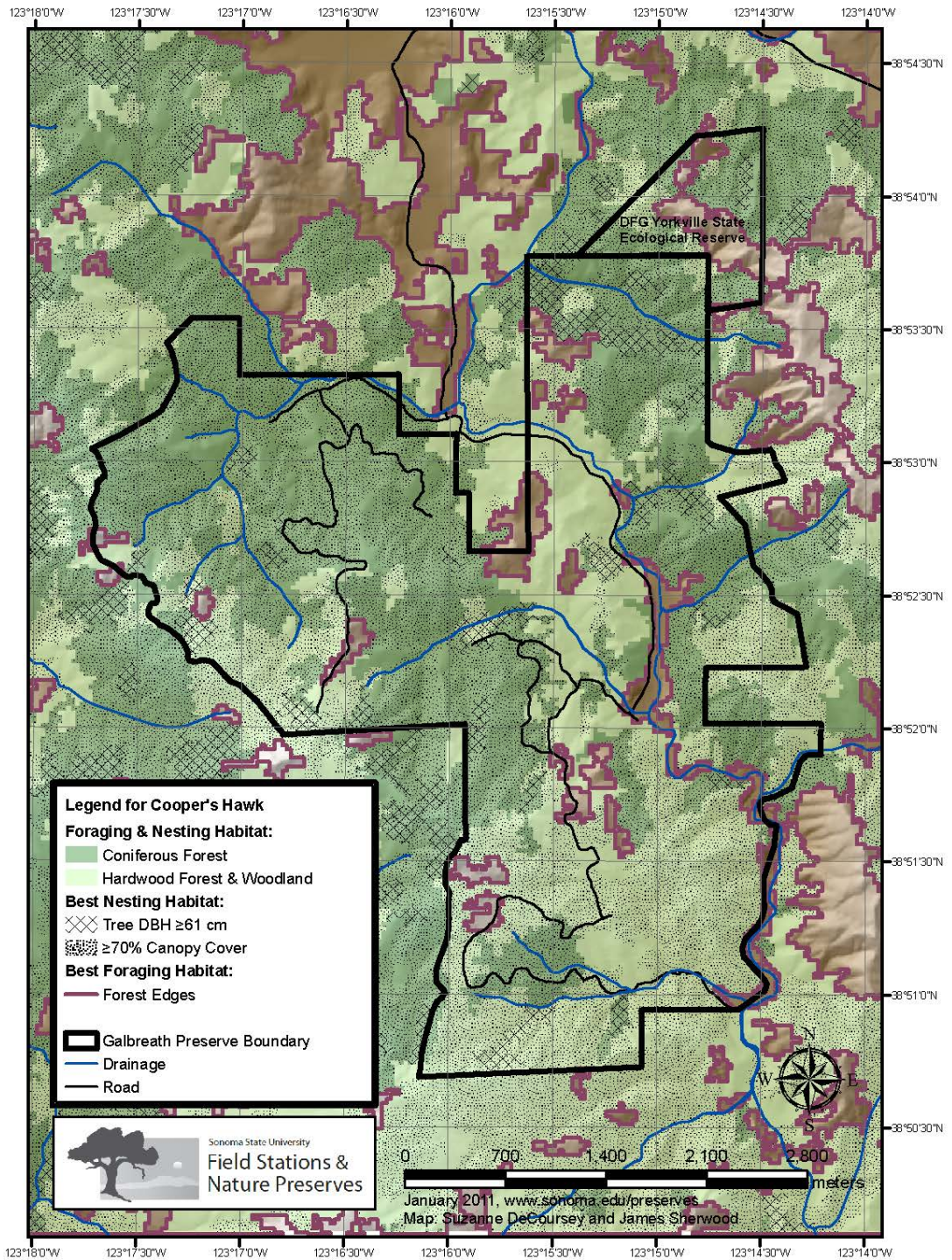
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**Species Account Description:** Emily Harvey



Figure 69. Potential habitat for Cooper's Hawk, *Accipiter cooperii*



*Aves (Birds): Ciconiiformes, Accipitridae*  
**Northern Goshawk (*Accipiter gentilis*)**  
**Potential Occurrence: Nesting Unlikely to Occur**

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**Status: (Nesting)**

Federal: None

State: Species of Special Concern

Other: MBTA

**Species Description:**

Conspicuous eyebrow, flaring behind eye, separates adult's dark crown from blue-gray back. Underparts are white with dense gray barring appear gray at distance; has wedge-shaped tail with fluffy undertail coverts. Juvenile is brown above, buffy below, with thick blackish brown streaks, heaviest on flanks; tail has wavy dark bands bordered with white and a thin white tip; undertail coverts usually have dark streaks. In flight, note tawny bar on upperwing on greater secondary coverts. (From Dunn and Alderfer 2006)



**Distribution:**

Holarctic distribution (Brown and Amadon 1968, Squires and Reynolds 1997). Current breeding and distributional records indicates that Northern Goshawks are still well distributed across their core breeding range in most of the northern Coast Ranges, the Klamath and Siskiyou mountains, across the Cascades, Modoc Plateau, and Warner Mountains, and south through the Sierra Nevada. Records and additional fieldwork have extended the known range (likely mostly occupied prior to 1944) south to southern Mendocino County in the Coast Ranges, south past the Sierra Nevada to the Tehachapi Mountains, east to the Glass Mountain region and White-Inyo ranges, and sparsely south to the Mount Pinos–Frazier Mountain area and the San Gabriel, San Bernardino, San Jacinto, and Cuyamaca mountains of southern California (Garrett and Dunn 1981, Bloom et al. 1986, Lentz 1993, Kiff and Paulson 1997, J. Keane and B. Woodbridge unpubl. data). (From Shuford and Gardali 2008)

In California, Goshawks breed in the North Coast and Sierra Nevada Ranges, and in the Klamath, Cascade and Warner mountains (Zeiner et al. 1990). In breeding areas, they are scarce to uncommon yearlong residents, preferring middle to high elevation dense mature coniferous forests. During the winter they are casual visitors along the coast, throughout the foothills, and in northern deserts where they are associated with pinyon (*Pinus* spp.) -juniper (*Juniperus* spp.) and low-elevation riparian habitats (Zeiner et al. 1990).

**Life History & Threats:**

Goshawks are opportunistic predators taking at least 44 species of forest birds and mammals in western North America (Reynolds et al. 1992). At least 36 species of prey are consumed in California (Schnell 1958; Bloom et al. 1986). Prey are caught in the air, on the ground, or in vegetation. An adult goshawk requires approximately 119-150 gm (4.2-5.3 oz) of food per day, or the equivalent of one or two small birds per day (Brown and Amadon 1968). A study of prey remains found in territories surrounding California goshawk nests identified 234 prey items



representing 31 species (Bloom et al. 1986). By frequency, avian prey constituted 68% of the total with mammals accounting for the remaining 32%. (From Timossi et al. 1995)

### **Habitat & Habitat Associations:**

*General Habitat:* The northern goshawk (*Accipiter gentilis*) inhabits coniferous or mixed coniferous forests in western North America (Wattel 1981; American Ornithologists' Union 1983). Uses mature and old-growth stands of conifer and deciduous forested habitats. Dense, mature conifer and deciduous forest, interspersed with meadows, other openings, and riparian areas required (Polite and Pratt 2005).

### *Foraging Habitat:*

Goshawks forage in mature dense forests, along forest edges, and in clearings (Bent 1937; Bartelt 1977; Hennessy 1978; Jones 1979). In California, meadows, riparian corridors, and aspen groves are critical habitat for the key prey species taken by goshawks (Bloom et al. 1986). Goshawks have been observed foraging in a wide variety of forest types and conditions (Fischer 1986; Kenward and Widen 1989; Widen 1989) suggesting that foraging habitat may be as closely tied to prey availability as to habitat composition or structure (Kenward and Widen 1989; Reynolds 1989). (From Timossi et al. 1995)

### *Nesting Habitat:*

Nesting habitat includes north-facing slopes near water (Polite and Pratt 2005).

The availability of open water is an important factor in goshawk nest site selection (Brown and Amadon 1968; Bartelt 1977; Hennessy 1978; Shuster 1980; Reynolds et al. 1982). In California, goshawk nests ranged from 15-1700 m (44-5,576 ft) from water with 75% of the nests located more than 100 m (328 ft) from water (Saunders 1982). In northwestern California, nests ranged from 0-357 m (0-1,171 ft) from water (Hall 1984). (From Timossi et al. 1995)

Nest site limits often coincide with boundaries between stands of different age or species composition, or with topographic features such as ridgelines (Reynolds 1983). Goshawks nest in older stands of coniferous, mixed, or deciduous forest characterized by large trees, dense canopies, and northerly aspects in the southern portion of the hawks' range (Bartelt 1977; McGowan 1975; Hennessy 1978; Shuster 1980; Reynolds et al. 1982; Saunders 1982; Hall 1984; Hayward and Escano 1989). The elevational range of nesting goshawks varies in northwestern California from 834-1186 m (2,736-3,891 ft) (Hall 1984). Goshawk nest sites are characterized by a high percentage of canopy cover with estimates ranging from 40-89% (Schnell 1958; Hennessy 1978; Moore 1980; Shuster 1980; Hall 1984; Crocker-Bedford and Chaney 1988; Hayward and Escano 1989). In northwestern California, Hall (1984) found a mean canopy closure of 94%. (From Timossi et al. 1995)

**Conceptual Basis for GIS Model Development:** To identify potential habitat for Northern Goshawk in the Study Area, we mapped:

### *Foraging and Nesting Habitat:*

- coniferous forest (i.e., Redwood-Douglas fir mix (*Sequoia sempervirens*-*Pseudotsuga menziesii*) and Pacific Douglas fir (*Pseudotsuga menziesii* var. *menziesii*))

- broadleaf upland forest and cismontane woodland (both of which include mixed hardwoods, montane mixed hardwoods, and single dominant hardwoods)

Possible best foraging habitat:

- trees > 61 cm DBH
- closed/high density forest (>70% canopy cover)
- edges of forest and woodlands
- riparian corridors - mapped as bare ground (which in the study area occurs only along the exposed banks of Rancheria Creek) and riparian vegetation. Riparian vegetation in the Study is patchy and is not represented well in existing GIS maps. To estimate riparian vegetation cover, we use a 130 m buffer surrounding Rancheria Creek.)
  - For mapping purposes this was interpreted to mean that all areas within the study area considered to be riparian corridors are potential best foraging habitat for this species. As such, the riparian layer was not clipped by the extent of the conifer and cismontane forests.

Possible best nesting habitat was mapped as areas with:

- trees > 61 cm DBH
- closed/high density forest ( $\geq$ 70% canopy cover)

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Potential nesting habitat, areas with mature, densely canopied forests and woodlands, occurs in roughly a dozen areas throughout the Preserve (Figure 70). The largest of these is located in coniferous forest in the northeastern corner of the Preserve.

Appropriate habitat shown in the GIS map overestimates potential nesting habitat for this species because it does not incorporate information on the distance to open water. In northwestern California, the maximum distance that Goshawks have been found nesting from open water is 375 m (~1/4 mile). The surface waters of Rancheria Creek generally recede early in the year and do not provide open water throughout the nesting period. Perennial areas of the mainstem of Rancheria Creek and the Navarro River are well over ¼ mile from the Preserve.

To the extent that prey availability can be tied to habitat structure, potential foraging habitat (needed to support the feeding of young) quality is moderate in the Study Area. Abundance is low on the Preserve: adjacent properties to the Preserve have a greater availability of forest edges and could provide more extensive foraging habitat. Within the Preserve, riparian areas occur in small irregular patches along the river.

Due to the lack of open water, significant riparian vegetation, and relatively low abundance of forest edges on the Preserve, we estimate that the quality of nesting habitat for this species is poor.

### *Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has been reported to occur in the Ornbaun Valley USGS quad adjacent to the Preserve.

*Summary:* Nesting Goshawks are “Unlikely to Occur” in the Preserve due to the lack of open surface water throughout the nesting season, and the low abundance of quality foraging habitat in the Preserve. .

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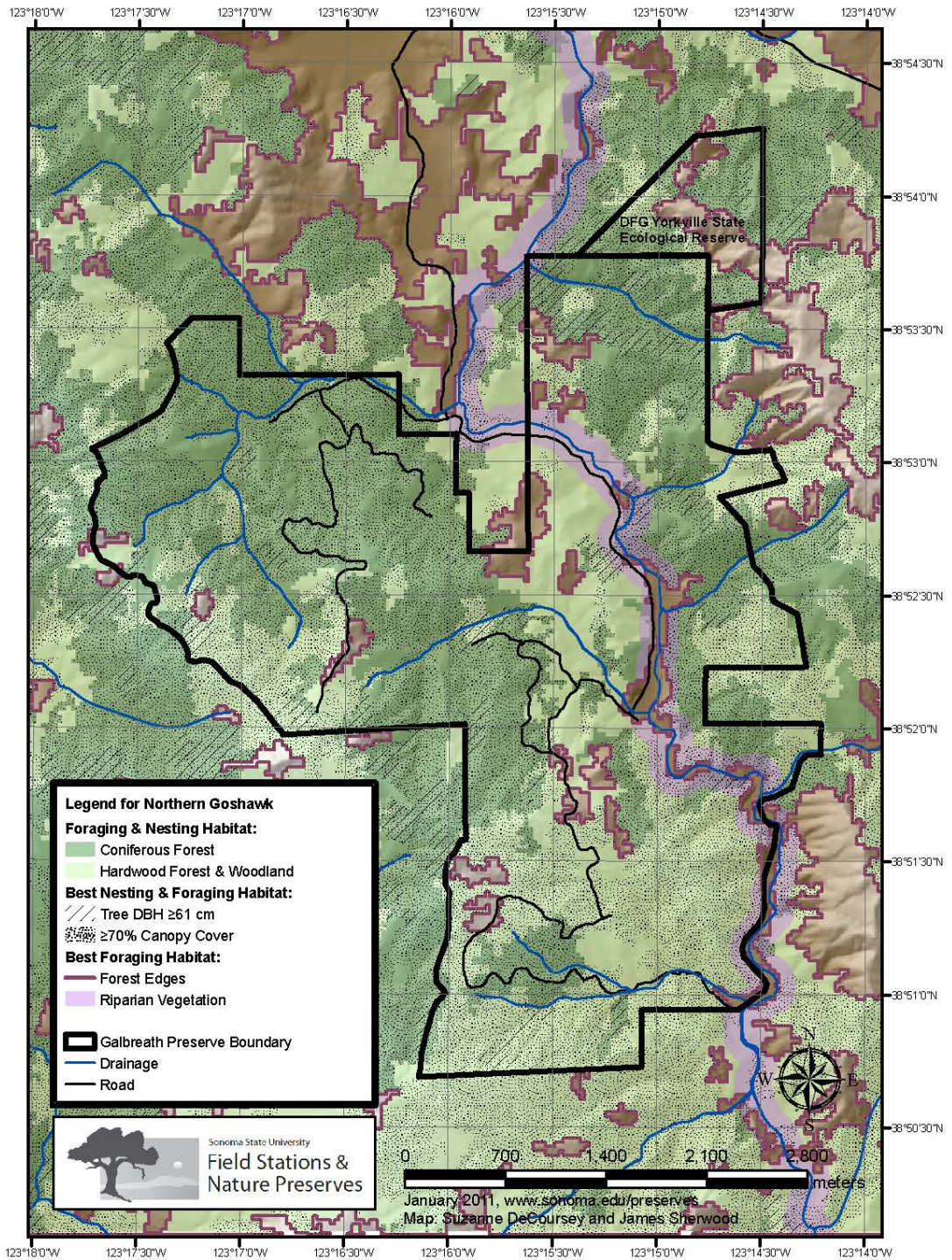
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**Species Account Description:** Neal Ramus & Emily Harvey



Figure 70. Potential habitat for Northern Goshawk, *Accipiter gentilis*



*Aves (Birds): Ciconiiformes, Accipitridae*  
**Sharp-shinned Hawk (*Accipiter striatus*)**  
**Potential Occurrence: Nesting Likely to Occur**

**Status: (Nesting)**

Federal: none

State: Watch  
Listed

Other: MBTA G5

S3



Photo: Jerry & Sherry Liguori



Photo: Nick Dunlop

**Species Description:**

Smallest North American accipiter. Total length: males 24–27 cm, females 29–34 cm; wingspan: males 53–56 cm, females 58–65 cm; mass: males 87–114 g, females 150–218 g; measurements from temperate North America ([Wheeler and Clark 1995](#)). Following generally applicable to widespread North American subspecies (*striatus* group; see Systematics, below). In adult (Definitive Basic) male upperparts, including wings and tail, bluish gray to slate, becoming slightly darker on the crown. Tail crossed by 3–5 visible slaty bands and narrowly tipped white. Tail usually appears square in shape when folded, but often appears slightly rounded when spread. Open wing appears dark above but whitish below with remiges boldly banded with black. Underparts primarily whitish and heavily barred with rufous or tawny on breast, belly, side, and flanks. Adult female similar in coloration, but upperparts more brownish olive and underparts less heavily barred than in males ([Brown and Amadon 1968](#)). Wings relatively short and rounded. Legs and toes yellow, long and sticklike with tarsometatarsus laterally compressed, hence the name “sharp-shin.” Eyes red. Adult plumages similar throughout year. In juveniles, head heavily streaked grayish brown and white or grayish brown and tawny on crown, nape, and sides of neck, with a pale superciliary stripe. Back, rump, and wings dark brown to dark brownish gray, with back and wing-coverts margined paler. Occasional white feather bases show on back and wing-coverts. Underwing white and boldly barred with dark brown. Tail as in adults but gray often replaced by brownish. Underparts white to cream with broad dark-brown streaking on breast, belly, side, and flanks. Eyes pale yellow. (From Bildstein and Meyer 2000)

**Distribution:**

The sharp-shinned hawk breeds from western and central Alaska... south to southern California... (From Sullivan 1994)

Fairly common migrant and winter resident throughout California, except in areas with deep snow... Probably breeds south in Coast Ranges to about 35° lat....Uncommon permanent resident and breeder in mid-elevation habitats. (From Zeiner et al 1990)

California range poorly known and described range tentative. Breeding or summering birds have occurred throughout the state, including the southern mountains, but most probably breed in northern half of state ([Small 1994](#)). (From Bildstein and Meyer 2000)



## Life History & Threats:

Yearlong, diurnal activity. Some individuals migrate into California for winter. Others migrate to mountains for summer and downslope to foothills and valleys for winter. Reynolds (1979) reported crude home range of 2750 ha (6600 ac). Appears to be same as home range. Distances averaged 4.1 km (2.5 mi) between nests. Very active nest defense. Breeds April through August; peak late May to July. Clutch averages 4-5 eggs; range 3-8. Incubation 34-35 days, by both parents. Male brings food to female and semi-altricial young; fledging occurs at about 60 days... Egg loss was greater than nestling loss. Nests may be reused in later years. Fledging is timed to coincide with fledging of prey birds, providing a food supply for young, inexperienced hunters. An important predator of small birds. May compete with Cooper's hawk. The least common breeding accipiter in California. Current breeding status in doubt; needs investigation. (From Zeiner et al 1990)

The sharp-shinned hawk nest consists of sticks and twigs and is lined with strips of bark. It is up to 2 feet (0.6 m) across, usually situated in a crotch or branch of a tree next to the trunk, and ranges from 10 to 60 feet (3-18 m) above the ground. New nests are usually built each year, but sharp-shinned hawks occasionally adapt a squirrel (*Tasacius* and *Sciurus* spp.) or crow (*Corvus* spp.) nest [14,50]. Eggs are laid from May to July. During egg production, eggs are laid on alternate days [40... Clutch size is usually four or five eggs, but ranges from three to eight eggs [14,50]. Eggs are incubated by both parents [50]; incubation periods range from 34 to 35 days [9], and all eggs usually hatch within a 36-hour period [40]. There is usually only one brood per nesting season [9]... Other authors reported that females fledge at approximately 27 days and males fledge at approximately 24 days after hatching [9,14]... The fledglings remain near the nest area and are fed by both parents for at least 21 and up to 50 days [39,42,50]. Food delivery by the parents decreases markedly at 42 to 47 days [39]. Juvenile sharp-shinned hawks go through first molt and acquire adult plumage at just over 1 year of age [23]...Most sharp-shinned hawks in northern portions of the breeding range migrate; birds that remain in the far north over the winter are mostly juveniles, and do not usually survive the winter. Most southwestern nesting sharp-shinned hawks also leave nesting territories on a seasonal basis, but these birds probably do not travel extensively [39]. Sharp-shinned hawks form large flocks during migration [15] and often follow migrating flocks of songbirds. Migration activity is initiated from late August to October [35]... Some sharp-shinned hawks first breed as yearlings, but most do not breed until later [39]. Sharp-shinned hawk ages of up to 12 years have been recorded; however, few sharp-shinned hawks live longer than 5 years [39,50]...Major identifiable causes of sharp-shinned hawk mortality include "road kill" and predators [25]. Evans and Rosenfield [8] reported sharp-shinned hawk mortality from collision with windows. In the first half of this century, a large number of sharp-shinned hawks were shot during migration (large flocks were easy targets); hawks are now under legal protection so this threat is greatly reduced [45]. These hawks are still shot in the belief that they represent a threat to domestic fowl or to songbirds [8,39]. Juvenile mortality is highest in fall and winter. However, almost half of mortality in older birds occurs in spring, apparently caused by the rigors of spring travel, and occurs mostly among females [39]. (From Sullivan 1994)

Even though bounties on Sharp-shinned Hawks were largely abolished by the beginning of the twentieth century, large numbers of the species—thousands, annually, in Pennsylvania alone—were shot during the first third of the twentieth century, when armies of men gathered along traditional migration corridors and bottlenecks...Although concentrations vary widely among individuals, organochlorine levels in some hawks remain sufficiently high to affect reproductive success (Wood et al. 1996)...Frequently hit by cars and more frequently fly into windows near bird feeders (Keran 1981)... Lack of accurate estimates of Sharp-shinned Hawk abundance at any level (continental, regional, local) precludes assessment of population-level effects of forest management practices and habitat degradation due to agricultural and urban development in North America...(From Bildstein and Meyer 2000)

The decline of sharp-shinned hawk populations in the eastern United States in the 1960's and 1970's was attributed to the thinning effect of DDT on eggshells [50]. Most populations appear to be in recovery from declines in the early 1970's and 1980's [10], although in some regions they continue to decline...Land use impacts on raptor habitat include reduction and fragmentation of habitat and reduction in prey availability [38]. (From Sullivan 1994)

## **Habitat & Habitat Associations:**

### *General Habitat*

All habitats except alpine, open prairie, and bare desert used in winter... Uses dense stands in close proximity to open areas...Winters in woodlands. (From Zeiner et al. 1990)

The sharp-shinned hawk occurs primarily in coniferous forests, but is also found in boreal mixed conifer-birch-aspen forests [50]. It is less common in other woodland types, except in mountainous areas [10]. Open areas are used for foraging but not for nesting. Diem and Zeveloff [11] listed sharp-shinned hawks as members of ponderosa pine (*Pinus ponderosa*) bird communities in the western United States...In California riparian woodland, sharp-shinned hawks were present from August to May but were not present during the breeding season [32]. (From Sullivan 1994)

[In winter range] A frequent visitor to rural farmsites and areas around suburban homes, where individuals feed on birds at and around feedlots and bird feeders (Dunn and Tessaglia 1994, KLB). Based on banding recoveries, females may be found in open areas and in human dominated landscapes more often than males (Clark 1985). (From Bildstein and Meyer 2000)

### *Foraging Habitat*

Often forages in openings at edges of woodlands, hedgerows, brushy pastures, and shorelines, especially where migrating birds are found. (From Zeiner et al 1990)

Based on habitat preferences of species identified among prey remains, Reynolds and Meslow (1984) concluded that nesting Sharp-shinned Hawks in Oregon foraged in the upper canopy. Other information indicates a much broader range of breeding- and nonbreeding-season foraging habitats, including forest mid- and understory, fields, and shorelines (Kilham 1958, Peeters 1963, Storer 1966, Page and Whitacre 1975, Quinn 1991)... (From Bildstein and Meyer 2000)

### *Nesting Habitat*

Breeds in ponderosa pine, black oak, riparian deciduous, mixed conifer, and Jeffrey pine habitats. Prefers, but not restricted to, riparian habitats. North facing slopes, with plucking perches are critical requirements. Nests in dense, even-aged, single-layered forest canopy...Usually nests in dense, pole and small-tree stands of conifers, which are cool, moist, well shaded, with little ground-cover, near water. Nest is a platform or cup in dense foliage against trunk, or in main crotch of tree, usually 2-24 m (6-80 ft) above ground. (From Zeiner et al 1990)

Nests in most forest types in range, particularly those with at least some conifers...Uses many species of trees (see Habitat: breeding range, above), typically within relatively dense stands. Conifers most frequently used, although deciduous are the norm in some locales (Platt 1976, Snyder and Wiley 1976, Quinn 1991)... (From Bildstein and Meyer 2000)

### *Roosting Habitat*

Roosts in intermediate to high-canopy forest. (From Zeiner et al 1990)

Roosts in trees with dense foliage, especially conifers. (From Bildstein and Meyer 2000)

**Conceptual Basis for GIS Model Development:** All habitats in the Study Area are potential wintering and foraging habitat for this species.

### Nesting Habitat:

- riparian forest (i.e., cottonwood forest and riparian vegetation). Note that riparian vegetation was mapped as a 130-m buffer along the main stem of Rancheria Creek. Riparian woodland, forest and scrub are disjunct within this area.
- coniferous forest (i.e. Redwood-Douglas fir mix (*Sequoia sempervirens*-*Pseudotsuga menziesii*) and Pacific Douglas fir (*Pseudotsuga menziesii* var.*menziesii*) vegetation types)

Possible best potential nesting habitat was mapped as areas in the vegetation types described above on:

- North facing slopes (north facing was mapped as north, northwest, and northeast facing, and slopes includes any area with slope greater than 8 degrees) with:
  - dense (>70%) canopy cover, or
  - single-layered forest canopy (non-multi-storied canopies)

Note that there are no Black Oak (*Quercus kelloggii*) dominated woodlands and forests in the Study Area.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* The quality of nesting habitat, north facing slopes with black oak, riparian deciduous, and mixed conifers, for this species is poor to good in the Preserve (Figure 71). Riparian forests on the Preserve are poorly developed and patchy in distribution and likely do not provide the dense woodland habitat preferred for nesting. The dense north-facing coniferous forests are of much higher quality and are relatively abundant in the northern area of the Preserve.

### *Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has not been reported to occur in USGS quads adjacent to the Preserve.

*Summary:* We anticipate that nesting by this widespread permanent resident of northern California is “Likely to Occur” in the Preserve due to the abundance of quality nesting habitat.

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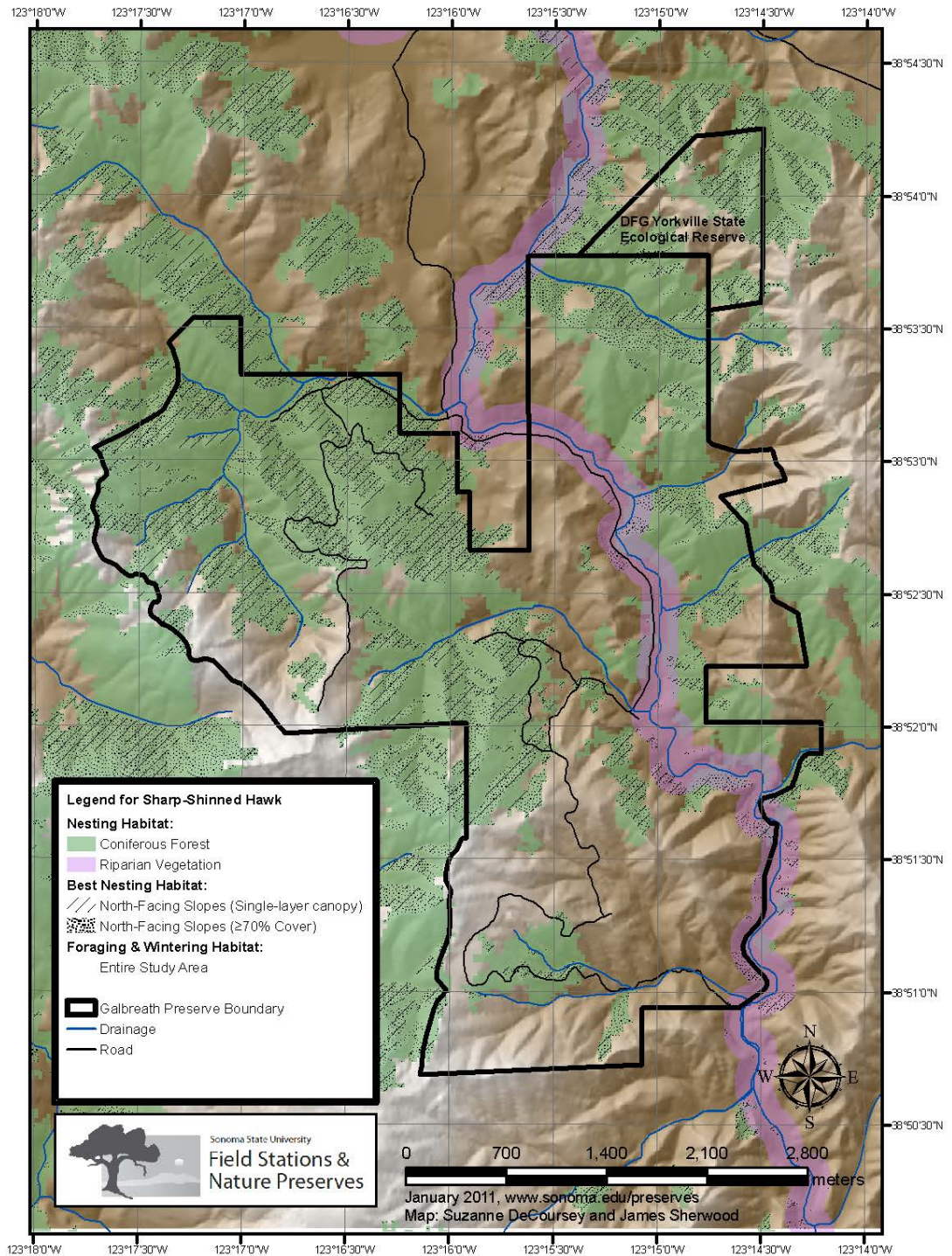
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**Species Account Description:** Linden Schneider & Emily Harvey



Figure 71. Potential habitat for Sharp-Shinned Hawk, *Accipiter striatus*



*Aves (Birds): Ciconiiformes, Accipitridae*

**Golden Eagle (*Aquila chrysaetos canadensis*)**  
**Potential Occurrence: Known to Occur**

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**Status:** (Nesting & Nonbreeding/Wintering)

Federal: Protected

State: Watch Listed/ Fully Protected

Other: MBTA G5 S3 BLM:S CDF:S USFWS:BCC



**Species Description:**

From Clark and Wheeler 1987, Watson 1997, and others as noted. Large, dark-brown raptor with long, broad wings. Length ranges from 70 to 84 cm; wingspan 185–220 cm. Mass of males 3,000–4,475 g; females 3,940–6,125 g... Adults (Definitive Basic plumage) entirely dark brown except for golden rear crown, nape, and sides of neck; gray bars on tail; and rear underparts and upper wing-coverts often paler than rest of feathers, the latter forming a tawny diagonal bar on upper wing; visible both on flying and perched birds. Some individuals also have small white “epaulet” at upper end of scapulars (Spofford 1961). Additionally, feathered tarsi vary from almost white to dark brown (Jollie 1947). Bill and talons black-tipped, fading to slate gray near the base. Cere, orbital ring, and feet yellow. Sexes similar in appearance, although females average larger than males. Suspected sexual differences in pattern and number of bands on tails of adults (Wheeler and Clark 1995) not verified in subsequent studies; not a reliable method for distinguish-ing sexes (W. Clark pers. comm.). Plumages the same throughout the year, but feathers dark, shiny, and smooth on edges when plumage fresh, while old feathers appear faded, more brownish, and frayed on edges. (From Kochert et. al. 2002)

Adult plumage differs from Juvenal and subsequent subadult plumages. Juvenal plumage (0–1 yr) distinguished from adults by much darker (unfaded) color, and by white at base of secondaries and inner primaries (Brown and Amadon 1968). These white areas form a white “window” at carpal joint of wing, visible in flight from above and below. Occasionally some upper wing-coverts also white (Johnsgard 1990). Amount of white varies individually, and a few juveniles lack white on wing entirely (Jollie 1947). Rectrices have wide, black band at tip with narrow, white terminal band. White terminal band wears away quickly as feathers age. Basal two-thirds of tail is usually white, although some dark flecks, particularly near the dark band, may occur (Jollie 1947). Amount of white in tail and wing gradually diminishes with each progressive molt. Adult plumage usually acquired in fifth summer, but older individuals may retain white in tail. Physiological condition of individual can influence rate of molt (Jollie 1947, T. and E. Craig unpubl.). See Appearance, below, for more detail. (From Kochert et. al. 2002)

Golden Eagles most often seen soaring or gliding with wings held in slight dihedral. Flapping flight consists of 6–8 deep wing-beats interspersed by short glides lasting several seconds. (From Kochert et. al. 2002)

**Distribution:** Golden eagles are found throughout the Northern Hemisphere (Kochert et al. 2002).

In North America the golden eagle breeds ...south to...Baja California... (From Tesky 1994)

The golden eagle winters ... south throughout the breeding range to Mexico,..(From Tesky 1994)



Uncommon permanent resident and migrant throughout California, except center of Central Valley. Perhaps more common in southern California than in north. Ranges from sea level up to 3833 m (0-11,500 ft) (Grinnell and Miller 1944)...(From Zeiner et.al. 1990)

### **Life History & Threats:**

Golden eagles are sexually mature at 4 or more years of age [16]...The golden eagle breeding season generally occurs from mid-January to mid-September, but varies according to geographic area [22,27].... The golden eagle lays one to three eggs, with two eggs most common [9,21,27]. The eggs are incubated for 35 to 45 days [9]... Nestlings fledge at 9 to 10 weeks and remain in the vicinity of the nest. The parents provide food for the fledglings until they are about 14 weeks old or older [9]...Migration varies with population and cohort and is a function of both food supply and climate. ... In the mountainous West, golden eagles often move down from the mountains onto the plains and valleys during the winter [8]. Breeding golden eagles prefer to maintain their nesting-hunting territories or travel the shortest distance necessary to survive prolonged cold or heat, while older prebreeders may be less tied to specific locations. Birds of the youngest cohort are often migratory... Golden eagles in captivity have lived 41 to 48 years, but it is unlikely that many live that long in the wild [9]. (From Tesky 1994)

Activity Patterns: Yearlong, diurnal activity. (From Zeiner et.al. 1990)

Seasonal Movements/Migration: Mostly resident, but may move downslope for winter, or upslope after breeding season. Some migrate into California for winter. (From Zeiner et.al. 1990)

Home Range: Home range probably same as territory. Size of home range related to prey density and availability, and openness of terrain. (From Zeiner et.al. 1990)

Territory: ...124 km<sup>2</sup> (48 mi<sup>2</sup>) in northern California (Smith and Murphy 1973). (From Zeiner et.al. 1990)

Reproduction: Breeds from late January through August; peak in March through July. Clutch size 1-3, usually 2. Eggs laid early February to mid-May. Incubation 43-45 days (Beebe 1974), and nestling period usually 65-70 days. (From Zeiner et.al. 1990)

Niche: Occasionally preys on domestic calves and lambs. May compete with ferruginous hawks for small mammals, and with California condors for carrion. May desert nest in early incubation if disturbed by humans (Thelander 1974). (From Zeiner et.al. 1990)

Direct and indirect human-caused mortality, disturbance, and the elimination of prey by habitat alteration are the main factors limiting golden eagle populations [28]. Shooting, poisoning, trapping, electrocution and/or collision with powerlines, and pesticide contamination have all been identified as causes of the decline of golden eagle populations. In addition, recreational activities may disturb breeding, wintering, and migration activities, disrupting and often reducing the population [9]. (From Tesky 1994)

Declined in early 1900s due to eradication campaigns, frequently encouraged by the use of bounties (eagle was believed to be a major predator on livestock). Extremely susceptible to powerline electrocution because wings can span phase-to-phase or phase-to-ground wires (Biosystems Analysis 1989); modifications have been made in problem areas. Other threats include poison intended for coyotes, occasional shootings, and habitat loss to agriculture and suburban land uses. (From NatureServe 2009)

## Habitat & Habitat Associations:

### *General Habitat:*

The golden eagle inhabits open country from barren areas to open coniferous forests. They are primarily in hilly and mountainous regions... In California the golden eagle favors grasslands, shrublands with tree saplings, and open-canopy blue oak (*Quercus douglasii*) woodlands. (From Tesky 1994)

Across w. U.S., prefers open habitats with native vegetation and avoids urban, agricultural, and forested areas (Millsap 1981, Fischer et al. 1984, Craig et al. 1986, Marzluff et al. 1997). Uses sagebrush communities, riparian areas, grasslands, and rolling oak savanna (Knight et al. 1979, Fischer et al. 1984, Hayden 1984, Estep and Sculley 1989). (From Kochert et al 2002)

Secluded cliffs with overhanging ledges and large trees used for cover... Uses rolling foothills and mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, and cliffs and rock outcrops. (From Zeiner et al. 1990)

### *Foraging Habitat:*

Needs open terrain for hunting; grasslands, deserts, savannahs, and early successional stages of forest and shrub habitats...Occasionally searches from a perch and flies directly to prey (Carnie 1954). (From Zeiner et. al. 1990)

The golden eagle generally forages in open habitats where rabbits and small rodents are available. During the nesting season the golden eagle usually forages within 4.4 miles (7 km) of the nest [7]. Trees, live or dead, are often used for perches if they are near open areas where prey can be easily seen [30]. (From Tesky 1994)

### *Nesting Habitat:*

Nests on cliffs of all heights and in large trees in open areas. Alternative nest sites are maintained, and old nests are reused. Builds large platform nest, often 3 m (10 ft) across and 1 m (3 ft) high, of sticks, twigs, and greenery. Rugged, open habitats with canyons and escarpments used most frequently for nesting. (From Zeiner et. al. 1990)

The golden eagle nests on cliff ledges, preferably overlooking grasslands; 10 to 100 feet (3-30 m) above ground in dead or live trees; in artificial structures; or on the ground [8,7,27]... Golden eagles are most likely to use trees for nesting if cliff sites are unavailable. (From Tesky 1994)

In central California, nests primarily in open grasslands and oak (*Quercus* spp.) savanna and to a lesser degree in oak woodland and open shrublands (Hunt et al. 1995, 1999). (From Kochert et. al. 2002)

### *Roosting Habitat:*

During nesting season, both males and females have preferred perches near nest ([Bergo 1987](#)); female often roosts at nest during nesting season ([Collopy 1984](#)). ... roosting on prominent perches with good views of the landscape; usually perches above nest site but below ridge during nesting season ([Watson 1997](#)). During nonnesting season, both members of resident pair... prefer sunny aspect in winter and avoid windy, exposed locations (From Kochert et.al. 2002)

**Conceptual Basis for GIS Model Development:** The entire Study Area is habitat for this species. To identify habitats with specific types of use by Golden Eagles, we mapped:

*Foraging Habitat:* All vegetation types with < 40% canopy cover, including:

- open drainages (i.e., bare ground. In the Study Area, bare ground is identified in the GIS layer as occurring only along scoured creeks and drainages)
- grasslands
- chaparral (i.e, mixed chaparral and scrub oak). Note that for chaparral vegetation, the Calveg classification characterizes all chaparral with 0% canopy cover.
- cismontane woodland. This includes oak dominated woodlands (i.e., Valley oak (*Quercus lobata*), Canyon live oak (*Quercus chrysolepsis*), Interior live oak (*Quercus wislizeni*), Oregon white oak (*Quercus garyana*), Blue oak (*Quercus douglasii*), Coast live oak (*Quercus agrifolia*). Mixed and montane mixed woodlands with the appropriate canopy cover were also mapped: we determined through field reconnaissance that mixed woodlands often include significant numbers of oaks.
- coniferous forest

Possible best foraging habitat in the above vegetation types was mapped as:

- all areas in the above habitat types with canopy cover < 20%

*Nesting/Roosting Habitat:*

- Large trees ( $\geq 61$  cm (24 in) DBH)
- Cliffs

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting and non-breeding individuals.

*Habitat:* While Golden Eagles can be found in almost any habitat type on the North Coast, they prefer open vegetation types for hunting and cliffs and large trees for roosting and nesting.

Habitat quality for foraging, nesting, and roosting is moderate to good (Figure 72). Open habitats preferred by this species for foraging occur are relatively abundant and occur along Rancheria Creek, in grasslands, and areas of open mixed oak woodland generally running north-south in the center of the Preserve. Nesting and roosting habitat is also relatively abundant but not optimal. Cliffs are preferred nesting and roosting locations for this species. Based on field reconnaissance, cliffs generally occur along ridgelines and are easily accessible by potential predators. Large trees and snags are of higher quality and patchily distributed throughout the Preserve. Note that while snags are not available for mapping in the GIS database, logging of the Preserve was discontinued in 2000 and large snags are common.

*Nearest Occurrence:*

Documented Occurrences in Preserve: This species has not been documented in the Preserve. To our knowledge, no surveys have been conducted.

Nearest Occurrence to Preserve: This species has not been reported to occur in USGS quads adjacent to the Preserve.

*Summary:* We anticipate this widespread species is "Likely to Occur" in the Preserve due to the relative abundance of moderate to good quality foraging, nesting and roosting habitat.

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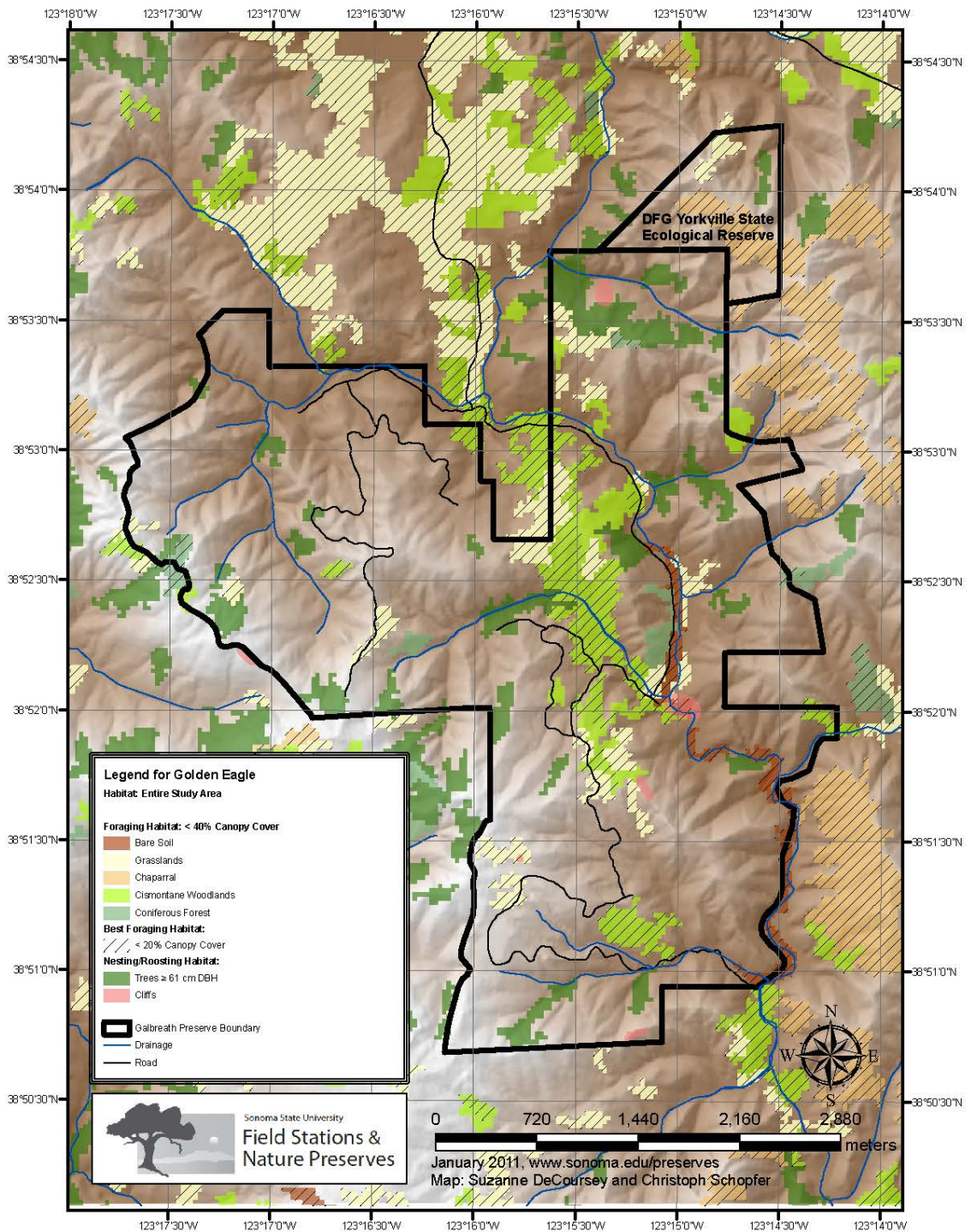
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**Species Account Description:** Linden Schneider and Emily Harvey



Figure 72: Potential habitat for Golden Eagle (*Aquila chrysaetos canadensis*)



*Aves (Birds): Ciconiiformes, Accipitridae*

**Northern Harrier (*Circus cyaneus* ssp. *hudsonius*)**  
**Potential Occurrence: Nesting Likely to Occur**

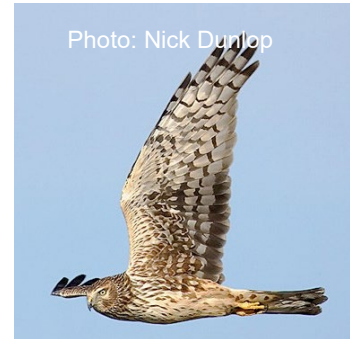
**Status:** (Nesting)

Federal: none

State: Species of Special Concern

CNPS: n/a

Other: G5 S3



**Species Description:**

A strongly sexually dimorphic hawk of slim body, long wings and tail, and long, slender legs. Females about 50% heavier and 12.5% larger than males. Adult male gray above, lighter below, and with black wing-tips; adult female brown above and buffy with brown streaks below. Subadults similar to adult female but darker brown above and russet below (the russet not occurring in Eurasian forms). Both sexes have a distinctive white rump patch. Owl-like appearance of the face due to a facial ruff similar in structure and function to that found in most owls...Northern Harrier usually seen in open habitats flying slowly low over the ground with a series of heavy flaps and distinctive buoyant, tilting glides, wings held in a shallow V. (From Macwhityer et al 1996)

**Distribution:**

The northern harrier has a circumpolar distribution. In North America, it is found from north Alaska east across Canada to the Atlantic Coast, and south to Mexico [8,16]. It breeds from the northernmost part of its range through the central states, and winters in the southern states. Some populations are year-round residents [16]. (From Snyder 1993)

Occurs year round within breeding range in California. At least some breeding populations may be resident. The species occurs more broadly and in much greater numbers during migration and winter than during the breeding season, which extends from March through August (Loughman and McLandress 1994)...The historic breeding range extended from the Modoc Plateau south to San Diego, mostly east and south of the humid northwest coast...In Mendocino County, the species breeds along the coast near Fort Bragg and at MacKerricher and Manchester state beaches (≤12 pairs, R. Keiffer in litt.)(From Shuford and Gardali 2008)

**Life History & Threats:**

Yearlong, diurnal activity. Some individuals migrate into California; others migrate through to Central America or northern South America....Very defensive of territory; will attack other, more formidable birds of prey, and humans during breeding season. Breeds April to September, with peak activity June through July. Single-brooded; clutch averages 5 eggs, range 3-12. Female incubates while male provides food. Nestling period lasts about 53 days (Craighead and Craighead 1956). Breeding pair and juveniles may roost communally in late autumn and winter. Competes with buteos, especially red-tailed and red-shouldered hawks for food. Often considered a diurnal counterpart of the short-eared owl. Population may

increase with some agricultural practices (e.g., grain crops), provided that cover and nesting habitat is preserved or enhanced. (From Zeiner et al 1990)

The primary threats to breeding harriers are loss and degradation of nesting and foraging habitat and nest failure from human disturbance, predator-control projects, agricultural practices, and unnatural predation pressure...Conversion of pastureland and suitable crops, such as alfalfa, to unsuitable crops, such as vineyards and orchards, poses a substantial threat to nesting harriers ... and has resulted in local extirpations in other areas (e.g., at Harper Dry Lake, S. Myers in litt.). In addition, overgrazing, haying, agricultural intensification, and the widespread use of rodenticides can degrade habitat by reducing numbers of small mammals on which harriers depend (MacWhirter and Bildstein 1996, Schweizer and Chesmore 1996). Decreasing water supplies may be a rising threat to harrier nesting habitats statewide...Human disturbance is a source of nest failure throughout most of the species' range in California. People walking or recreating near nests, off-leash dogs, and off-highway vehicles are the main sources (Burrige 1995, Unitt 2004)...Ground nests of harriers are highly vulnerable to trampling by livestock, haying, plowing, flooding, and fire associated with some agricultural operations and management activities (MacWhirter and Bildstein 1996, Hunter et al. 2005, D. Shearwater in litt.). Predation of eggs and young by non-native Red Foxes (*Vulpes vulpes*) is a growing threat, and feral cats and dogs place increasing pressure on harriers attempting to nest near urban areas (Roberson 1993, Gallagher and Bloom 1997). Contamination of the food chain by organochloride pesticides, especially DDT, was a threat in the mid-20th century, when it resulted in reproductive failure and population declines in harriers in North America (MacWhirter and Bildstein 1996)... (From Shuford and Gardali 2008)

Continued widespread destruction of freshwater and estuarine wetlands in U.S. poses a threat to breeding and wintering populations. Conversion of native grassland prairies for monotypic farming has contributed to local population declines, and remains a major threat to populations (e.g., Duebbert and Lokemoen 1977, Toland 1985b). In upland areas, mechanized agriculture and early mowing have increased the threat of nest destruction. Overgrazing of pastures, and the advent of larger crop fields and fewer fencerows, together with the widespread use of insecticides and rodenticides, have reduced prey availability and thus the amount of appropriate habitat for the species (Duebbert and Lokemoen 1977, Hamerstrom 1986, KLB)...(From Macwhirter et al 1996)

California population has decreased in recent decades (Grinnell and Miller 1944, Remsen 1978), but can be locally abundant where suitable habitat remains free of disturbance, especially from intensive agriculture. Breeding population much reduced, especially in southern coastal district. Destruction of wetland habitat, native grassland, and moist meadows, and burning and plowing of nesting areas during early stages of breeding cycle, are major reasons for the decline (Remsen 1978). (From Zeiner et al 1990)

## **Habitat & Habitat Associations:**

### *General Habitat*

Northern harriers prefer sloughs, wet meadows, marshlands, swamps, prairies, plains, grasslands, and shrublands [8]....Northern harriers prefer low perches such as fence posts or stumps. (From Snyder 1993)

Open wetlands, including marshy meadows; wet, lightly grazed pastures; old fields; freshwater and brackish marshes; also dry uplands, including upland prairies, mesic grasslands, drained marshlands, croplands, cold desert shrub-steppe, and riparian woodland. Populations ...in w. U.S., proportionately more in upland (dry) habitats ([Apfelbaum and Seelbach 1983](#), [Simmons and Smith 1985](#)). In both wetland and upland areas, densest



populations typically associated with large tracts of undisturbed habitats dominated by thick vegetation growth ([Apfelbaum and Seelbach 1983](#), [Toland 1986b](#), [Kantrud and Higgins 1992](#)). Breeds up to (rarely) >2,400 m)... (From Macwhirter et al 1996)

Northern Harriers breed and forage in a variety of open (treeless) habitats that provide adequate vegetative cover, an abundance of suitable prey, and scattered hunting, plucking, and lookout perches such as shrubs or fence posts...In California, such habitats include freshwater marshes, brackish and saltwater marshes, wet meadows, weedy borders of lakes, rivers and streams, annual and perennial grasslands (including those with vernal pools), weed fields, ungrazed or lightly grazed pastures, some croplands (especially alfalfa, grain, sugar beets, tomatoes, and melons), sagebrush flats, and desert sinks (MacWhirter and Bildstein 1996, J. Silveira in litt., J. Seay in litt.).(From Shuford and Gardali 2008)

Occurs from annual grassland up to lodgepole pine and alpine meadow habitats, as high as 3000 m (10,000 ft). Breeds from sea level to 1700 m (0-5700 ft) in the Central Valley.... Frequents meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands; seldom found in wooded areas...Mostly found in flat, or hummocky, open areas of tall, dense grasses, moist or dry shrubs, and edges for nesting, cover, and feeding.. (From Zeiner et al 1990)

### *Nesting Habitat*

They nest on the ground, usually near water, or in tall grass, open fields, clearings, or on the water. In the latter case, nests are built on a stick foundation, willow clump, or sedge tussock [8]....Northern harriers need open, low woody or herbaceous vegetation for nesting and hunting [8]. Harriers usually nest adjacent to hunting grounds and where nest predation is low... (From Snyder 1993)

Nests on ground in open (treeless), vegetated habitats, including drained and nondrained wetlands as well as uplands. Extremely eclectic in choice of vegetative cover, even within a single area...Most nests built within patches of dense, often tall, vegetation (e.g, cattails, meadowsweet [*Spiraea*]) in undisturbed areas (e.g., [Simmons and Smith 1985](#), [Sutherland 1987](#), [Kantrud and Higgins 1992](#)). At most sites, even many of those in dry-land habitats, disproportionate number of nests located in wet areas, e.g., surrounding stock ponds or along creeks ([Simmons and Smith 1985](#), [Martin 1987](#), [Grant et al. 1991](#)). (From Macwhirter et al 1996)

Harriers nest on the ground, mostly within patches of dense, often tall, vegetation in undisturbed areas (MacWhirter and Bildstein 1996). Plant species composition varies by site, and the average height of vegetation surrounding nests varies regionally and annually (Loughman and McLandress 1994). (From Shuford and Gardali 2008)

Nests on ground in shrubby vegetation, usually at marsh edge (Brown and Amadon 1968). Nest built of a large mound of sticks on wet areas, and a smaller cup of grasses on dry sites. Mostly nests in emergent wetland or along rivers or lakes, but may nest in grasslands, grain fields, or on sagebrush flats several miles from water. (From Shuford and Gardali 2008)

### *Roosting Habitat*

In breeding season, adults and fledglings roost on ground, alone...In the nonbreeding season, between about late Oct and early Mar, Northern Harriers gather at communal roosts, sometimes with Short-eared Owls (*Asio flammeus*). Within the roost, individuals occupy small ( $\leq 0.25 \text{ m}^2$ ) patches of open ground, e.g., in grassy or stubble field...(From Macwhirter et al 1996)



Uses tall grasses and forbs in wetland, or at wetland/field border, for cover; roosts on ground. (From Zeiner et al 1990)

### *Foraging Habitat*

Northern harriers need open, low woody or herbaceous vegetation for nesting and hunting [8]. For hunting, they use large forest openings. They occur from sea level to 10,400 feet (3,200 m) in elevation [17]. (From Snyder 1993)

Forages over open habitats, e.g., prairies, shrub-steppe uplands, marshes...Areas of short vegetation, e.g., heavily grazed pasture and harvested fields, are underused, whereas idle and abandoned (often wet) fields with vegetative cover are used more than expected (Linner 1980, Bildstein 1987, Preston 1990). Males prefer more open habitats than females; ...Females hunt more in taller and denser vegetation...(From Macwhirter et al 1996)

**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped as:

- All areas with < 10% canopy cover. In the Study Area, this includes grasslands, shrublands, and bare ground along water courses.
- Riparian areas (i.e., cottonwood forests and riparian vegetation). Riparian vegetation was mapped as a 130-m buffer along the mainstem of Rancheria Creek. Riparian forest, woodlands and scrub is disjunct within this polygon.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Northern Harriers nest on the ground, often near water, in treeless areas. Habitat quality in the Preserve is good but limited in quantity. Chaparral does not occur in the Preserve and potential nesting areas are limited to grasslands and open areas along Rancheria Creek.

The best quality nesting habitat for this species is likely in areas undisturbed by road or trail access. These lie the southern half of the Rancheria Creek mainstem and in some grassland patches. Foraging habitat needed to raise young is similar to nesting habitat but can also include openings in woodlands and forests, especially for females. Grasslands and chaparral hunting areas occur close to the northern and eastern boundaries of the Preserve.

### *Nearest Occurrence:*

Documented Occurrences in Galbreath Wildlands Preserve: This species has not been documented in the Preserve. To our knowledge, no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: Northern Harriers are known to nest throughout California and are known to breed near Fort Bragg. They have not been reported to nest in USGS quads adjacent to the Study Area.

*Summary:* We anticipate that nesting Northern Harriers are “Likely to Occur” in the Preserve because, although limited in distribution, the quality of potential nesting habitat is good.

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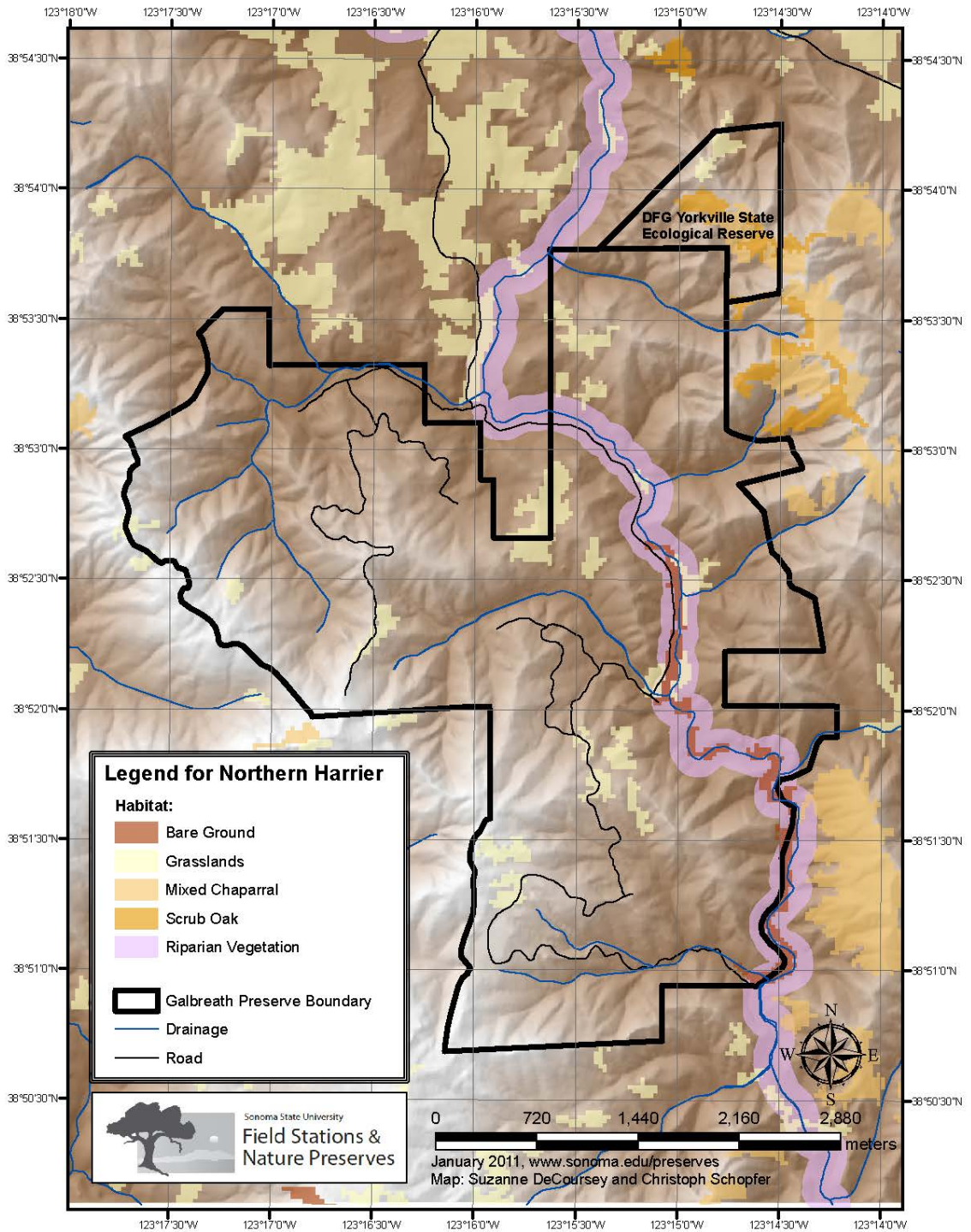
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**Author of this Species Account:** Linden Schneider

Figure 73: Potential habitat for Northern Harrier (*Circus cyaneus hudsonius*)



*Aves (Birds): Ciconiiformes, Accipitridae*  
**White-tailed kite (*Elanus leucurus*)**  
**Potential Occurrence: Nesting Likely to Occur**

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**Status:** (nesting)

Federal: none

State: Fully Protected

Other: G5 S3



**Species Description:**

Medium-small hawk, total length 32–38 cm with long white tail. Sexes similar in size but females have darker backs than males ([Hawbecker 1942](#), JRD). Conspicuous in good light are large, black scapulars and marginal coverts on an otherwise gray back, and black under wing coverts near bend in wing. Adults white underneath and gray on back from crown to upper tail coverts, with red eyes. Juveniles have buffy streaks on breast and head, and gray with white-tipped (scalloped) feathers on back, with yellow eyes. Short yellow legs. Wings long, somewhat pointed, and relatively thin. Long tail extends well beyond primaries when perched, unlike closely related Black-shouldered Kite (*Elanus caeruleus*) ([Clark and Banks 1992](#)). In flight, can be confused with adult male Northern Harrier (*Circus cyaneus*), but latter has large black patch on underside of primaries and a markedly different hunting style. Kites hunt by hovering 5–25 m above ground, whereas harriers course lower to the ground and rarely hover at heights typical for kites. While hunting, kites are easily identified by their size, bright white color, and hovering. (From Dunk 1995)

**Distribution:**

Present distribution is largest in species' known history and may still be expanding. Breeding range stronghold in North America is California, with nearly all areas up to w. Sierra Nevada foothills and southeast deserts occupied...In California observed sporadically throughout most of state in winter (Small 1994). (From Dunk 1995)

[In California] Common to uncommon, yearlong resident in coastal and valley lowlands... (From Zeiner 1990)

**Life History & Threats:**

Yearlong diurnal, and crepuscular activity. Apparently not migratory, but Binford (1979) found some movements in coastal California. May become nomadic in response to prey abundance (Dunk and Cooper 1994). Forages from a central perch over areas as large as 3 sq km (1.9 sq mi) Warner and Rudd 1975). Seldom hunts more than 0.8 km (0.5 mi) from nest when breeding (Hawbecker 1942). Henry (1983) found mean breeding home range to be 0.57 sq km (0.2 mi). Generally not territorial, but nest site may be defended against crows, other hawks, and eagles (Pickwell 1930, Dixon et al. 1957). Defended foraging territories of about 0.10 sq km (.04 sq mi) in winter from red-tailed hawks and northern harriers (Bammann 1975). Communal roost used in nonbreeding seasons (Waian and Stendell 1970). Territory size a function of prey and competitor abundance (Dunk and Cooper 1994). Monogamous; breeds from February to October, with peak from May to August. Average clutch 4-5 eggs, range 3-6. Female only incubates, for about 28 days. Young fledge in 35-40 days. During incubation and nestling period, male feeds female, and supplies her with food to feed the young. Usually single



brooded; occasionally 2 broods. Preys on rodents that may be harmful to agricultural crops. Nest may be robbed by jays, crows yellow-billed magpies, raccoons, and opossums. Great horned owls may prey on adults and young. (From Zeiner et al 1990)

[Degradation of habitat is] A significant threat to populations, especially loss of nest trees and foraging habitat...egg collectors surely reduced populations in early 1900s, at least locally. Communal roost disturbance has also caused local abandonment (JRD). Degree of sensitivity to disturbance at nests is unknown. (From Dunk 1995)

## **Habitat & Habitat Associations:**

### *General Habitat*

Generally occurs in low elevation grassland, agricultural, wetland, oak-woodland, or savannah habitats. Riparian areas adjacent to open areas also used. Specific plant associations seem unimportant... Topography flat to steep. Lightly grazed or ungrazed fields generally support larger prey populations and are thus more suitable. Intensively cultivated areas also used. (From Dunk 1995)

...rarely found away from agricultural areas. Inhabits herbaceous and open stages of most habitats mostly in cismontane California...Uses herbaceous lowlands with variable tree growth and dense population of voles (Waian and Stendell 1970). (From Zeiner et al 1990)

### *Nesting Habitat*

Nest trees range from single isolated trees to trees within relatively large stands (>100 ha). Nest tree/shrub species extremely variable, from shrubs <3 m tall (e.g., *Atriplex* and *Baccharis*) ([Stendell 1972](#)) to large trees >50 m tall (e.g., *Sequoia sempervirens* and *Picea sitchensis*) (JRD)...Nest trees from 3 m to 50 m tall. Trees may be isolated or parts of contiguous forested areas. Most nests are on habitat edges and are placed in upper third of trees. Nest tree species variable; more than 20 species used (see [Pickwell 1930](#), [Dixon et al. 1957](#), [Wright 1978](#))...(From Dunk 1995)

Nest placed near top of dense oak, willow, or other tree stand; usually 6-20 m (20-100 ft) above ground (Dixon et al. 1957). Nest located near open foraging area...Substantial groves of dense, broad-leaved deciduous trees used for nesting and roosting. (From Zeiner et al 1990)

### *Roosting Habitat*

Communal roosts in fall and winter are generally in small stands of trees (isolates) (Waian and Stendell 1970, JRD), but have been observed in open fields on the ground (Clark and Wheeler 1989) and in orchards (Dixon et al. 1957, Waian 1973, A. Erichsen pers. comm.). Again plant associations not important for roost sites; wide variety of associations used. Important features of roost-sites are unknown... Roosts generally in trees or tall shrubs, but recorded < 1 m from ground in sugar cane fields ([Clark and Wheeler 1989](#)). (From Dunk 1995)

Uses trees with dense canopies for cover...Substantial groves of dense, broad-leaved deciduous trees used for nesting and roosting. (From Zeiner et al 1990)

### *Foraging Habitat*

Prefers ungrazed grasslands (Bammann 1975, JRD), wetlands dominated by grasses, and fence rows and irrigation ditches (with residual vegetation) adjacent to grazed lands (Bammann 1975). (From Dunk 1995)

Forages in undisturbed, open grasslands, meadows, farmlands and emergent wetlands.  
(From Zeiner et al 1990)

**Conceptual Basis for GIS Model Development:** All habitats in the Study Area are potential habitat for this species. We mapped the following types of habitats:

Nesting Habitat: All areas with trees (i.e., coniferous forest, broadleaf upland forest, and cismontane woodland vegetation types).

Possible best nesting habitat was identified as dense, broad-leafed deciduous trees (i.e., broadleaf upland forest (mixed, mixed montane or single dominant deciduous hardwoods) with a canopy cover of >70 %).

Foraging Habitat: grasslands

Note that plant associations are not an indicator of roosting sites and were not mapped

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* White-Tailed Kites nest in dense forest, most often at the edge of open ungrazed grasslands, farms and wetlands. Nesting habitat quality is good in the Galbreath Wildlands Preserve but limited due to the low amount of foraging habitat (Figure 74). Grasslands are most abundant in areas north of the Preserve, making densely wooded areas of the northern Preserve the most likely to support nesting Kites.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented in the Study Area. To our knowledge, no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: The White-Tailed Kite has not been reported to occur in USGS quads adjacent to the Study Area.

*Summary:* We anticipate that nesting White-Tailed Kites are “Likely to Occur” in the Preserve because they are known to occur in nearly all areas between the coast and Sierra Nevada foothills, and good potential nesting habitat occurs in the Preserve.

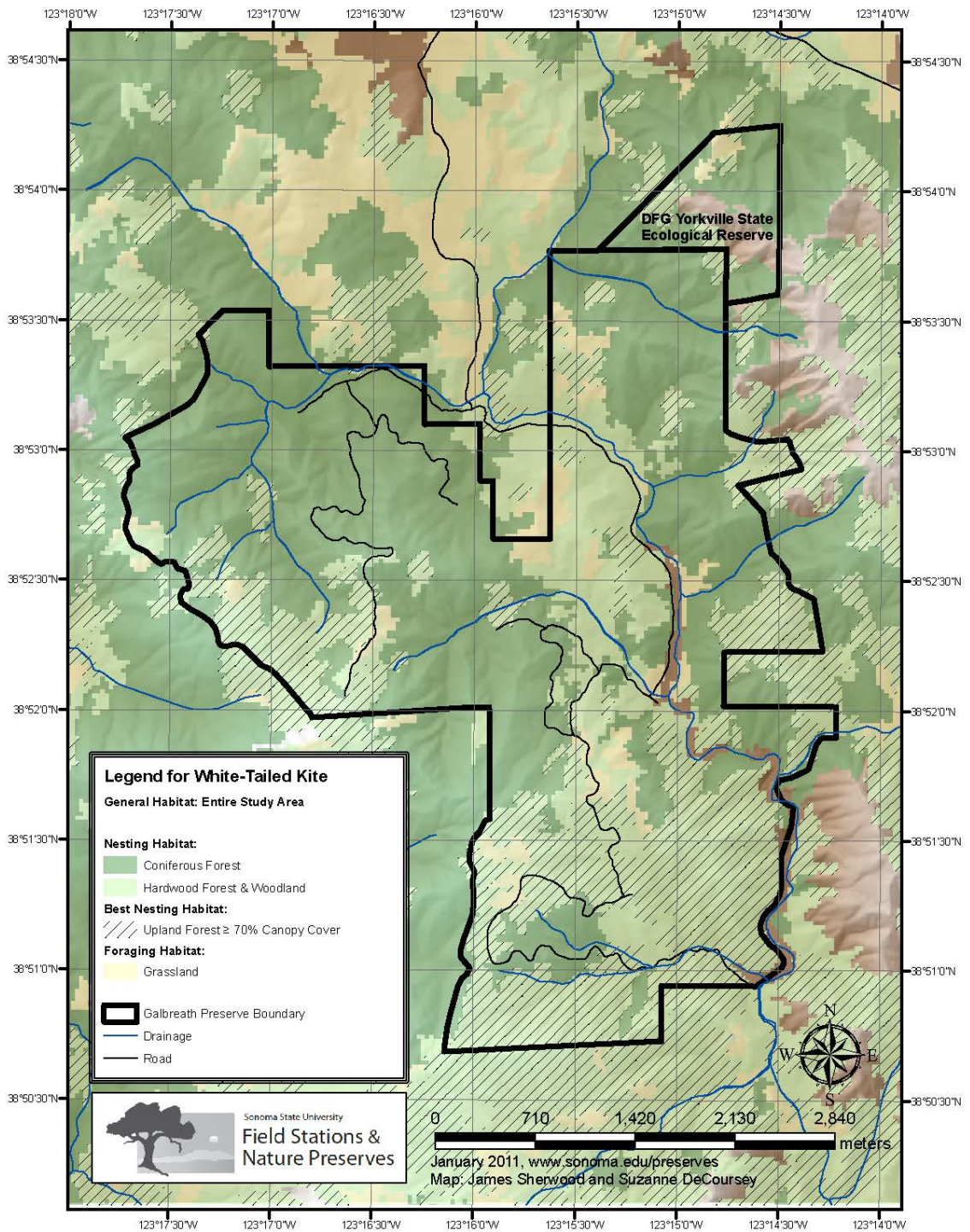
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**Species Account Description:** Linden Schneider & Emily Harvey

Figure 74: Potential habitat for White-Tailed Kite (*Elanus leucurus*)



**Status:** (Nesting & Nonbreeding/Wintering)

Federal: Delisted

State: Endangered, Fully Protected

Other: G5 S2 CDF:S MBTA



**Species Description:**

Very large and dark, with plank-like wings and relatively large head and bill. Adult distinctive, with white head and tail. Juvenile dark with white underwing coverts, whitish streaks on tail, and pale belly. Takes four to five years to acquire adult plumage; after one year develops white patches on belly and back, and after two years white on head and yellow bill begin to develop. Voice: rather weak, flat, chirping whistles. (From Sibley 2009)

**Distribution:**

Permanent resident, and uncommon winter migrant, now restricted to breeding mostly in Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity cos. About half of the wintering population is in the Klamath Basin. More common at lower elevations; not found in the high Sierra Nevada. Fairly common as a local winter migrant at a few favored inland waters in southern California. Largest numbers occur at Big Bear Lake, Cachuma Lake, Lake Mathews, Nacimiento Reservoir, San Antonio Reservoir, and along the Colorado River. (From Polite 1999)

**Life History & Threats:**

Most eagles that breed in Canada and the northern U.S. move south for winter. Migrates widely over most of North America (AOU 1983); moves generally E-SE across Canada and the Great Lakes region to the northeast coast of the U.S. In the northern Chesapeake Bay region, radio-tagged northern migrants arrived in late fall (mean date 21 December) and departed in early spring (mean date 27 March); radio-tagged southern migrants arrived throughout April-August and departed June-October (Buehler et al. 1991). (From NatureServe 2009)

Clutch size is 1-3 (usually 2). Incubation lasts about 5 weeks, by both sexes. Second hatched young often dies. Young first fly at 10-12.5 weeks, cared for by adults and may remain around nest for several weeks after fledging. Generally first breeds at about 5-6 years. Adults may not lay every year. (From NatureServe 2009)

Feeds opportunistically on fishes, injured waterfowl and seabirds, various mammals, and carrion (Terres 1980)...Hunts live prey, scavenges, and pirates food from other birds (e.g., osprey) and, in Alaska, sea otter (Watt et al. 1995, Condor 97:588-590)...In the Columbia River estuary, tidal flats and water less than 4 m deep were important foraging habitats (Watson et al. 1991)...Sheep carcasses were significant food sources in winter in Oregon (Marr et al. 1995, Wilson Bulletin 107:251-257). (From NatureServe 2009)

The bald eagle was historically threatened by habitat loss, use of DDT and other organochlorine pesticides, and illegal shootings and egg collection. These threats have reduced to a point



where the species has recovered (72 Federal Register 130). However, the species are occasionally shot and DTT still causes egg failure for eagles occurring on Santa Catalina Island (Sharpe 2004). Currently, habitat loss continues to threaten bald eagles. Human development is the greatest cause of habitat loss affecting all life stages of the bald eagle: shoreline nesting, perching, roosting, foraging habitat, and dispersal (Buehler 2000). Human development may limit expansion of breeding populations in many areas and limit eagle carrying capacity at or below current population levels in some areas in the future (Fraser *et al.* 1996). Bald eagles avoid human-developed areas for nesting (Fraser *et al.* 1985), roosting (Buehler *et al.* 1991a), and perching/foraging (Buehler *et al.* 1991b, Chandler *et al.* 1995). Additionally, human disturbance can cause abandonment of nest sites or relocation of nest sites (USFWS 1986). (From Estep *et al.* 2009)

### **Habitat & Habitat Associations:**

*Foraging Habitat:* Bald Eagles utilize large bodies of water such as lakes and free flowing rivers as hunting grounds, primarily feeding on fish (Polite 1999).

*Nesting Habitat:* Most nests are about 50-200 feet above ground and 10-12 miles from foraging areas (Polite 1999).

Nests are constructed in a variety of large, old growth hardwoods and conifers, especially ponderosa pine (Polite and Pratt 1999). Trees that provide an unobstructed view of a water body and that are the dominant or co-dominant tree in the surrounding stand are typically favored (Lehman 1979). Bald eagles most frequently build nests in stands with less than 40% canopy cover, but usually some foliage shading the nest (Call 1978). Nests are constructed 16-61 m (50-200 feet) above the ground but usually below the tree crown (Polite and Pratt 1999). Anthony *et al.* (1982) and Lehman *et al.* (1980) reported that the mean diameter of nest trees was 104-117 cm (41-46 inches) at breast height in California and Oregon. (From Estep *et al.* 2009)

Historically, bald eagles bred in a variety of habitats in California, including offshore islands; coastal cliffs and pinnacles; and along coastal rivers, interior valley streams and wetlands, and mountain lakes and rivers (Detrich 1985). Most eagle nesting territories are now found in mountainous habitat in ponderosa pine and mixed conifer forests (Lehman 1979, Detrich 1985, Jurek 1990). Bald Eagles require large bodies of water or free flowing rivers that support an abundance of fish, waterfowl, or other waterbird prey (USFS 2008). In California, 87% of nest sites were within 1.6 km (1 mile) of water (Lehman 1979). Further, approximately 70% of breeding populations in California are associated with water bodies larger than 200 ha (494 acres) (Detrich 1985). Snags or other perches adjacent to water bodies are also required. Bald Eagles perch high in large, stoutly limbed trees, on snags or broken-topped trees, or on rocks near water (Polite and Pratt 1999). (From Estep *et al.* 2009)

*Roosting Habitat:* Bald Eagles prefer to roost in large, old growth trees of mixed conifer with less than 40% canopy (Polite 1999). Snags are commonly used to perch while searching for prey (Polite 1999). Rocky outcrops or snags near aquatic foraging grounds (Polite 1999).

**Conceptual Basis for GIS Model Development:** We mapped potential habitat for Bald Eagles as:

*Foraging Habitat:* mainstem of Rancheria Creek, which contains steelhead during the winter

*Nesting/Roosting Habitat:*

- coniferous forests (i.e., Redwood-Douglas Fir mix and Pacific Douglas Fir vegetation types) with < 40% canopy cover
- cismontane woodland (i.e., mixed, montane mixed, and single dominant hardwood vegetation types with < 40% canopy cover)

Possible best nesting habitats are areas in the above habitat types:

- Within 1 mile of Rancheria Creek

Areas with trees > 61 cm DBH were not mapped as best nesting habitat, because there are no areas in Nesting/Roosting areas with trees this size.

### **Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat:* The quality of nesting and wintering habitat for this species is moderate to good in the Preserve (Figure 75). Wintering habitat is good quality. Rancheria Creek supports steelhead during the winter and areas there are forested areas with open canopy are relatively abundant near the Creek. Snags are also present for roosting in areas throughout the Preserve (Data on snag location are not available. However logging on the Preserve was discontinued in 2000 and large snags are relatively common).

Nesting habitat is moderate to good quality. Open forested areas near Rancheria do not contain large trees preferred by this species for nesting.

Foraging habitat quality is poor to moderate, however adjacent areas to the preserve may provide additional foraging habitat for this species.

#### *Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: Rancheria Creek (Emily Harvey, personal observation).

Nearest Occurrence to the Galbreath Wildlands Preserve: Ornbaun Valley quad (CNDDDB), immediately NW of the Preserve.

*Summary:* Bald Eagles are observed occasionally in the Preserve. Moderate to good quality nesting and wintering habitat is abundant and sufficient to support several individuals of this widespread species.

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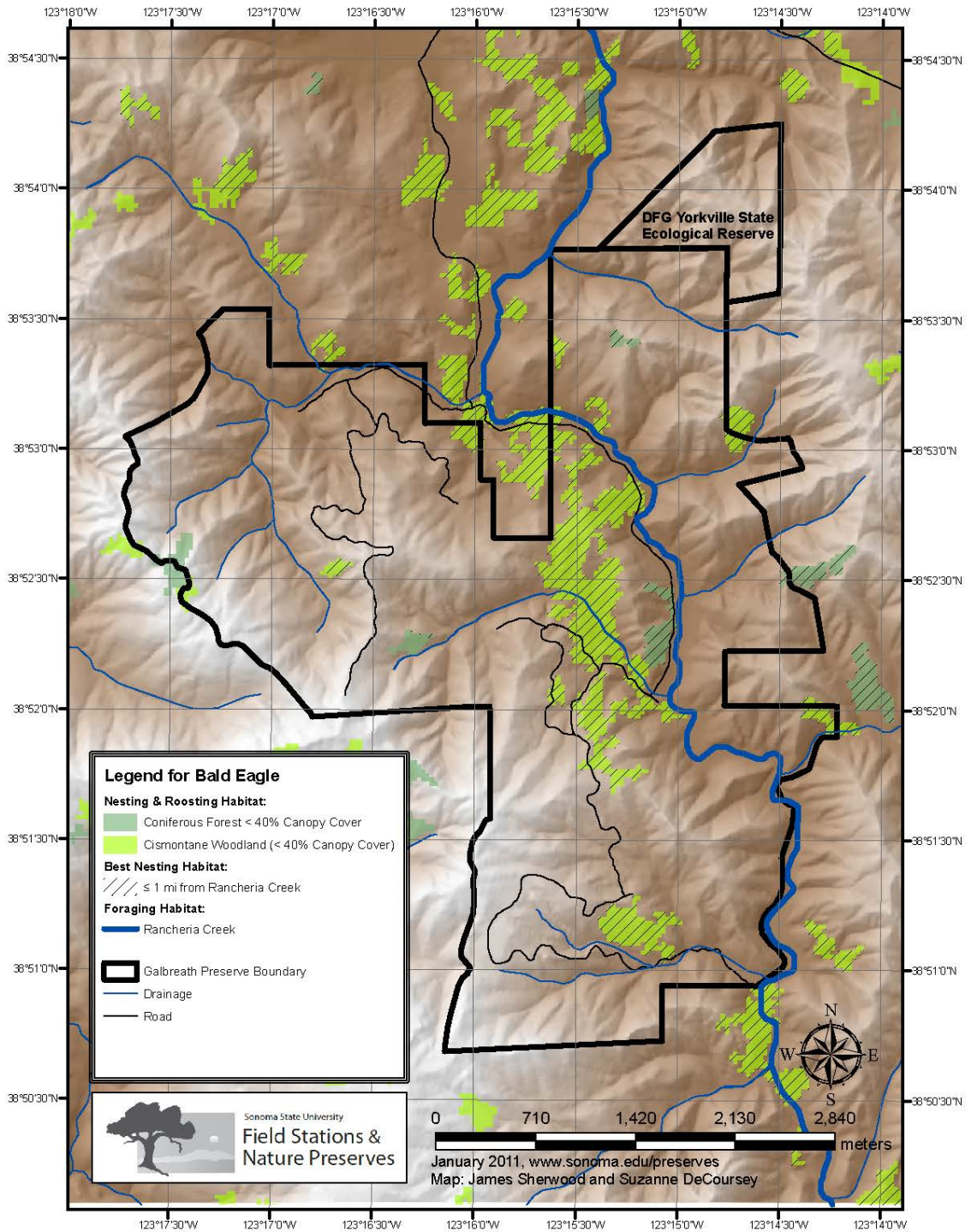
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**Species Account Description:** Emily Harvey

Figure 75: Potential habitat for Bald Eagle (*Haliaeetus leucocephalus*)





*Aves (Birds): Ciconiiformes, Accipitridae*  
**Osprey (*Pandion haliaetus*)**  
**Potential Occurrence: Nesting Likely to Occur**

**Status:** (Nesting)

Federal: None

State: Watch Listed

Other: MBTA G5 S3 CDF:S



Photo: William Newton/ CLO



cdbx/Bridshare

**Species Description:**

...Large (approx. 1,400- to 2,000-g body mass), long-winged (150- to 180-cm wingspan) raptor with dark chocolate-brown back and upper wing-coverts, mostly white breast (some speckling) and belly, white crown and forehead, and dark line through eye... Iris yellow. Cere and legs pale blue-gray. Speckled brown necklace on breast of female (and some males). Juvenile similar to adult, but upperparts appear scaly because of light-buff feather edges on back and upper wing-coverts; these generally wear off by first winter; iris orange-red through first year. Individuals often heard before seen; whistled guard calls (see Sounds: vocalizations, below) are a prominent feature on breeding grounds. Upright posture when at rest; may open wings slightly. Sexes often difficult to distinguish in the field. Adult female larger than male in body mass (almost 25%, on average, in New England breeders), wing (6%), and bill, but some overlap in all but mass (Poole 1989a). Females generally have fuller, darker breast-bands (speckling) than do males, but here again some overlap, especially in Caribbean and Baja populations. See Prevost 1983b and Poole 1989a for details. In flight (Dunne et al. 1988), dark carpal-patches and crook in wing (bends back at carpal joint) are diagnostic. Seen high overhead or from the side, head appears small. Seen head on, “. . . holds its wings in an exaggerated, uplifted bow completely above the horizontal axis” (Dunne et al. 1988: 165). Stiff wing-beat; appears centered at elbows (carpal joint). (From Poole et al 2002)

**Distribution:**

The osprey is nearly worldwide in distribution... In North America the subspecies *carolinensis* breeds from northwest Alaska ... south to Baja California...(From Tesky 1993)

Breeds in northern California from Cascade Ranges south to Lake Tahoe, and along the coast south to Marin Co. Regular breeding sites include ... inland lakes and reservoirs, and northwest river systems... (From Zeiner et al 1990)

**Life History & Threats:**

Yearlong, diurnal activity. Arrives on nesting grounds mid-March to early April. Migrates south along coast and western slope of Sierra Nevada in October...Travels up to 8-10 km (5-6 mi) from nest to fishing areas (Garber 1972, French and Koplín 1977). Pair defends nest, sometimes violently, when young present (Call 1978). Breeds March to September. Clutch size 1-4 eggs, usually 3. Colonial nesting common. Young breed first at 3 yr. Pesticides caused reproductive failure in past (Garber 1972), but reproductive success has increased since early 1970's (Airola and Shubert 1981). Bald eagles and gulls compete with osprey for food, often stealing osprey catch. (From Zeiner et al 1990)

Ospreys generally arrive on their breeding grounds in late March or early April. Pair bonding persists from one year to the next, and the same nest site may be used for many years [26]. Most ospreys are monogamous; occasionally they breed as a polygynous trio (one male breeding concurrently with two females) [24]. Ospreys generally first breed when they are between 3 and 4 years old [24,28]. Juveniles spend about 17 months on the wintering grounds. At around 2 years of age they return to the nesting grounds but do not breed until the following year [28]. Age at first reproduction varies not only among individual ospreys but among populations, apparently in relation to the availability of nest sites and other resources... Most migratory ospreys lay two to four eggs from late April to early May and incubate them for 5 to 6 weeks [24,28]. An average of 1.1 to 1.3 young per active nest are fledged per year [28]. Young fledge when they are about 2 months old [4,28]. They return to the nest for feeding and roosting for another week, and can be found nearby for sometime after that [4]. Most resident ospreys lay their clutch in winter... On average, out of 100 fledged young, 37 will be alive 4 years after fledging, 17 will be alive 8 years after fledging, and only six to eight will be alive 12 years after fledging. The greatest longevity recorded is 25 years [24]. (From Tesky et al 1993)

Historically affected by shooting in North America, although less so than other diurnal raptors. Persistent organochlorine pesticides, particularly DDT/DDE, had major effects on some regional populations from 1950s through early 1970s. These chemicals, stored in fatty tissue and increasingly concentrated moving up food chains, have been correlated with depressed reproductive success (Wiemeyer et al. 1975, 1978, 1988; Spitzer et al. 1978). Most noticeable effect was eggshell-thinning, which caused problems ranging from reduction in gas exchange (including water loss) for developing embryos to eggs breaking under the weight of an incubating adult. (Hg) is biomagnified in food chains and tends to be higher in biota from recently created reservoirs than in naturally occurring ponds and lakes (Hughes et al. 1997, DesGranges et al. 1998). Ospreys accumulate Hg in body tissues between molts, but chicks eliminate 85% and adults eliminate 95% of body burden into feathers at each molt (Hughes et al. 1997, DesGranges et al. 1998)...Adults, and especially fledglings, at nests near highways are vulnerable to collisions with vehicles...Generally tolerant of land development...Probably more vulnerable to changes in water quality, but this not well quantified...Some regional population declines probably associated with loss of nest sites, related in turn to increased lumbering and agricultural activities (Ewins 1997)...(From Poole et al 2002)

## **Habitat & Habitat Associations:**

### *General Habitat*

Ospreys occur in a variety of plant communities in association with riparian habitat including shrublands, grasslands, swamps, and coniferous and deciduous forests [14,24,30]. Ospreys occupy a wide range of habitats near water, primarily lakes, rivers, and coastal waters with adequate supplies of fish [4]. (From Tesky 1993)

Habitat varies greatly (boreal forest to temperate coasts/lakes to subtropical coasts to desert salt-flat lagoons), but common denominators are: (1) adequate supply of accessible fish within commuting distance (10–20 km) of nest; shallow waters (0.5–2 m deep), which generally provide most accessible fish; (2) open nest sites free from predators (especially mammalian); such sites generally elevated (e.g., trees, large rocks [especially over water], or bluffs); predator-free islands; and, increasingly, artificial structures such as towers supporting electrical lines or cell-phone relays and channel markers...(From Poole et al 2002)

Associated strictly with large, fish-bearing waters, primarily in ponderosa pine through mixed conifer habitats. (From Zeiner et al 1990)

### *Nesting Habitat*

Their nests are generally built within 6 to 7 miles (9.6-11.2 km) of large lakes or rivers with slow-moving water [14,30]. Flattened portions of partially broken off snags, trees, rocks, dirt pinnacles, cacti, and numerous man-made structures such as utility poles and duck blinds are used for nests [14,28,30]...The area around the nest is generally open, giving the birds clear access when landing. Ponderosa pine in the western United States... are... favored as nest trees for this reason [24]...Ospreys typically nest at the extreme tip of a tree or snag with little or no overhead cover [17]. They prefer tall snags that provide good visibility and security [5]...Islands free of mammalian predators allow safe nesting in low trees and even on the ground. Swamps also provide safe nesting [24]. (From Tesky 1993)

Wide variety of natural and artificial sites... Common features, generally: proximity to water, especially good feeding areas; openness, allowing easy access to nest; safety from ground predators, achieved by height or over-water location (islands; flooded trees, channel markers); sufficiently wide and stable base to accommodate the large nest...Natural sites include trees, cliffs (including large pinnacles and stacks), large shoreline boulders, and, on predator-free islands, the ground. In trees (live or dead), usually nests on or near top, or lower down, where a large branch forms crotch that can support a nest...In w. U.S. (Idaho, California, Oregon), most pairs (80–95%) nest in trees..Artificial sites include trees in newly flooded reservoirs, duck-hunting blinds in shallow coastal waters, channel markers, power/lighting poles, and nesting platforms built for Ospreys. Reservoirs kill trees, providing abundant nesting snags; particularly important for w. U.S. populations.(From Poole et al 2002)

Nests on platform of sticks at the top of large snags, dead-topped trees, on cliffs, or on human made structures... Occasionally nests on ground. Nest usually within 400 m (1312 ft) of fish-producing water, but may nest up to 1.6 km (1 mi) from water (Airola and Shubert 1981)...Needs tall, open-branched "pilot trees" nearby for landing before approaching the nest, and for use by young for flight practice. Nest tree averaged 172 cm (68 in) dbh (range 76-206 cm; 30-81 in dbh) in northern California. (From Zeiner et al 1990)

### *Foraging Habitat*

Varies greatly; along coasts in salt-water marshes, lagoons and ponds, estuaries, silted river mouths, coral reefs, and only rarely in deeper, off-shore water...Inland, forages along rivers, marshes, reservoirs, and natural ponds and lakes, where individuals feed in both shallow littoral zones as well as deeper water...Foraging less efficient and successful in water with thick emergent and submerged vegetation ([Postupalsky and Stackpole 1974](#), [Prevost 1977](#)). Reservoirs often provide ample expanses of shallow, clear water—ideal conditions for hunting ([Swenson 1981](#), [Vana-Miller 1987](#)), although periods of low water can lead to reduced prey availability owing to prolific growth of aquatic vegetation (S. Postupalsky in [Vana-Miller 1987](#)). (From Poole et al 2002)

Requires open, clear waters for foraging. Uses rivers, lakes, reservoirs, bays, estuaries, and surf zones. (From Zeiner et al1990)

### **Conceptual Basis for GIS Model Development:**

*Nesting and Roosting Habitat:* Potential nesting and roosting habitat for this species occurs throughout the Study Area.

Possible best nesting habitat was mapped as:

- Cliffs

- Large trees (DBH > 61 cm) in coniferous forest vegetation types (i.e., Redwood-Douglas fir mix (*Sequoia sempervirens*-*Pseudotsuga menziesii*) and Pacific Douglas fir (*Pseudotsuga menziesii* var. *menziesii*) vegetation types).

*Foraging Habitat:* Potential foraging habitat is the mainstem of Rancheria Creek

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Osprey nest primarily in coniferous forest near shallow waters bearing large fish. Their nest sites tend to be open (i.e., large snags, dead-topped trees, cliffs, human made structures, sometimes on ground) and have some protection from mammalian predators. Habitat quality for this species is moderate to good in the Galbreath Wildlands Preserve. Stands of coniferous forest with large trees (> 61 cm DBH) occur within easy distance of the mainstem of Rancheria Creek where Steelhead are known to occur. However, early draw-down of surface waters in Rancheria Creek (June to July) occur before the end of the nesting season (September) and may reduce the attractiveness of nesting sites in the Preserve. Cliffs in the Preserve are likely not good nesting habitat for this species since many are not steep or isolated enough to prevent access by mammalian predators. Large snags, however, are common in the Preserve.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented in the Preserve. To our knowledge, no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: The Osprey has not been reported to occur in USGS quads adjacent to the Study Area, but is known to breed along the northern California coast from Marin northward.

*Summary:* We anticipate that nesting Ospreys are “Likely to Occur” in the Preserve because of suitable nesting, foraging and roosting habitat for this widespread species.

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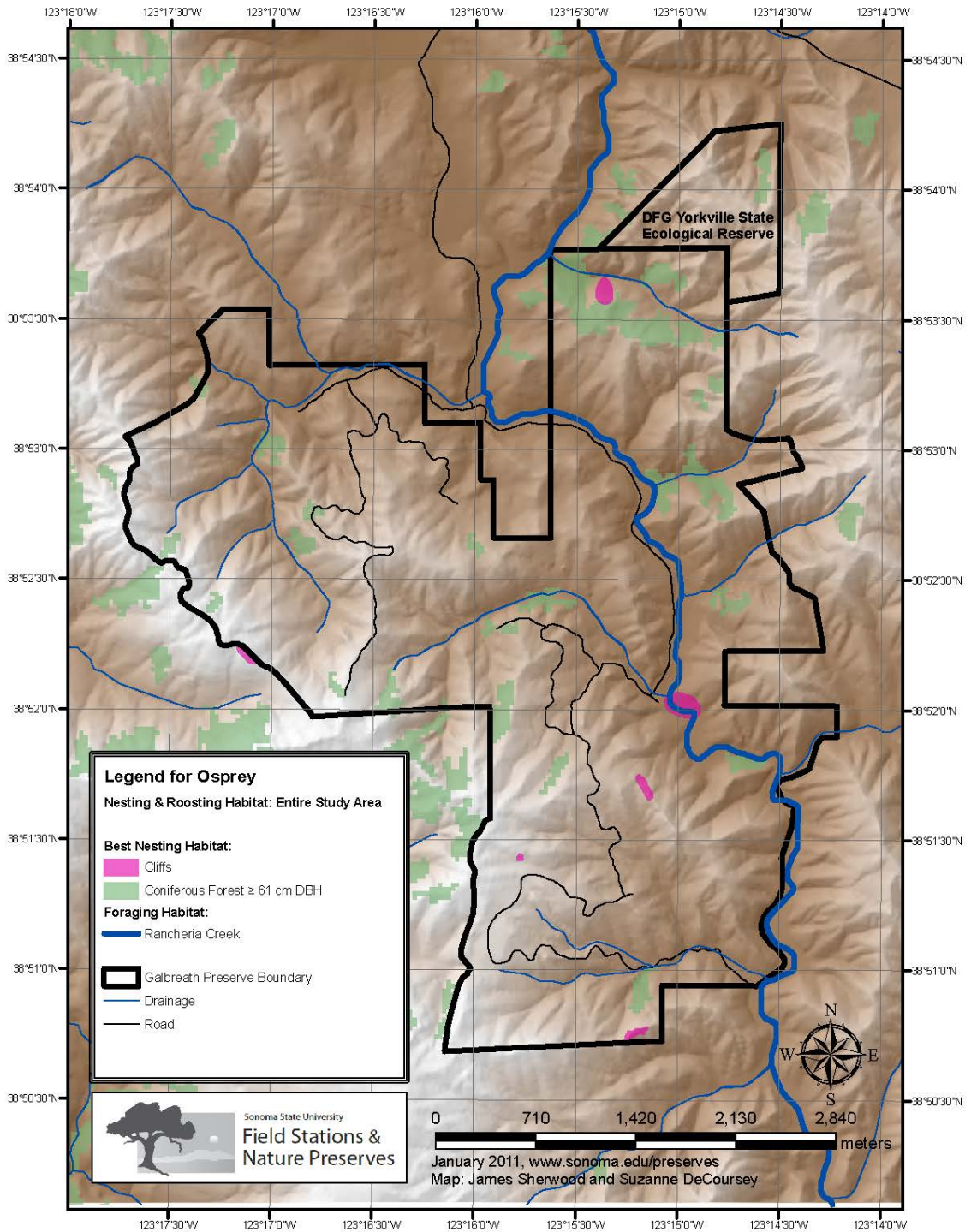
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**Species Account Description:** Linden Schneider & Emily Harvey



**Figure 76: Potential habitat for Osprey (*Pandion haliaetus*)**



*Aves (Birds): Ciconiiformes, Alcidae*  
**Marbled Murrelet (*Brachyramphus marmoratus*)**  
**Potential Occurrence: Nesting Unlikely to Occur**

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**Status:** (Nesting)

Federal: Threatened

State: None

Other: MBTA



**Species Description:**

Breeding plumage entirely dark brownish; nonbreeding plumage black and white with obvious white collar and partial dark collar. Like all murrelets, flies low with very fast beats of long pointed wings. Voice: a high, squealing, gull-like series given at sea and in flight near nest site. (From Sibley 2009)

**Distribution:**

Marbled murrelets range along the Pacific coast from Alaska to California; the southern end of the breeding range is in central California. Their at-sea distribution becomes more discontinuous in California. Some wintering birds are found in southern California and as far south as northern Baja California, Mexico. Nesting behavior has been documented beyond 80 kilometers (50 miles) inland, though most nesting habitat likely occurs within 80 kilometers (50 miles) of shore throughout the breeding range. Currently, breeding populations are not distributed continuously throughout the forested portion of Washington, Oregon, and California (Pacific Northwest). Due to the substantial loss and modification of nesting habitat (older forest) and mortality from net fisheries and oil spills, the Washington, Oregon, and California vertebrate population segment was federally listed as threatened in September 1992. Critical habitat was designated for the species in May 1996. It is listed as endangered by California and as threatened in Washington and Oregon. It also is federally listed as threatened in Canada. (From USFWS 1997)

The Study Area lies just outside the inland boundary of the predicted historical range for the species (USFWS 1997) The Study Area is not within designated Critical Habitat (USFWS 1997).

**Life History & Threats:**

The marbled murrelet (*Brachyramphus marmoratus*) is a small diving seabird that breeds along the Pacific coast of North America from the Aleutian Archipelago and southern Alaska south to central California. In the Pacific Northwest (Washington, Oregon, and California) (Figure 1), it forages almost exclusively in the nearshore marine environment (mainly within a few kilometers of shore), but flies inland to nest in mature conifers. Behavior indicative of marbled murrelet nesting has been documented to occur beyond 80 kilometers (50 miles) inland from the marine environment, though most nesting habitat likely occurs within 80 kilometers (50 miles) of shore throughout the breeding range. The most inland occupied site in the Pacific Northwest was located 84 kilometers (52 miles) from marine waters in Washington. (From USFWS 1997)

Marbled murrelets have a unique life history strategy that differs from most seabirds and provides special challenges in managing the species. Although marbled murrelets feed primarily on fish and invertebrates in nearshore marine waters, they fly inland to nest on large limbs of mature conifers. The marbled murrelet is the only alcid known to nest in trees. Marbled murrelets appear to be solitary in their nesting and feeding habits, but interact in groups over the forest and at sea (Sealy and Carter 1984, Carter and Sealy 1990, Nelson and Hamer 1995a). Simultaneous detections of more than one bird are frequently made at inland sites, with pairs of birds being the most frequently observed group size (Hamer and Cummins 1990, O'Donnell *et al.* 1995). Similarly, marbled murrelets occur primarily in singles and pairs at sea (Carter and Sealy 1990). Larger group sizes are also frequently seen. (From USFWS 1997)

Marbled murrelets lay only one egg on the limb of a large conifer tree and probably nest only once a year (Desanto and Nelson 1995). Nesting occurs over an extended period from late March to late September (Carter and Erickson 1992, Carter and Sealy 1987a, Hamer and Nelson 1995a, Rodway *et al.* 1992). Nests are not built; the egg is placed in a small depression or cup made in moss or other debris on the limb. (From USFWS 1997)

Marbled murrelets feed on a variety of small fish and invertebrates (see summaries in Sealy 1975, Carter 1984, Vermeer *et al.* 1987, Burkett 1995); however, very little information is available on food habits of marbled murrelets in Washington, Oregon or California, and systematic stomach content analyses have never been conducted in the tri-state area. (From USFWS 1997)

Euphausiids (luminescent shrimp-like crustaceans forming an important part of marine plankton, or krill, also important to fishes and whales) do not comprise a dominant component during the breeding season. However, this prey source is important to marbled murrelets in the winter and spring in some locales (Sealy 1975, Krasnow and Sanger 1982, Vermeer 1992). Mysids and gammarid amphipods, also shrimp-like crustaceans, are another component of the marbled murrelet diet, especially in winter (Munro and Clemens 1931; Sanger 1983, 1987) (Table 1). (From USFWS 1997)

The marbled murrelets' life history strategy (i.e., relatively long life span, delayed maturity and low annual reproductive potential) allows individuals to reproduce successfully over their lifetimes, despite periodic adverse conditions during its lifetime. However, cumulative impacts (including nesting habitat loss, oil spills, net mortalities, etc.), in addition to repeated El Nub events, over a short time period, could contribute to serious population declines or extirpations. (From USFWS 1997)

The weight of evidence indicates that the major factors in marbled murrelet decline from historical levels in the early 1800's (or earlier) are (1) loss of nesting habitat, both through direct loss and changes in forest age distribution, and (2) poor reproductive success in the habitat that does remain, a phenomenon that appears due in large part to increased vulnerability of nests to predators in highly fragmented landscapes. (From USFWS 1997)

Threats include loss of habitat, predation, gill-net fishing operations, oil spills, marine pollution, and disease. Recent reviews have concluded that the risk of predation is currently a larger threat than previously considered. (From USFWS 2009)

### **Habitat & Habitat Associations:**

The only California alcid to breed inland (Sowls *et al.* 1980). Only 4 nests have been found, 1 in California (Binford *et al.* 1975, Singer and Verardo 1975). This nest was in a Douglas-fir 45 m (145 ft) above ground in Big Basin Redwoods State Park (Binford *et al.* 1975). Apparently requires dense, mature forests of redwood and Douglas-fir for breeding (Cogswell 1977,

Remsen 1978). In California, probably prefers to nest in tall trees; nest made of moss and lichen. (From Sanders 1990)

Nest stands are typically composed of low elevation conifers, which include Douglas-fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*), Sitka spruce (*Picea sitchensis*), western hemlock (*Tsuga heterophylla*), and coastal redwood (*Sequoia sempervirens*). The average nest stand size was 206 hectares (509 acres), with stands ranging in size from as small as 3 hectares (7 acres) to as large as 1,100 hectares (2,718 acres) (Hamer and Nelson 1995b). This includes forests, generally characterized by large trees (80 centimeters [32 inches] or greater diameter at breast height), a multistoried stand, and a moderate to high canopy closure. Nest stands in Oregon and Washington are characterized by medium to large diameter trees with an average size of 47.7 centimeters (19 inches) diameter at breast height. In certain parts of the range (Oregon Coast Range), marbled murrelets are also known to use mature forests with an old growth component of large trees (Grenier and Nelson 1995). (From USFWS 1997)

In addition to requiring shallow, coastal waters for feeding, may need a stream near the nest to float fledging young down to the coast (Kischinsky 1965, Sealy 1972). ..Breeders require mature, coastal coniferous forest for nesting and nearby coastal waters for feeding. (From Sanders 1990)

**Conceptual Basis for GIS Model Development:** Marbled Murrelets require dense old-growth Redwood or Douglas fir forests for nesting (Sanders 1990). Potential nesting habitat for this species was mapped as coniferous forest types with:

- > 61 cm (24 in) DBH, the largest size class in the Study Area
- > 40% canopy cover
- multi-storied canopy

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Marbled Murrelets nest in dense old-growth Redwood or Douglas fir forests. Nesting habitat quality for this species is moderate and abundance is limited (Figure 77). Preserve lands are roughly 17 miles from the coast, well within the 45 miles maximum inland nesting distance observed for this species. Most of the Preserve has been logged (although this practice was discontinued in 2000), limiting the amount of old-growth forest available. Some areas still support relatively large trees with a dense multi-story canopy; the largest patch of potential nesting habitat is over 40 acres in size and located in the northeast portion of the Preserve.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has been reported to nest in 3 locations in California: Ten Mile, Russian Gulch and Alder Creek (Griffin and Scharffenberger 2003).



The three separate areas where marbled murrelets currently are found in California correspond to the three largest remaining blocks of old-growth coastal conifer forests (Carter and Erickson 1992). These populations are largely separated by areas of second-growth forest not used by marbled murrelets. A large break in the main breeding distribution is located at the southern portion of the range in California, where approximately 480 kilometers (300 miles) separate the southernmost breeding population in San Mateo and Santa Cruz counties (central California) from the next largest populations to the north in Humboldt and Del Norte counties (northern California). Most of this largely unpopulated section, especially in Mendocino County, probably contained significant numbers of marbled murrelets prior to extensive logging (Carter and Erickson 1988, Paton and Ralph 1988). Very small numbers of marbled murrelets probably still nest there. In addition, marbled murrelets may have nested in other areas of central California south of northwestern Santa Cruz County (see Figure 1) where they apparently no longer nest today. (From USFWS 1997)

*Summary:* Nesting Marbled Murrelets are “Unlikely to Occur” in the Preserve because almost all old growth in the Preserve has been logged and nesting Marbled Murrelets are rare in Mendocino County.

The very small nesting and at-sea population of marbled murrelets along the coast of Mendocino, Sonoma and Main Counties is important to future reconnection of marbled murrelet populations in northern and central California, if they can survive over the short term. Almost all of the older forest has been removed from this area, although small pockets of old-growth forest occur in State parks and on private lands. Forests in southeast Main County and in the Berkeley Hills (Alameda County) may have been used for nesting in the distant past, but these areas were logged from the early 1800's to the early 1900's. Much of the remaining marbled murrelet nesting habitat in this Zone is located on private lands. (From USFWS 1997).

The maintenance of this population will require considerable cooperation between State, Federal and private management representatives. Recovery efforts in this Conservation Zone could enhance the probability of survival and recovery in adjacent Conservation Zones by minimizing the current gap in distribution. The population is so small that immediate recovery efforts may not be successful at maintaining this population over time and longer term recovery efforts (e.g., developing new suitable habitat) may be most important. However, if this small population can be maintained over the next 50 years, it will greatly speed recovery in this Conservation Zone. Whether or not marbled murrelets can recolonize regenerated old-growth forests over such a large geographic area is not known. (From USFWS 1997)

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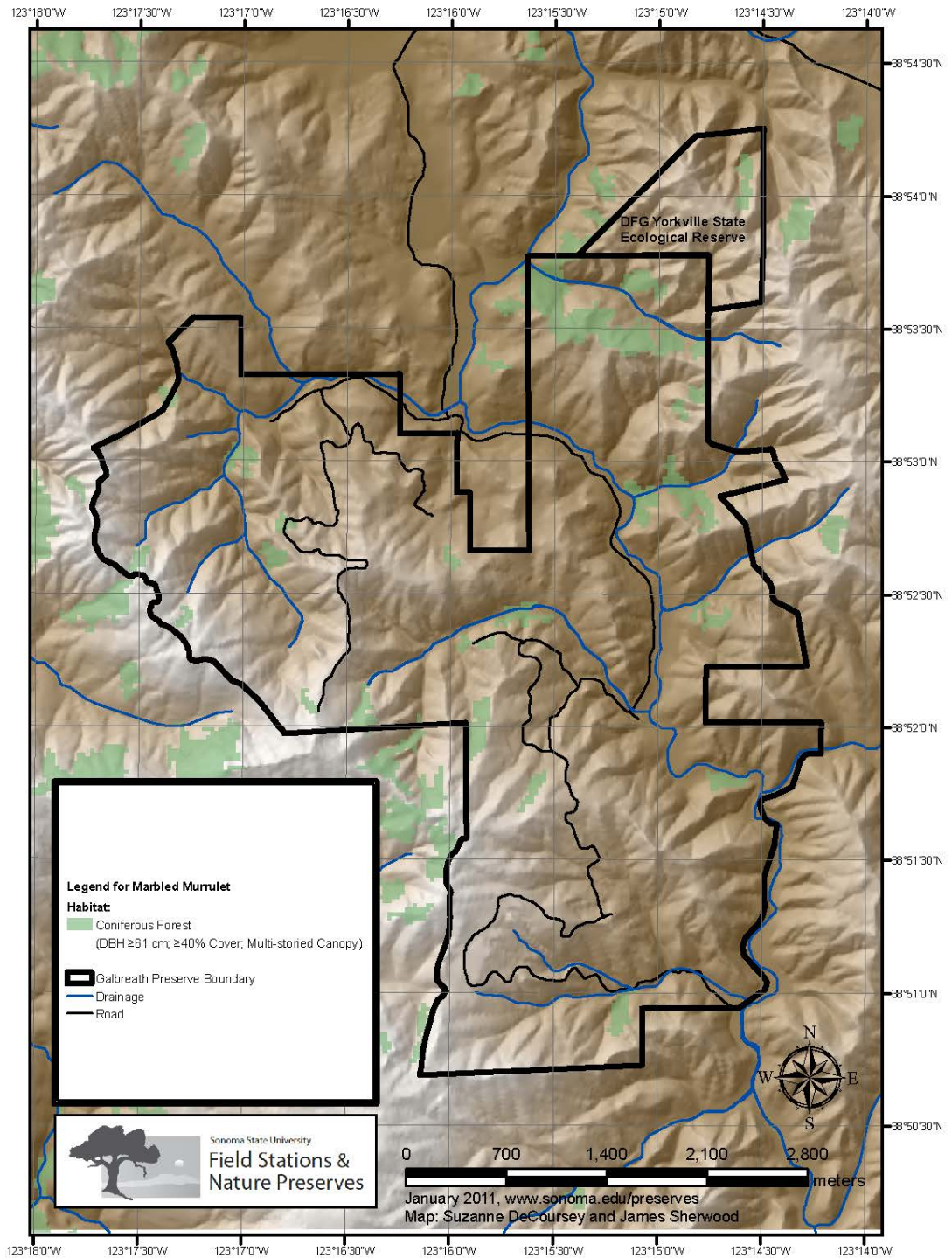
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**Species Description Account:** Emily Harvey

Figure 77. Potential habitat for Marbled Murrelet, *Brachyramphus marmoratus*



**Status:** (Rookery Sites)

Federal: none

State: none

Other: MBTA; CDF:S



**Species Description:** The largest of the North American herons, the Great Blue Heron has a head-to-tail length of 36-55 inches, a wingspan of 66-79 inches, and weighs between 4.4 to 8 pounds (del Hoyo 1992). As a wading bird, the Great Blue Heron has long legs, a long neck, a long, and a thick yellow beak. Their wings, belly, and back are blue-grey and a white face with black plume extending from the head. They fly with their necks folded, as opposed to cranes which fly with their necks outstretched (Clarke 1976).

**Distribution:** The Great Blue Heron is widely distributed in North America and is a year-round resident in much of California, including the North Coast region (Hammerson 1996).

**Life History & Threats:** Nests are large, bulky, and made of sticks and usually the herons breed in colonies of a few pairs to hundreds. Nests are often high in trees but occasionally may be built on the ground (Clarke 1976; Hammerson 1996). Both parents care for a clutch of 3-7 eggs and nestlings fledge the nest in 60-90 days. Great blue herons eat a diet of mostly fish, but also frogs, insects, and mice, which are caught by patient stalking. Like other aquatic predators, they are threatened by pollutants and pesticide runoff that makes its way up the food chain (USFWS 2009). Nesting colonies can be threatened by human disturbance and by Bald Eagle predation (Hammerson 1996). A 300 m buffer zone around the colony with no human activity is recommended during courtship and nesting (Butler 1992).

The great blue heron has a remarkable ability to exploit a wide range of habitats and food types. Consequently it is widespread and abundant, and is not subject to any major threats at the species level (4) (6). Nonetheless, some populations, particularly those occupying small areas on the coast, are vulnerable to localized impacts (4). This broadly includes habitat destruction, human disturbance and persecution, and contamination by pollutants (2) (4). (From ARKive 2010)

**Habitat & Habitat Associations:**

**Foraging Habitat:** freshwater and brackish marshes, along lakes, rivers, bays, lagoons, fields and meadows (Hammerson 1996).

Great blue herons always live near sources of water, including rivers, lake edges, marshes, saltwater seacoasts, and swamps. They tend to avoid marine habitats along the east coast and instead live inland (Ferguson, 1998 ). (From ARKive 2010)



*Nesting Habitat:* Great Blue Herons usually nest in trees or bushes that stand near water, breeding at elevations of up to 1,500 m (ARKive 2010). Will nest within 16 km (10 miles) of feeding area (Krebs 1974).

Generally, the great blue heron nests in tall trees that are near to aquatic feeding areas, and are to some extent isolated from human disturbance (4). However, when trees are not available, it will also nest on the ground in areas free from predators, and in reeds, shrubs and mangroves (2). Although some nest singly, many breed in colonies, which vary in size depending on the amount of nearby foraging habitat (2) (4). (From Arkive 2010)

Herons nest in a variety of forests in rural, residential and urban areas. Colonies are located within about 10 kilometers (16 miles) of the foraging areas. The area of the foraging area determines the number of herons that will nest in the neighbourhood. (From Heron Working Group 2010)

*Species Associations:* Trees used for nesting include pine, cypress, eucalyptus (Aquarium of the Pacific 2010). Old great blue heron nests are sometimes used by Great Horned Owls, Long Eared owls, and other birds.

**Conceptual Basis for GIS Model Development:** To identify potential habitat for the Great Blue Heron in the Study Area, we mapped potential foraging and nesting habitat as:

*Foraging Habitat:*

- bare soil (nearly all bare ground within the study area at GIS-visible scales represents flood plains or other water-adjacent features)
- grasslands
- riparian vegetation (i.e., Fremont Cottonwood vegetation)
- ponds, drainages, and creeks

*Nesting Habitat:* Because the Study Area is within 16 km of the main stem of the Navarro River, a productive feeding area, we considered the entire Study Area as suitable nesting habitat. We mapped the possible best nesting habitat as large dense coniferous forest (i.e., Redwood-Douglas fir mix or Pacific Douglas fir vegetation with canopy cover  $\geq 70$  and a DBH  $\geq 24$  inches).

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting rookeries.

*Habitat:* Great Blue Herons prefer trees and bushes located with 10-15 km of rookery sites. The entire Study Area was considered potential nesting habitat due to the location of the Preserve near the mainstem of the Navarro River, a productive feeding area.

Rookery habitat quality varies from moderate in the Preserve is good. The best potential nesting areas, characterized by large coniferous with dense canopy cover, are patchy throughout the Preserve; the largest patch is located in the northeast corner of the Preserve (Figure 78).

### *Nearest Occurrence:*

Documented Occurrences in Preserve: This species has not been documented in the Preserve. To our knowledge, no surveys have been conducted.

Nearest Occurrence to Preserve: Rookeries have not been reported to occur in USGS quads adjacent to the Preserve.

*Summary:* While the Preserve contains high quality habitat for Great Blue Heron rookeries, we expect that rookeries are “Unlikely to Occur.” Herons prefer to nest near productive foraging areas, such as the mainstem of the Navarro River. With the abundance of large, densely forested slopes in the watershed, it is unlikely that rookery nest are limiting in the Navarro River watershed. We anticipate that rookeries are more likely to occur in areas west of the Preserve near the mainstem.

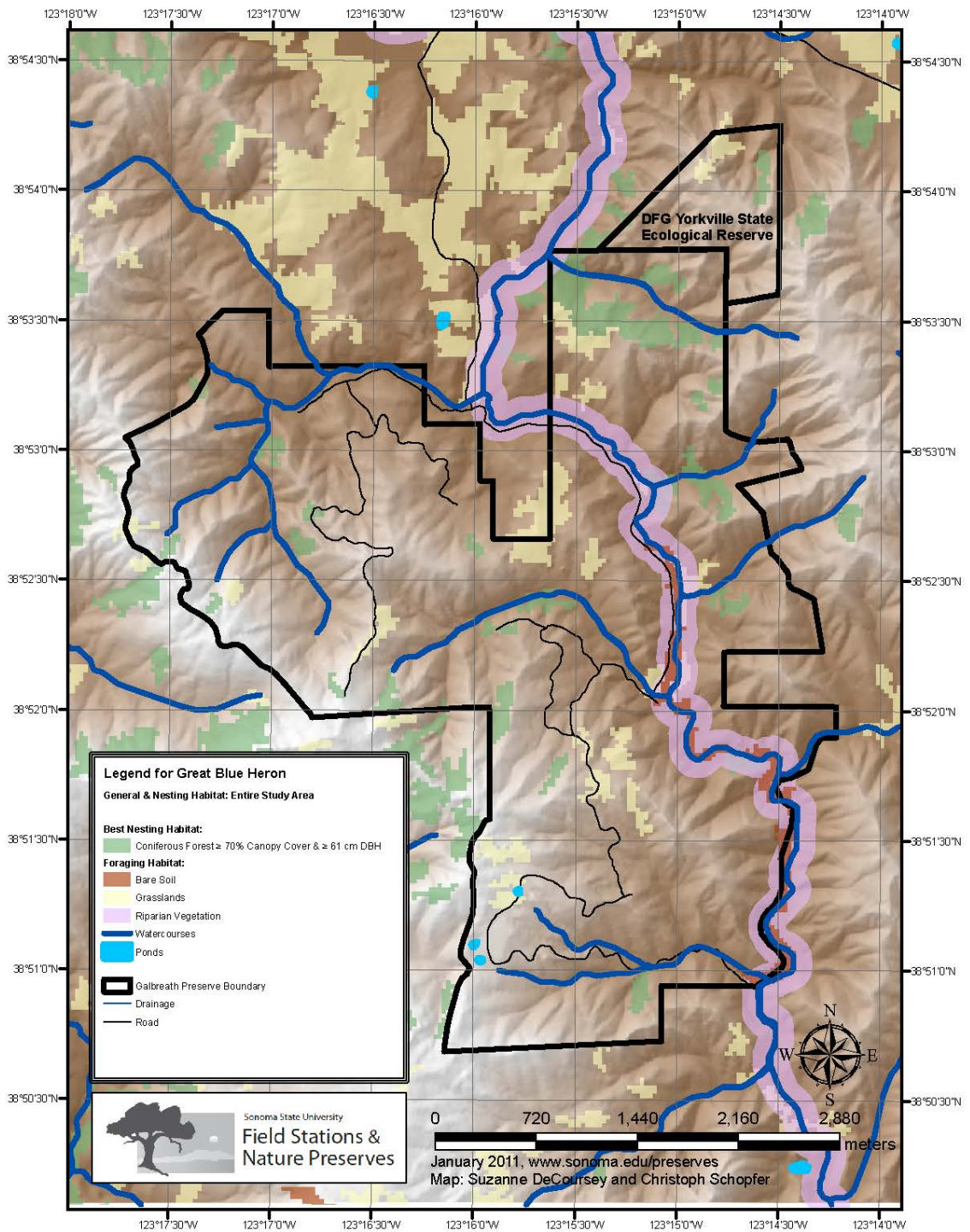
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<[http://commons.wikimedia.org/wiki/ File:Ardea\\_herodias\\_01997t.JPG](http://commons.wikimedia.org/wiki/File:Ardea_herodias_01997t.JPG)>. 2010 July 5.

**Species Account Description:** Kandis Gilmore and Emily Harvey

Figure 78: Potential habitat for Great Blue Heron (*Ardea herodias*)





*Aves (Birds): Ciconiiformes, Ardeidae*  
**Black-Crowned Night-Heron (*Nycticorax nycticorax*)**  
**Potential Occurrence: Rookeries Unlikely to Occur**

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**Status:** (Rookery Site)

Federal: None

State: None

Other: G4 S2S4 USFWS:BCC



**Species Description:**

Adult Black-Crowned Night-Herons have pale gray bellies and wings and black backs. Their faces are white with a black cap, topped by a white plume. They have black bills and red eyes. Juveniles are mottled in gray, brown, and white coloring and have streaked breasts. One-year-old birds have an intermediate plumage somewhat between that of juveniles and adults. Black-Crowned Night-Herons have short necks that are often pulled in, giving the birds a somewhat thick-set appearance for a heron. (From Birdweb 2008)

**Distribution:**

The Black-Crowned Night-Heron is a fairly common, yearlong resident in lowlands and foothills throughout most of California, including the Salton Sea and Colorado River areas, and very common locally in large nesting colonies. Feeds along the margins of lacustrine, large riverine, and fresh and saline emergent habitats and, rarely, on kelp beds in marine subtidal habitats. Nests and roosts in dense-foliaged trees and dense emergent wetlands. Common nesting species on northeastern plateau from April to August. Uncommon in northwestern, and rare in northeastern, California in midwinter. Uncommon transient and rare in winter in southern deserts, and rare on Channel Islands. Seldom seen in mountains, but formerly nested at Big Bear Lake in San Bernardino Mts. (Cogswell 1977, McCaskie et al. 1979, Garrett and Dunn 1981). (From Granholm 1999)

**Life History & Threats:**

Black-Crowned Night-Herons are gregarious at all times of the year, and are often seen in very large groups. As their name implies, they are mostly nocturnal, roosting during the day in trees or marshes, and foraging at night, especially at dusk and dawn. They have also been seen feeding during the day, a practice most common during the demanding nesting season. When foraging, they usually stand still or walk slowly at the edge of shallow water, waiting for their prey. They will also perch above the water to fish. Birds return year after year to traditional winter roost sites. (From Birdweb 2008)

Feeds mostly nocturnally and crepuscularly. Highly variable diet consists of fishes, crustaceans, aquatic insects and other invertebrates, amphibians, reptiles, small mammals, and rarely young birds (Palmer 1962, Wolford and Boag 1971b). Collins (1970) and Hunter and Morris (1976) reported feeding on young terns. Usually hunts in shallow water, waiting motionlessly or, less commonly, stalking prey slowly (Kushlan 1976a). Sometimes vibrates bill to lure or flush prey, and may alight briefly on deep water to make a strike. (From Granholm 1999)

Breeds mainly February to July, but April to August in northeastern California (Cogswell 1977). Monogamous, colonial nester. Clutch size is 3-4, sometimes 5. Mean clutch size for 684 nests in a South San Francisco Bay colony (Bair Island) in May 1971, was 2.9 eggs (Gill 1977). Incubation reportedly 24-26 days. Semi-altricial, downy young are tended by both parents. They fly first at 6 wk, but are not independent until sometime later. A few breed at 1 yr, but most not until 2-3 yr (Palmer 1962, Harrison 1978). (From Granholm 1999)

Local migrator, dispersing widely from breeding colonies after nesting (Gill and Mewaldt 1979). Much of the breeding population from northwestern and northeastern California probably moves southward and is absent from those areas in midwinter. (From Granholm 1999)

Human disturbance of nesting colonies in Quebec (simulating a typical scientific nesting study) resulted in nest abandonment, predation of eggs, and reduced late-season nesting (Tremblay and Ellison 1979). Corvidae and other predators eat eggs. Numbers have been reduced from drainage of marshes and swamps, and cutting of trees, but this species is more adaptable and persistent than most other ardeids. (From Granholm 1999)

### **Habitat & Habitat Associations:**

#### *General:*

Black-Crowned Night-Herons inhabit a variety of fresh and saltwater wetlands. In Washington, they breed primarily in freshwater areas. In spring and fall, they can be found in wetlands flanking large river basins. Winter habitat is varied, but these herons frequent forested swamps. (From Birdweb 2008)

#### *Roosting Habitat:*

Roosts among dense foliage of trees, not always near water, and in dense, fresh or brackish emergent wetlands (Grinnell and Miller 1944). Often rests on piers and pilings...(From Granholm 1999)

#### *Nesting Habitat:*

Nests in dense-foliaged trees, dense, fresh or brackish emergent wetlands, or dense shrubbery or vine tangles, usually near aquatic or emergent feeding areas. Nests are built of twigs and/or marsh plants. (From Granholm 1999)

In the San Francisco Bay Area, 11 Black-crowned Heron rookery sites were located in open shrub/grassland, wetlands, suburban areas, and islands. Birds nested in Eucalyptus (*Eucalyptus* sp.), Buckeye (*Aesculus californica*), Coast Live Oak (*Quercus agrifolia*), Monterey Pine (*Pinus radiata*), and reeds (*Scirpus* sp.) and most were within 0.5 km of wetland habitat (Kelly et al. 1993).

**Conceptual Basis for GIS Model Development:** To identify potential habitat for the Black-Crowned Night-Heron in the Study Area, we mapped:

- Foraging Habitat: perennial and intermittent watercourses and ponds.
- Nesting Habitat: woodland and forest vegetation types (i.e., coniferous, broadleaf upland, cismontane woodland, and riparian vegetation) within 0.5 km of foraging habitat

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Rookery habitat for Black-Crowned Night-Herons is poor to moderate in the Preserve (Figure 79). Open forests are relatively abundant within 0.5 km of the mainstem of Rancheria Creek. However, foraging habitat needed to raise young is poor during most of the breeding season (February to July). Surface water in the mainstem draws down early in the year; the Creek is characterized by erosional surfaces and lacks substantial amounts emergent vegetation preferred by this species. Riparian forests on the Preserve are also poorly developed and patchy in distribution.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been observed on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has not been reported to occur in USGS quads adjacent to the Preserve.

*Summary:* We anticipate that rookery sites of this species is “Unlikely to Occur” on the Preserve because foraging habitats needed by breeding colonies are poor for most of the breeding season.

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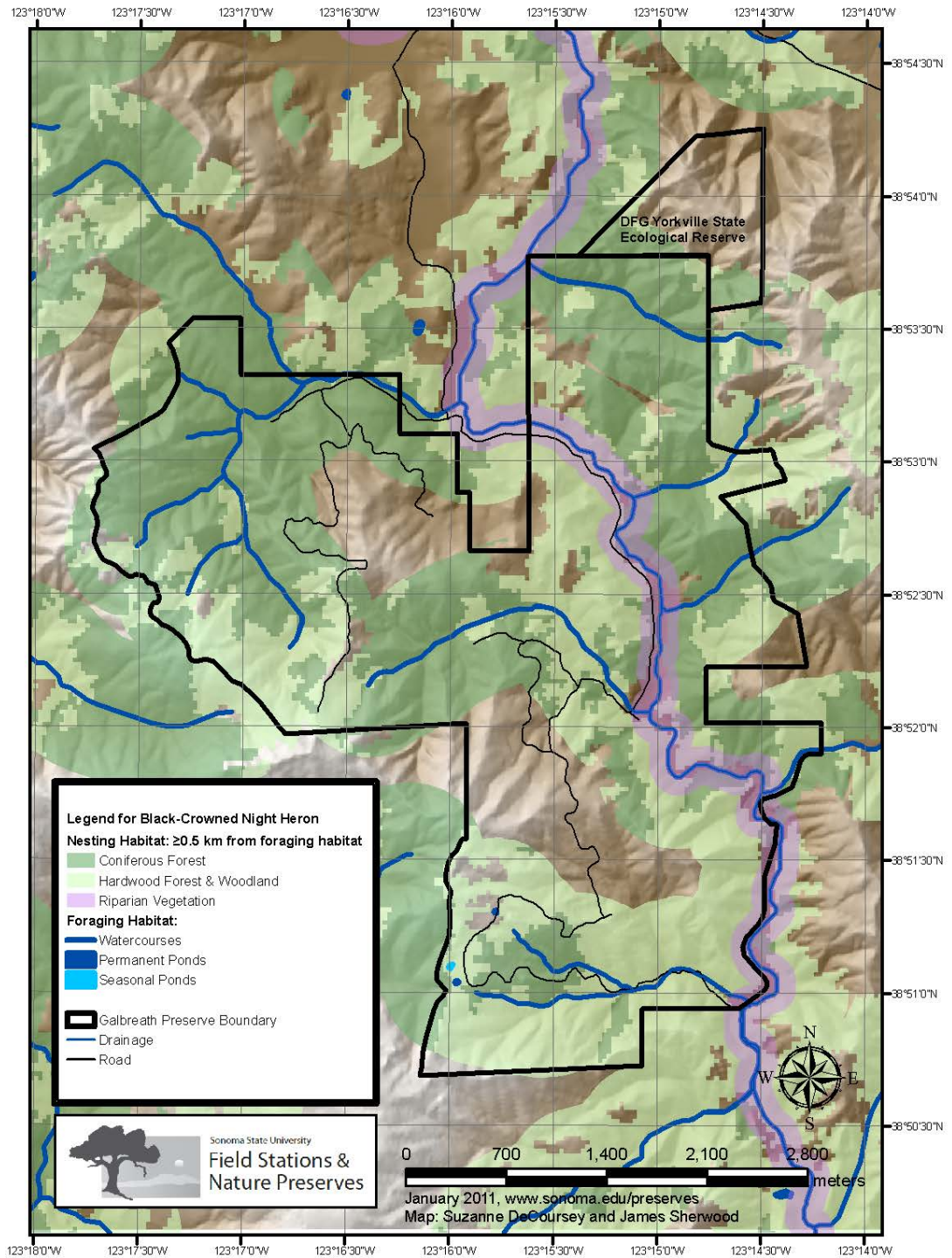
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**Species Account Description:** Emily Harvey

Figure 79. Potential habitat for Black-Crowned Night Heron, *Nycticorax nycticorax*





**Status:**  
(Nonbreeding/Wintering)

Federal: none

State: Watch Listed

Other: G5 S3

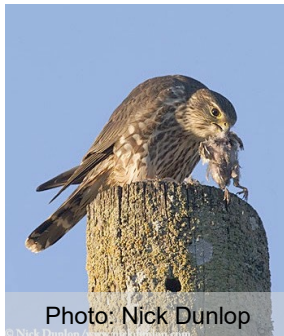


Photo: Nick Dunlop



Photo: Nick Dunlop

**Species Description:**

Small falcon. Sexually dimorphic in size and plumage (adults but not juveniles). Total body length varies from 24 to 30 cm, wing span from 53 to 68 cm, depending on sex and subspecies. Mass: (on average) males 160–170 g; females 220–240 g. Iris dark brown, beak dark blue-gray, and cere and legs bright yellow (breeding males have noticeably orange legs). Adult males 24% to 30% smaller in body mass than females, with dorsal plumage varying from blackish gray to pale blue-gray. Undertail coverts typically whitish with dark feather shafts. Leg feathers often have a distinct rufous wash; adult males have rufous wash on sides of breast. Tail black with white terminal band; generally 2 (Black Merlin), 3 (Boreal), or 4 (Prairie) lighter bands, usually gray. These bands reduced or nearly absent in Black Merlins. Females have similar breast pattern, but are brown on the back and lack rufous leg feathers (rump and uppertail coverts have grayish cast in Boreal Merlins). Female tail dark brown with buffy to white light bands and a terminal white band. Yearlings of both sexes resemble adult females in coloration, but are sometimes darker on back (Boreal subspecies) and lack grayish cast on rump and uppertail coverts. Like adults, yearlings show reversed sexual size dimorphism (females larger than males). Juvenile females separable from juvenile males by larger size and more tawny dorsal tail bands; from adult females only in late summer and fall by lack of molt...Most individuals lack the distinct mustache mark that is typical of most other North American falcons and are readily distinguished from the American Kestrel by their lack of rufous coloration on back and tail...(From Warkentin et al 2005)

**Distribution:** Breeds in Canada and northern US, and is a year around resident in coastal western Canada and Alaska and northwestern central US (Warkentin et al 2005). This species is an uncommon winter migrant in California from September to May (Zeiner 1990).

**Life History & Threats:**

Yearlong, diurnal activity...Winters in California from September to May. Wanders in search of abundant prey. Some individuals migrate as far as South America in winter....During winter, mean home range size of adults was observed to be 196 ha in Saskatoon (Warkentin and Oliphant 1990)....Apparently do not defend feeding territories (Becker and Sieg 1987, Warkentin and Oliphant 1990, Sodhi and Oliphant 1992). Feeding home range tend to overlap. Intraspecifically aggressive while nesting...Clutch of 4-5 eggs laid from late May into June. Incubates 28-32 days, and chicks fledge at about 24 days (Trimble 1972)...Because feeds mostly on birds, numbers probably have been reduced by pesticides. Potential avian predators are driven away as soon as they enter the territory; particularly intolerant of accipiters (Fox 1964, Bent 1938, Oliphant 1974). (From Zeiner et al 1990)

Wintering Merlins feed heavily on various species of small shorebirds in areas where they are abundant; e.g., Least Sandpiper (*Calidris minutilla*) and Dunlin (*C. alpina*) each made up nearly 40% of the diet of Merlins wintering at Bolinas Lagoon (Page and Whitacre 1975; Buchanan et al. 1988). (From Warkentin 2005)

In North America, loss of suitable habitat may be the major factor affecting Merlin numbers (Cade 1982, Oliphant 1985)...The effects of habitat loss and change on... wintering grounds are still unknown... Although most Merlin populations are no longer affected by pesticide contamination and are reproducing well (see Demography and Populations: measures of breeding activity), some individuals may still be impacted...Contaminants remain higher than levels suggested to cause abnormal behavior (Fox and Donald 1980) ... Merlins from North America continue to be exposed to DDT through prey either on wintering grounds in Central and South America, or via the prey that they consumed on the breeding grounds (e.g., Schick et al. 1987)... (From Warkentin 2005)

### **Habitat & Habitat Associations:**

#### *General Wintering Habitat:*

Poorly documented, but appears similar to breeding habitat, e.g., open forest and grasslands...Regularly hunts prey (e.g., shorebirds) concentrated on tidal flats (Page and Whitacre 1975, Boyce 1985, Buchanan 1988)... Often winters in cities throughout its range, where frequently perches on buildings, power poles, and tall trees (Oliphant 1974, Servheen 1985, Warkentin and Oliphant 1990). (From Warkentin 2005)

Winters in open woodland, grasslands, open cultivated fields, marshes, estuaries, and seacoasts. (From Sodhi et al 1993)

Seldom found in heavily wooded areas, or open deserts. Frequents coastlines, open grasslands, savannahs, woodlands, lakes, wetlands, edges, and early successional stages. Ranges from annual grasslands to ponderosa pine and montane hardwood-conifer habitats...Frequents open habitats at low elevation near water and tree stands. Favors coastlines, lakeshores, wetlands. (From Zeiner et al 1990)

#### *Roosting Habitat:*

May roost communally (L. Powers pers. comm.) but usually singly in conifer trees; tall trees with greater crown volume selected for roosting (Warkentin and James 1990). (From Warkentin 2005)

#### *Foraging Habitat:*

Regularly hunts prey (e.g., shorebirds) concentrated on tidal flats (Page and Whitacre 1975, Boyce 1985, Buchanan 1988). (From Warkentin 2005)

Frequents shorelines in winter and catches shorebirds. (From Zeiner et al 1990)

**Conceptual Basis for GIS Model Development:** Potential nonbreeding/wintering habitat in the Study Area was mapped as:

- coniferous forest types (i.e. Redwood-Douglas fir mix (*Sequoia sempervirens-Pseudotsuga menziesii*) or Pacific Douglas fir (*Pseudotsuga menziesii var.menziesii*) with canopy cover < 40%

- cismontane woodland (i.e., mixed hardwoods, montane mixed hardwoods, single dominant hardwoods with canopy cover < 40%)
- grasslands
- agricultural areas

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nonbreeding/wintering individuals.

*Habitat:* Merlins winter in open woodlands, grasslands, open fields on or near marshes, estuaries and seacoasts (Sodhi et al 1993). Appropriate seacoast habitat is 15 to 20 miles west of the Preserve. Merlins, however, are strong fliers and may on occasion visit the Preserves open woodlands and grasslands. These habitats are patchily distributed in through the center of the Preserve (Figure 80). More extensive grasslands and agriculture areas are located north of the Preserve boundaries. It is unlikely that this species would spend much time on the Preserve due the poor quality of wetland areas where Merlins prefer to forage (e.g., freshwater marshes, lakes). Areas with emergent vegetation are very rare and riparian vegetation along Rancheria Creek is poorly developed.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has not been reported to occur in USGS quads adjacent to the Preserve.

*Summary:* We anticipate that nonbreeding/wintering Merlins are “Unlikely to Occur” in the Preserve. Merlins are uncommon winter migrants in California and prefer coastal areas. The Preserve lacks high quality wetland foraging habitat and location of the Preserve roughly 20 miles inland of preferred winter foraging areas.

**References**

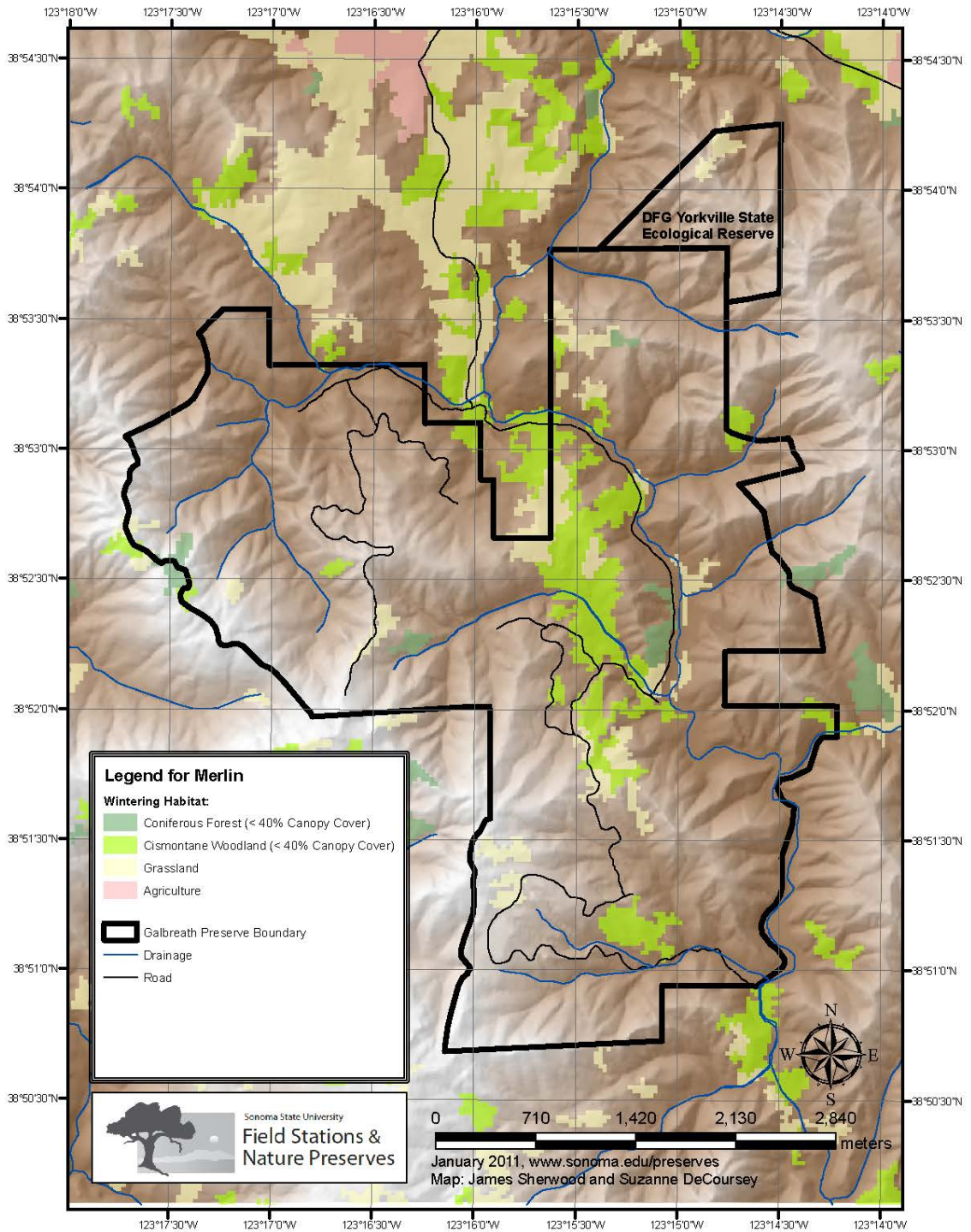
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**Species Account Description:** Linden Scheider & Emily Harvey

Figure 80: Potential habitat for Merlin (*Falco columbarius*)





*Aves (Birds): Ciconiiformes, Falconidae*  
**Prairie Falcon (*Falco mexicanus*)**  
**Potential Occurrence: Nesting Unlikely to Occur**

**Status:** (Nesting)

Federal: None

State: Watch Listed

Other: G5S3USFWS:BCC



**Species Description:**

Large, pale brown falcon. Adult lengths, based on measurements of live birds and museum specimens (Wheeler and Clark 1995), range from 37 to 47 cm (n = 41); wingspans 90–113 cm (n = 102); masses 420–1,100 g (n = 686). Eye large and dark; relatively large squarish head has characteristic black malar streaks, dark ear-patch, and distinctive white area between eye and ear-patch. When perched, wing-tips fall short of tail-tip (Clark and Wheeler 1987). Distinguished in flight from below by its distinctive dark axillaries and trailing edge of underwing-coverts, which contrast with light-colored underwing surface. Sexes similar in plumage, but males are smaller (see Measurements, below). Length of female's foot pad is >86 mm; male's foot pad is <86 mm long (McFadzen and Marzluff 1996a). Median underwing-coverts more heavily marked on females than on males (Wheeler and Clark 1995). Cere and legs bluish gray in juveniles, turning yellow after approximately 1 yr. Underparts barred or spotted in adults and streaked in juveniles; juveniles are buffier, and their ventral plumage has a more rosy tinge. Median pair of rectrices is unbarred in adults and indistinctly barred in immatures (Friedmann 1950). (From Steenhof 1998)

**Distribution:** The Prairie Falcon breeds in western Canada, winters in Mexico, on the west coast and in midwest of the US and is a year around resident in the western US and northern Mexico (Steenhof 1998).

Uncommon permanent resident that ranges from southeastern deserts northwest throughout the Central Valley and along the inner Coast Ranges and Sierra Nevada. (From Zeiner et al 1990)

This species winters in Mendocino County, but is a year round resident in eastern Sonoma, southern Lake and all of Napa County (Zeiner et al 1990).

**Life History & Threats:**

Yearlong, diurnal activity. Much time spent perching near eyrie. Forages mostly early morning and late afternoon except when feeding nestlings or prey scarce. Migrants from north winter in California. Some residents wander upslope in summer and downslope for winter... In California average home range size ranged from 59-288 km<sup>2</sup> (Harmata 1978, Haak 19982). Territory and home range probably the same. Intensively defends territory but less so on the wintering grounds (Steenhoff 1998). Active nests have been recorded within 200 m (636 ft) of one another (Enderson 1964, Garrett and Mitchell 1973), in sites where individuals did not confront or see each other regularly. Thus, relative orientation of potential nest site probably more important than actual distance from another potential site. Breeds from mid-February through mid-September, with peak April to early August. Clutch size 3-6 eggs, average 5. Mean laying date for 280 records 1900-1977 was April 4-11 (Walton 1977). Fledging success over 5 yr for

135 nests averaged 3.2 young, ranging 0-5; 19% of the nests had 5 young (Walton 1977). Young begin to disperse in June and July. May live as long as 13-20 yr (Enderson 1969, Denton 1975). Vulnerable to DDE poisoning. Egg and nestling predation occurs at sites accessible to mammal predators, great horned owls, and golden eagles. May compete with red-tailed hawks for food and nest sites, and with great horned owls and ravens for nest sites. (From Zeiner et al 1990)

Some prairie falcons breed when 1 year old, but most probably do not begin breeding until 2 years old [16,27]. The breeding season varies depending on geographic area. Reproductive activity usually begins in late winter or early spring. Courtship and mate selection occur on the breeding grounds at least 1 month before egg laying [16]. In California prairie falcons breed from mid-February to mid-September, with peak activity from early May to early August [34]. Prairie falcons generally lay three to six eggs. The eggs are incubated for 29 to 33 days. If the first clutch is destroyed another may be laid after 20 to 25 days [27,32]. Nestlings fledge in 40 days [32]. Other than local movements to low elevations, many adult prairie falcons tend to be residents on their breeding range if there is an adequate year-round food supply [27,32]. During the nonbreeding season most juveniles and some adult prairie falcons migrate to the intermontane valleys and Great Plains [16]. The adults seem to establish winter territories on their winter range [32]. Prairie falcons may live as long as 20 years; the longest known banding recovery is 13 years. Immature mortality has been estimated to be 75 percent and average annual adult mortality 25 percent. The average life expectancy of the prairie falcon has been estimated at 2.4 years [16]. (From Tesky 1994)

Illegal shooting is a common cause of mortality, particularly for first-year birds (see Demography and populations: causes of mortality, above). Shooting near the nest also can cause adults to leave nests temporarily, sometimes resulting in loss of eggs or young (Harmata et al. 1978). The Prairie Falcon is legally harvested for falconry in 19 states. Falconers take an estimated 0.2% of the population annually. The Prairie Falcon is the second most commonly harvested bird of prey in U.S. More sensitive to DDE effects than the Peregrine Falcon and Merlin. Captive individuals can succumb to lead poisoning when they consume prey that have lead shot embedded in their tissues (Redig et al. 1980), but the extent of this problem in the wild is unknown. Collisions with fences seem to be common (Beauvais et al. 1992); collisions with telephone wires and vehicles also reported (Boyce 1982, Robbins and Easterla 1992, G. Craig pers. comm.). Susceptible to habitat loss on breeding areas because nesting distribution is closely tied to cliffs. Because the number of nest sites is finite and nonrenewable, pairs cannot move to other undisturbed areas when nest sites or foraging habitats adjacent to cliffs are destroyed (Becker and Ball 1981). Large-scale agricultural development in the breeding range affects Prairie Falcon adversely, particularly in areas where populations forage on ground squirrels. Small-scale agricultural development, on the other hand, can benefit the Prairie Falcon when it provides an ecotone for prey populations. Agriculture benefits the Prairie Falcon on wintering areas because farms provide habitat for key avian prey species. Much of the habitat within the Prairie Falcon's breeding range is in demand for mining and various types of energy development. The species is affected adversely when mining excavations destroy nest sites, but it is relatively resilient to disturbances associated with energy developments on foraging areas. Effect of human activity near a nest site depends on the nature of activity, its proximity, and its duration and timing (Harmata et al. 1978). In general, pairs are more sensitive to disturbance during courtship and incubation than during brood-rearing and after fledging. Short, but intense disturbances can startle birds, causing them to flush and accidentally knock eggs from the nest. Disturbances of longer duration can cause a pair to abandon its nest (Harmata et al. 1978). Pairs are usually tenacious in defending their nests against humans, but aggressive reactions are less common in areas with considerable human activity (Harmata et al. 1978, Peterson 1988). (From Steenhof 1998)

## Habitat & Habitat Associations:

### *General Habitat*

Prairie falcons occupy open treeless terrain including prairies, deserts, riverine escarpments, canyons, foothills, and mountains in relatively arid western regions [13,16,32,34]. In the Sierra Nevada prairie falcons range above timberline in late summer but winter at lower elevations [34]. (From Tesky 1994)

The Prairie Falcon inhabits dry environments of western North America where cliffs or bluffs punctuate open plains and shrub-steppe deserts...Open habitat at all elevations up to 3,350 m; "arid plains and steppes of interior North America, wherever cliffs or bluffs are present for nesting sites" (Brown and Amadon 1968: 834). Shrub-steppe desert, grasslands, mixed shrub and grasslands, and alpine tundra. (From Steenhof 1998)

Distributed from annual grasslands to alpine meadows, but associated primarily with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas. Mostly absent from northern coastal fog belt...Prairie falcons commonly occur in arid and semiarid shrubland and grassland community types. They are also occasionally found in open parklands within coniferous forests [21]. (From Zeiner et al 1990)

### *Nesting Habitat*

During the breeding season prairie falcons are commonly found in foothills and mountains which provide cliffs and escarpments suitable for nest sites [16]... Prairie falcons generally nest on cliffs, from low rock outcrops of 30 feet (9 m) to vertical cliffs 400 feet (121 m) high. They prefer cliffs with a sheltered ledge with loose debris or gravel for a nest, overlooking treeless country for hunting. They may also nest in potholes or large caves [32]. Prairie falcons sometimes use old nests of ravens (*Corvus* spp.), hawks, and golden eagles (*Aquila chrysaetos*) [8,13,32]. Nest sites with southern or eastern exposures are preferred. However... in the San Joaquin Valley, California, most prairie falcon nests had northern exposures and no south-facing ledges were used [32]... Of 36 nesting cliffs in Colorado and Wyoming, 14 were sandstone, 10 were sedimentary conglomerate, 7 were limestone, and 5 were granite. Twenty-two nesting ledges faced south, five faced north and nine faced east or west [32]. In southeastern Montana and northern Wyoming, Phillips and others [28] reported that all prairie falcon nests were found in cracks or potholes in sandstone cliffs... In British Columbia prairie falcon nests were situated on ledges, in caves, in crevices, and in potholes on cliffs. Nesting cliffs were granite or sandstone and ranged from 49 to 453 feet (15-138 m) in height; the actual nest site ranged from 29 to 295 feet (9-90 m) from the base of the cliff [12].... Nests are rarely located at the top of a cliff [27]. (From Tesky 1994)

Nests primarily on cliffs, but also in trees (MacLaren et al. 1984), on power line structures (Roppe et al. 1989, Bunnell et al. 1997), on buildings (Nelson 1974a), and inside caves (Pitcher 1977, Haak and Denton 1979) or stone quarries (Smith and Murphy 1973). Most common nest sites are in cavities, ledges, crevices, or potholes on volcanic buttes, sandstone canyons, bluffs, and isolated rock outcrops. Vertical cracks and horizontal shelves provide the most typical opportunities for nesting on basalt, granite, and conglomerate cliffs; nests on sandstone and clay cliffs are usually in potholes. Most cliff nest sites have some degree of overhang...Cliffs used for nesting ranged from 2 to 154 m, and nests in 8 study areas averaged 18.5 m above ground (Runde and Anderson 1986). Mean nest heights correlate with mean cliff heights; most nests occur in upper half of cliff face...Usually nests on south-facing cliffs (Anderson 1964). Nest aspects in 5 states averaged 161.2° ( $n = 215$  nests; Runde and Anderson 1986). Southerly exposures may be advantageous when temperatures are low during incubation and brood-rearing in northern parts of breeding range. In low deserts at the southern end of range, individuals may select nest sites to avoid high temperatures; north-

facing cliffs were used more often at low elevations but not at high elevations in w.-central Arizona ([Millsap 1981](#)). ( From Steenhof 1998)

Usually nests in a scrape on a sheltered ledge of a cliff overlooking a large, open area. Sometimes nests on old raven or eagle stick nest on cliff, bluff, or rock outcrop...Southeast-facing nest site apparently preferred, but height and orientation secondary to nature and character of the ledge. (From Zeiner et al 1990)

### *Roosting Habitat*

During the breeding season, females always roost at or near nest, but males sometimes use night roost sites away from nests ([Harmata et al. 1978](#), [Kaiser 1986](#)). (From Steenhof 1998)

Occurs in open areas of all kinds, including plains, grasslands, steppes, deserts, and agricultural areas, especially where there are cliffs for nesting and roosting. (Global Raptor Information Network 2010)

### *Foraging Habitat*

Prairie falcons generally forage in open areas with low vegetation containing ground squirrels (*Spermophilus* spp.) and passerine birds... Prairie falcons also hunt from perches...Prairie falcons prefer to hunt in open areas covered only by short, sparse ground vegetation [[32](#)]. (From Tesky 1994)

**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped as:

- Grassland
- Chaparral
- Agricultural fields

Possible best nesting/roosting habitat is cliffs

Possible best foraging habitat is mapped as grasslands

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Prairie Falcons nest on rock outcrops and cliffs with loose debris or gravel that occur in or near open habitats, such as grasslands, savannahs, rangeland and scrub. Nesting habitat quality is poor to moderate in the Galbreath Wildlands Preserve. Prairie Falcons are mostly absent from the northern coastal fog belt, and the Galbreath Preserve, which does receive some coastal fogs, may be too damp for this species. However, rock outcrops in the Preserve are abundant and several areas with well-developed cliffs have been identified (Figure 81). These sites are typically heavily fissured and eroded, providing the crevices and gravels preferred by the species. Foraging habitat is more abundant outside than inside the Preserve: most wooded areas in the Preserve are too dense for prairie falcon and grasslands are more abundant to the north of the Preserve.

*Nearest Occurrence:*



Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented in the Preserve. To our knowledge, no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: The Prairie Falcon has not been reported to occur in USGS quads adjacent to the Study Area. The species is known to winter in Mendocino County and has been documented as a year round resident in eastern Sonoma, southern Lake and all of Napa County.

*Summary:* We anticipate that nesting Prairie Falcons are “Unlikely to Occur” in the Preserve because although nesting habitat and foraging habitats are available, Prairie Falcons tend to nest (i.e., are resident) in inland areas of the north coast; and only winter in Mendocino County.

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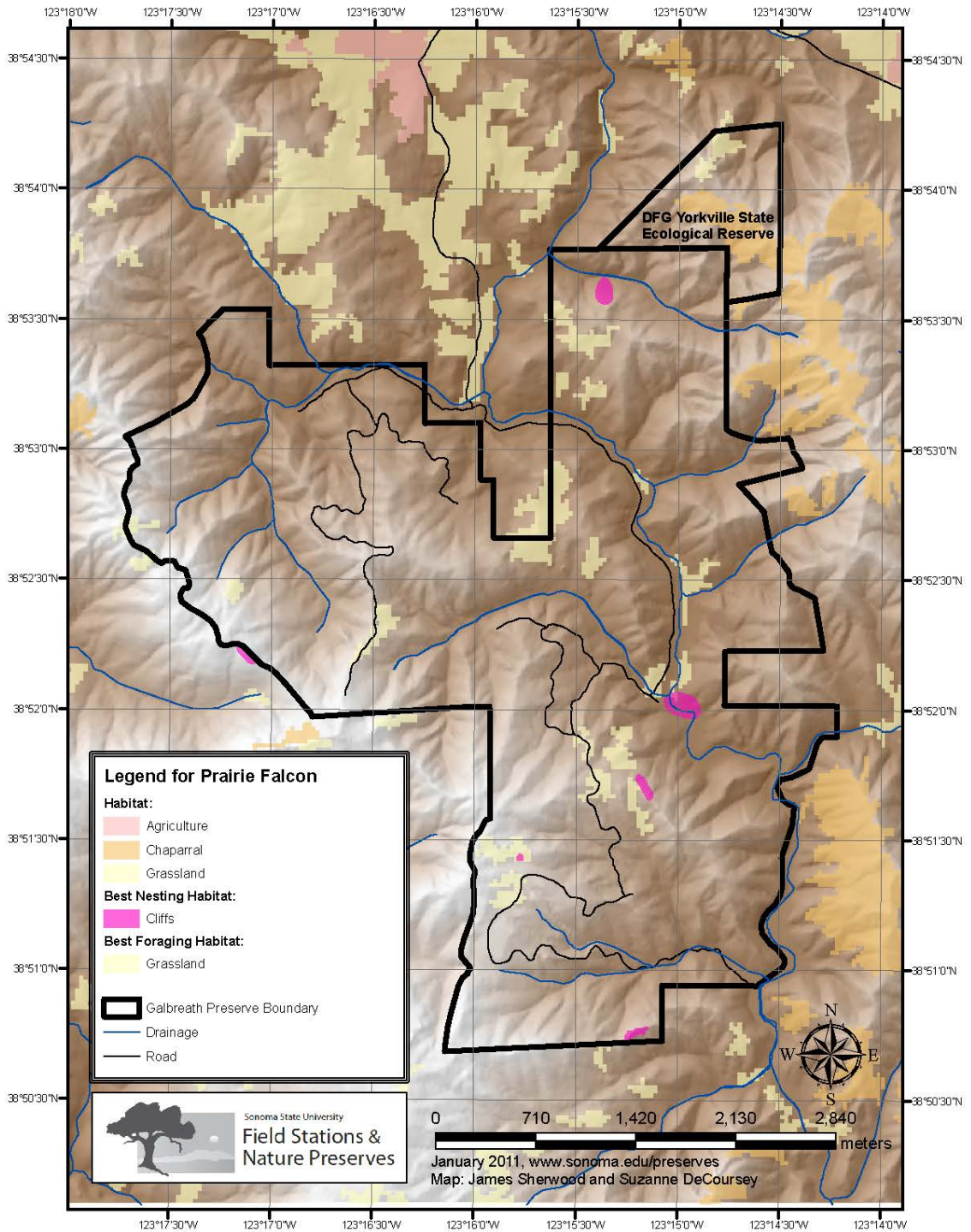
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**Species Account Description:** Linden Schneider & Emily Harvey

**Figure 81: Potential habitat for Prairie Falcon (*Falco mexicanus*)**



*Aves (Birds): Ciconiiformes, Falconidae*  
**American Peregrine Falcon (*Falco peregrinus anatum*)**  
**Potential Occurrence: Nesting Likely to Occur**

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**Status:** (Nesting)

Federal: Delisted

State: Endangered, Fully Protected

Other: G4T3 S2 CDF:S USFS:S USFWS:BC



**Species Description:**

Peregrines are crow-sized, with a wingspan of 36-44 inches. Adults have slate-gray backs and barred breasts, while immature birds have brown backs and heavily streaked breasts. All peregrines have prominent cheek ("moustache") marks on either side of their head. As is true in most species of "birds of prey", the female is larger than the male: females average 32 ounces in weight, while males only average 22 ounces in weight. (From Michigan DNRE)

Sleek and powerful, with very pointed wings and relatively short tail. Prominent dark 'moustache' unique; also note uniformly patterned under-wing. Voice: A series of harsh notes *rehk rehk rehk*. (From Sibley 2009)

**Distribution:**

The peregrine falcon is global in distribution [6,27].... In North America, the peregrine falcon's range extends from western Alaska to southern Greenland and south into Mexico ([6], review by [190]) (From Luensmann 2010)

Very uncommon breeding resident, and uncommon as a migrant. Active nesting sites are known along the coast north of Santa Barbara, in the Sierra Nevada, and in other mountains of northern California. In winter, found inland throughout the Central Valley, and occasionally on the Channel Islands. Migrants occur along the coast, and in the western Sierra Nevada in spring and fall. (From Polite 1999)

**Life History & Threats:**

Peregrine falcons are considered solitary, long-distance migrants [45,160,187,190]. However, some fledgling siblings migrate together in fall, while other siblings migrate separately [27,116]. Many peregrine falcons spend the breeding season in North America and overwinter in South America [1]. Peregrine falcons banded in the Northern Territories are recovered throughout South America [197]. American and arctic peregrine falcons in arctic and subarctic regions of North America migrate as far south as Argentina and Chile, a distance of 7,500 miles (12,000 km) or more [4,5,85,156,186]. Some populations in both regions are year-round residents (review by [190]). In particular, populations at temperate latitudes and along coastal areas are largely resident or engage in short-distance winter movements [4,170,186] (From Luensmann 2010)

Peregrine pairs mate for life, and often use the same nest site (in natural settings they are called "eyries") for many years in a row. Eyries usually occur on a ledge in high cliffs or an escarpment where the nest will be inaccessible to predators....Nest sites usually have an

encompassing view of the surrounding area, and are often near or over a lake or river. A nearby gravel shoreline or shoal for bathing is also a norm. The nest consists of a shallow scrape into which three to four eggs are laid. The eggs are whitish or pinkish with bold red and/or brown spots. Incubation lasts around 33 days and the responsibility is shared by both the male and female. (From Luensmann 2010)

The diet of the peregrine falcon includes a wide variety of small birds, including pigeons, seabirds, shorebirds and songbirds. Occasionally, they have been known to take small ducks, earning them the misleading name of "duck hawks." Peregrines hunt by diving at their prey from far above and catching them in mid-flight. During these incredible dives, called "stoops", the birds can reach speeds of 180 miles per hour. (From Michigan DNRE)

From the 1950s to the mid-1970s, global peregrine falcon population declines resulted from eggshell thinning and embryo mortality due to use of organochlorine pesticides, particularly DDT and DDE, in agriculture and forestry [101,134,137,190]. No known breeding pairs were present in the eastern United States by the mid-1960s [9]. Adult mortality during the same time period was linked to the insecticides aldrin and dieldrin [134]. Risebrough and Peakall [148] concluded that dieldrin played a more substantial role in peregrine falcon decline in Britain than it did in North America. In the 1970s, peregrine falcons were placed on the Federal List of Endangered and Threatened Wildlife (review by [190]). (From Luensmann 2010)

Recovery of peregrine falcon populations began after DDT and similar pesticides were banned in 1972 [137]. Intensive reintroduction efforts began throughout the United States and elsewhere to promote population recoveries [9,32,55]. Populations in North America were increasing at a rate of 2.9% to 25% per year between 1974 and 2000, partially due to reintroduction efforts [30,46,64,151]. Nesting sites in Alaska, Canada, and Greenland were increasingly occupied between 1980 and 1985 compared to previous decades, with some nesting territories consistently used from year to year [4,17,21,22,67,116,125]. Nesting success was higher in western Mexico from 1976 to 1985 compared to 1968 to 1974 [139]. These findings demonstrate the recovery of peregrine falcons in those areas. By 1999, populations within the United States had recovered sufficiently to prompt the US Fish and Wildlife Service to delist the peregrine falcon [121]. Despite recovery efforts in the United States, peregrine falcons migrating to Central and South America or areas where DDT or similar pesticides are still used may continue to accumulate pesticide residues [85]. (From Luensmann 2010)

Disturbances that may have contributed to the peregrine falcon decline include destruction of wetlands, construction of roads and other structures, poaching, removal of eggs and nestlings from nests, disturbance from recreational activities, and climate change [101]. Because peregrine falcons use a wide range of habitats and landscapes, the effects of habitat degradation are difficult to assess. The greatest effects are likely due to losses of nesting sites, which may be limited. (From Luensmann 2010)

## **Habitat & Habitat Associations:**

### *General Habitat*

Peregrine falcons show little preference for specific ecological communities [27]. Because of their hunting behavior, peregrine falcons are most adapted to open or partially wooded habitats [142]. Associated habitats from sea level to 13,000 feet (4,000 m) include coastal areas, plains, grasslands, shrublands, heaths, steppes, forests, and deserts [28,36,57,59,140,144,155](From Luensmann 2010)

In coastal California, peregrine falcons inhabit coastal sage scrub communities that are associated with coastal dunes, perennial grasslands, annual grasslands, croplands, pastures,



coast Douglas-fir (*Pseudotsuga menziesii* var. *menziesii*)-hardwood forests, coastal oak (*Quercus* spp.) woodlands, montane hardwood woodlands, closed-cone pine-cypress (*Cupressus* spp.) woodlands, chamise-red shank (*Adenostoma fasciculatum*-*A. sparsifolium*) chaparral, and mixed-chaparral communities. Coastal sage scrub is vegetated with bush lupine (*Lupinus* spp.) and manycolored lupine (*L. versicolor*) on exposed, oceanside sites and coyote bush (*Baccharis pilularis*) on less exposed sites [47]. East of San Francisco Bay, peregrine falcons occupy cliffs and rocky areas in coastal sage scrub habitat on southwest-facing slopes. Dominant species include California sagebrush (*Artemisia californica*), Eastern Mojave buckwheat (*Eriogonum fasciculatum*), black sage (*Salvia mellifera*), and snakeweed (*Gutierrezia* spp.) [117]. (From Luensmann 2010)

### *Nesting Habitat*

American peregrine falcons nest almost exclusively on protected ledges of high cliffs, primarily in woodland, forest, and coastal habitats (CDFG 1980, USFWS 1982). (From Estrep 2008).

According to a review, primary peregrine falcon habitat in the Pacific Northwest and British Columbia includes nesting cliffs along or near the coast and foraging areas that include tidal flats, beaches, interior marshes, prairies, or other open areas [106]. Cliffs in California are surrounded by patches of coniferous forest, sagebrush scrub, oak woodland, grassland, chaparral, or marshes [36]. (From Luensmann 2010)

Nest sites usually provide a panoramic view of open country, are near water, and are associated with a local abundance of passerine, waterfowl, or shorebird prey (Johnsgard 1990). They have been reported to use man-made structures, such as tall buildings and bridges, and will occasionally use tree or snag cavities or old nests of other raptors (Polite and Pratt 1999). (From Estrep 2008).

Eyries are typically on broad, open cliff ledges or in shallow caves and range from 32 to 86 feet<sup>2</sup> (3-8 m<sup>2</sup>) in area [43,144,170]. Eyries may also be found in deep recesses and rock cavities known as "potholes" [27,193] that have been carved out of cliffs by weathering. Small amounts of vegetation are common at eyries [43,144,170]...All but very small cliffs have some ledges that are potentially suitable for a peregrine falcon nest. Thus, availability of cliff ledges is likely not a limiting factor for peregrine falcons in most habitats [144]. (From Luensmann 2010)

Brush above eyries may screen the nest from predators [27]. Vegetation on nest ledges provides shade for young peregrine falcons. Fecal matter combined with prey remains may provide a nutritive base on which grasses or other vegetation may establish [26]. Shade at eyries is essential when day time temperatures reach 90 °F (32 °C) or higher. Adults may be able to shade nestlings during periods of excessive heat, but adults have limited tolerance to direct sunlight as well [126]. (From Luensmann 2010)

Cliff orientation may be influenced by availability rather than a choice of a particular exposure in some locations [45]. Local climatic conditions may influence the importance of nest or cliff aspect [87,185]. In the Southwest and southern Rocky Mountains, southern exposures are largely avoided [57,59,69,77,140,193] due to excessive afternoon heat. All aspects other than due south, including southeast and southwest, are used for nesting in southern Utah [77,193]. Nests in the Southwest that face south or west are often on deeply recessed ledges with a boulder or vegetation on the ledge or with overhanging rock that provides afternoon shade [57,77]. Peregrine falcons in the Southwest, including unmated individuals, may utilize cliff ledges facing all directions for activities other than nesting [69]. (From Luensmann 2010)

Although peregrine falcons primarily nest on cliff ledges (review by [190]), nesting in trees, on the ground, or on man-made structures is common [27]. The use of old or abandoned stick nests from other species, including abandoned common raven nests on electric pylons,

transmission towers, stone quarries and silos; osprey and cormorant nests on channel buoys; bald eagle nests along the Pacific Coast; common raven, cormorant, and red-tailed hawk nests on sandy coastal bluffs; and other nests within snags or man-made structures, is widespread ([38,72,144,190], review by [37])...Use of abandoned nests from other avian species appears to be most widespread in arctic and subarctic regions. (From Luensmann 2010)

While peregrine falcons prefer cliff habitats, in the Canadian Arctic where cliffs are not present they readily nest on riverbanks, coastal areas, dykes, low mounds, or boulders. Nests in riverbanks are usually situated in hollows; in potholes under tree roots at the top of the bank; under roots; or under rock outcrops protruding from the face of the bank. (From Luensmann 2010)

### *Roosting and Perching Habitat*

Preferred roosts are often small ledges, knobs, or projections with protective overhangs on steep rock faces [144]. Multiple lookout points and available cover were considered highly desirable on a large nesting cliff in Pennsylvania and New Jersey [147]. Several roosting places are often found on a nesting cliff [144]. Perches in California were on ridges within 0.6 mile (1 km) of the eyrie [65]. Males often perch near the eyrie while the female broods the young [144]. (From Luensmann 2010)

In Kentucky, hacked peregrine falcons perched in decaying pine trees that had large DBH and were surrounded by few deciduous trees. On average, perch trees in Kentucky had greater DBH, a more advanced stage of decay, and a greater field of view than nearest-neighbor trees that were not used for perching. In 2 models, perch use in Kentucky was positively associated with DBH and advanced stages of decay ( $P < 0.001$ ), while negatively associated with tree height and deciduous tree density ( $P < 0.001$ ) [39]. (From Luensmann 2010)

### *Foraging Habitat*

Peregrine falcons do not generally forage in associations with canopy cover  $\geq 70\%$  in the Sierra Nevada. They utilize all seral stages of forested, woodland, and chaparral habitats in the Sierra Nevada [180]. However, late-seral stages of chaparral may reduce prey availability [113]. Peregrine falcons likely occur in redwood (*Sequoia sempervirens*) and giant sequoia (*Sequoiadendron giganteum*) associations [53,196]. (From Luensmann 2010)

According to Smith and others [160], peregrine falcons inhabit successional forests. Peregrine falcons in the Pacific Northwest breed and hunt in grass-forb, shrub-seedling, pole-sapling, young, mature, and old-growth coniferous forest [155]. They do not hunt within dense forest canopies, but they do hunt above forest canopies and expanses between stands [173]. Wellersdick and Zalunardo [182] asserted that peregrine falcons were heavily dependent on snags in the Cascade Range, but they did not discuss any observations from which to base that conclusion. Six tree eyries in dense Sitka spruce forests on offshore islands along the northern coast of British Columbia were described by Campbell and others [38]. (From Luensmann 2010)

Factors that limit habitat suitability for peregrine falcons vary between locations. Primary factors may include limited access to prey, such as shorebirds and passerines (Passeriformes), and limited nest site availability [87,140,173]. Diverse communities of avian prey are attracted by large water sources [140,170]. Thus, peregrine falcons tend to inhabit areas near large bodies of water including wetlands, lakes, streams, and marine environments [140]. (From Luensmann 2010)

The distance that peregrine falcons hunt from the eyrie may partially depend on breeding status, previous hunting success, and prey size [55]. Most peregrine falcons hunt within 9 miles (15 km) of the nest [27,61,65,120,140,191]. However, peregrine falcons often travel 15 miles (24 km) or more to hunt [61,120,173,191]. Females can carry prey a longer distance than males; thus, they may have larger hunting ranges [144]. On Langara Island, British Columbia, nesting peregrine falcons generally have small ranges, often hunting from perched positions at or near the eyrie [11]. At the opposite extreme, peregrine falcons in the forested interior of British Columbia traveled up to 60 miles (100 km) from the nest to prey on seabird colonies on the coast [38]. (From Luensmann 2010)

### **Conceptual Basis for GIS Model Development:**

Potential habitat for Peregrine Falcons includes all vegetation types and elevations in the Study Area. Areas of greatest potential for their occurrence were mapped as:

*Foraging Habitat:* all vegetation types with < 70% canopy cover. (Note however that peregrines can hunt above dense forest canopies (Leunsmann 2010)).

*Nesting Habitat:*

- Cliffs

*Roosting and Perching Habitat:*

- Trees  $\geq$  61 cm (24 in) DBH
- Cliffs

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Peregrine Falcons nest almost exclusively on protected cliffs and prefer to forage for their young in open areas of a wide variety of habitats. Habitat quality for this species is moderate to good in the Galbreath Wildlands Preserve. Open areas for foraging are abundant and cliffs do occur within the Preserve (Figure 82). Cliff sites, however, may be poorly protected. Some of the cliff areas visited were easily accessible to potential predators.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented in the Preserve. To our knowledge, no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: The Peregrine Falcon has not been reported to occur in USGS quads adjacent to the Study Area, but are known to nest in the mountains of northern California. Neighbors to the Preserve have reported that Peregrine falcons nest at a site to the east of the Preserve.

*Summary:* We anticipate that nesting Peregrine Falcons are “Likely to Occur” in the Preserve because, although they are an uncommon resident, the Preserve could provide suitable nesting, foraging and roosting habitat.

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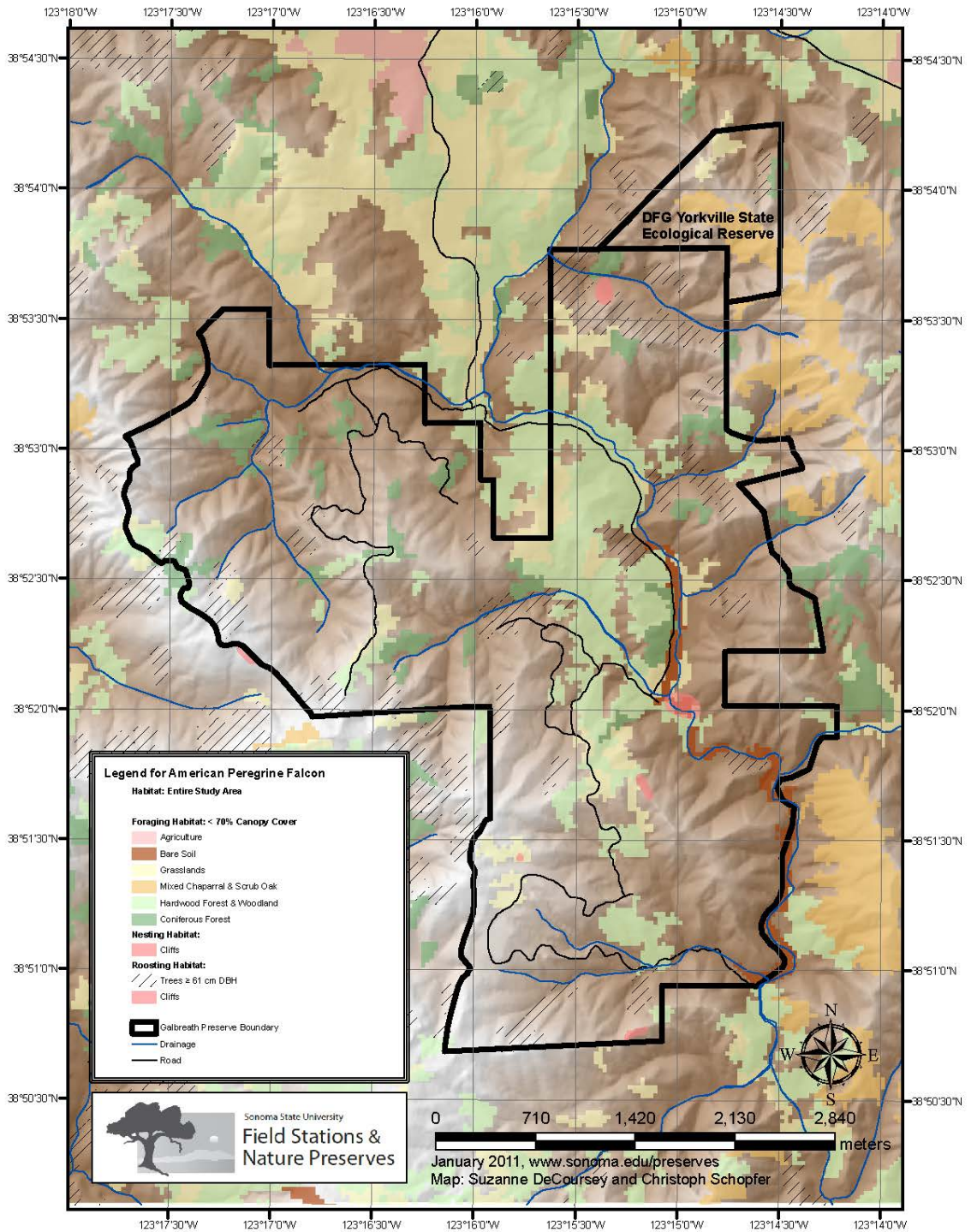
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**Species Account Description:** Emily Harvey



Figure 82: Potential habitat for American Peregrine Falcon (*Falco peregrinus anatum*)



*Aves (Birds): Passeriformes, Alaudidae*  
**California Horned Lark (*Eremophila alpestris actia*)**  
**Potential Occurrence: Nesting Unlikely to Occur**

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**Status:** (Nesting)

Federal: None

State: WL

Other: G5T3Q S3



Photo: Alan Vernon

**Species Description:** The Horned Lark is fairly slender with proportionally long wings, a short and stout bill, and square tail. Grey upperparts and white underparts, with a distinctive yellow and black mask and black collar. During summer, males have tiny black “horns” of plumage (Beason 1995; Sibley 2000).

**Distribution:** While the Horned Lark is widely distributed throughout North America and Europe, the California subspecies is found along the Coast Ranges from Humboldt County south, and in the central valley south to Baja California. This subspecies can also be found in the high Sierra Mountains during summer (Green 1990).

**Life History & Threats:** A year-round resident of most of California, the Horned Lark breeds from March through July, with the highest activity in May. Frequently there are two broods in one season, each with 2-5 eggs (Green 1990). This species is on the watch list because populations have declined 56% in the past 40 years (National Audubon Society 2010).

While the loss of agricultural fields to reforestation and development have contributed to the population declines in eastern North America (Buckelew and Hall 1994, Laughlin and Kibbe 1985), the factors responsible for their declines in other portions of North America are poorly understood. Habitat loss is a factor in southern California (Garrett and Dunn 1981), and may be involved in declines in other areas with rapidly expanding human populations. However, the varied temporal patterns shown by the declining populations may indicate that multiple factors are responsible for these survey-wide trends. (From Peter John, 1995)

**Habitat & Habitat Associations:**

*General:* Found on barren ground with short grass or scattered bushes (Sibley 2000). Often uses fallow agricultural fields (Green 1990)

Grassland, tundra, sandy regions, areas with scattered low shrubs, desert playas, grazed pastures, stubble fields, open cultivated areas, and rarely open areas in forest (AOU 1983). Nests in hollow on ground often next to grass tuft or clod of earth or manure. (From Hammerson 1995)

*Nesting Habitat:*

Nests in hollow on ground often next to grass tuft or clod of earth or manure. (From Hammerson)

**Conceptual Basis for GIS Model Development:** We mapped potential habitat for this species as grasslands and agricultural fields. Areas of bare ground were also mapped, although bare ground in the study area is found exclusively within scoured riparian areas.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* The quality of nesting habitat for Horned Larks is poor in the Preserve (Figure 83). Grasslands on the Preserve are not extensive and patchy in distribution. Since 2000, grasslands have not been grazed by cattle which would create the open grasslands and barren soil preferred by this species. Scoured mineral soils on stream terraces along the main stem of Rancheria Creek tend to support sparse grasslands and may be the best habitat for this species.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has not been reported to occur in USGS quads adjacent to the Preserve.

*Summary:* We anticipate that nesting by this widespread permanent resident of northern California is “Unlikely to Occur” in the Preserve because quality nesting habitat is scarce.

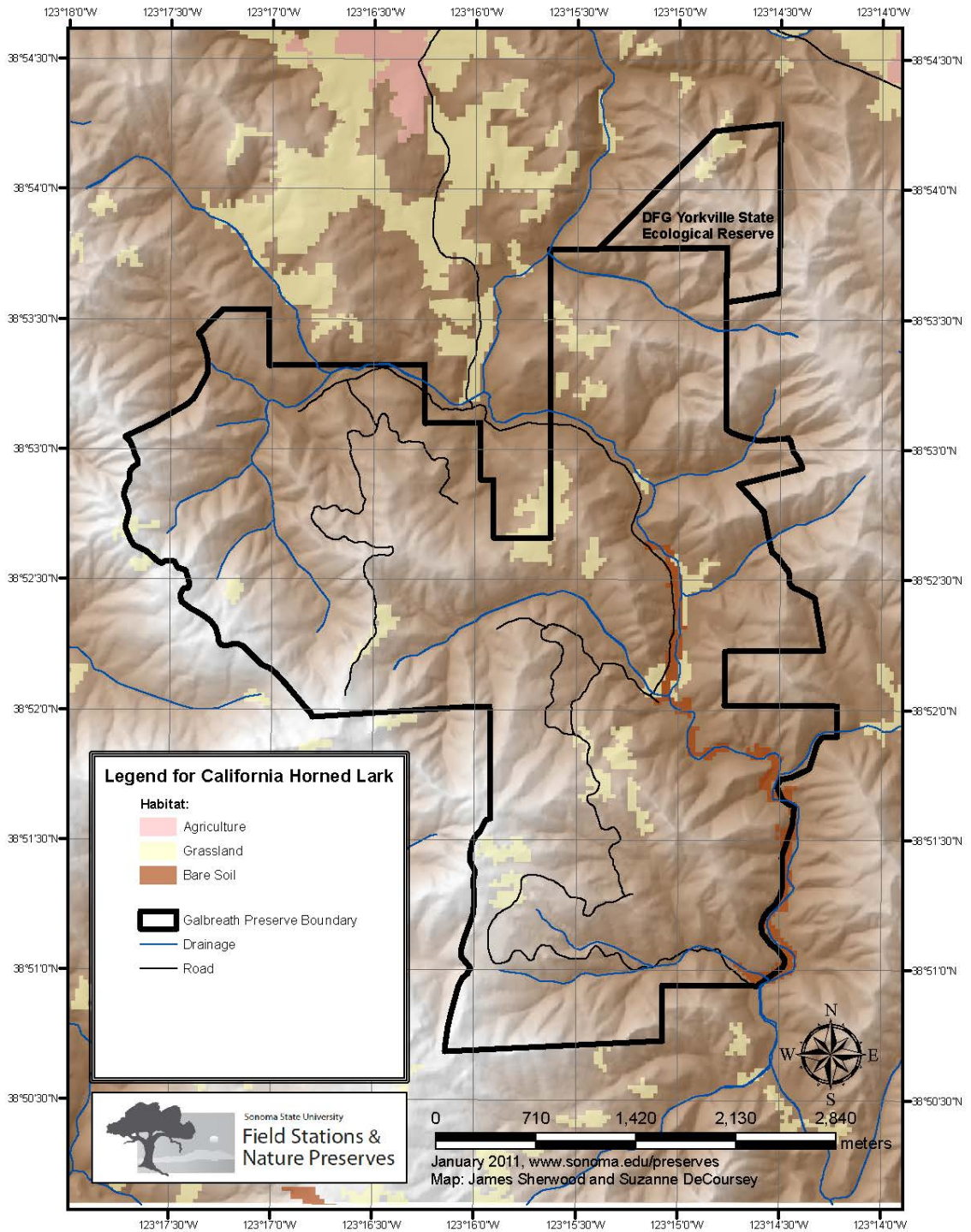
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**Species Account Description:** Kandis Gilmore & Emily Harvey



**Figure 83: Potential habitat for California Horned Lark (*Eremophila alpestris actia*)**





*Aves (Birds): Passeriformes, Emberizidae*  
**Grasshopper sparrow (*Ammodramus savannarum*)**  
**Potential Occurrence: Nesting Likely to Occur**

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**Status:** (Nesting)

Federal: None

State: Species of Special Concern

Other: MBTA, G5 S2

**Species Description:**

The Grasshopper Sparrow is small (11–13 cm, mass 14.5–20 g), flat-headed, and inconspicuous. The head has a dark, blackish crown that is narrowly streaked with buff and divided by a pale buffy-white crown stripe. Lores are orange-yellow, sometimes extending thinly over and behind the eyes. The bill is deep. Nape is greyish, with fine chestnut or reddish brown streaks. The back is streaked with chestnutrust and black, with yellow wing edges that are brightest at the carpal joint. Tail is short and sharp, with rectrices pointed with bare shaft at tip (as is typical of *Ammodramus*). Breast is buffy and unstreaked, with a whitish lower breast. Juvenile Grasshopper Sparrows have a band of streaks across their breasts (Vickery 1996; Cannings 1995). (From B.C. Ministry of Water, Land and Air Protection 2004)



**Distribution:**

Occurs across North America and ranges from southern Canada disjunctly south to Ecuador. Of twelve subspecies currently recognized, four breed in North America (Vickery 1996). *A. s. perpallidus* occurs very patchily from the Pacific coast, including California, east to the Great Plains. Regarded as “rare” and local in Oregon (Gilligan et al. 1994) and endangered in British Columbia (Cannings 1991). Common only in the Great Plains, but numbers even there are declining with loss of habitat, conversion of pasture to row crops, and fire suppression (Vickery 1996). The Grasshopper Sparrow occurs in California primarily as a summer resident from March to September (Garrett and Dunn 1981, McCaskie et al. 1979); the breeding season extends from mid-March to August (Collier 1994). The winter status of this secretive species is obscure, though it is generally considered rare and appears with greatest frequency on the coastal slope of southern California (Grinnell and Miller 1944; 55 winter records for San Diego atlas, Unitt 2004; CBC maps). The Grasshopper Sparrow is at least partly migratory; the occasional birds seen in winter at breeding localities may not be the same individuals there in spring and summer. (From Shuford and Gardali 2008)

Grinnell and Miller (1944) described the Grasshopper Sparrow as a summer resident from Mendocino, Trinity, and Tehama counties south, west of the Cascade–Sierra Nevada axis and southeastern deserts, to San Diego County, from sea level to 4900 ft (1494 m), as in the San Jacinto Mountains. The only suggestion of breeding in the Great Basin is a 13 July 1928 record of a fully fledged young at 4500 ft (1372 m) in Pete’s Valley, Lassen County (Grinnell et al. 1930), which might have represented an extralimital breeding record or evidence of postbreeding dispersal across the mountains. Willett (1912) considered the Grasshopper Sparrow “fairly common” though local on the southern coast of California, but Grinnell and Miller (1944) designated it “sparse and irregularly distributed” overall in the state and noted its semicolonial nature and variable occurrence from year to year. They noted winter occurrence was mainly in the western lowlands, chiefly in southern California, with records extending north

to Fresno County and perhaps to the San Francisco Bay region. (From Shuford and Gardali 2008)

### **Life History & Threats:**

The diet of breeding Grasshopper Sparrows in Nebraska consisted of 33% seeds and 67% arthropods, although nestlings were fed entirely on arthropods (Kaspari and Joern 1993). Adults in Nebraska selected acridid grasshoppers (Orthoptera) and adult Coleoptera above all else, followed by Hemiptera species, although Homoptera species were more widely available (Kaspari and Joern 1993). In other locations including Oklahoma and South Dakota, grasshoppers (Orthoptera species) and Lepidopteran larvae made up a large proportion of the adult diet, although seeds still accounted for 14–39% of breeding season diet (Wiens 1973; Vickery 1996). In Wisconsin, nestlings were fed primarily Lepidoptera larvae, with other items including Odonata, Orthoptera, Hemiptera, Diptera larvae, Arachnida, and Oligochaete (Wiens 1969). Concurrent measures of prey availability revealed that adult Grasshopper Sparrows are not opportunistic foragers as suggested by Wiens and Rotenberry (1979) but rather select prey based on size and profitability (Kaspari and Joern 1993). They avoid small prey, and prey with high chitin ratios, and will strip insects of their chitinous exoskeletons to maximize food value for effort (Kaspari and Joern 1993). (From B.C. Ministry of Water, Land and Air Protection 2004)

Males begin territory establishment upon arrival at breeding grounds (Smith 1968). Pairs form immediately after arrival of females at breeding ground, usually 3–5 days after males. Nest building may be initiated immediately, and the female alone builds the nest over 2–3 days. Nests are typically 11–14 cm in diameter, and 5–7 cm in height. Grasshopper Sparrows commonly produce two or more broods in a year, when conditions are favourable. Nests are not reused in subsequent nesting attempts. Clutch size varies from three to six, with second clutches generally smaller, often with two eggs. (From B.C. Ministry of Water, Land and Air Protection 2004)

The female alone incubates the clutch for 11–13 days (Smith 1968). If a female is flushed while incubating, she is likely to feign injury to distract predators (Smith 1963). There is a record of a Grasshopper Sparrow dumping two eggs into a Savannah Sparrow nest (Wiens 1971). The eggs were incubated and hatched although the nestlings were subsequently predated (Wiens 1971). Both males and females feed nestlings (Vickery 1996). Non-parental attendants helped to feed nestlings at 4 of 23 nests in Nebraska between 1981 and 1984, although it did not affect nestling survival (Kaspari and O'Leary 1988). This was most likely misdirected parental care and not kin-based altruism since there was no evidence of site fidelity (Kaspari and O'Leary 1988). (From B.C. Ministry of Water, Land and Air Protection 2004)

Juveniles are well feathered by 9 days when they leave the nest, and plumage is complete by 10–12 days (Smith 1968). Nestlings in Nebraska departed nests at 6–8 days (Kaspari and O'Leary 1988). Both sexes give approximately 4–19 days of post-fledging parental care before females initiate nest construction for the second clutch. Fledglings disperse immediately from the vicinity of the nest, and young of first brood are dispersed by the time second brood is being fed (Vickery 1996). Grasshopper Sparrows breed the first spring after hatching, and presumably every year after (Vickery 1996). Nesting success rates in Missouri Conservation Reserve Program (CRP) fields were 32–63% (McCoy et al. 1999), 30% in Iowa CRP fields (Patterson and Best 1996), and 20% in Minnesota (Johnson and Temple 1990). (From B.C. Ministry of Water, Land and Air Protection 2004)

Grasshopper Sparrows are thought to experience a low level of brood parasitism by Brown-headed Cowbirds (*Molothrus ater*) (Smith 1968), although parasitism levels vary throughout their range (2–50%) (Vickery 1996). One of the five nests recorded in British Columbia had a cowbird egg (Cannings et al. 1987). However, in Ontario, only 8% of nests were parasitized by

cowbirds (n = 74) (Peck and James 1987). It is possible that the structure and placement of nests keeps them well hidden from cowbirds (Burger et al. 1994). (From B.C. Ministry of Water, Land and Air Protection 2004)

Urbanization is the primary current threat to the Grasshopper Sparrow. Much of its California habitat lies in the path of expanding cities, especially in southern California and the foothills surrounding the Central Valley. The great expansion of vineyards in the Central Valley and inner Coast Ranges (e.g., Merenlender 2000) is likely removing substantial habitat for this species. The effect of conversion from native to non-native grasslands on Grasshopper Sparrows is unknown, but in Oregon Grasshopper Sparrows prefer native bunchgrass (Janes 1983, Holmes and Geupel 1998). In the Santa Monica Mountains of Ventura County, W. Wehtje (pers. comm.) notes the invasion of Harding Grass (*Phalaris aquatica*) as a threat to Grasshopper Sparrow habitat. (From Shuford and Gardali 2008)

Depending on degree, the effect of grazing can be negative (Saab et al. 1995) or positive. For example, in humid Oklahoma the species was found only in grazed tallgrass prairie, whereas in arid southeastern Arizona it was eliminated by grazing (Bock and Webb 1984). Behle et al. (1985) ascribed the species' current rarity in Utah to a history of overgrazing. In the Lake Henshaw basin of north-central San Diego County, heavy grazing in combination with pumping out of groundwater confine the Grasshopper Sparrow to a few mesic microhabitats in an area where it would otherwise likely be widespread. Conversely, during the 1990s, the cessation of cattle grazing in Happy Camp Regional Park near Moorpark, Ventura County, led to Coyote Brush (*Baccharis pilularis*) replacing grass and Grasshopper Sparrows disappearing (W. Wehtje pers. comm.). Fire suppression may also threaten Grasshopper Sparrows if it leads to grassland converting into unsuitable habitats such as dense scrub. (From Shuford and Gardali 2008)

## **Habitat & Habitat Associations:**

### *General Habitat:*

In general, however, Grasshopper Sparrows in California prefer short to middle-height, moderately open grasslands with scattered shrubs. Grinnell and Miller (1944) listed a variety of generalized grassland-like habitats, including alfalfa. Dawson (1923) mentioned a nest near Escondido in an alkaline meadow covered with saltgrass (*Distichlis*). Often the sparrow's habitat in this area is an ecotone between grassland and sage scrub, so there are scattered shrubs such as California Buckwheat (*Eriogonum fasciculatum*) or California Sagebrush (*Artemisia californica*), used by the birds as song perches (pers. obs.). (From Shuford and Gardali 2008)

In some parts of the sparrow's California range, native bunchgrasses appear to be important habitat components (e.g., San Diego, Unitt 2004), although this is probably not the case in most of the state, given that non-native annuals dominate most grasslands. In Riverside County's Santa Rosa Plateau Ecological Reserve, the presence of native grasses was less important than the absence of trees (Collier 1994). These sparrows generally are absent from areas with extensive shrub cover, though some shrubbery is tolerated and perhaps preferred (Johnston and Odum 1956, Bock and Bock 1992, Vickery 1996). Patchy bare ground has also been noted as an important habitat component elsewhere (e.g., in Arizona, Bock and Webb 1984; in West Virginia, Whitmore 1981). The Grasshopper Sparrow is more likely to be found in large tracts of habitat than in small ones (Vickery et al. 1994); minimum area requirements are about 100 ha in Maine (Vickery et al. 1994), 30 ha in Illinois (Herkert 1994). (From Shuford and Gardali 2008)

### *Foraging Habitat:*

Grasshopper Sparrows forage exclusively on the ground, and require some amount of bare ground for foraging (Whitmore 1981; Vickery 1996). (From B.C. Ministry of Water, Land and Air Protection 2004)

*Nesting Habitat:*

Grass cover is important for concealing nests (Vickery 1996). Grasshopper Sparrow nests are extremely difficult to find, usually hidden at the base of clumps of grass, clover, dead vegetation, alfalfa, or other cover (Smith 1968). In Florida, *A. savannarum floridanus* often places nests beneath dwarfed live oak (*Quercus minima*) instead of grass clumps (Delany and Linda 1998). Nests are sunk into depressions, with the rim flush with the ground. Nests are made of dried grass and lined with fine materials including grasses, sedges, and sometimes hair (Vickery 1996). The top is usually arched or domed at the back, giving it an oven-like appearance (Smith 1968). (From B.C. Ministry of Water, Land and Air Protection 2004)

Grasshopper Sparrows typically select moderately open grasslands and prairies with patchy bare ground (Vickery 1996). Grasshopper Sparrows in Wisconsin occurred at the highest densities in habitats with relatively short vegetation (Ribic and Sample 2001). In eastern Washington, Grasshopper Sparrows were positively associated with perennial grasses, which are indicative of native grassland (Vander Haegan et al. 2000). Soil type (loamy, shallow, or sandy) and range condition (good, fair, or poor) had a significant interaction when used to describe abundance of this species. Grasshopper Sparrows were most abundant in sites that had loamy soil with fair range, or shallow soil with poor range (Vander Haegan et al. 2000). (From B.C. Ministry of Water, Land and Air Protection 2004)

The positive association of Grasshopper Sparrow with cheatgrass, a weedy annual grass, and pasture sage indicates that this species tolerates some level of disturbance, and habitat selection may not be affected by invasion of exotic species (Paczek 2001). Grasshopper Sparrows may respond more to plant structure than floristics, as they were more abundant in areas with abundant Eurasian weeds, relative to native plants in Manitoba, Illinois, and Colorado (Wilson and Belcher 1989; Haire et al. 2000; Walk and Warner 2000). Presence of weeds could indicate habitats that are rich in prey. For example, in Arizona, grasshoppers (Orthoptera) prefer rangelands dominated by weedy herbs rather than wellgrazed ranges (Nerney 1958); in Oklahoma, Orthoptera, particularly acridids, increased in moderate to heavily grazed grassland (Smith 1940)... Song perches in general are important for Grasshopper Sparrows, which sing most often from fixed perches such as shrubs, flower stems, and fence posts, and occasionally from the ground, usually in the periphery of their territories (Vickery 1996). (From B.C. Ministry of Water, Land and Air Protection 2004)

**Conceptual Basis for GIS Model Development:** Potential foraging and nesting habitat was mapped for the Grasshopper Sparrow in the Study Area as grasslands.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Grasshopper sparrows nest in open grasslands. Nesting habitat in the Preserve is not very abundant but is likely moderate to good in quality (Figure 84). Preserve grasslands, which contain both non-native and native grasses and forbs, have not been grazed since 2000 and provide undisturbed areas for nesting. Adjacent properties, especially areas north of the Preserve, have greater availability of grasslands and agricultural fields preferred by this species.

*Nearest Occurrence:*



Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has been reported to occur in the Hopland USGS quad east of the Preserve, and is widespread in California.

*Summary:* Nesting Grasshopper Sparrows are “Likely to Occur” in the Preserve due to the occurrence of quality nesting habitat.

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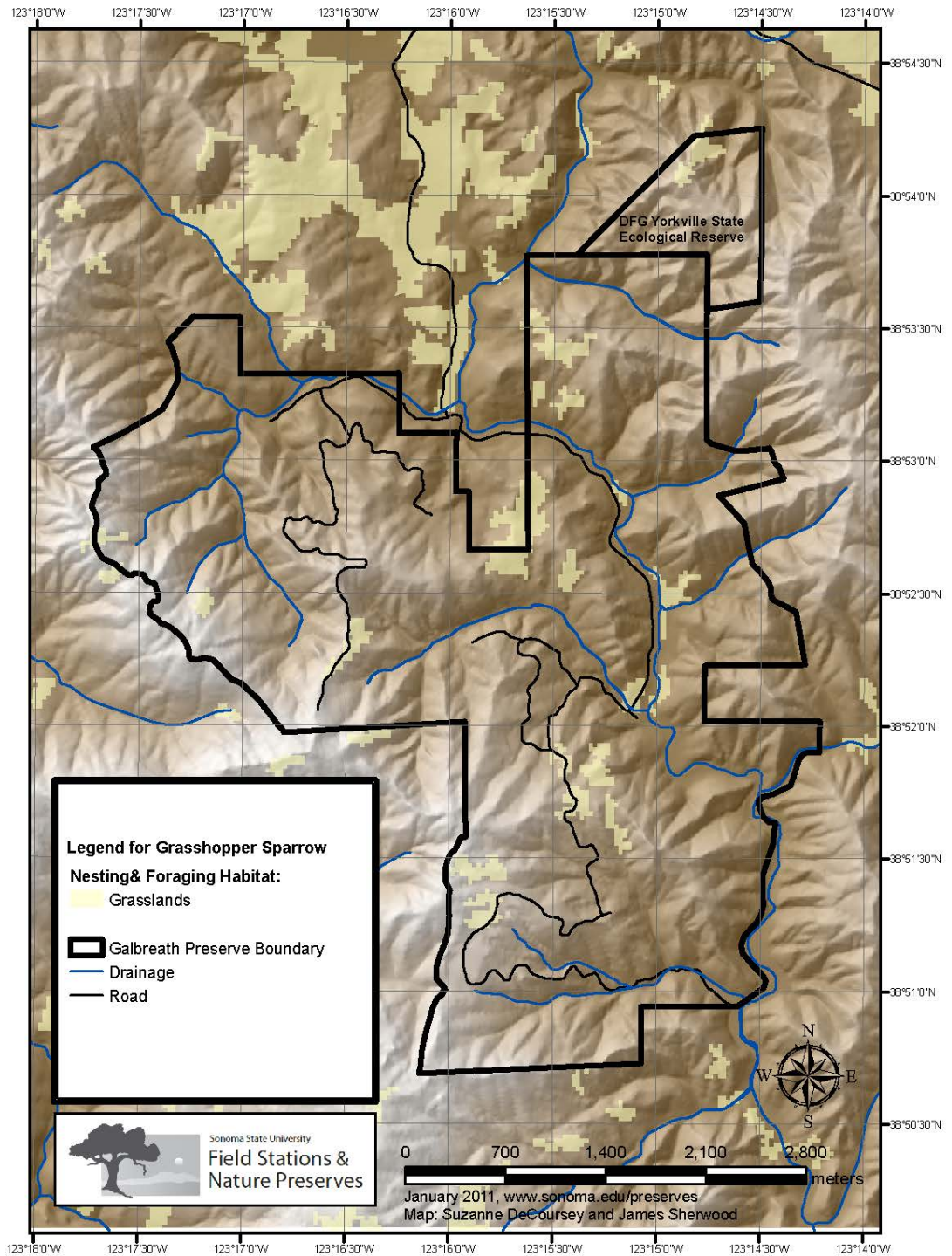
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**Species Account Description:** Neal Ramus & Emily Harvey

Figure 84. Potential habitat for Grasshopper Sparrow, *Ammodramus savannarum*



*Aves (Birds): Passeriformes, Emberizidae*  
**Chipping Sparrow (*Spizella passerina*)**  
**Potential Occurrence: Nesting Likely to Occur**

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**Status:** (Nesting)

Federal: none

State: none

Other: G5 S3S4; MBTA



Photo: Eric Hendrickson

**Species Description:** A small bird with the typical sparrow body shape, the Chipping Sparrow has a rufous-tinged crown that grows brighter in color during the breeding season (April through August). Brown and white wings accent an overall gray body and a grayish rump. There is a strong, dark eyeline extending back from the eye (Sibley 2000).

**Distribution:** The Chipping Sparrow is widespread throughout North America, and its breeding range extends from to Central America. The Central American breeders are sedentary, but the more northern populations migrate over long distances to the southern U.S., Mexico, and Nicaragua. (Hammerson 2009). In northern California, Chipping Sparrows spend the summer in most areas (including Mendocino and Sonoma counties) but move to the central valley and southern California during winter (Zeiner 1990).

**Life History & Threats:** In California, breeding season begins in April-May. A solitary nester, each clutch contains 3-5 eggs and often there are two broods per season (Granholm 1990). The altricial young are tended by both parents and fledge at 14 days after hatching. The diet consists of grass and weed seeds for most of the year, and insects and spiders during breeding season (Middleton 1998).

Males return to the breeding area a week or so before the females, and begin to establish territories. When the females return, pair bonds form. Although monogamy is common, some males may have more than one mate. The male and female choose a nest site together, usually in a conifer, within 15 feet of the ground. The female builds the nest, a loose, open cup made of grass, weeds, and rootlets, lined with hair and fine grass. It is often situated at the outer end of a branch in a clump of needles or leaves. The female incubates 4 eggs for 10 to 12 days. The male feeds the female while she incubates. Both parents feed the young, which leave the nest 9 to 12 days after hatching. The young can make sustained flights within three days of leaving the nest, although the parents continue to feed them for about three more weeks. Second broods are not uncommon, but most pairs raise only one brood a season. (From Seattle Audubon 2005-2008)

Although the Chipping Sparrow is still common and widespread across its range, its population has ebbed and flowed as a result of human influences. Originally, the Chipping Sparrow was probably not a common species, but may have benefited from European settlement. The population peaked in the 1850s, when it was the most common city sparrow. Since the 1900s, Chipping Sparrow populations have been declining due to habitat loss, Brown-headed Cowbird parasitism, and competition with House Sparrows and House Finches. The population is still likely to be greater than it was before European settlement. (From Seattle Audubon 2005-2008)

## Habitat & Habitat Associations:

General: Coniferous forest with a grassy understory, oak woodlands, orchards, mixed evergreen (Douglas fir and redwood) forests. (Hammerson 2009; Middleton 1998) Open woods (Sibley 2000).

The Chipping Sparrow prefers open woodlands, the borders of natural forest openings, edges of rivers and lakes, and brushy, weedy fields (From Middleton 1998).

## Nesting:

Its preference for nesting in the groves and open glades of coniferous forests, and for foraging in brushy open areas, suit this sparrow to human-modified habitats. (From Middleton 1998).

Chipping Sparrows typically build their nests low in a shrub or tree,.. Females typically build their nests between 3 and 10 feet off the ground, hidden in foliage at the tip of a branch. They gravitate toward evergreen trees, but also nest in crabapples, honeysuckle tangles, maples, ornamental shrubs, and other deciduous species. (From Middleton 1998).

**Conceptual Basis for GIS Model Development:** We mapped potential habitat for this species as all vegetation types with a canopy cover < 40%.

Possible best nesting habitat (groves and open glades of coniferous forest) was mapped as areas described above in coniferous forest types (i.e., Redwood-Douglas fir mix (*Sequoia sempervirens-Pseudotsuga menziesii*) and Pacific Douglas fir (*Pseudotsuga menziesii* var.*menziesii*) vegetation types)

Possible best foraging habitat (brushy open areas) was mapped as grasslands and chaparral.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Chipping sparrows nest in open woodlands, preferring areas with coniferous species. Nesting habitat quality in the Preserve is moderate to good (Figure 85). Areas with open coniferous forest is highly limited occurring in only a few scattered locations in the Preserve. The largest are is between the Rancheria and Livingston creeks.

## *Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has not been reported to occur in USGS quads adjacent to the Preserve.

*Summary:* Nesting Chipping Sparrows are “Likely to Occur” in the Preserve because they are a relatively common widespread resident in the region, and nesting habitat in the Preserve is moderate to good with the potential to support breeding individuals.

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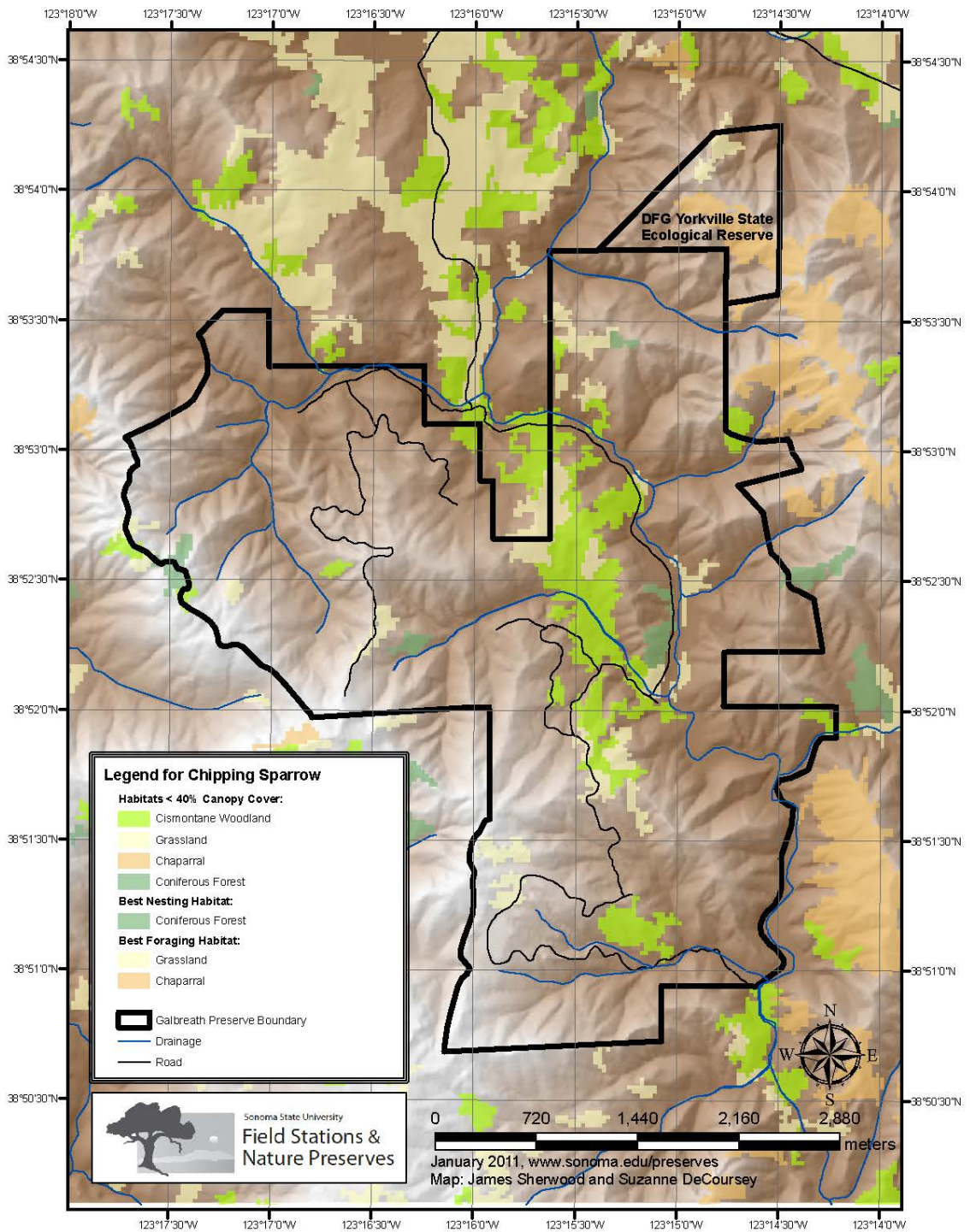
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**Species Account Description:** Kandis Gilmore & Emily Harvey

Figure 85: Potential habitat for Chipping Sparrow (*Spizella passerina*)



*Aves (Birds): Passeriformes, Hirundinidae*  
**Purple Martin (*Progne subis*)**  
**Potential Occurrence: Nesting Likely To Occur**

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**Status:** (Nesting)

Federal: None

State: Species of Special Concern

Other: G5 S3



**Species Description:**

The Purple Martin is the largest swallow in North America and one of the largest in the world. Adult males are a solid, glossy, purplish-blue both above and below. Females are colored similarly but less brightly above and have gray napes and foreheads. Below, females have brownish-gray breasts and light gray bellies. Juveniles look much like females, but are streaked underneath. The tails of Purple Martins are slightly forked. In flight, European Starlings can be confused with Purple Martins, but the narrower wings, forked tails, and typical swallow flight of martins distinguish the two. (From Birdweb 2008)

**Taxonomy:**

Of three recognized subspecies, *P. s. arboricola* was described from the Great Basin ranges (Behle 1968) and has been assumed to occur in the southern Rocky Mountains and Pacific states and British Columbia (Brown 1997). Pacific martins are considered *P. s. arboricola* by some (Phillips 1986, Pyle 1997), *P. s. subis* by others (Unitt 1984, Browning 2002). Recent mitochondrial DNA analysis shows strong differentiation between Pacific martins and eastern birds designated as *P. s. subis* (Baker et al. in press.), but subspecific taxonomy of western populations remains unclear. (From Shuford and Gardali 2008)

**Distribution:**

Grinnell and Miller (1944) described martins as “fairly common” and widely but irregularly scattered throughout California west of the Great Basin, Mojave, and Colorado deserts and from sea level to 5900 ft (1798 m) elevation. (From Shuford and Gardali 2008)

*Northwestern California.* With a population currently totaling 350–800 pairs from 14 counties, martins are more numerous and uniformly distributed in this region than elsewhere in the state. They are concentrated in Redwood (*Sequoia sempervirens*) forests near the coast but occupy many inland areas except at the highest elevations and the inner Coast Ranges. While most martins here breed as pairs or small groups, larger concentrations (>8 pairs) have been reported since 1980 at Red Hills Road, Lake County (Woodward and Woodward 2005); the Highway 1 bridge at Gualala River, Sonoma County; Howell Mountain and Palisades, Napa County; and Shelter Cove, Humboldt County. The Humboldt Breeding Bird Atlas found martins in 18% of all blocks, with most at low to midelevations in the coast Redwood zone in the west-central portion of the county (Hunter et al. 2005). (From Shuford and Gardali 2008)

**Life History & Threats:**

Purple martin migratory behavior is relatively well known. In spring, adult (>1 year old) males are the first to arrive at breeding sites, followed by adult females, and subsequently (up to two months later) by first year birds of both sexes (Morton 2003)...Martins begin to form post-breeding flocks soon after the young fledge, remaining together through fall migration (Brown 1997)... During the breeding season, martins appear to forage solitarily or in pairs and may forage far from their nest site (Brown 1997). Birds from late-summer roosts may range up to 100 km during daily foraging trips (Brown and Wolfe 1978, Russell and Gauthreaux 1999). Purple martins do not forage during periods of heavy rain or when the temperature is less than 9 °C (Brown 1976). (From Wiggins 2005)

Purple martins feed primarily on flying insects, apparently taking advantage of those prey that are most easily available. Compared to most other swallow species, martins feed at relatively high altitudes (50 to 150 m), moving to relatively low altitudes and closer to their nest sites later in the day (Brown 1997). During the breeding season, the pair often feeds together; Brown (1997) suggests this may simply represent mate-guarding by male martins. There is conflicting opinion as to whether breeding martins feed in groups (Johnston and Hardy 1962, Brown 1997), but observations of such behavior may relate to incidences of martins converging on blooms of ephemeral insects. Early and late in the breeding cycle, martins spend long periods away from the nest foraging. Once egg laying has begun, they tend to make much shorter foraging trips and spend more time in the immediate nest area (Brown 1997). (From Wiggins 2005)

Individual females or paired birds typically inspect several potential nesting sites before settling. Females apparently choose nest sites based largely on site characteristics, rather than male quality (Johnston and Hardy 1962, Brown 1997)... Nest construction is carried out largely by female martins although males may initiate the nest building and bring green leaves during construction (Brown 1997). Within the chosen nest cavity, martins assemble a loose structure comprised of small twigs, grass, green leaves, and mud (the latter especially around the entrance hole). The function of green leaves is not known (Hill 1989), but they are primarily added to the nest by the male during the incubation period (B. Stutchbury personal communication 2004)...Clutch size is typically four or five eggs (mean = 5.4), with a normal range of three to six (Brown 1997) and with seven-egg clutches occasionally reported (Hill 1999). (From Wiggins 2005)

Both parents incubate the eggs, but females perform the vast majority of the incubation duties (Brown 1997, and only they develop a brood patch (Hill 1993). The incubation period lasts 15 to 18 days (Hill 1997b). During this time, females incubate 70 to 75 percent of daylight hours, with lengths of incubation bouts depending on the local weather conditions (Allen and Nice 1952, Brown 1997). The young are brooded by only the female and extensively at hatching. The frequency of brooding decreases as the young age until it finally ceases when they are approximately 10 days old (Allen and Nice 1952). (From Wiggins 2005)

Young purple martins grow quickly, nearly doubling their weight every three days between ages three and nine days, and peaking at about 60 grams at 17 to 21 days of age (Allen and Nice 1952, Hill 1994a). At that point, they slowly begin to lose mass, declining to 50 grams around fledging age (26 to 31 days of age). Feathers begin external development when the young are about 12 days old, and the flight feathers continue to grow throughout the nestling stage (Brown 1997), and likely for several weeks thereafter. (From Wiggins 2005)

In midelevation forests in much of the state, removal of large snags in suitable ridge and upper slope areas continues to reduce opportunities for martin establishment. Incidence of stand-replacing fire, which is increasing following years of fire suppression, is probably sufficient to create widespread habitat for martins if adequate numbers of large trees are retained in suitable sites. Postfire salvage logging, snag removal to reduce lightning ignitions, and, due to shortened logging rotations, lack of creation of large trees reduce martins' nesting opportunities in most



of their range (Williams 1998). Awareness of the importance of retaining snags and residual large trees has increased, but safety and fire considerations often appear to override nest habitat protection in upper slope and ridge areas of greatest value to martins. (From Shuford and Gardali 2008)

Competition from starlings (Airola and Grantham 2003) is the main threat to remnant martin populations in lowland woodlands, making recolonization of most areas unlikely. Human development of more remote areas occupied by martins may increase competition by starlings (Williams 2002). Incremental loss of sycamore woodland from age and lack of regeneration is a long-term threat in the few remaining areas occupied by martins, although starlings are also a significant threat at most of these sites. (From Shuford and Gardali 2008)

## **Habitat & Habitat Associations:**

### *General Habitat:*

Purple Martins are widely but locally distributed in forest and woodland areas at low to intermediate elevations throughout much of the state...Populations are densest in central and northern coastal conifer forests and smaller and more localized in the Sierra Nevada, interior foothills, and southern California. (From Shuford and Gardali 2008)

### *Nesting Habitat:*

Common to all nesting areas are concentrations of nesting cavities, relatively open air space above accessible nest sites, and relatively abundant aerial insect prey. Martin distribution and abundance is most consistently determined by nest-site availability. New locations are colonized following an increase in nest sites, and local extirpations usually result from loss of nest sites or competition from starlings. Martins use a wide variety of nest substrates (e.g., tree cavities, bridges, utility poles, lava tubes, and, formerly, buildings), but nonetheless are very selective of habitat conditions nearby. Typical of all sites is low canopy cover at the nest height (usually <20% within 100 m). Also, most tree nest sites are located in the upper slopes of hilly and mountainous terrain. Martins seldom use snags along canyon bottoms or sites with dense vegetation at or above nest height. (From Shuford and Gardali 2008)

Martin distribution also appears to be influenced by the availability of aerial insects, especially large ones such as dragonflies. Thus, martins are most abundant in mesic regions, near large wetlands and other water bodies, and at upper slopes and ridges, which likely concentrate aerial insects. Starlings must be present in low densities or absent, or nest sites that discourage starling use must be available (e.g., in bridges; Airola and Grantham 2003). In conifer regions, martins are most numerous in low- to midelevation forests (from sea level to 6000 ft [1829 m]) such as Redwood, yellow pine (*Pinus ponderosa*, *P. jeffreyi*), and mixed conifer. Conifer snags (occasionally dead-top trees and hardwood snags) are the most common nesting substrate, used by perhaps >70% of the California population; martins select very tall, large trees (medians for height = 22 m and diameter [at breast height] = 119 cm; Williams 1998). Stand-replacing fire is the main process that creates martin habitat by creating snags and open terrain. In coastal areas, however, martins also use remnant Redwoods that stand above regenerating forest or are made accessible by logging, including clear-cutting (B. Williams pers. obs.). Population persistence in forested areas appears to depend on the presence of clusters of large snags or individual very large snags that can support multiple pairs. (From Shuford and Gardali 2008)

Nearly all woodland nesting sites support concentrations of very large trees, primarily Valley Oaks (*Quercus lobata*) and sycamores. However, martins have disappeared from nearly all otherwise suitable foothill and lowland Valley Oak and sycamore riparian habitats, presumably because of starling competition. Martins persist in oak habitats only in the Tehachapi

Mountains, where large oaks occur at relatively high elevations and in prominent positions, and where starling numbers are low (Williams 2002). (From Shuford and Gardali 2008)

#### *Foraging Sites:*

Historically, purple martins breeding in eastern North America were thought to forage around their nesting sites, which included forest edges and riparian areas, wooded ponds, and beaver marshes (Brown 1997). The situation in eastern North America today is very different. Although martin foraging habitat still appears to depend on the locality of suitable nesting sites, such sites are now typically suburban areas or even heavily populated cities. Purple martins (the *hesperia* subspecies) in the desert Southwest may feed far from their nesting sites over habitat in which they do not nest (Phillips et al. 1964, Brown 1997). In the Rocky Mountains, the *arboricola* subspecies forages over open mountain meadows, lakes, and beaver ponds (Hayward et al. 1976, Gillihan and Levad 2002), but there are no data available on the foraging range of individuals from their nest sites. (From Wiggins 2005)

In the eastern portions of their range, purple martins still appear to prefer nesting near open water, but they will colonize areas far from available water sources. Montane and northwestern coast populations apparently depend on nest sites near water. In Colorado, most nest sites are located within a few hundred meters of open water (e.g., beaver ponds; Levad 2003). The attraction to areas of open water may relate to a number of factors: 1) the presence of submerged, dead trees with nesting holes (historically important in eastern populations; likely still important in Rocky Mountain and northwestern populations), 2) a reliable source of insect prey such as dragonflies and damselflies (Odonata), as well as ephemeral blooms of aquatic insects (e.g., Chironomidae), and 3) importance as a foraging area early in the season or at high altitudes, when cold temperatures often drive martins to feed low over the water (Riggs 1947, Brown 1997). During cold weather, eastern martins (*subis* subspecies) will also feed at low altitudes in cities, apparently attracted to the warm microclimate that attracts insects (Robins 1971, Brown 1997). (From Wiggins 2005)

**Conceptual Basis for GIS Model Development:** To identify potential habitat for the Purple Martin in the Study Area, we mapped:

*General Habitat:* Coniferous forest (i.e., Redwood-Douglas fir mix (*Sequoia sempervirens*-*Pseudotsuga menziesii*) and Pacific Douglas fir (*Pseudotsuga menziesii* var. *menziesii*)) vegetation types. Note that Purple Martins are not known to occupy riparian and oak woodland in northwestern California.

*Nesting Habitat:* Coniferous forests on upper slopes of hilly and mountainous terrain.

Possible best nesting habitat was mapped as coniferous forests:

- with trees >61 cm DBH. Note that trees used by Purple Martins are generally larger than 61 cm DBH (median DBH 119 cm).
- in areas with < 40% canopy cover. Note that Purple Martins prefer areas with < 20% canopy cover within 100 m of the nest site. We use 40% here due to restrictions in data layer descriptions.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Purple Martins nest in large snags or remnant redwoods in coniferous forests on the upper slopes of rugged terrain. Nesting habitat quality is poor to moderate in the Preserve (Figure 86). Coniferous forests are abundant in the northern areas of the Preserve and the terrain is appropriately rugged. However, nest sites may be limited because:

- The Preserve has been regularly logged over the last 100+ years and large trees are not common. The largest remaining conifers are in the northeast area of the Preserve.
- Northwest coast populations may choose nest sites near water (Wiggins 2005) for reliable (e.g., dragonflies and damselflies) and ephemeral blooms of insects. Open aquatic sites in the Preserve are either seasonal (mainstem of Rancheria Creek) or limited in size (ponds).

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: Purple Martin populations are known to be densest in central and northern coastal conifer forests (Shuford and Gardali 2008). This species has not been reported to occur in USGS quads adjacent to the Preserve.

*Summary:* Nesting Purple Martins are “Likely to Occur” in the Preserve. Moderate quality nesting habitat is found in the northeast area of the Preserve; Purple Martins are densest on the northwest coast; and starlings, one of the Martins biggest threats are rare on the Preserve (Claudia Luke personal observation).

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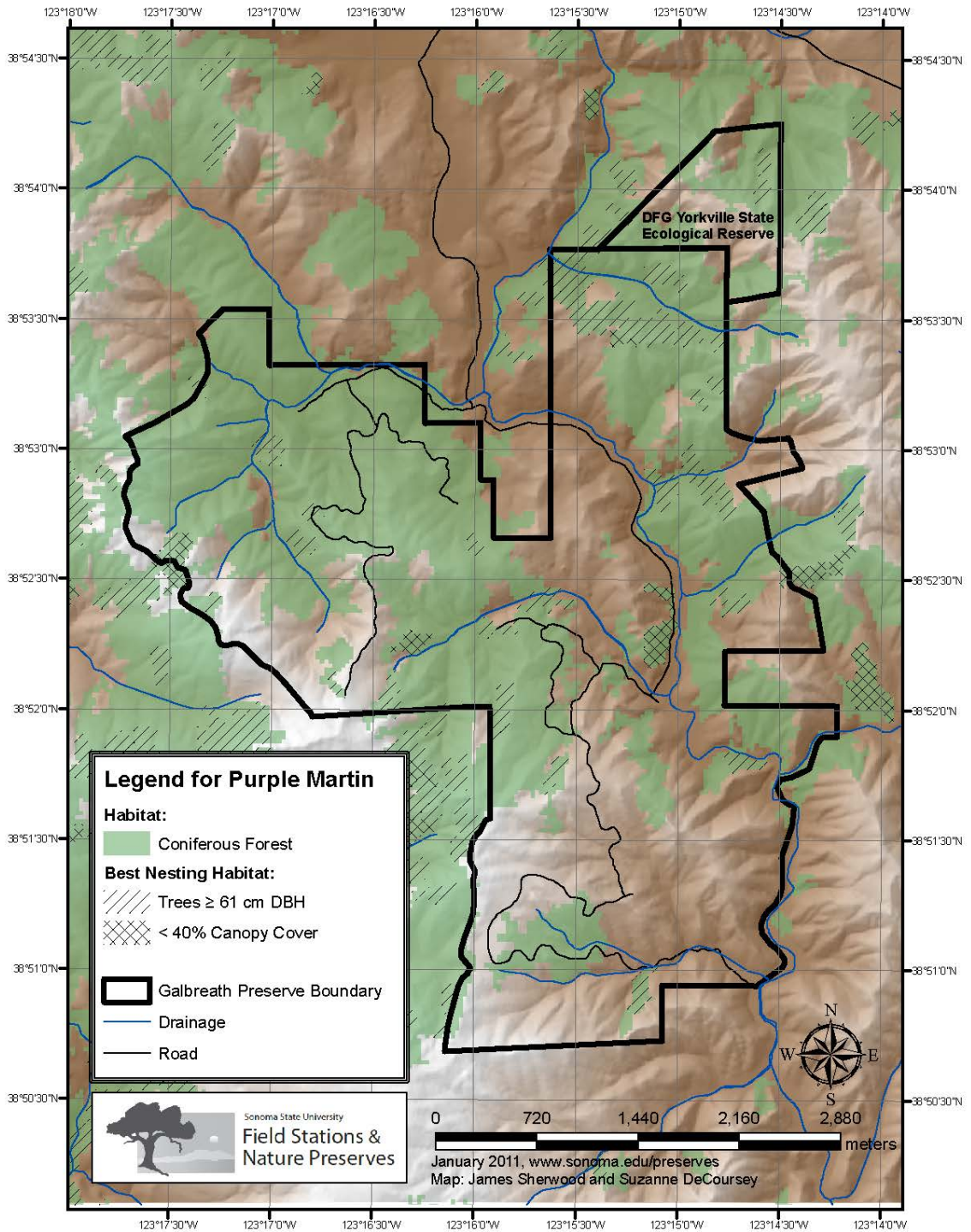
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**Species Account Description:** Emily Harvey

Figure 86: Potential habitat for Purple Martin (*Progne subis*)





*Aves (Birds): Passeriformes, Icteridae*  
**Tricolor blackbird (*Agelaius tricolor*)**  
**Potential Occurrence: Nesting “Unlikely to Occur”**

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**Status:** (Nesting Colony)

Federal: None

State: Species of Special Concern

Other: MBTA G2G3 S2 BLM:S USFWS:BBC



**Species Description:**

The adult male of the Tricolor is entirely black, glossed bluish (in full sunlight), with brownish-red feathers forming a reddish patch on wing shoulders (epaulets) and buffywhite to pure-white feathers providing a lower border to the red (Mailliard 1910; Beedy and Hamilton 1999, citing DeHaven 1975 - not examined). The adult female “is mostly black, with distinct grayish streaks; relatively whitish chin and throat, rarely with faint pinkish or peach wash; and small but distinct reddish shoulder patch” (Beedy and Hamilton 1999, citing DeHaven 1975 - not examined). (From Gustafson and Steele 2004)

**Distribution:**

Mostly a resident in California. Common locally throughout Central Valley and in coastal districts from Sonoma Co. south. Breeds near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, tall herbs. Feeds in grassland and cropland habitats. Breeds locally in northeastern California. In winter, becomes more widespread along central coast and San Francisco Bay area (Grinnell and Miller 1944, McCaskie et al. 1979, Garrett and Dunn 1981) and is found in portions of the Colorado Desert. (From Granholm 2008)

**Life History & Threats:**

The Tricolor is the most colonial passerine bird in North America forming large colonies that may include thousands of birds at a single breeding site. Colonies usually nest near water in emergent tule or cattail marsh, in armored vegetation like Himalayan blackberry, or in agricultural settings. Colonies select sites near suitable foraging habitat. (From Gustafson and Steele 2004)

In California studies summarized by Skorupa et al. (1980), animal matter, mostly insects and spiders, made up 86-91% of nestling and fledgling diet, and 28-96% of adult diet in spring and summer. Seeds and cultivated grains, such as rice and oats, are other major foods, composing most of fall and winter diet. Forages on ground in croplands, grassy fields, flooded land, and along edges of ponds. (From Granholm 2008)

[The tricolor's] breeding season [lasts from] mid-April into late July. Polygynous; each male may have several mates nesting in his small territory. A colony varies in size from a minimum of about 50 nests (Grinnell and Miller 1944) to over 20,000 in an area of 4 ha (10 ac), or less (DeHaven et al. 1975). Colonies were even larger in former decades. Apparently has highest nesting density of any blackbird in North America (Ehrlich et al. 1988). Clutch size usually 3 or 4 eggs, range 2-6; may raise 2 broods per yr (Terres 1980). Incubation lasts about 11 days;

altricial young tended by female or by both parents. Young leave nest at about 13 days. Probably breeds first at 1 yr (Harrison 1978). (From Granholm 2008)

The greatest threats to this species are the direct loss and degradation of habitat from human activities (Beedy and Hamilton 1999). Entire colonies (up to tens of thousands of nests) in cereal crops and silage are often destroyed by harvesting and plowing of agricultural lands (Beedy and Hamilton 1999, Hamilton 2004, Cook and Toft 2005, Messe 2006). Concentration of a high proportion of the known population in a few breeding colonies increases the risk of major reproductive failures, especially in vulnerable habitats such as active agricultural fields. (From Shuford and Gardali 2008)

### **Habitat & Habitat Associations:**

#### *Foraging Habitat:*

Tricolor foraging habitats in all seasons include pastures, dry seasonal pools, agricultural fields (such as large tracts of alfalfa with continuous mowing schedules), rice fields, feedlots, and dairies. Tricolors also forage occasionally in riparian scrub, saltbush (*Atriplex* spp.) scrub, marsh borders, and grassland habitats. Weed free row crops and intensively managed orchards and vineyards do not serve as regular foraging sites. (From Beedy and Hamilton 1997)

Most tricolors forage within 5 km of their colony sites (Orians 1961b), but commute distances of up to 13 km have been reported (Hamilton pers. obs.). Short distance foraging (i.e., within sight of the colony) for nestling provisioning also is common. Both sexes provision nestlings. (From Beedy and Hamilton 1997)

#### *Nesting Habitat:*

Tricolors have three basic requirements for selecting their breeding colony sites: (1) open accessible water; (2) a protected nesting substrate, which is usually either flooded or thorny or spiny vegetation; and (3) a suitable foraging space providing adequate insect prey within a few kilometers (km) of the nesting colony (Beedy 1989, Hamilton et al. 1995). Almost 93 % of the 252 tricolor breeding colonies reported by Neff (1937) were in freshwater marshes dominated by tules (*Scirpus* sp.) and cattails (*Typha* sp.). The remaining colonies in Neff's study were in willows (*Salix* spp.), blackberries (*Rubus* sp.), thistles (*Cirsium* and *Centaurea* spp.), or nettles (*Urtica* sp.). An increasing percentage of tricolor colonies in the 1980s and 1990s were reported in Himalaya berries (*Rubus discolor*), and some of the largest recent colonies are in silage and grain fields (Hamilton et al. 1995). (From Beedy and Hamilton 1997)

**Conceptual Basis for GIS Model Development:** To identify potential habitat for Tricolored Blackbird in the Study Area, we mapped:

#### *Foraging Habitat:*

- Pastures (mapped as grasslands)
- Agricultural fields
- Seasonal ponds

- Riparian scrub. Note that riparian vegetation was mapped as a 130-m buffer along the main stem of Rancheria Creek. Riparian woodland, forest and scrub is disjunct within this area.

*Nesting Habitat:*

- Perennial ponds. Perennial ponds are the only sites with cattails and tules in the Study Area.
- Riparian vegetation. Note that riparian vegetation was mapped as a 130-m buffer along the main stem of Rancheria Creek. Riparian woodland, forest and scrub vegetation is disjunct within this area.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting colonies.

*Habitat:* Tricolored blackbird colonies nest near open accessible water on spiny or flooded nesting substrates within a few kilometers of suitable foraging areas. Nesting habitat for this species in the Preserve is poor or unavailable (Figure 87). Perennial water in the Preserve occurs only in shaded tributaries that drain into Rancheria Creek and small ponds. Patches of tules and cattails, the most common nesting substrate for this species, are too small to support a colony. Willows, blackberries, thistles, or nettles occur in riparian areas along Rancheria Creek. However, the GIS map overestimates riparian vegetation abundance, which is only patchily distributed within the area identified. Surface water in the Creek is only available during the winter and draws down occurs early in the spring and is not be available to nesting birds.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has been reported to occur in the Hopland USGS quad to the east of the Preserve.

*Summary:* Nesting Tricolored Blackbirds are “Unlikely to Occur” in the Preserve due to the lack of appropriate nesting habitat.

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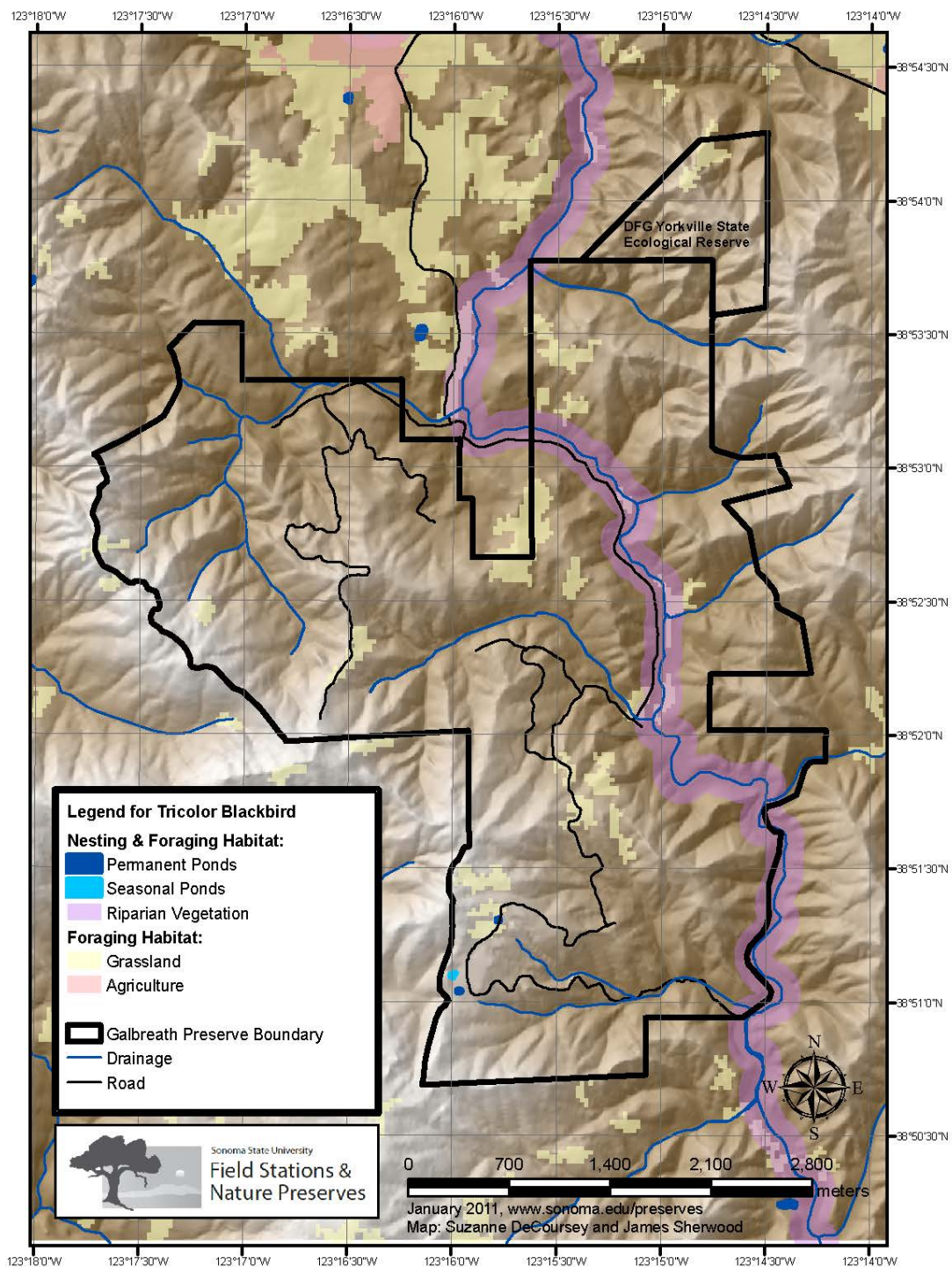
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**Species Account Description:** Neal Ramus & Emily Harvey



Figure 87. Potential habitat for Tricolor Blackbird, *Agelaius tricolor*



*Aves (Birds): Passeriformes, Laniidae*  
**Loggerhead Shrike (*Lanius ludovicianus*)**  
**Potential Occurrence: Nesting Not Expected to Occur**

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**Status:** (Nesting)

Federal: none

State: SSC

Other: USFWS: BBC



Photo: Larry Thompson

**Species Description:** The Loggerhead Shrike has a proportionally large head that is grey with black bill and facemask. It has grey upperparts and white underparts with black accents on the wings and tail. The bill is hooked at the tip. "Slightly smaller than an American Robin," they are 9 inches in length, with a wingspan of 12 inches (Granholm 1990; Sibley 2000).

**Distribution:** This species has a widespread breeding distribution in central Canada and the American Midwest, and a year-round distribution across the southern half of the United States and extending through Mexico (Soule 1995). A year-round resident in most of California, the Loggerhead Shrike does not breed in the high Sierras and is known to spend only the winters on the North Coast north of Mendocino County (Zeiner 1990).

**Life History & Threats:** As predatory songbirds, they do not have large talons, so these shrikes instead use thorns and barbed wire to impale their prey, which are mainly insects and also vertebrates (including small mammals, other birds, and reptiles) (Sibley 2000; Yosef 1996). Nests are built in shrubs or small trees adjacent to grasslands and 4-6 eggs per clutch are laid between February and July. Nestlings are independent about 36 days after hatching (Soule 1995). The Loggerhead Shrike has become endangered in the northeastern part of its North American range and overall has declined 71% in the past 40 years, putting it on the Audubon watchlist (National Audubon Society 2010).

**Habitat & Habitat Associations:** Brushy habitat along field edges, open country with short vegetation, riparian areas, and agricultural fields (Yosef 1996).

A common resident and winter visitor in lowlands and foothills throughout California. Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Highest density occurs in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, pinyon-juniper, juniper, desert riparian, and Joshua tree habitats. (From Granholm 1990)

Short grass with isolated trees or shrubs, especially pastureland (From National Audubon Society 2010)

**Nesting Habitat:** Nests are built in shrubs or small trees adjacent to grasslands (National Audubon Society 2010).

**Conceptual Basis for GIS Model Development:** We mapped potential Loggerhead Shrike habitat as:

- grasslands
- agricultural fields
- chaparral
- riparian. Note that riparian vegetation was mapped as a 130-m buffer along the main stem of Rancheria Creek. Riparian woodland, forest and scrub is disjunct within this area.
- cismontane woodland (i.e., mixed, montane mixed, and single dominant hardwoods with < 40% canopy cover)

Possible best habitat was mapped in the above areas as grasslands and agricultural fields.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* The quality of nesting habitat for Loggerhead Shrikes is good in the Preserve (Figure 88). Riparian forests on the Preserve are poorly developed and patchy in distribution and likely do not provide the open woodland habitat preferred for nesting. However, open forests are of much higher quality and are relatively abundant throughout the Preserve. Grasslands and agricultural areas also provide quality nesting habitat for this species.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been observed on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has not been reported to occur in USGS quads adjacent to the Preserve. The westernmost range of the breeding range of Loggerhead Shrikes terminates in eastern Mendocino County, approximately 20 miles northeast of the Preserve (Shuford and Gardali 2008).

*Summary:* Nesting Loggerhead Shrikes are “Not Expected to Occur” in the Preserve because breeding is limited to areas further inland.

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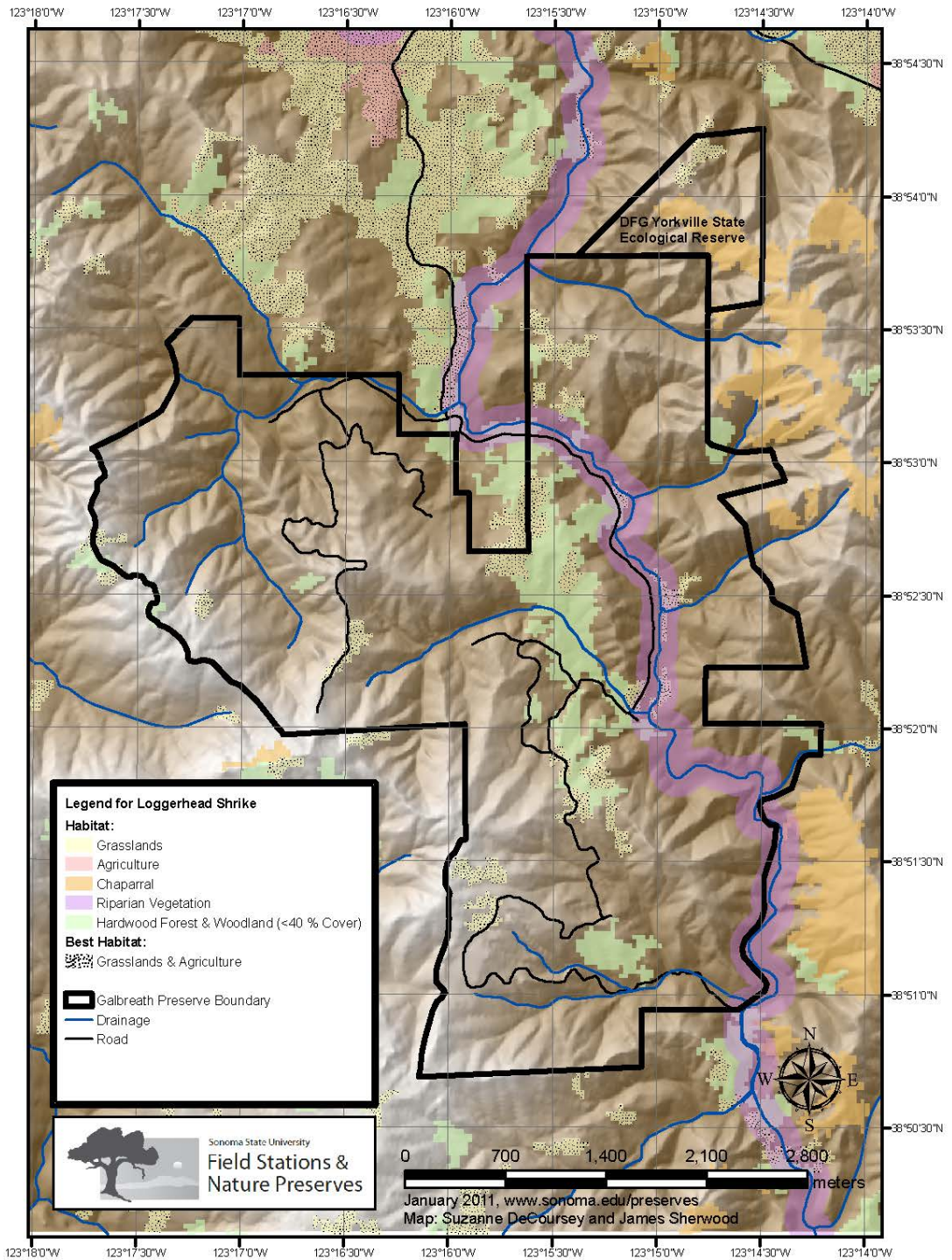
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**Species Account Description:** Kandis Gilmore & Emily Harvey



Figure 88. Potential habitat for Loggerhead Shrike, *Lanius ludovicianus*



*Aves (Birds): Passeriformes, Paridae*  
**Oak Titmouse (*Baeolophus inornatus*)**  
**Potential Occurrence: Nesting Likely to Occur**

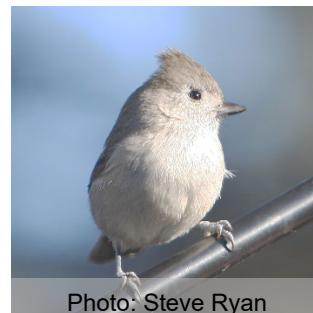
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**Status:** (Nesting)

Federal: none

State: none

Other: G5S3



**Species Description:** The oak titmouse is a small, drably colored brown-tinged grey bird with a small crest on its head like a cardinal. The underside is a lighter grey color. Males and females look alike, and males are only slightly larger than females (Cicero 2000).

**Synonyms:** Until recently, the Oak Titmouse and Juniper Titmouse (*Baeolophus ridgwayi*) were thought to be one species, the Plain Titmouse (*Palus inornatus*) (Cicero 2000).

A comprehensive analysis of geographic variation in the species complex ([Cicero 1996](#)), along with genetic evidence of relationships within the family ([Sheldon et al. 1992](#), [Slikas et al. 1996](#)), has led to their reclassification as sibling species in the genus *Baeolophus* ([American Ornithologists' Union 1997](#)). (From Cicero 2000).

**Distribution:** Found in oak and oak-pine woodlands on the Pacific slope (Cicero 2000). Breeding area ranges from southwest Oregon to northwest Baja California (Gilligan 1994; Wilbur 1987).

**Life History & Threats:** Nests in cavities from 3 to 32 ft above the ground (Burrige 1995; Cicero 2000). The female incubates a clutch of 6-8 eggs for 14-16 days. Nestlings are cared for by both parents and leave the nest within 3 weeks, but stay with their parents for 3-4 more weeks (Hammerson 1994). Feed mainly on insects and spiders and also acorns, leaf galls, and seeds (Hammerson 1994; Cicero 2000).

Invertebrates, especially terrestrial insects or flying insects, are essential. Seeds, berries, and acorns are also eaten. (From Laudenslayer 2007)

Loss of natural cavities for this sedentary species is affecting populations... Breeding Bird Survey (BBS) data show the Oak Titmouse and Juniper Titmouse declining 1.9% per year throughout California from 1980 through 1996. The Oak Titmouse experienced a 1.6% annual decline in the California foothills from 1966 through 1996.... Habitat loss from development is the greatest threat to the species. Sudden Oak Death fungal disease, which has killed tens of thousands of oaks in California, may cause the loss of much habitat for the Oak Titmouse though in the short-term it could increase availability of nesting cavities because of the prevalence of dead and infected trees. However, efforts to prevent the spread of the oak pathogen often include removing all dead and infected trees. (From Audubon WatchList 2007)

**Habitat & Habitat Associations:**

### *General Habitat:*

Species finds suitability (H --->L) for reproduction, cover and/or feeding in some or all stages of: Blue Oak Woodland, Blue Oak Foothill Pine, Chamise-Redshank Chaparral, Closed-Cone Pine- Cypress, Coastal Oak Woodland, Deciduous Orchard, Eucalyptus, Mixed Chaparral, Montane, Hardwood, Montane, Hardwood-Conifer, Urban, Valley Foothill Riparian, and Valley Oak Woodland. (From Laudenslayer 2007) Composition of oak woodland varies, but arboreal species dominate, and woodland is generally open." (From Cicero 2000)

Found in open, dry woods (Sibley 2000) and water enhances suitability. Species has been known to drink occasionally in summer. (From Laudenslayer 2007)

California Partners in Flight recently created The Oak Woodland Bird Conservation Plan to guide land management policy and action for California's oak woodland habitats and the wildlife that inhabit them. The conservation plan includes increasing the number of dead standing oak species in the Oak Titmouse's range. Live trees with dead limbs as well as diseased trees in which the heartwood decays are especially important. Oak woodlands should be thinned to contain a canopy cover of 40-70%. (From Audubon WatchList 2007).

### *Nesting Habitat:*

Species requires either hardwoods or a tree layer for all 3 life requisites. Either snags (rotten, all sizes) or trees with cavities are required for reproduction and cover. (In oaks, such cavities are usually natural cavities not made by a woodpecker, but this may not be universal.) Will also use nest boxes. (From Laudenslayer 2007)

*Elevation:* 12-1,900 m (Cicero 2000). (Elevation of study area ranges from 230-710 m).

**Conceptual Basis for GIS Model Development:** Suitable habitat for this species was mapped as open woodlands and forests (i.e., any tree dominated vegetation type with canopy cover between 10 and 40%), riparian vegetation, and chaparral. Best habitat is mapped as cismontane woodland types (i.e., woodlands containing oaks and canopy cover between 10 and 40%).

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Oak titmice nest in cavities in trees in open woodlands. Nesting habitat quality is good in the Preserve, with a variety of woodland types (Figure 89). Riparian forests indicated on the potential habitat map are likely the poorest quality; vegetation in this zone is patchy in distribution and likely do not provide the open woodland habitat preferred for nesting.

*Nearest Occurrence:* This species has been observed on the Preserve (Claudia Luke personal observation).

*Summary:* Nesting Oak Titmice are "Likely to Occur" in the Preserve. This species is observed regularly, and good quality habitat is abundant.

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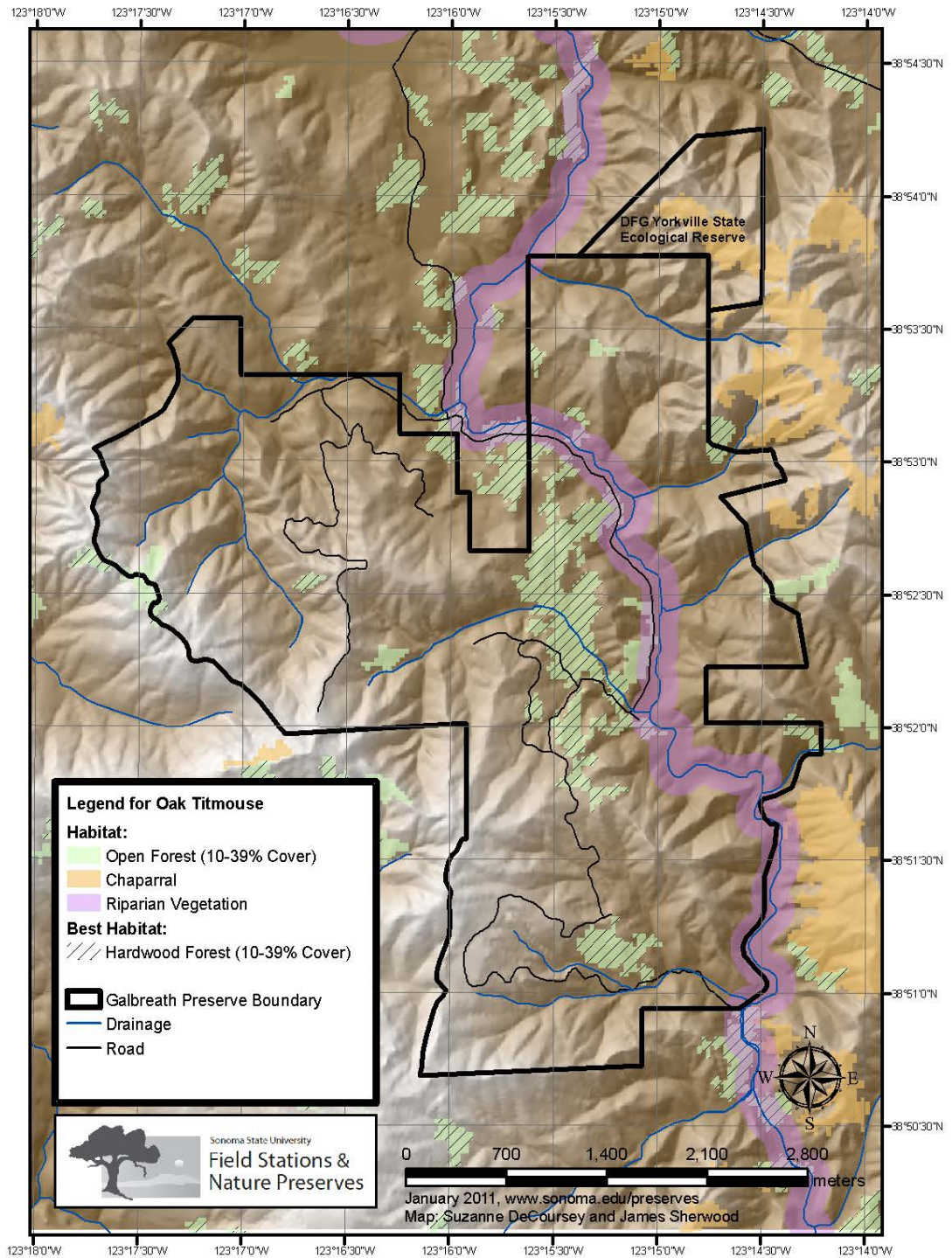
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**Species Account Description:** Kandis Gilmore & Emily Harvey



Figure 89. Potential habitat for Oak Titmouse, *Baeolophus inornatus*



*Aves (Birds): Passeriformes, Parulidae*  
**Hermit Warbler (*Dendroica occidentalis*)**  
**Potential Occurrence: Nesting Likely to Occur**

---

**Status:** (Nesting)

Federal: none

State: none

Other: G4G5 S3



Photo: Steven Dowlan

**Species Description:** A small passerine bird, the Hermit Warbler has a yellow head with a short, pointed bill, black chin and throat, a grey back, and white underparts with black-streaked flanks (Sibley 2000). Males have a more prominent black chin than females and white wing-bars and tail spots (Pearson 1997).

**Distribution:** The Hermit Warbler is said to be a shy, reclusive bird, which is reflected in its common name (Sibley 2000). Its breeding range is in mountainous regions which extend from Cascade ranges in Washington to the San Bernardino Mountains of California in the south. It also inhabits the coastal regions where appropriate coniferous forest exists (Pearson 1997). It winters in the mountainous regions of Mexico to Nicaragua, but on occasion individuals have been seen during winter on the north coast of California from Del Norte County south to Tomales Bay (Pearson 1997; Green 1998).

**Life History & Threats:** Feeds by gleaning spiders and insects from foliage in the upper canopy. The Hermit Warbler builds its nest on a horizontal branch 25-125 feet above the ground and breeds from late April to early July with 3-5 eggs per clutch (Green 1998). In a study looking at effects of forest fragmentation on wildlife, this warbler was found to be sensitive to edges (Pearson 1997) which is consistent with its anecdotally shy nature.

Threats largely unstudied. Activities that degrade or eliminate coniferous forest canopy and insect prey would be detrimental. Threats include logging and development of forest habitats on breeding and wintering grounds, possible increase in exposure to brood parasitism by brown-headed cowbirds (*Molothrus ater*), and hybridization and possible competition with Townsend's warbler (*Dendroica townsend*) (From Paige 1999).

**Habitat & Habitat Associations:** In the coastal California mountains, the Hermit Warbler is most abundant in fir-dominated forest more than 300 years old (Raphael 1987)

Generally in upland coniferous forests with high canopy volume; shrub understories less important (Pearson 1997, AOU 1998). Prefers mature stands of pine and fir, with large trees and dense cover; prefers scattered groups of tall trees emergent from canopy (USDA Forest Service 1994). Douglas-fir (*PSEUDOTSUGA MENZIESII*) an important tree species throughout breeding habitat. Nests in older second-growth (> 40 yrs) and mature forests (> 120 yrs; Meslow and Wight 1975). (From NatureServe 2009)

Frequently found in association with the Yellow-Rumped Warbler (*Dendroica coronata*) (Hammerson 1994).

**Conceptual Basis for GIS Model Development:** We mapped suitable habitat as coniferous forest (i.e., Redwood-Douglas fir mix (*Sequoia sempervirens*-*Pseudotsuga menziesii*) or Pacific Douglas fir (*Pseudotsuga menziesii* var.*menziesii*) vegetation types). Possible best habitat was mapped as old growth areas with > 61 cm DBH.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Hermit warblers were observed on the Preserve by Russ Landers (California Department Fish and Wildlife, Redding) Spring 2014. Protection status for this species applies to nesting individuals.

*Habitat:* Hermit Warblers nest in the canopy of older second and mature coniferous forests, particularly those with Douglas Fir. The quality of nesting habitat is good in the Preserve (Figure 90). Douglas-fir, an important species in breeding habitat, is found throughout coniferous forest on the Preserve. Older second growth forest (> 61 cm DBH) with Douglas Fir is most abundant in the northeast corner of the Preserve.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has not been reported to occur in USGS quads adjacent to the Preserve.

*Summary:* Nesting Hermit Warblers are “Likely to Occur” in the Preserve. Good quality nesting is available in the Preserve and the species is a widespread breeder where appropriate habitat occurs.

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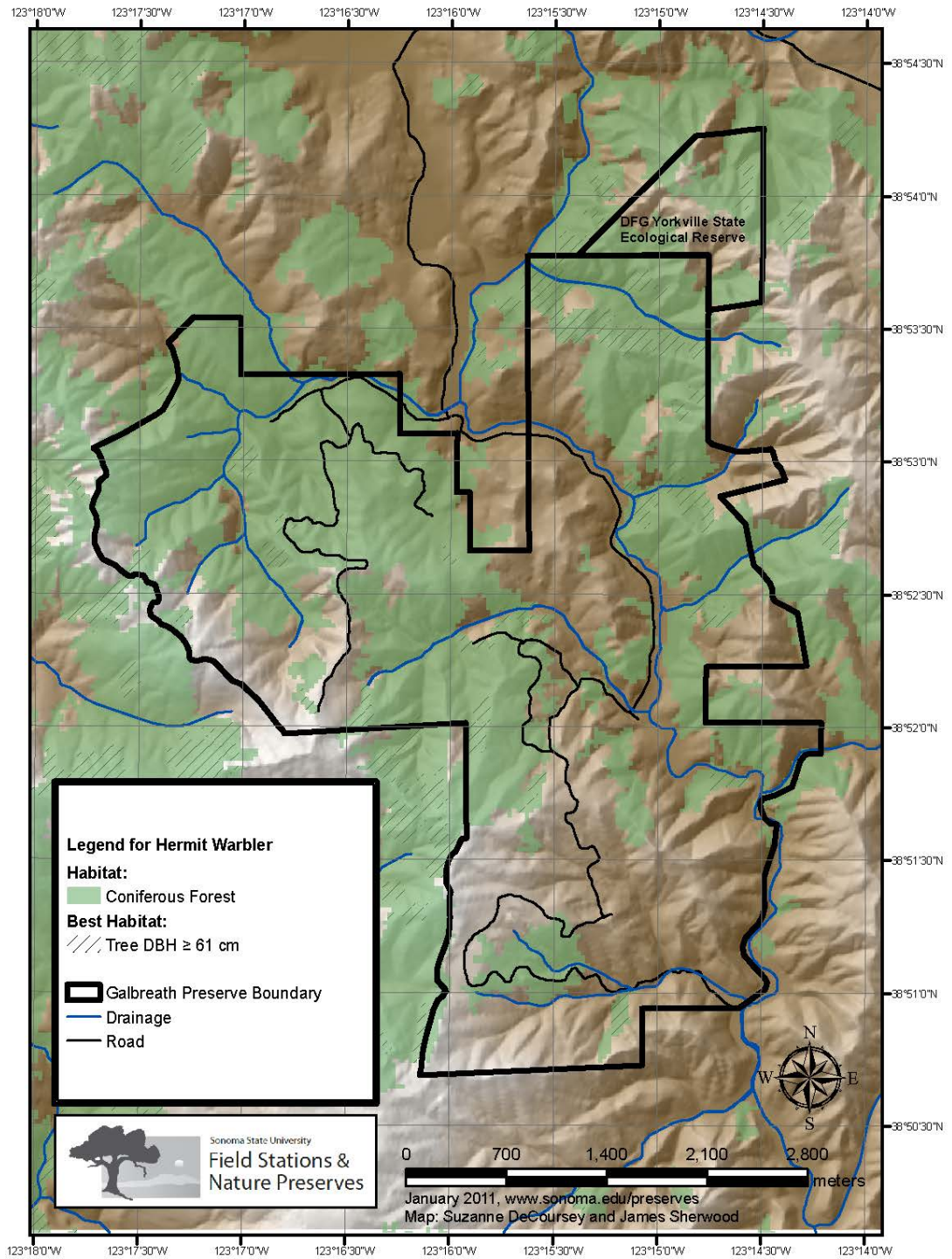
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**Species Account Description:** Kandis Gilmore & Emily Harvey



Figure 90. Potential habitat for Hermit Warbler, *Dendroica occidentalis*



*Aves (Birds): Passeriformes, Parulidae*  
**Yellow warbler (*Dendroica petechia brewsteri*)**  
**Potential Occurrence: Nesting Likely to Occur**

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**Status:** (Nesting)

Federal: None

State: SSC

Other: G5T3 S2



**Species Description:** A small and active bird with a short, pointed bill. Golden-yellow plumage with rusty streaks on the breast, which are more prominent in males. The upper parts are tinged with olive. The Yellow Warbler is 5 inches tall with an 8-inch wingspan (Sibley 2000).

**Distribution:** The Yellow warbler occurs throughout North America in its summer breeding range. The sub-species *brewsteri* is endemic to the Pacific Northwest and Northern California (Lowther 1999).

Breeding distribution includes from the coast range in Del Norte county, east to Modoc plateau, south along coast range to Santa Barbara and Ventura counties and along western slope of Sierra Nevada south to Kern county. Also breeds along eastern side of California from the Lake Tahoe area south through Inyo co. Also breeds in several southern California mountain ranges and throughout most of San Diego County. Winters in Imperial and Colorado River valleys. (From Green 1990)

As a migratory bird it spends the winters in southern California and southern Florida through the Brazilian Amazon, Bolivia, and Peru. (Bachynski 2003)

**Life History & Threats:** The Yellow Warbler feeds principally on insects and nests in willow and alder trees in a cup-shaped nest 2-16 feet from the ground, breeding in late May to early June. The Yellow Warbler has been experiencing a population decline within California and has been listed in California as a Species of Special Concern. (Stusis-Timmer 2009; Young 2007). Population declines are also affected by Brown Cowbird brood parasitism (Bachynski 2003).

The yellow warbler is an uncommon to common summer resident in the north, a locally common resident in the south, and a rare but regular visitor in winter in the south. It breeds and forages in riparian woodlands, montane chaparral, open ponderosa pine, and mixed conifer habitats with substantial brush, from coastal and desert lowlands up to 8,000 feet in the Sierra Nevada. It also breeds in montane chaparral, in open ponderosa pine, and mixed conifer habitats with substantial amounts of brush. It is now rare to uncommon in many lowland areas where it was formerly common. The species is usually found in riparian deciduous habitats in summer in cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland. The nest is an open cup placed 2 to 16 feet above ground in a deciduous sapling or shrub. The territory often includes tall trees for singing and foraging and a heavy brush understory for nesting. Breeding occurs from mid-April into early August with peak activity in June. The pair breeds solitarily and lays 3 to 6 eggs, which are incubated by the female for 11 days. Altricial young are tended by both parents until fledging at 9 to 12 days. (From Southern California Edison 2003)

## Habitat & Habitat Associations:

*Vegetation Types:* Riparian woodland with shrubby understory (Lowther 1999). Willows in wet areas (Sibley 2000).

It breeds and forages in riparian woodlands, montane chaparral, open ponderosa pine, and mixed conifer habitats with substantial brush, from coastal and desert lowlands up to 8,000 feet in the Sierra Nevada. It also breeds in montane chaparral, in open ponderosa pine, and mixed conifer habitats with substantial amounts of brush. (From Southern California Edison 2003)

### *Nesting Habitat:*

The species is usually found in riparian deciduous habitats in summer in cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland. (From Southern California Edison 2003)

*Dendroica petechia* prefers moist habitats with high insect abundance. The presence of willows is one common feature of yellow warbler habitat north of Mexico. South of Mexico mangroves are a dominant feature. Habitats include the edges of marshes and swamps, willow-lined streams, and leafy bogs. *Dendroica petechia* also inhabits dry areas such as thickets, orchards, farmlands, forest edges, and suburban yards and gardens. They seem to prefer areas of scattered trees, dense shrubbery, and any other moist, shady areas (Nuttall and Chamberlin, 1971; USGS, 2000). (Celada et al., 1999; Nuttall, Chamberlin, and ed., 1903; U.S. Department of the Interior and U.S. Geological Survey, 2000) (From Bachynski and Kadlec 2003).

**Conceptual Basis for GIS Model Development:** We mapped potential habitat as vegetation near the mainstem of Rancheria Creek. GIS vegetation layers did not show willow and alder as occurring along the Creek, but field reconnaissance indicated that many small patches and thin corridors of this vegetation type occur on the banks for the Creek. To capture the occurrence of this habitat types, we mapped riparian vegetation as a 130-m buffer along the main stem of Rancheria Creek. Riparian woodland, forest and scrub are disjunct within this area.

Yellow Warblers have been observed in mixed conifer vegetation with substantial brush. We did not map mixed conifer vegetation as potential habitat, because vegetation on the Preserve does not contain substantial brush.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Yellow Warblers nest in low, open-canopy riparian woodland, especially those where willows occur. The quality of nesting habitat for this species is poor to moderate in the Preserve (Figure 91). Riparian scrub and woodlands with willows do occur within this area, but it is fragmented and poorly developed due to regular flooding. It is uncertain whether any areas of riparian woodland are large and dense enough to provide adequate nesting habitat for Yellow Warblers.

### *Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has not been reported to occur in Mendocino County according to natural heritage records (NatureServe 2009).

*Summary:* We anticipate that nesting by this widespread permanent resident of northern California is “Unlikely to Occur” in the Preserve because potential nesting habitat is highly fragmented and may not be extensive enough to support breeding individuals.

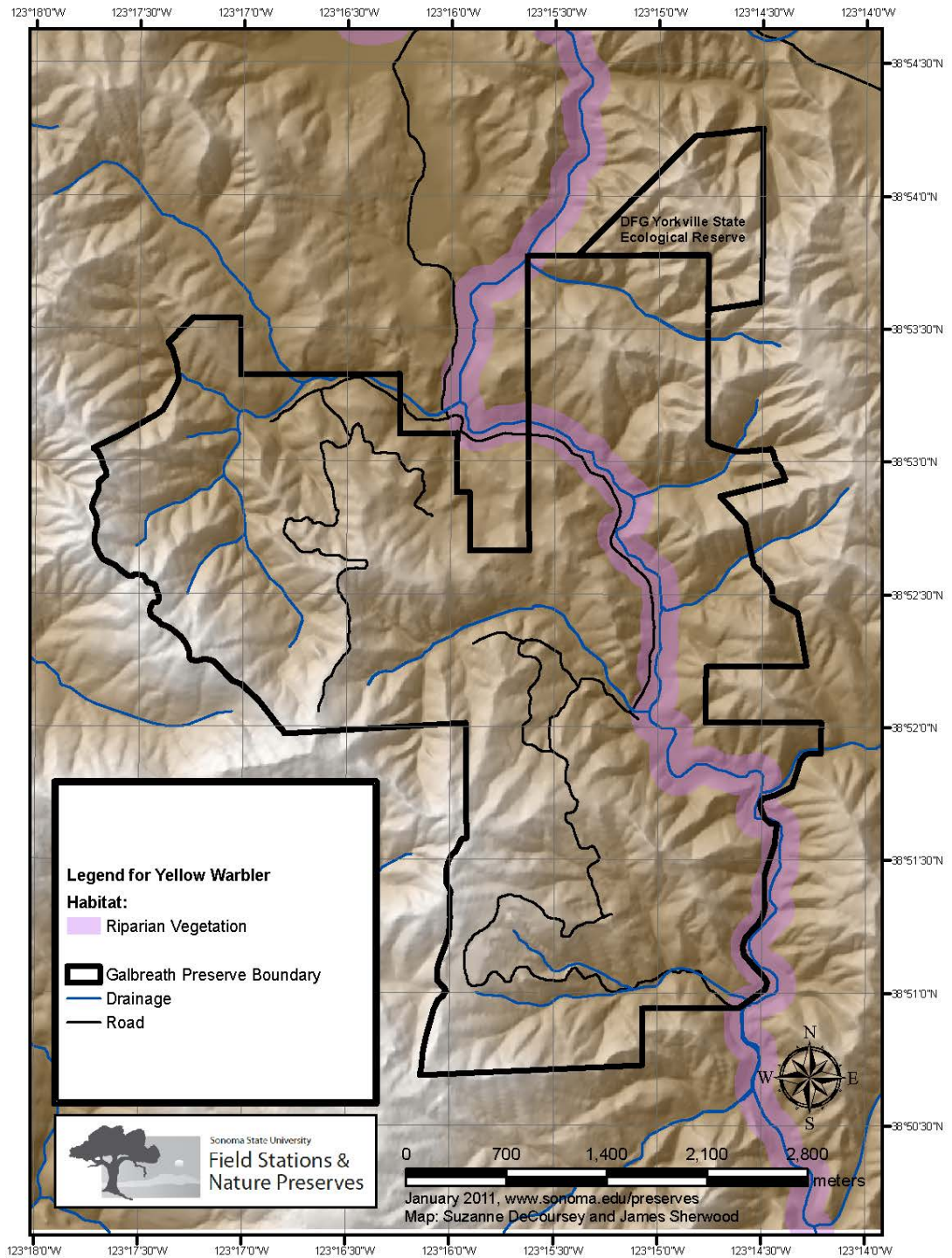
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**Species Account Description:** Kandis Gilmore & Emily Harvey



Figure 91. Potential habitat for Yellow Warbler, *Dendroica petechia brewsteri*



*Aves (Birds): Passeriformes, Parulidae*  
**Yellow-breasted Chat (*Icteria virens*)**  
**Potential Occurrence: Nesting Unlikely to Occur**

---

**Status:** (Nesting)

Federal: None

State: SSC

Other: G5 S3



**Species Description:** The largest of the wood warblers, the Yellow-breasted Chat is 7.5 inches long and has a 10 inch wingspan (Sibley 2000). Compared to other warblers, this bird has a large bill and long tail. Olive-brown upper parts and white underparts, with the distinct yellow patch along the chin, throat, and breast (Eckerle 2001). There are white “spectacles” around the eyes (Sibley 2000).

**Distribution:** Breeds in northwestern North America from British Columbia through California, and has a widespread range in the eastern United States and winters in Mexico from Baja California to northern Sinaloa (Hammerson 1996). It is rare or absent in 35% of its historic breeding range in much of the California’s Central Valley. In northwestern California, Yellow-breasted Chats are widely distributed and are regularly reported on BBS routes in Humboldt, Siskiyou, Shasta, Mendocino, and Lake Counties (Shuford 2008).

**Life History & Threats:** The Yellow-breasted chat constructs a nest close to the ground (from ground level to 2 meters) and lays between 3-5 eggs from mid-May to late June (Hammerson 1996). Only the female incubates the eggs and broods the nestlings, but both parents feed the young (Eckerle 2001). Nestlings fledged in 8-11 days after hatching.

Chats’ dependence on understory and shrubby riparian vegetation for nesting makes them vulnerable to habitat loss from vegetation removal along river channels during flood-control maintenance and from urban and agricultural development. (From Shuford 2008)

Brown-headed cowbird is a brood parasite of this species (Eckerle 2001).

**Habitat & Habitat Associations:**

**Nesting Habitat:** The Yellow-breasted chat nests in dense shrubs along riparian corridors and in early-successional open canopy forest (i.e. after a clear cut) (Eckerle 2001; Schuford 2008).

Chats will nest in tamarisk, Himalayan Blackberry (*Rubus discolor*), Russian Olive (*Elaeagnus angustifolius*), and other non-native plants that provide dense shrub layers. (From Schuford 2008)

**Conceptual Basis for GIS Model Development:** We mapped potential habitat of the Yellow-breasted Chat as riparian vegetation. GIS vegetation layers did not show willow and alder as occurring along Rancheria Creek, but field reconnaissance indicated that many small patches and thin corridors of this vegetation type occur on the banks of the Creek. To capture the occurrence of this habitat types, we mapped riparian vegetation as a 130-m buffer along the

main stem of Rancheria Creek. Riparian woodland, forest and scrub are disjunct within this area.

Note that small patches of Cottonwood Woodlands do occur immediately north of the Study Area along Rancheria Creek, but do not occur within the map view.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Yellow-breasted Chats nest in dense shrubs along riparian corridors. Nesting habitat is poor to moderate quality in the Preserve (Figure 92). Riparian scrub and woodlands with willows do occur within the area, but are fragmented and poorly developed due to regular flooding. Riparian vegetation shown in Figure 92, is an estimate of a zone containing only a patchy distribution of riparian woodland and scrub. It is uncertain whether any areas of riparian vegetation are large and dense enough to provide adequate nesting habitat for Yellow-breasted Chats.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has not been reported to occur in USGS quads adjacent to the Preserve.

*Summary:* Nesting Yellow-breasted Chats are “Unlikely to Occur” on the Preserve because potential nesting habitat is highly fragmented and may not be extensive enough to support breeding individuals.

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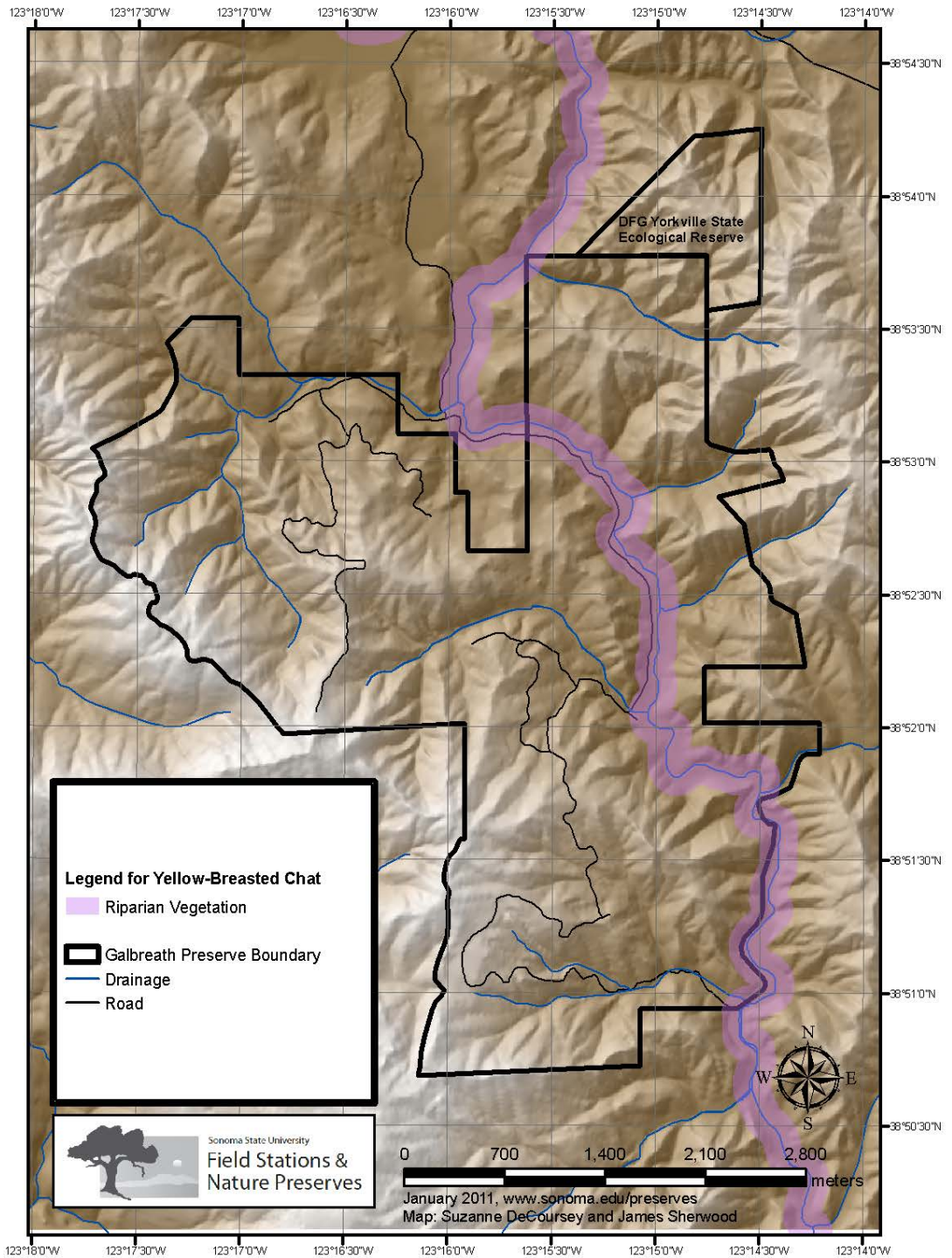
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**Species Account Description:** Kandis Gilmore & Emily Harvey



Figure 92. Potential habitat for Yellow-Breasted Chat, *Icteria virens*





*Aves (Birds): Passeriformes, Tyrannidae*  
**Olive-sided Flycatcher (*Contopus cooperi*)**  
**Potential Occurrence: Nesting Likely to Occur**

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**Status:** (Nesting)

Federal: none

State: SSC

Other: USFWS BBC

**Synonym:** Prior to 1997, this species was called *Contopus borealis* (Wikipedia 2010)



**Species Description:** The Olive-sided Flycatcher is 6.25 inches long, with a triangular head, relatively short tail, and stout bill (Gough 1998).

Plumage deep brownish olive-gray above (darkest on crown), and white on throat and center of breast and belly, with strongly contrasting olive-gray sides and flanks (often streaked). Dark patches on either side of white breast and belly are distinctive and often likened to appearance of an unbuttoned vest.” (From Altman 2000)

**Distribution:** This bird’s breeding range extends from Alaska and the Yukon south to Baja California. It breeds throughout northern California except for the central valley and eastern deserts (Altman 2000).

**Life History & Threats:** The Olive-sided Flycatcher breeds in North America and Canada and winters primarily in Panama and the Andes mountains in South America (Altman 2000). In California, a clutch of 3-4 eggs is laid in late May to early July, incubation lasts 14-19 days, and young leave the nest between 15 and 23 days after hatching (Gotthardt 2008). The Olive-sided Flycatcher’s diet consists of insects, which it hunts by flying in a “yo-yo pattern” perching at the tallest point of a snag, swooping down to attack, and then returning to its perch (Altman 2000).

In the past 30 years this species has experienced significant declines in populations throughout its range, causing it to be listed as a Sensitive Species or Species of Concern by several federal and state agencies and conservation groups. Until recently, most life-history information on Olive-sided Flycatchers was anecdotal. Recent species-specific research on habitat relationships and nesting ecology in Alaska (Wright 1997), Colorado (Kotliar and Melcher 1997, 1998), and Oregon (Altman 1998, 1999) has advanced our knowledge about the species substantially. (From Altman and Salabanks 2000)

**Habitat & Habitat Associations:**

*Foraging Habitat:*

Primarily montane and northern coniferous forests, usually at mid- to high-elevations. Within coniferous forest biome, most often associated with forest openings, forest edges near natural openings (e.g., meadows, bogs, canyons, rivers) or human-made openings (e.g., harvest units), or open to semi-open forest stands. Presence in early successional forest appears

dependent on availability of snags or residual live trees for foraging and singing perches. Frequently occurs along wooded shores of streams, lakes, rivers, beaver ponds, bogs and muskegs, where natural edge habitat occurs and standing dead trees often are present. (From Cornell Ornithology Lab 2010)

*Nesting Habitat:* Red spruce (*Picea rubens*) balsam fir, tamarack and eastern hemlock (*Tsuga canadensis*) are commonly found near nesting sites (Gotthardt 2008). Douglas fir forests (*Pseudotsuga menziesii*) in northern California. Uses lichens from the genus *Usnea* in nest building (Altman 2000).

Female appears to choose nest site, although some males suggest locations by repeatedly flying to certain branches while female is nearby and bellying down into foliage as if molding lining of a nest. Generally saddled on top of a horizontal branch, well out toward the tip, often where overhanging branch provides some security and protection from weather. Most nests in coniferous trees, although observed in trembling aspen and willow. (From Cornell Ornithology Lab 2010)

*Special Habitat Features:* Extensive use of snags for aerial attack of prey and territorial singing (Gotthardt 2008).

**Conceptual Basis for GIS Model Development:** To identify potential habitat for the Olive-sided Flycatcher in the Study Area, we mapped:

*General Habitat:* as all types of cismontane, broadleaf upland, and coniferous forest vegetation.

Best habitat was mapped as areas in the above vegetation types with:

- open to moderately closed canopy (< 70% canopy cover)
- streams and ponds (seasonal and perennial)

*Nesting Habitat:* Douglas Fir

*Foraging Habitat:* Snag locations are not mapped in a GIS data layer.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* In northern California, Olive-sided Flycatchers nest in Douglas Fir forests and prefer to forage in areas with open or moderately open canopies near streams and ponds. Nesting habitat is abundant in the Preserve and good quality (Figure 94).

*Nearest Occurrence:*

Documented Occurrences in Preserve: This species has not been documented in the Preserve. To our knowledge, no surveys have been conducted.

Nearest Occurrence to Preserve: This species has not been reported to occur in USGS quads adjacent to the Preserve, but is known to occur throughout California.

*Summary:* We anticipate that nesting Olive-sided Flycatchers are “Likely to Occur” in the Galbreath Wildlands Preserve due to abundant high-quality nesting habitat.

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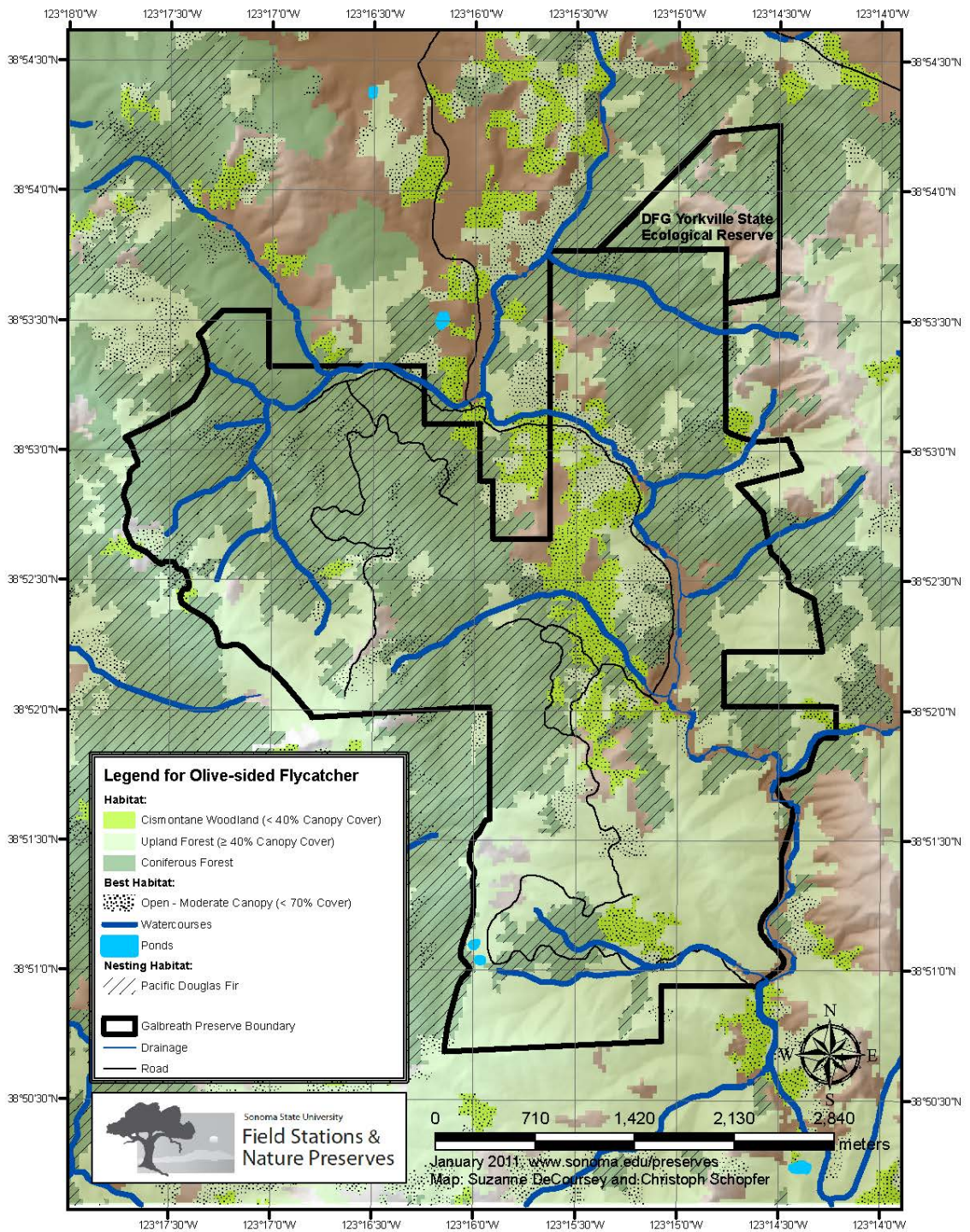
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**Photo info:** Published by the US Forest Service, this photo is in the public domain.  
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**Species Account Description:** Kandis Gilmore and Emily Harvey



Figure 94: Potential habitat for Olive-sided Flycatcher (*Contopus cooperi*)





*Aves (Birds): Passeriformes, Picidae*  
**Lewis's Woodpecker (*Melanerpes lewis*)**  
**Potential Occurrence: Nesting Unlikely to Occur**

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**Status:** (Nesting)

Federal: None

State: None

Other: USFWS:BCC



**Species Description:**

A medium-sized woodpecker, the Lewis's distinct coloration differentiates it from other woodpeckers in the field. Its dark red face contrasts with a gray collar and upper breast, and the remainder of the head is greenish-black, as are its back, wings, and tail. The lower breast and belly are pink. In flight, the long wings make deep, slow beats. It may also glide, and its overall flight pattern and dark coloring make it easily mistaken for a crow or a jay. On average, the Lewis's Woodpecker grows to 10.75 inches with a 21 inch wingspan and weighs 4 ounces. (From Audubon 2002)

**Distribution:**

The range of this species covers much of the west, but its distribution can be patchy and inconsistent from year-to-year. The breeding range overlaps the range of Ponderosa Pine in North America, from southern British Columbia into southern New Mexico and from eastern South Dakota to the Pacific Coast. Lewis's Woodpecker winters in the southern half of its breeding range from Oregon, Utah, and Colorado south to the U.S.-Mexican border and into northern Baja California. The distribution of this species has contracted, especially in western British Columbia, western Washington, and southern California. Its range has expanded into southeastern Colorado, most likely because of habitat changes: the presence of mature cottonwoods and corn. (From Audubon 2002)

An uncommon, local winter resident occurring in open oak savannahs, broken deciduous, and coniferous habitats. Found along eastern slopes of the Coast Ranges south to San Luis Obispo Co. Also winters in the Central Valley, Modoc Plateau, and the Transverse and other Ranges in southern California. Breeds locally along eastern slopes of the Coast Ranges, and in the Sierra Nevada, Warner Mts., Klamath Mts., and in the Cascade Range. (From Ahlborn and Harvey 1990)

**Life History & Threats:**

Named after famed explorer Meriwether Lewis, Lewis's Woodpecker has uniquely dark coloring and long wings. The members of its genus, *Melanerpes* (which means "black creeper"), are unlike other woodpeckers in that they often catch insects in the air; and some of them, like the Lewis's, forage on the ground. Lewis's slow wingbeats and frequent glides make a complex flight pattern, similar to a jay's. (From Audubon 2007)

Forages primarily on insects in spring and summer. In summer, 60% of feeding time was spent hawking insects, 30% foraging on ground and in brush, and 10% gleaning insects from trunks and branches of trees (Bock 1970). In late summer and fall, fruits and berries eaten frequently. Winter food mostly cached acorns, other nuts and seeds, and emerging insects. Caches acorns

and other nuts in crevices and holes for use in nonbreeding season. (From Ahlborn and Harvey 1990)

Lewis's Woodpecker begins nesting in mid-spring, earliest in the southern and latest in the northern part of its range. Pairs appear to be monogamous and may re-form each year on the same territory, which the male defends with calls, like the rapid "churr." A weak roll followed by several taps, drumming is done only in courtship. A raised wing display flashes the male's pink underparts, to attract his mate and to warn intruders. Nesting is sometimes colonial. (From Audubon 2007)

Lewis's Woodpeckers are monogamous and may form long-term pair bonds. Both members of the pair excavate a hole in a decayed tree, typically a cottonwood or Ponderosa pine. The nest consists of a wood-chip lining inside the hole. They commonly reuse nest sites. Both members of the pair generally incubate the 6 to 7 eggs for 12 to 16 days. Both feed the young, which leave the nest after 28 to 34 days. The young are dependent on the parents for some time after they leave the nest. (From Birdweb 2008)

Lewis's Woodpecker permanently inhabits the southern half or more of its breeding range, but northern populations evacuate their territories in late summer. Usually traveling in flocks and always moving slowly at low altitudes (10 to 500 feet), these migrants do not appear to follow traditional routes, but rather move through areas with the best food supplies. Migrants arrive on their wintering grounds in mid-fall and depart in March or April. Flocks range in size from a few to 150 woodpeckers (From Audubon 2007)

Its close association with open-canopy forests (ponderosa pine and cottonwoods along rivers) has made Lewis's Woodpecker susceptible to habitat loss and degradation. Fire suppression, grazing, logging, and closely spaced seedlings have caused significant losses of open ponderosa pine forests in British Columbia, Washington, Oregon, and Arizona. (From Audubon 2007)

Loss of habitat and nest sites to land cultivation and development has reduced breeding population in northern California (Bock 1970). Competition with acorn woodpeckers for stored mast has been reported (Bock 1970). (From Ahlborn and Harvey 1990)

## **Habitat & Habitat Associations:**

### *General Habitat:*

Suitable habitat includes open, deciduous and conifer habitats with brushy understory, and scattered snags and live trees for nesting and perching (Bock 1970). Uses logged and burned areas. Prefers oaks and acorns in winter. (From Ahlborn and Harvey 1990)

### *Nesting Habitat:*

Excavates nest cavity in snag or dead part of live tree, usually 1.5 to 24 m (5-80 ft) above ground (Bock 1970, Raphael and White 1984). Usually nests in sycamore, cottonwood, oak, or conifer. May nest near other pairs. (From Ahlborn and Harvey 1990)

Lewis's Woodpeckers bred at elevations from 330 to 1100m, in habitats including, at the valley bottom, open riparian cottonwood forests, mixed coniferous-broadleaved woodlands, open ponderosa pine, and mixed ponderosa pine-Douglas fir grassland; on the upper parts of surrounding hills, pure Douglas fir grassland. Live tree canopy cover at used sites ranged from zero in heavily burned areas up to 36% in old growth riparian cottonwood and mixed coniferous-broadleaved woodlands. (From Xiang Zhu 2006)

**Conceptual Basis for GIS Model Development:** Potential general habitat (including nesting habitat) in the Study Area for the Lewis's Woodpecker was mapped as cismontane woodland (i.e., mixed coniferous and broadleaved woodlands with canopy cover < 40%).

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Lewis's Woodpeckers nest in snags in open mixed deciduous and coniferous woodland, primarily in areas with Ponderosa Pine and Cottonwood. The habitat quality for this species is poor to moderate in the Galbreath Wildlands Preserve, due to the lack of cottonwoods and Ponderosa pine (Figure 93). Open mixed woodlands with other tree species are, however, common. Snags, used by this species for nesting, are also present on the Preserve; logging on the Galbreath Wildlands Preserve was discontinued in 2000 and large snags are common..

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented in the Preserve. To our knowledge, no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: The Lewis's Woodpecker has not been reported to occur in USGS quads adjacent to the Study Area. They are known to breed along the eastern slope of the Coast Ranges which are east of the Preserve boundaries.

*Summary:* We anticipate that nesting Lewis's Woodpeckers are "Unlikely to Occur" in the Preserve because key species associates, Ponderosa Pine and Cottonwood, do not occur in the Preserve, and breeding is thought to be more common in inland areas on the eastern slopes of the Coast Ranges.

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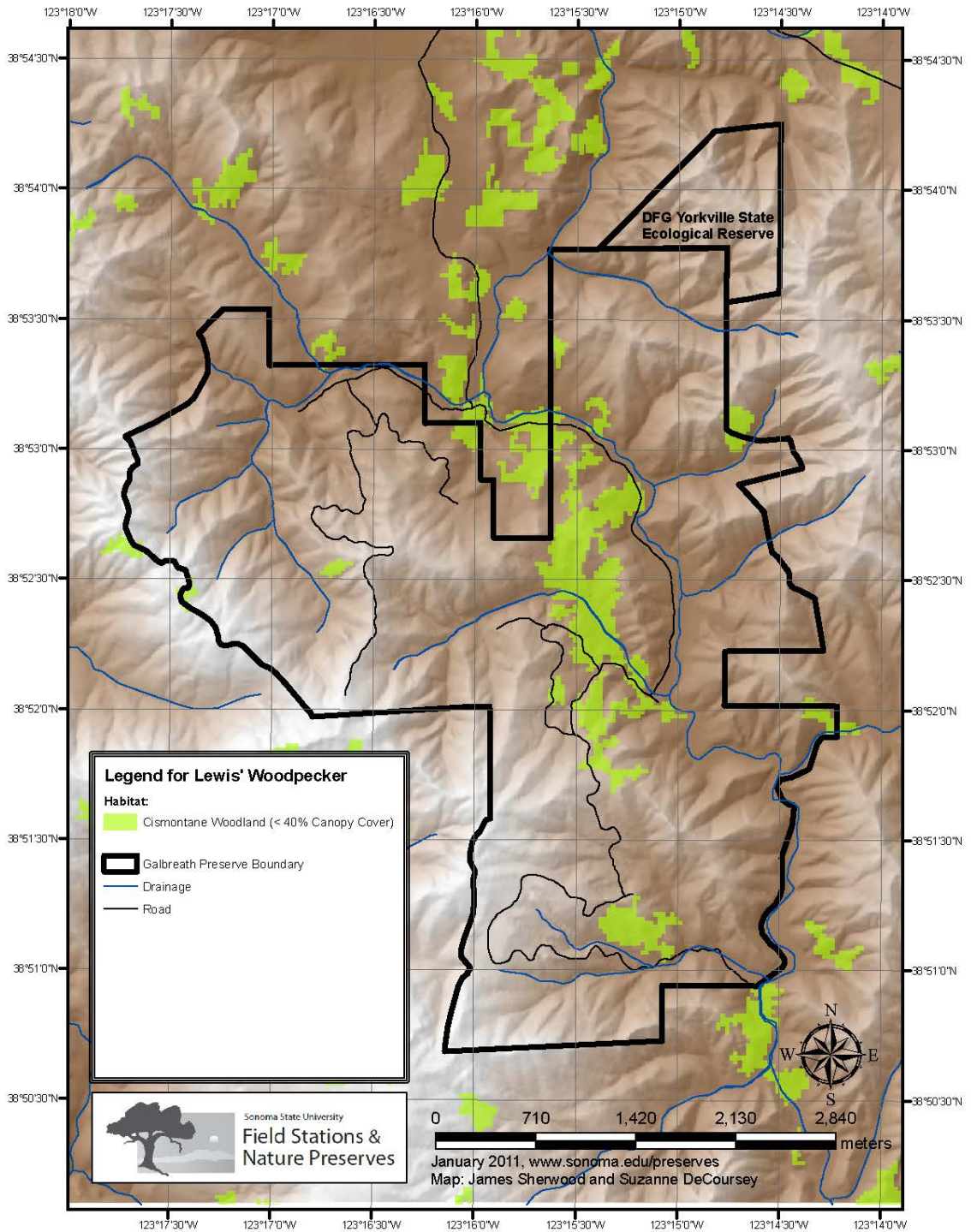
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**Species Account Description:** Emily Harvey

Figure 93: Potential habitat for Lewis' Woodpecker (*Melanerpes lewis*)





*Aves (Birds): Strigiformes, Strigidae*  
**Short-Eared Owl (*Asio flammeus*)**  
**Potential Occurrence: Nesting Unlikely to Occur**

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**Status:** (Nesting)

Federal: none

State: Species of Special Concern

Other: G5 S3



**Species Description:**

Short-eared Owls are medium-sized owls with mottled brown and buff plumage. Their facial disks are light, with dark patches at the eyes. They have short ear-tufts that are usually held down, out of view. They are light underneath, with finely streaked chests and bellies. Males are paler than females. Short-eared Owls have dark markings at the wrist on both the underside and upper side of the wings. In flight they can be hard to tell from the closely related Long-eared Owls, except by behavior and habitat. (From Birdweb 2008)

**Distribution:**

The short-eared owl is a widespread, nearly cosmopolitan species, occurring on all continents except Australia and Antarctica. The species is considered polytypic, with eight or nine subspecies, depending on the source (Mikkola 1983, Cramp 1985, Voous 1988, König et al. 1999). Short-eared owls have colonized many isolated island groups, and these populations make up five or six of the recognized subspecies. A single subspecies (*Asio flammeus flammeus*) occupies the entire north-temperate zone (North America, Europe, Asia). (From Wiggins 2008)

Formerly a resident locally the length of the state, excluding higher mountains. A widespread winter migrant, found primarily in the Central Valley, in the western Sierra Nevada foothills, and along the coastline. An uncommon winter migrant in southern California, including the Channel Islands (Garrett and Dunn 1981). Usually found in open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and fresh emergent wetlands. Occasionally still breeds in northern California (McCaskie et al. 1988). Breeding range includes coastal areas in Del Norte and Humboldt counties, the San Francisco Bay Delta, northeastern Modoc plateau, the east side of the Sierra from Lake Tahoe south to Inyo county, and the San Joaquin valley. (From Polite 2005)

**Life History & Threats:**

Short-eared Owls are prey specialists, concentrating on small rodents (primarily microtines), which undergo regular population cycles (Wiebe 1991; Sullivan 1992; Holt and Leasure 1993). When microtine populations crash in one area, Shorteared Owl populations must move to find a new prey supply. Other small mammals, insects, and birds are taken in lesser quantities. Short-eared Owls usually hunt in a low flight path over grasslands, marshes, fallow fields, and other open areas. They also hover or hunt from a perch (Wiebe 1987; Holt and Leasure 1993). (From Cooper and Beauchesne 2004)

Because they are active during the day, Short-eared Owls are easier to see than most other owls. They are especially active at dawn and dusk, and they perform dramatic courtship flights,

complete with vocalizing and wing clapping, during the breeding season. They are chase-predators and hunt by flying low over an open area, with their wings at a slight dihedral, somewhat like Northern Harriers. Their buoyant wing-beats give them a distinctive moth-like appearance. (From Birdweb 2008)

Courtship consists of aerial displays and hooting (Pitelka et al. 1955a). Breeds from early March through July (Bent 1938). Clutch size 4-14 eggs, usually 5-7, and higher in years with high prey population. Eggs laid in April and May; incubated by female for 21-28 days. Male brings food to female, which feeds and cares for semialtricial young. Fledging is at 31-36 days (Urner 1923). (From Polite 2005)

Predators include great horned owls (Hunt 1918, Killpack 1951), golden eagles (McGahan 1968), snowy owls (Murie 1929), and peregrine falcons (Sooter 1942). Small, predatory mammals and large reptiles may prey upon young and eggs. Competitors include northern harriers (Berger 1958), gulls (Fisler 1960), barn owls, and other large owls. (From Polite 2005)

As a ground nesting species, hazards to nests and nestlings include fire, flooding of marsh or coastal habitat, farm machinery, and predators (Campbell et al. 1990; Cadman 1994). Mortality in adults has also been attributed to shooting; collisions with cars, aircraft, and other machinery; and entanglement with barbed wire and hip chain (Holt and Leasure 1993; Cadman 1994). (From Cooper and Beauchesne 2004)

## **Habitat & Habitat Associations:**

### *Nesting Sites:*

Extensive open areas such as grasslands, savannahs, rangeland, or marshes with an abundant prey base, suitable nest sites, and adequate roosting sites are important breeding habitats (Cannings et al. 1987; Campbell et al. 1990). In British Columbia, most of the nests reported in Campbell et al. (1990) were found in shrubby, grassy fields adjacent to agricultural areas (e.g., pastures, fallow fields, and cultivated fields). Other sites, in order of frequency, included airport fields, marshes, open rangeland, sagebrush plains, and hayfields. In the Peace Lowlands (B.C.), uncultivated edges around wetlands are also used (M. Phinney, pers. comm.). Elsewhere, Short-eared Owls have been documented using newly cleared forests (Johnsgard 1988; Semenchuk 1992; Holt and Leasure 1993). Nests are usually situated on a raised, dry site within low, concealing vegetation (Holt and Leasure 1993). (From Cooper and Beauchesne 2004)

Nests on dry ground in a depression concealed in vegetation, and lined with grasses, forbs, sticks, and feathers; occasionally nests in a burrow. One record nest recorded on bare soil with no nest material (Holt 1992). (From Polite 2005)

### *Foraging Sites:*

The Short-eared Owl requires ample, accessible prey near the nest site. Open areas with patchy vegetation provide suitable forage for small mammal prey species and opportunities for the owls to access their prey. (From Cooper and Beauchesne 2004)

### *Roosting Sites:*

Winter roost sites must be close to hunting areas, provide protection from the weather and concealment from predators and mobbing birds, and be relatively free from human disturbance. This owl typically roosts on the ground within tall grass or shrubs, or in hedgerows (Holt and

Leasure 1993). On Sea Island (British Columbia), roosts often occur in patches of Scotch broom (*Cytisus scoparius*). They will also roost in trees when snow depths exceed 5 cm (Johnsgard 1988). (From Cooper and Beauchesne 2004)

**Conceptual Basis for GIS Model Development:** To identify suitable nesting, foraging and roosting habitat for the Short-Eared Owl in the Study Area, we mapped:

- open areas (i.e., all habitat types, including bare ground, with canopy cover 0-10%)
- agricultural areas

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Short-Eared Owls nest in depressions in the ground in open habitats often near agricultural areas. Habitat quality for this species is moderate in the Galbreath Wildlands Preserve. The GIS map (Figure 95) illustrates the lack of nesting habitat in the Preserve; however there is appropriate habitat adjacent to the Preserve at the northern boundary.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented in the Study Area. To our knowledge, no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: The Short-Eared Owl has not been reported to occur in USGS quads adjacent to the Study Area.

*Summary:* We anticipate that the Short-Eared Owl is “Unlikely to Occur” in the Preserve because of a lack of abundant potential nesting habitat.

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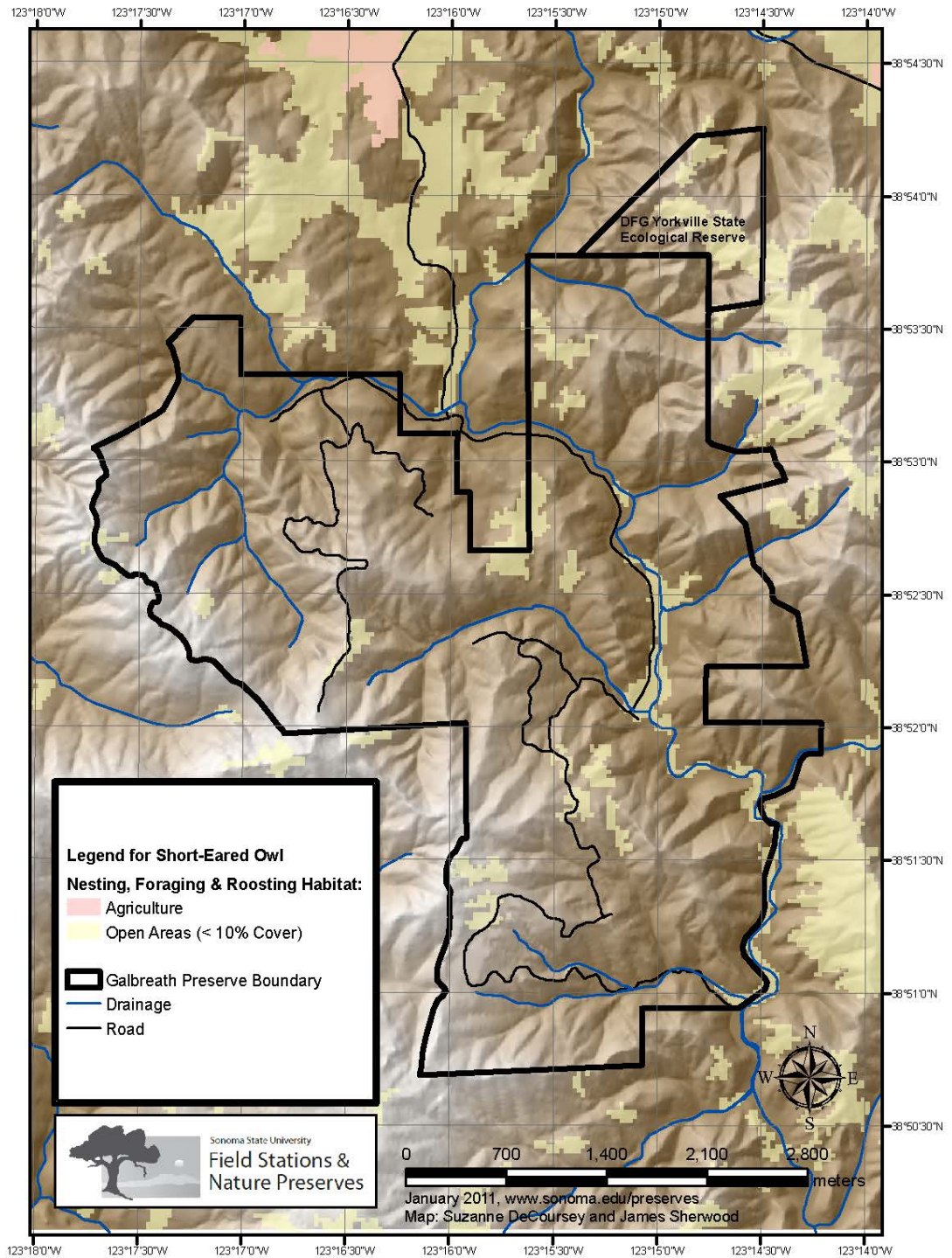
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**Species Account Description:** Emily Harvey

Figure 95. Potential habitat for Short-Eared Owl, *Asio flammeus*



*Aves (Birds): Strigiformes, Strigidae*



**Long Eared Owl (*Asio otus*)**  
**Potential Occurrence: Nesting Likely to Occur**

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**Status:** (Nesting)

Federal: None

State: Species of Special Concern

Other: G5 S3



**Species Description:**

Medium-sized owl. Total length: males 35–37.5 cm, females 37–40 cm (Mikkola 1983); wingspan 90–100 cm (Cramp 1985); mass: males 220–305 g, females 260–435 g (Cramp 1985). Legs and toes densely feathered. Head large and round with conspicuous “ear” tufts (not visible in flight); facial disk round. Irides yellow to golden yellow (North America)... Wings long and rounded with 10 functional primaries, 13 secondaries, and 4 alulae (Wijnandts 1984). Dorsum a mix of black, brown, gray, buff, and white; buff patch on upperwing just distal to bend of wing. Facial disk buff with white “eyebrows” and white patch below bill; lores and bill black. Ventral feathers whitish-gray and buff with dark brown streaking and barring; dark patch on underwing just distal to carpal region. Males generally paler than females, especially facial disk, tarsi, and underwing coverts. Overall, female plumage tends to have more dark brown and richer buff. (From Marks et al. 1994).

**Distribution:**

Distributed broadly throughout the Holarctic. In North America, breeds across central Canada and south interruptedly through northern Baja California in the West and Virginia in the East (Marks et al. 1994). It may winter throughout the breeding range, but northernmost populations usually are migratory; disperses south to the southeastern United States and southern Mexico (Howell and Webb 1995)...[Historically] Grinnell and Miller (1944) described the Long-eared Owl as breeding the length and breadth of the state east of the northern humid coastal region and from sea level to 7000 ft (2134m)... Surveys for the Humboldt County breeding bird atlas found Long-eared Owls in 11 scattered blocks in the southern half of the county, mainly in the interior (Hunter et al. 2005). Prior records for the region representing possible breeding birds extend from Bald Hills, Humboldt County, south to Willets, Mendocino County (Harris 2005). (From Shuford and Gardali 2008)

Uncommon yearlong resident throughout the state except the Central Valley and Southern California deserts where it is an uncommon winter visitor...(From Zeiner et al. 1990)

**Life History & Threats:**

Activity Patterns: Yearlong, nocturnal activity (Marti 1976)... Seasonal Movements/Migration: Apparently makes only local movements in California, although some migration may occur. Often congregates in winter flocks, perhaps including family groups. May be seasonal movement westward from Sierra Nevada foothills in fall. Small (1974) reported irregular wandering of groups in winter... Territory: Few data found. Apparently does not defend space outside immediate vicinity of nest. Hunting grounds may be shared by adults from different nests (Marks et al. 1994)... Reproduction: Breeding extends from early March to late July. One brood per yr from a clutch of 3-8 eggs, usually 4-5. Eggs usually laid in April and May; incubation 21 -28 days, by female; male feeds. Nestlings fledge in about 50 days or less. May

nest in loose colonies.... Niche: Northern harriers may compete for prey; red-shouldered hawks may compete for nest sites (Wilson 1938). Great horned owls may prey on young. (From Zeiner et al. 1990)

Resident populations in the state have been declining since the 1940s, especially in southern California (Grinnell and Miller 1944, Remsen 1978). Shuford and Fitton (1998) suggested populations of *A. otus* are still abundant in the Great Basin regions of California. All reasons for decline not known, but destruction and fragmentation of riparian habitat and live oak groves have been major factors (Remsen 1978). Urban development and agriculture have been the major causes for decline in coastal southern California (Bloom 1994). (From Zeiner et al. 1990)

The primary threat to Long-eared Owl populations is loss and degradation of breeding and foraging habitat (Marks et al. 1994), the main factor linked with historic declines in California....Nest predation, particularly by increasing species such as ravens and other corvids, may be contributing to local and regional declines (Marks 1986)...Long-eared Owls are undoubtedly exposed to pesticides in open agricultural settings, but the direct effects of ingestion and exposure to pesticides and the indirect effects of reduced prey numbers from rodenticide use are unknown in California...Bosakowski et al. (1989) suggested rodenticide use may decrease prey populations of Long-eared Owls. Grazing may affect prey populations of these owls in some agricultural areas (J. Winter pers. comm.). (From Shuford and Gardali 2008)

Loss of riparian woodlands and isolated tree groves would be highly detrimental to Long-eared Owls. Such changes would be especially damaging in arid West, where much of nesting habitat occurs in narrow bands along watercourses. Decline in s. California attributed to loss of riparian and grassland habitats to development ([Marti and Marks 1989](#), [Bloom 1994](#)). (Marks et al 1994)

## **Habitat & Habitat Associations:**

### *General Habitat:*

Frequents dense, riparian and live oak thickets near meadow edges, and nearby woodland and forest habitats. Also found in dense conifer stands at higher elevations....Riparian habitat required.; also uses live oak thickets and other dense stands of trees. (From Zeiner et al. 1990)

Key habitat components are some dense cover for nesting and roosting, suitable nest platforms, and open foraging areas. (From Shuford and Gardali 2008)

Inhabits dense vegetation adjacent to grasslands or shrublands; also open forests. Elevations range from near sea level to >2,000 m. Reports of forests as main habitat (e.g., Bent 1938, Am. Ornithol. Union 1983, Johnsgard 1988, Sibley and Monroe 1990) misleading in that Long-eared Owls normally use these habitats for nesting and roosting only...(From Marks et. al 1994)

### *Nesting Habitat:*

Riparian or other thickets with small, densely canopied trees required for roosting and nesting...Uses old crow, magpie, hawk, heron, and squirrel nest in a variety of trees with dense canopy. Nest usually 3-15 m (10-50 ft) above ground, rarely on ground or in tree or snag cavity (Karalus and Eckert 1974). Breeds from valley foothill hardwood up to ponderosa pine habitats. (From Zeiner et al. 1990)

Long-eared Owls nests in conifer, oak, riparian, pinyon-juniper, and desert woodlands that are either open or are adjacent to grasslands, meadows, or shrublands...In Humboldt County, the owls apparently nest in mixed stands of conifers and oaks with edges and openings such as meadows or prairies (Hunter et al. 2005)... Long-eared Owls nest mainly in old corvid or hawk nests but also in old woodrat and squirrel nests, mistletoe brooms, and natural platforms of (or debris piles in) trees (Voous 1988, Bloom 1994, Marks et al. 1994). They occasionally nest on cliffs, in tree cavities, in orchards or ornamental trees, in man-made structures, or on the ground. (From Shuford and Gardali 2008)

Nesting in dense or brushy vegetation amidst open habitats also occurs in California (Bloom 1994)...(From Marks et al. 1994)

Wooded areas with dense vegetation needed for roosting and nesting, open areas for hunting. Often associated with conifers in eastern North America, also with deciduous woods near water in West. (NatureServe 2009)

#### *Roosting Habitat:*

Riparian or other thickets with small, densely canopied trees required for roosting and nesting...(From Zeiner et al. 1990)

These owls apparently select nesting and roosting sites with dense, occasionally armored, cover for concealment from predators or perhaps to dampen thermal variation...(From Shuford and Gardali 2008)

Roost groves are adjacent to open habitats used for foraging (Getz 1961, Bosakowski 1984, Wijnandts 1984, Marti et al. 1986, Smith and Devine 1993, DWH, JSM). (From Marks et al. 1994)

#### *Foraging Habitat:*

Usually hunts in open areas, occasionally in woodland and forested habitats. (From Zeiner et al. 1990)

Long-eared Owls forage primarily at night by flying low over open ground, including grasslands, meadows, active or fallow agricultural lands, sagebrush scrub, and desert scrub... (From Shuford and Gardali 2008)

Presumably most food captured on ground (mammals and some birds) or from low vegetation (roosting birds). Hunts below canopy in open forests (Glue and Hammond 1974)... (From Marks et al. 1994)

**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped for:

#### *Nesting/Roosting:*

- Riparian (modeled as 130-m buffer along Rancheria Creek)
- Densely canopied trees (i.e., all forest and woodland types with canopy cover > 70%)

#### *Foraging Habitat:*

- Open areas: bare ground, grassland, chaparral
- Open canopy forests: 10-39%
- Agricultural areas were also mapped as foraging habitat.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Long-Eared Owls nest in densely wooded vegetation adjacent to grasslands and shrubs, often near riparian areas. Nesting habitat in the Preserve is good quality and widespread (Figure 96). North-facing (aspect not mapped), dense-canopied forests are abundant in the Preserve and occur adjacent to foraging habitat (open-canopied forests and grasslands).

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has not been reported to occur in USGS quads adjacent to the Preserve. Possible breeding sites have been documented in Mendocino County (Harris 2005).

*Summary:* Nesting long-eared owls are “Likely to Occur” in the Preserve because nesting habitat quality is good. However, Long-Eared Owls are uncommon residents and nesting individuals are anticipated to be rare.

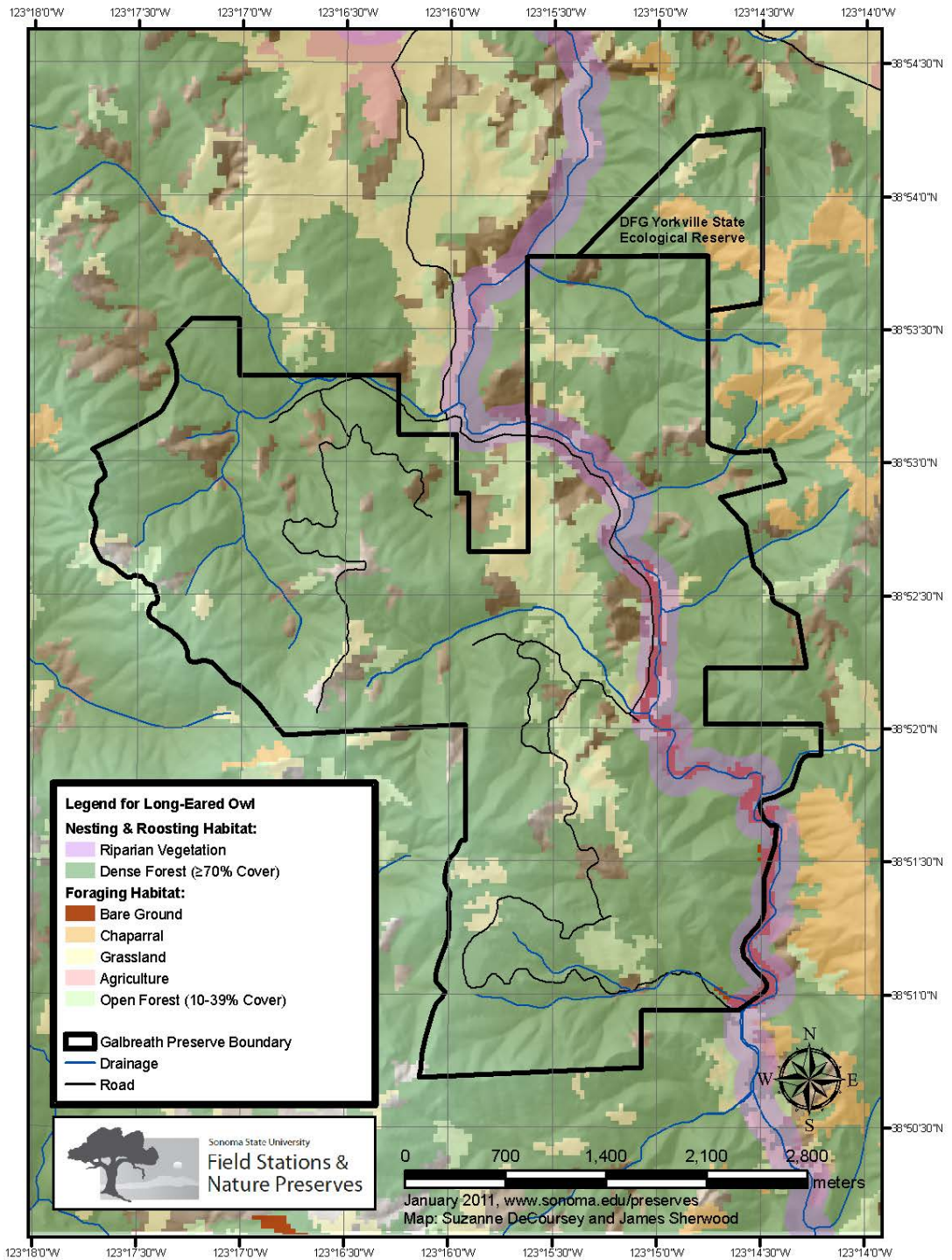
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**Species Account Description:** Linden Schneider & Emily Harvey



Figure 96. Potential habitat for Long-Eared Owl, *Asio otus*



*Aves (Birds): Strigiformes, Strigidae*  
**Burrowing Owl (*Athene cunicularia*)**  
**Potential Occurrence: Unlikely to Occur**

**Status:** (burrow sites & some wintering sites)

Federal: none

State: Species of Special Concern

Other: G4 S2 USFWS:BCC



**Species Description:**

Small, ground-dwelling owl. Total length: males 19.5–25.0 cm, females 19.0–25.0 cm; mass about 150 g. Legs long and sparsely feathered below the tibiotarsal joint. Head round, lacking ear tufts. Distinct oval facial ruff, framed by a broad, buffy-white eyebrow-to-malar stripe on the interior part. Iris usually bright lemon yellow. Wings relatively long and rounded, with 10 brown and buffy-white barred primaries (3 outermost with inner webs sinuated); tail short with 12 brown and buffy-white barred rectrices. Dorsum brown; back, scapulars, and crown profusely spotted with buffy white. Throat and undertail coverts white; remainder of underparts of adults buffy-white with broad brown barring on both sides. Females generally darker than males overall, particularly in worn plumage. (From Haug 1993)

**Distribution:**

Burrowing owl is a pan-American species...*Athene cunicularia* ssp. *hypugaea* is distributed from southern interior British Columbia east to south-central Manitoba and south to west-central Mexico....(From Howard 1996)

Owls in ... the southern portion of the western range generally are year-round residents (Haug et al. 1993), but elsewhere in North America they appear to migrate south ... (James 1992). Scant data on migration suggest that most Burrowing Owls that breed in North America winter in Mexico (G. Holroyd pers. comm.), Arizona, New Mexico, Texas, Louisiana, and California, which is considered one of the most important wintering grounds for migrants (James and Ethier 1989)... Year-round resident throughout much of the state [California]. Seasonal status varies regionally, with birds retreating from higher elevations such as the Modoc Plateau in winter (Grinnell and Miller 1944)...year-round residency in the Central Valley, San Francisco Bay region, Carrizo Plain, and Imperial Valley (Brenckle 1936, Coulombe 1971, Thomsen 1971, Catlin 2004, Johnson 1997b, L. Trulio et al. and D. K. Rosenberg et al. unpubl. data). Migrants from other parts of western North America may augment resident lowland populations in winter.... Grinnell and Miller (1944) described the historic range of this owl as throughout most of California and most of its islands, except the coastal counties north of Marin and mountainous areas. (From Shufrod and Gardali 2008)

Formerly common in appropriate habitats throughout the state, excluding the humid northwest coastal forests and high mountains... (Zeiner et al 1990)

**Life History & Threats:**

Activity Patterns: Yearlong, circadian activity. Hunts day or night; frequently perches or stands at burrow entrance in daytime. (From Zeiner et al 1990)

Seasonal Movements/Migration: Individuals in northern parts of the range may winter to the south, as far as Central America (Call 1978), but mostly resident in California. May be some movement downslope in winter, or wandering. Strong site fidelity is suggested (Schultz 1993). (From Zeiner et al 1990)

Home Range: Home range at the Oakland Airport varied from 0.04 to 1.6 ha (0.1 to 4 ac), with a mean of 0.8 ha (2 ac) (Thomsen 1971). (From Zeiner et al 1990)

Territory: Martin (1973) reported average distance between burrows of 166 m (436 ft), but that burrow not defended until another burrowing owl came within 10 m (33 ft). (From Zeiner et al 1990)

Reproduction: Male gives courtship display and notes in front of burrow. Breeding occurs from March through August, with peak in April and May. Clutch size 2-10, average 5-6 eggs; may increase to the north (Bent 1938). Young emerge from burrow at about 2 wk, and fly by about 4 wk (Zarn 1974a). Martin (1973) reported 95% of the young fledged, and a mean reproductive success of 4.9 young per pair. Semicolonial; probably the most gregarious owl in North America. (From Zeiner et al 1990)

Niche: Conversion of grassland to agriculture, other habitat destruction, and poisoning of ground squirrels have contributed to the reduction in numbers in recent decades, which was noted in the 1940s, and earlier (Grinnell and Miller 1944, Zarn 1974a, Remsen 1978). Predators include prairie falcons, red-tailed hawks, Swainson's hawks, ferruginous hawks, northern harriers, golden eagles, foxes, coyotes, and domestic dogs and cats (Martin 1973). Fleas, lice, and feather mites are common ectoparasites. Collisions with autos may be a significant cause of mortality. (From Zeiner et al 1990)

Burrowing owls begin nesting in spring in burrows that they line with cow, horse, or bison (Bison bison) dung [63]....The female does all incubation and brooding [28]. Clutch size is large, from 6 to 11 eggs [31], with an average of 6.5 eggs [51]. Eggs are laid at intervals of 24 to 72 hours. Incubation period is 27 to 30 days and begins when the first egg is laid, resulting in a multi-aged brood [16]. Owlets are born partially covered with down and with eyes closed. Eyes open at 5 days of age [28]. Owlets move among nest burrows when 10 days old [31]. They fly well by 6 weeks of age, and fledge when about 44 days old [43]. At Davis, California, a DNA fingerprinting study of burrowing owl showed that 37 percent of adult owls were raising owlets other than their biological offspring. Owllet movement and polygamy accounted for some of the discrepancy; intraspecific brood parasitism may also be a factor [38]...Burrowing owls are migratory, but little is known of their migration routes and wintering areas. The majority of burrowing owls that breed in Canada and the northern United States are thought to migrate south during September and October and north during March and April. Burrowing owls migrating to Saskatchewan arrive in early May [28]....Christmas birds counts show California as the most important American state for wintering burrowing owls, followed by New Mexico, Florida, Arizona, and Texas, respectively [36]....southern California have year-round burrowing owl residents as well as winter migrants [28]. (From Howard 1996)

Factors in population decline: Intensive agriculture or development results in loss of burrows, loss of foraging habitat, and creation of suboptimal nesting habitat. It also increases vulnerability to predation [26] and may reduce the chances of unpaired owls to find mates [28]. Loss of habitat has been cited as factor of decline in the Bay Area and Central Valley of California [13,23] and elsewhere...Programs to destroy prairie dogs and other burrowing rodents have greatly reduced burrowing owl populations by reducing the amount of prey and burrows available [4,23,28,63]. Poisons used to destroy rodents probably have a direct effect on burrowing owls: at least one rodenticide (carbamate) has been shown to lower burrowing owl reproduction and survival when sprayed over nest burrows [37]. The effects of consuming poisoned prey on burrowing owl are not well known [28]. However, weight of breeding

burrowing owl in pastures where strychnine-coated grain was used to control ground squirrels was significantly lower than on control pastures, suggesting either a sublethal effect or less available food [36]... Overstocking can harm burrowing owl, however. Burrowing owl have become extirpated from some islands of Tierra del Fuego by domestic sheep trampling their burrows [32]. (From Howard 1996)

In addition to loss of nesting burrows from extermination of ground squirrels, developed environments pose a substantial risk to Burrowing Owls from mortality caused by traffic (Klute et al. 2003, D. K. Rosenberg et al. unpubl. data)...High-voltage electrical fences around prisons have caused mortality ...Pesticides may affect Burrowing Owl populations in croplands and rangelands (James and Fox 1987, James et al. 1990)...Farming practices are likely a greater threat to Burrowing Owls in agricultural environments. Discing to control weeds in fallow fields may destroy burrows (Rosenberg and Haley 2004). Road and ditch maintenance in agricultural areas poses a threat to both owls and their nests...Emerging diseases such as West Nile virus may be significant threats to Burrowing Owl populations, but few data currently exist...(From Shuford and Gardali 2008)

## **Habitat & Habitat Associations:**

### *General Habitat*

Burrowing owls occupy grasslands, shrub steppes, and savannas. They also occur in other open areas such as agricultural lands, old fields, extensive forest clearings, airports, golf courses, and spacious residential zones [1,3,23,50,63,76]. (From Howard 1996)

Dry, open, shortgrass, treeless plains, often associated with burrowing mammals. Also golf courses, cemeteries, road allowances within cities, airports, vacant lots in residential areas and university campuses, and fairgrounds. (From Haug 1993)

Frequents open grasslands and shrublands with perches and burrows. (From Zeiner et al 1990)

The Burrowing Owl is primarily a grassland species, but it persists and even thrives in some landscapes highly altered by human activity (Thomsen 1971, Haug et al. 1993, Millsap 2002, Gervais et al. 2003, Rosenberg and Haley 2004). The overriding characteristics of suitable habitat appear to be burrows for roosting and nesting and relatively short vegetation with only sparse shrubs and taller vegetation (Green and Anthony 1989, Haug et al. 1993). (From Shuford and Gardali 2008)

### *Nesting Habitat*

When selecting a burrow, the owls prefer burrows with low, open cover that provide good horizontal visibility [23]. Burrowing owls are commonly found in plant communities in early stages of succession because cover is low [45]. Long-abandoned burrows are usually not used because the burrow entrance has become overgrown...In California...burrowing owls primarily use ground squirrel burrows [23]... Other burrows commonly occupied by burrowing owl throughout North America include those of badger (*Taxidea taxus*), pocket gophers (*Geomys* spp.), fox (*Vulpes* and *Urocyon* spp.), and rattlesnakes (*Crotalus* spp.) [22,26,63]... Burrowing owls use ground cavities other than burrows for cover... such as culverts. (From Howard 1996)

Owls in agricultural environments nest along roadsides and water conveyance structures (open canals, ditches, drains) surrounded by crops (DeSante et al. 2004, Rosenberg and Haley



2004). Burrowing Owls often nest near and under runways and associated structures (Thomsen 1971, Gervais et al. 2003). (From Shuford and Gardali 2008)

#### *Roosting Habitat*

Uses rodent or other burrow for roosting and nesting cover...(From Zeiner et al 1990)

#### *Foraging Habitat*

During the breeding season, owls forage close to their burrows...Foraging owls in agricultural areas of California exhibited little or no selection for cover types; instead, foraging locations were best predicted by distance to nest (Gervais et al. 2003, Rosenberg and Haley 2004). (From Shuford and Gardali 2008)

**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped as grasslands, chaparral, or agricultural areas. (Note bare ground was not mapped since this habitat type in the Study Occurs only as scoured river beds along the edges of Rancheria Creek which are unlikely to be occupied by Burrowing Owls)

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to burrow sites and some wintering areas individuals.

*Habitat:* Burrowing Owls prefer open grasslands adjacent to agricultural areas for nesting. The habitat quality for this species is moderate in the Galbreath Wildlands Preserve. The GIS map (Figure 97) illustrates the paucity of potential nesting habitat in the Preserve; however there is appropriate habitat adjacent to the Preserve at the northern boundary.

#### *Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented in the Study Area. To our knowledge, no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: The Burrowing Owl has not been reported to occur in USGS quads adjacent to the Study Area.

*Summary:* We anticipate that the Burrowing Owl is “Unlikely to Occur” in the Preserve because although potential habitat for burrow sites is moderate in quality, there is very little within Preserve boundaries.

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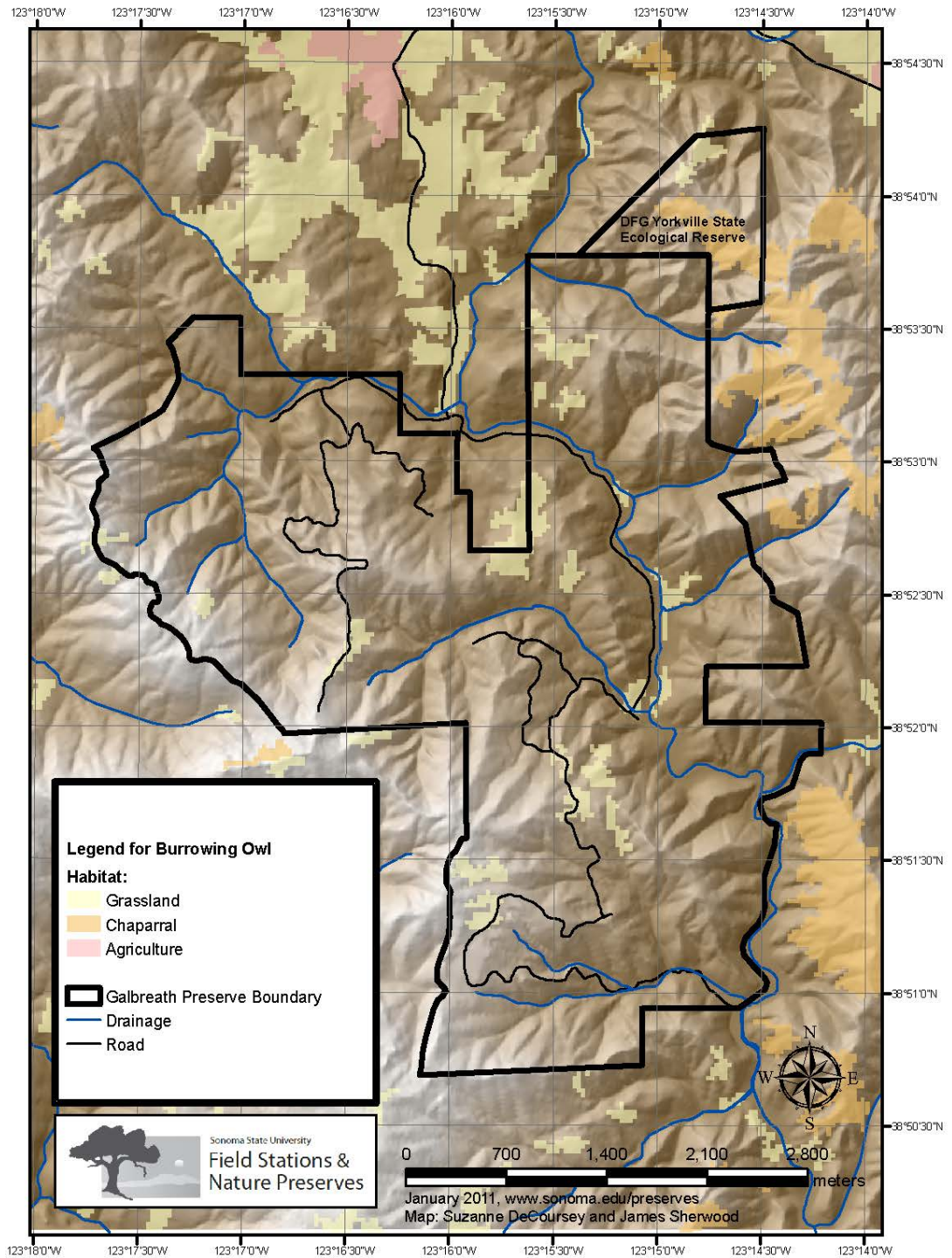
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**Species Account Description:** Linden Schneider & Emily Harvey

Figure 97. Potential habitat for Burrowing Owl, *Athene cunicularia*



*Aves (Birds): Strigiformes, Strigidae*  
**Flammulated Owl (*Otus flammeolus*)**  
**Potential Occurrence: Nesting Unlikely to Occur**

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**Status:** (Nesting)

Federal: none

State: none

Other: G4 S2S4 USFWS:BCC



Photo: Rick & Nora Bowers

**Species Description:**

Flammulated Owls are small owls with short ear-tufts that can be held erect or flush to the head. Their plumage is of varying dark and light shades of gray, with some mottling and striping of rufous. They can be distinguished from Western Screech-Owls by their dark eyes. (From Birdweb 2008)

**Distribution:**

Flammulated owls occur in the western United States and occupy most of Oregon, Washington, Utah, Nevada, Arizona, and New Mexico. The species also exists in montane regions of California, western Colorado, and central Mexico, and has small populations in Baja California, Idaho, and British Columbia (Johnsgard 1988). The breeding range covers over nine hundred thousand square miles with about ten percent occurring in California (USDA, 1994). (From Yasuda 2001)

Flammulated owls breed from southern British Columbia south through the western United States (Zeiner et al. 1990). In California, it is found in summer throughout the Cascades, Sierra Nevada, forested parts of the coast ranges from Del Norte County south to Monterey County, the Transverse Ranges, the Peninsular Ranges (Winter 1974), the Klamath Ranges (Zeiner et al. 1990), and all national forests (Timossi 1990) where suitable habitat exists. The breeding range is limited to the higher parts of the yellow pine (ponderosa pine) belt, between elevations of 366 m (1200 ft) to 1676 m (5500 ft) in the north, and up to 2743 m (9000 ft) in the southern part of its range (Winter 1974). (From Yasuda 2001)

**Life History & Threats:**

Flammulated Owls mostly eat large insects, especially moths and beetles. They most often take their prey from foliage, but they also catch prey in mid-air and on the ground. They only rarely take vertebrate prey. Although Flammulated Owls are difficult to see, their low-pitched calls are often heard in the Ponderosa pine belt in late spring and early summer. These calls sound as if they must come from much larger owls, and many can often be heard calling from one spot. Flammulated Owls are most active just after dark and just before dawn. (From Birdweb 2008)

Males arrive on the breeding grounds before females. They call to establish territories and to attract arriving females. Birds pair with their mates of the previous year, but if one does not return, they often pair with a bird from a neighboring territory. The male shows the female potential sites from which she selects the one that will be used, usually an old Pileated Woodpecker or Northern Flicker hole, sometimes an artificial nest box. Flammulated Owls do



not add nest material to the cavity. The female incubates 2-4 eggs for 20-26 days while the male brings her food. Once the young hatch, she broods them for about 12 days. During that time the male brings food for the female and the owlets. After brooding ends, the female also hunts for the growing brood. The young leave the nest around after about 25 days but stay nearby. Sometimes the brood divides, with each parent taking one or two of the young. Adults and young stay together for another month before the young disperse. (From Birdweb 2008)

Home range size is not well defined but seems to vary from 5-20 ha (12 to 50 ac) (Zeiner et al. 1990) and appears to be dependent on the degree of patchiness and age of overstory trees with home range increasing with a decrease in amount of suitable habitat components. Home range shape is determined by the topography of the area and the existence of neighboring home ranges (Johnsgard 1988). Breeding densities vary from 3.2 to 5.2 adult males per 100 ha (247 ac) (Zeiner et al. 1990). Ranges of females are not known but are probably smaller, as females are fed by males during incubation and the early nesting period (McCallum 1994b). A study in Oregon, showed a reduction in the male home range from 16 ha (39 ac) during the incubation stage to 7.9 ha (20 ac) during the nestling period, possibly to decrease time between feeding visits (McCallum 1994b). (From Yasuda 2001)

Flammulated owls show significant site fidelity (about 50% return rate) with the males being more faithful than the females. The females have a higher tendency to disperse, but usually only move to adjacent territories, which correspond to dispersal distances of about 425 m (1394 ft) (Reynolds and Linkart 1987a). The young leave the home ranges of their parents at about the age of 8 weeks, which is usually only shortly before fall migration starts in October. Their dispersal distance on the breeding grounds the following spring is not known (Johnsgard 1988). (From Yasuda 2001)

The flammulated owl's preference for yellow pine and/or Douglas-fir has been linked to prey availability as there are four times as many lepidopteran (moth and butterfly) species associated with Douglas-fir and ponderosa pine than other common western conifers. Both high prey diversity and structure of these forest types may favor successful foraging by flammulated owls primarily in open mature forests versus dense even-aged stands. Foraging occurs in the open upper two-thirds of tree crowns, between trees and on the ground (McCallum 1994b). (From Yasuda 2001)

Flammulated owls feed primarily on insects which they capture in the air by "hawking" (Ehrlich et al. 1988), on the ground or trees by pouncing from a nearby perch (Richmond et al. 1980) or gleaning them from trunks or branches (Zeiner et al. 1990). Hunting occurs mainly at dawn and dusk with less activity occurring in the middle of the night (Marshall 1957). (From Yasuda 2001)

The species depends on northern flicker, pileated woodpecker, sapsuckers, and other primary cavity nesters to excavate nest cavities (McCallum 1994a). Loss of old forest types in the northern range of the species could eliminate habitat for the pileated woodpecker, resulting in loss of nesting cavities for the owl. South of the pileated woodpecker range, the northern flicker takes on the role as the main excavator of cavities utilized by flammulated owls (McCallum 1994b). Flicker cavities are often co-opted by European starlings, reducing the availability of nest cavities for both flickers and owls (McCallum 1994a). Africanized honey bees will nest in in tree cavities (Merrill and Visscher 1995) and may be a competitor where natural cavities are limiting, particularly in southern California where the bee has expanded its range north of Mexico. (From Yasuda 2001)

## Habitat & Habitat Associations:

### *General Habitat:*

Flammulated owls are typically found in mid-elevation coniferous forests containing mature to old, open canopy yellow pine (ponderosa pine [*Pinus ponderosa*] and Jeffrey pine [*Pinus jeffreyi*]), Douglas fir (*Pseudotsuga menziesii*), and grand fir (*Abies grandis*) (Bull and Anderson 1978, Goggans 1986, Howie and Ritchie 1987, Reynolds and Linkhart 1992, Powers et al. 1996). In central Colorado, Linkhart and Reynolds (1997) reported that 60% of the habitat within the area defended by territorial males consisted of old (200-400 year) ponderosa pine/Douglas-fir forest. Territories most consistently occupied by breeding pairs (>12 years) contained the greatest (>75%) amount of old ponderosa pine/Douglas-fir forest. Marcot and Hill (1980) reported that California black oak (*Quercus kelloggii*) and ponderosa pine occurred in 67% and 50%, respectively, of the flammulated owl nesting territories they studied in northern California. In northeastern Oregon, Bull and Anderson (1978) noted that ponderosa pine was an overstory species in 73% of flammulated owl nest sites. Powers et al. (1996) reported that ponderosa pine was absent from their flammulated owl study site in Idaho and that Douglas-fir and quaking aspen (*Populus tremuloides*) accounted for all nest trees. (From Hays and Rodrick 2003)

### *Nesting Habitat:*

The owls nest primarily in cavities excavated by flickers (*Colaptes* spp.), hairy woodpeckers (*Picoides villosus*), pileated woodpeckers (*Dryocopus pileatus*), and sapsuckers (*Sphyrapicus* spp.) (Bull et al. 1990, Goggans 1986, McCallum 1994). Bull et al. (1990) found that flammulated owls used pileated woodpecker cavities with a greater frequency than would be expected based upon available woodpecker cavities. There are only a few reports of this owl using nest boxes (Bloom 1983). Reynolds and Linkhart (1987) reported occupancy in 2 of 17 nest boxes put out for flammulated owls. (From Hays and Rodrick 2003)

Flammulated owls nest in habitat types with low to intermediate canopy closure (Zeiner et al. 1990). Nesting cavities are typically found in ponderosa pine forests, however, the flammulated owl will use other tree species including aspen. In the western Sierra Nevada, the Wildlife Habitat Relationship (WHR) database lists ponderosa pine, black oak woodland, mixed conifer, Jeffrey pine, red fir, and lodgepole pine as the habitats used by flammulated owls (Verner and Boss 1980, Zeiner et al. 1990). A nesting record from the Argus Mountains of California was in an old pinyon forest (McCallum 1994b). (From Yasuda 2001)

Studies in several states, including California show owl territories tend to be on south slopes, ridgetops and plateaus, where ponderosa pine and Douglas-fir occurs (McCallum 1994b). The owls also seem to prefer nest sites on ridges, on the upper third of slopes, and on east or south facing slopes (Bull et al. 1990). Owls nested on slopes with stands of trees whose average diameter at breast height (dbh) are greater than 50 cm (20 in) (Bull et al. 1990). Flammulated owls are obligate secondary cavity nesters (McCallum 1994b), requiring large snags to roost and nest in. (From Yasuda 2001)

### *Foraging Habitat:*

Flammulated owls are entirely insectivores; nocturnal moths are especially important during spring and early summer (Reynolds and Linkhart 1987). As summer progresses and other prey become available, lepidopteran larvae, grasshoppers, spiders, crickets, and beetles are added to the diet (Johnson 1963, Goggans 1986). In Colorado, foraging occurred primarily in old ponderosa pine and Douglas-fir with an average tree age of approximately 200 years (Reynolds and Linkhart 1992). Old growth ponderosa pine were selected for foraging, and young Douglas-firs were avoided. Flammulated owls principally forage for prey on the needles and bark of large trees. They also forage in the air, on the ground, and along the edges of clearings

(Goggans 1986; E. Bull, personal communication; R. Reynolds, personal communication). Grasslands in and adjacent to forest stands are thought to be important foraging sites (Goggans 1986). However, Reynolds (personal communication) suggests that ground foraging is only important from the middle to late part of the breeding season, and its importance may vary annually depending upon the abundance of ground prey. Ponderosa pine and Douglas-fir were the only trees selected for territorial singing in male defended territories in Colorado (Reynolds and Linkhart 1992). (From Hays and Rodrick 2003)

They prefer to forage in older stands that support understories, and need slightly open canopies and space between trees to facilitate easy foraging. The open crowns and park-like spacing of the trees in old growth stands permit the maneuverability required for hawk and glean feeding tactics (USDA 1994). (From Yasuda 2001)

**Conceptual Basis for GIS Model Development:** To identify suitable nesting and foraging habitat for the Flammulated Owl in the Study Area, we mapped:

*Foraging Habitat:*

- Coniferous forest types (i.e., Redwood-Douglas fir mix (*Sequoia sempervirens-Pseudotsuga menziesii*) or Pacific Douglas fir (*Pseudotsuga menziesii var.menziesii*) vegetation types)

Possible best foraging habitat are the areas described above:

- with < 70% canopy cover
- at the edges of the coniferous forest that abut grasslands.
- trees > 28 cm DBH. Note that Flammulated Owls prefer nesting trees > 50 cm DBH. DBH categories in the available GIS database did not allow this distinction and we chose the most inclusive size category for mapping.

*Nesting Habitat:*

- Coniferous forest types with < 70% canopy cover.

Possible best nesting habitat is mapped as nesting habitat with:

- trees > 28 cm DBH. Note that Flammulated Owls prefer nesting trees > 50 cm DBH. DBH categories in the available GIS database did not allow this distinction and we chose the most inclusive size category for mapping.
- east or south facing slopes (i.e., E, SE, or S-facing)
- ridgetops. Although owls generally prefer the upper third of the slope near the ridgeline, we only mapped ridgelines.

**Potential Occurrence in the Galbreath Wildlands Preserve:** Protection status for this species applies to nesting individuals.

*Habitat:* Flammulated Owls nest in open-canopy coniferous forests, preferring areas with mature trees on east- or south-facing slopes near ridgelines (Yasuda 2001). Habitat quality for this species is moderate in the Galbreath Wildlands Preserve. Open-canopied coniferous forest is scattered throughout the Preserve, and about half of these areas have mature trees on south or east facing slopes.. Nesting sites in these areas are also possible. Flammulated Owls are obligate secondary cavity nesters. Logging on the Galbreath Wildlands Preserve was discontinued in 2000 and large snags are relatively common in the Preserve. Preferred foraging habitat, the interface between coniferous forests and grasslands, is quite limited, but in several areas occurs near the best available nesting habitat.

Patch size of nesting habitat in the Preserve reduces the potential occurrence of Flammulated Owls in the Preserve:

- (1) Flammulated Owl territory and home range sizes range from 1.6 to 4 ha (4-10 acres) and 5-29 ha (12-50 ac) respectively (Yasuda 2001). The largest patches of potential habitat in the Preserve indicated in Figure 98 are roughly 5 ha.
- (2) Figure 98 overestimates available nesting habitat since Flammulated Owls prefer trees  $\geq 50$  cm DBH, while the map shows trees  $\geq 28$  cm DBH, suggesting that habitat patches are smaller than indicated.
- (3) Flammulated Owls prefer to occupy territories adjacent to other owls (Yasuda 2001); this would be limited if not impossible within the fragmented nesting habitat patches in the Preserve.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented in the Study Area. To our knowledge, no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: Flammulated Owls have not been reported to occur in USGS quads adjacent to the Study Area, but they are known to be widespread in the coast ranges in this region.

*Summary:* We anticipate that nesting by Flammulated Owl is “Unlikely to Occur” in the Preserve. Nesting habitat is moderate quality but fragmented into patches that likely limit its use to Flammulated Owls.

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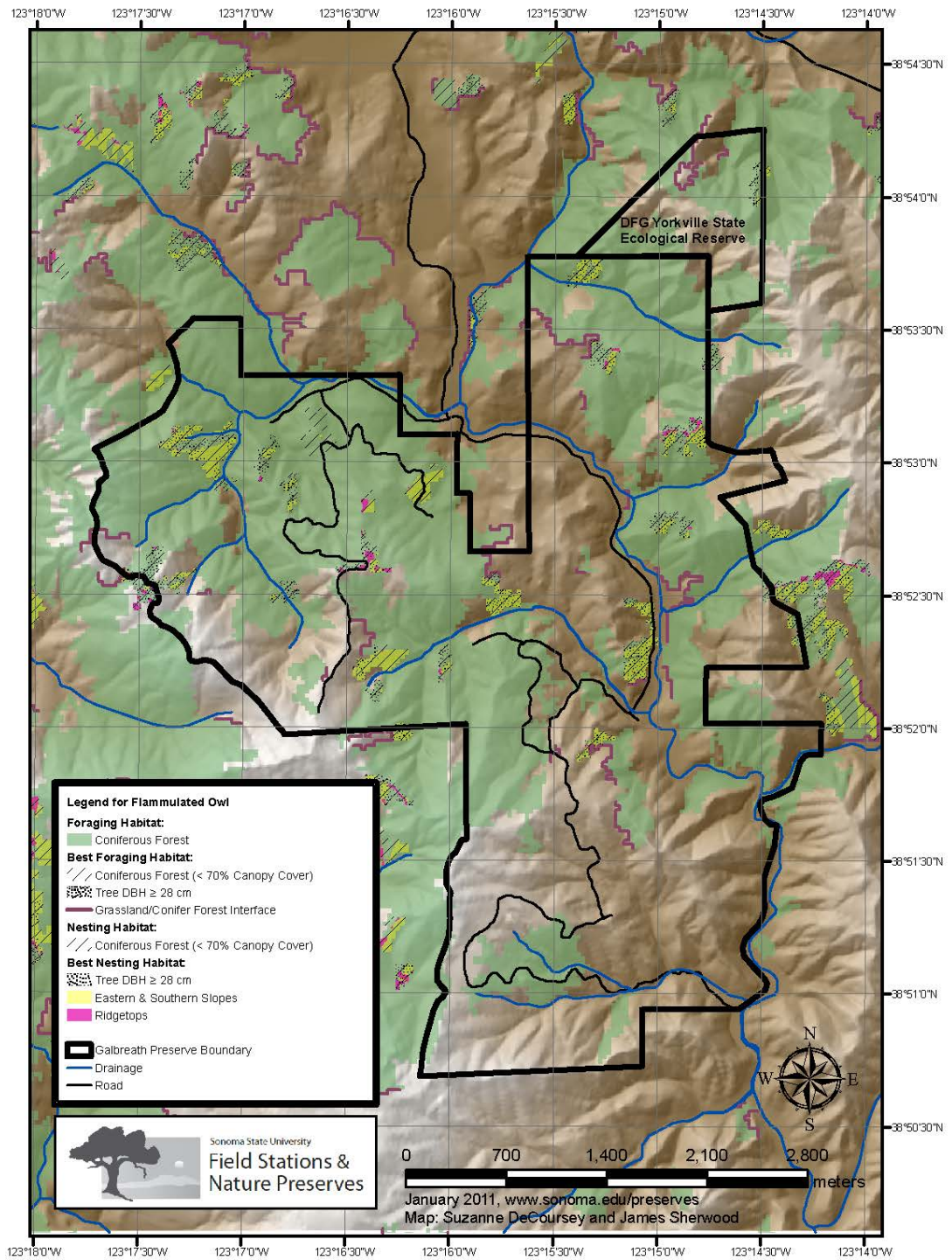
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**Species Account Description:** Emily Harvey

Figure 98. Potential habitat for Flammulated Owl, *Otus flammeolus*



*Aves (Birds): Strigiformes, Strigidae*  
**Northern Spotted Owl (*Strix occidentalis caurina*)**  
**Potential Occurrence: Unlikely to Occur**

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**Status:**

Federal: Threatened

State: Species of Special Concern

Other: G3T3 S2S3 CDF:S MBTA



Photo: Holly Doremus

**Species Description:**

A relatively stocky, medium-size owl; note dark eyes and overall brown color with white spots. Similar to Barred Owl, but darker with spotted belly. Voice: Strong resonant hooting and barking with distinctive rhythm *whup, hoo-hoo, hooooo* or a longer series. Also a rising nasal whistle given by female *toweeeeeeeip* (From Sibley 2009).

The northern spotted owl is a medium-sized owl and is the largest of the three subspecies of spotted owls (Gutiérrez *et al.* 1995). It is approximately 46 to 48 centimeters (18 inches to 19 inches) long and the sexes are dimorphic, with males averaging about 13 percent smaller than females. The mean mass of 971 males taken during 1,108 captures was 580.4 grams (1.28 pounds) (out of a range 430.0 to 690.0 grams) (0.95 pound to 1.52 pounds), and the mean mass of 874 females taken during 1,016 captures was 664.5 grams (1.46 pounds) (out of a range 490.0 to 885.0 grams) (1.1 pounds to 1.95 pounds) (P. Loschl and E. Forsman 2006 pers. comm.). The northern spotted owl is dark brown with a barred tail and white spots on its head and breast, and it has dark brown eyes surrounded by prominent facial disks. Four age classes can be distinguished on the basis of plumage characteristics (Forsman 1981; Moen *et al.* 1991). The northern spotted owl superficially resembles the barred owl, a species with which it occasionally hybridizes (Kelly and Forsman 2004). Hybrids exhibit physical and vocal characteristics of both species (Hamer *et al.* 1994). (From USFWS 2008a)

**Distribution:** The Study Area lies within the California Coast Physiographic Province designated by USFWS for the Spotted Owls, but does not occur within Critical Habitat for this species (USFWS 2008b).

The northern spotted owl (*Strix occidentalis caurina*) (spotted owl) inhabits structurally complex forests from southwest British Columbia through the Cascade Mountains and coastal ranges in Washington, Oregon, and California, as far south as Marin County. (From Polite 1999)

**Life History & Threats:**

The spotted owl is relatively long-lived, has a long reproductive life span, invests significantly in parental care, and exhibits high adult survivorship relative to other North American owls (Forsman *et al.* 1984; Gutiérrez *et al.* 1995). Spotted owls are sexually mature at 1 year of age, but rarely breed until they are 2 to 5 years of age (Miller *et al.* 1985; Franklin 1992; Forsman *et al.* 2002). Breeding females lay one to four eggs per clutch, with the average clutch size being two eggs; however, most spotted owl pairs do not nest every year, nor are nesting pairs successful every year (USFWS 1990b; Forsman *et al.* 1984; Anthony *et al.* 2006). The small clutch size, temporal variability in nesting success, and delayed onset of breeding all contribute to the relatively low fecundity of this species (Gutiérrez 1996). (From USFWS 2008b)

Courtship behavior usually begins in February or March, and females typically lay eggs in late March or April. The timing of nesting and fledging varies with latitude and elevation (Forsman *et al.* 1984). After they leave the nest in late May or June, juvenile spotted owls depend on their parents until they are able to fly and hunt on their own. Parental care continues after fledging into September (USFWS 1990b; Forsman *et al.* 1984). During the first few weeks after the young leave the nest, the adults often roost with them during the day. By late summer, the adults are rarely found roosting with their young and usually only visit the juveniles to feed them at night (Forsman *et al.* 1984). (From USFWS 2008b)

Spotted owls are mostly nocturnal, although they also forage opportunistically during the day (Forsman *et al.* 1984; Sovern *et al.* 1994). The composition of the spotted owl's diet varies geographically and by forest type. Generally, flying squirrels are the most prominent prey for spotted owls in Douglas-fir and western hemlock forests (Forsman *et al.* 1984) in Washington and Oregon, while dusky-footed wood rats are a major part of the diet in the Oregon Klamath, California Klamath, and California Coastal Provinces (Forsman *et al.* 1984, 2001, 2004; Ward *et al.* 1998; Hamer *et al.* 2001). Depending on location, other important prey include deer mice, tree voles, red-backed voles, gophers, snowshoe hare, bushy-tailed wood rats, birds, and insects, although these species comprise a small portion of the spotted owl diet (Forsman *et al.* 1984, 2004; Ward *et al.* 1998; Hamer *et al.* 2001). (From USFWS 2008b)

The spotted owl was listed under the Endangered Species Act (ESA) as threatened on June 26, 1990 (USFWS 1990a).

The northern spotted owl was listed as threatened throughout its range primarily due to loss and adverse modification of suitable habitat as a result of timber harvesting and exacerbated by catastrophic events such as fire, volcanic eruption, disease, and wind storms. At the time of listing, small and isolated populations vulnerable to extinction, predation and competition were also identified as threats. Since listing of the northern spotted owl, recent reviews have more specifically identified competition with the barred owl (*Strix varia*), and fire in the relatively dry East Cascades and Klamath provinces of California and Oregon as greater threats than previously considered. New potential threats of unknown magnitude to the subspecies and its habitat include West Nile virus and the sudden oak death tree disease, respectively. (From USFWS 2010b)

## **Habitat & Habitat Associations:**

### *General Habitat:*

Forsman *et al.* (1984) reported that spotted owls have been observed in the following forest types: Douglas-fir, western hemlock, grand fir, white fir, ponderosa pine, Shasta red fir, mixed evergreen, mixed conifer hardwood (Klamath montane, Marin County), and redwood. In addition, spotted owls in Marin County, California use Bishop pine forests and mixed evergreen-deciduous hardwood forests. The upper elevation limit at which spotted owls occur corresponds to the transition to subalpine forest, which is characterized by relatively simple structure and severe winter weather (Forsman 1975; Forsman *et al.* 1984). (From USFWS 2008b)

Spotted owls generally rely on older forested habitats (Carroll and Johnson In Press) because such forests contain the structures and characteristics required for nesting, roosting, and foraging. (From USFWS 2008b)

Spotted owls may be found in younger forest stands that have the structural characteristics of older forests or retained structural elements from the previous forest. In redwood forests and mixed conifer-hardwood forests along the coast of northwestern California, considerable



numbers of spotted owls also occur in younger forest stands, particularly in areas where hardwoods provide a multilayered structure at an early age (Thomas *et al.* 1990; Diller and Thome 1999). (From USFWS 2008b)

Requires blocks of 40-240 ha (100-600 ac) of mature forest with permanent water and suitable nesting trees and snags (Forsman 1976). In northern California, apparently prefers narrow, steep-sided canyons with north-facing slopes. (From Polite 1999)

### *Nesting & Roosting Habitat:*

Nesting habitat provides structural features for nesting, protection from adverse weather conditions, and cover to reduce predation risks for adults and young. (From USFWS 2007)

Features that support nesting and roosting typically include a moderate to high canopy closure (60 to 90 percent); a multilayered, multi-species canopy with large overstory trees (with diameter at breast height [dbh] of greater than 30 inches); a high incidence of large trees with various deformities (large cavities, broken tops, mistletoe infections, and other evidence of decadence); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for spotted owls to fly (Thomas *et al.* 1990). Forested stands with high canopy closure also provide thermal cover (Weathers *et al.* 2001) and protection from predators. (From USFWS 2008b)

In some forest types, northern spotted owls nest in younger forest stands that contain structural characteristics of older forests. Nesting northern spotted owls consistently occupy stands having high canopy cover that may provide thermoregulatory benefits (Weathers *et al.* 2001, p. 686), (From USFWS 2007)

Usually nests in tree or snag cavity, or in broken top of large tree. Less frequently nests in large mistletoe clump, abandoned raptor or raven nest, in cave or crevice, on cliff or ground (Call 1978). Mature, multi-layered forest stands are required for breeding (Remsen 1978). Nest usually placed 9-55 m (30-180 ft) above the ground. (From Polite 1999)

In mixed conifer forests in the eastern Cascades in Washington, 27 percent of nest sites were in old-growth forests, 57 percent were in the understory reinitiation phase of stand development, and 17 percent were in the stem exclusion phase (Buchanan *et al.* 1995). In the western Cascades of Oregon, 50 percent of spotted owl nests were in late-seral/old-growth stands (greater than 80 years old), and none were found in stands of less than 40 years old (Irwin *et al.* 2000). (From USFWS 2008b)

Patches of nesting habitat, in combination with roosting habitat (PCE 2-(b)) need to be sufficiently large and contiguous to maintain northern spotted owl core areas and home ranges, and be in a spatial arrangement with foraging habitat (PCE 2-(c)) that allows efficient provisioning of young at the nest. (From USFWS 2007)

**Roosting Habitat.** Roosting habitat differs from nesting habitat in that it need not contain those specific structural features used for nesting (cavities, broken tops, and mistletoe platforms). As such, it generally includes moderate to high canopy closure; a multi-layered, multi-species canopy; 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. (From USFWS 2007)

The primary functions of roosting habitat are to facilitate thermoregulation in summer or winter, shelter northern spotted owls from precipitation, and provide cover to reduce predation risk while resting or foraging. Studies of roosting locations found that northern spotted owls tended to use stands with greater vertical canopy layering (Mills *et al.* 1993, pp. 318 to 319), canopy closure (King 1993, p. 45), snag diameter (Mills *et al.* 1993, pp. 318 to 319), diameter of large

trees (Herter *et al.* 2002, pp. 437, 441), and amounts of large woody debris (Chow 2001, p. 24; reviewed in Courtney *et al.* 2004, pp. 5–14 to 4–16, 5–23). The characteristics of roosting habitat differ from those of nesting habitat only in that roosting habitat need not contain the specific structural features used for nesting (Thomas *et al.* 1990, p. 62). (From USFWS 2007)

Over 50% of summer roosting and foraging observations occurred on north-facing slopes in predominantly mixed-evergreen forests of northwestern California (Solis 1990).

#### *Foraging Habitat:*

Foraging habitat generally has attributes similar to those of nesting and roosting habitat, but such habitat may not always support successfully nesting pairs (USFWS 1992b). (From USFWS 2008b)

The primary function of foraging habitat is to provide a food supply for survival and reproduction. Foraging activity is positively associated with tree height diversity (North *et al.* 1999, p. 524), canopy closure (Irwin *et al.* 2000, p. 180; Courtney *et al.* 2004, p. 5– 15), snag volume, density of snags greater than 20 in (50 cm) dbh (North *et al.* 1999, p. 524; Irwin *et al.* 2000, pp. 179 to 180; Courtney *et al.* 2004, p. 5– 15), density of trees greater than or equal to 31 in (80 cm) dbh (North *et al.* 1999, p. 524), volume of woody debris (Irwin *et al.* 2000, pp. 179 to 80), and young forests with some structural characteristics of old forests (Carey *et al.* 1992, pp. 245 to 247; Irwin *et al.* 2000, pp. 178 to 179). (From USFWS 2007)

Northern spotted owls select old forests for foraging in greater proportion than its availability at the landscape scale (Carey *et al.* 1992, pp. 236 to 237; Carey and Peeler 1995, p 235; Forsman *et al.* 2005, pp. 372 to 373), but will forage in younger stands with high prey densities and access to prey (Carey *et al.* 1992, p. 247; Rosenberg and Anthony 1992, p. 165; Thome *et al.* 1999, pp. 56 to 57). Because northern spotted owls show a clear geographic pattern in diet, and different prey species prefer different habitat types, prey distribution contributes to differences in northern spotted owl foraging habitat selection across the range. In the northern portion of their range, northern spotted owls forage heavily in older forests or forests with similar structure that support northern flying squirrels (Rosenberg and Anthony 1992, p. 165; Carey *et al.* 1992, p. 233). In the southern portion of their range, where woodrats are a major component of their diet, northern spotted owls are more likely to use a variety of stands, including younger stands, brushy openings in older stands, and edges between forest types in response to higher prey density in some of these areas (Solis 1983, pp. 89 to 90; Sakai and Noon 1993, pp. 376 to 378; Carey *et al.* 1999, p. 73; Sakai and Noon 1997, p. 347; Franklin *et al.* 2000, p. 579). An adequate amount and distribution of foraging habitat within the home range is essential to the survival and reproduction of northern spotted owls. (From USFWS 2007)

Foraging habitat provides a food supply for survival and reproduction of northern spotted owls and includes a wider array of forest types than nesting and roosting habitat, particularly more open and fragmented forests. While some foraging habitat has attributes that closely resemble those of nesting and roosting habitat, especially in the northern portions of the subspecies' range, some younger stands without all these attributes are used for foraging, especially in the southern portion of the range. Some younger stands may have high prey abundance and some structural attributes similar to those of older forests, such as moderate tree density, subcanopy perches at multiple levels, multi-layered vegetation, or residual older trees. To be fully functional for northern spotted owls, foraging habitat generally contains some roosting habitat attributes. (From USFWS 2007)

#### *Dispersal Habitat:*

Dispersal habitat, at a minimum, consists of stands with adequate tree size and canopy closure to provide protection from avian predators and at least minimal foraging opportunities (USFWS

1992b). Forsman *et al.* (2002) found that spotted owls could disperse through highly fragmented forest landscapes, yet the stand-level and landscape-level attributes of forests needed to facilitate successful dispersal have not been thoroughly evaluated (Buchanan 2004). Therefore, a more complete description of dispersal habitat may be determined in the future. There is little evidence that small openings in forest habitat influence the dispersal of spotted owls, but large, non-forested valleys such as the Willamette Valley apparently are barriers to both natal and breeding dispersal (Forsman *et al.* 2002). The degree to which water bodies, such as the Columbia River and Puget Sound, function as barriers to dispersal is unclear, although radio telemetry data indicate that spotted owls move around large water bodies rather than cross them (Forsman *et al.* 2002). (From USFWS 2008b)

**Conceptual Basis for GIS Model Development:** Potential habitat for this species was identified as:

- Areas within all types of coniferous forest, cismontane woodland, and broadleaf upland forest that have the following characteristics:
  - $\geq 60\%$  canopy closure
  - DBH  $\geq 61$  cm (24 in), the largest size class in the Study Area, and a multilayered canopy
  - narrow, steep-sided canyons with north, northeast, and northwest facing slopes

#### **Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat Quality:* Northern Spotted Owls are generally found in coniferous forests with:

moderate to high canopy closure (60 to 80 percent); a multilayered, multi-species canopy with large (generally greater than 30 in (76 cm) dbh) 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. (From USFWS 2007)

The most consistent habitat characteristic affiliated with Northern Spotted Owl occupation is canopy cover  $> 60\%$  (USFWS 2007).

Habitat quality in the southern portion of the Northern Spotted Owl's range (*e.g.*, Marin and Sonoma counties) is distinctly different from that in the north. In the south, owls nest in high-density coniferous, as well as mixed conifer-hardwood and evergreen-deciduous hardwood forests, and optimal habitat may be a combination of nesting habitat stands interspersed with varied types of foraging habitat (USFWS 2007). This difference in habitat use has been attributed to the propensity for southern birds to feed on Dusky-Footed Woodrat which reach their highest densities in shrublands (USFWS 2007).

Habitat quality for Northern Spotted Owl in the Preserve is moderate (Figure 99):

- Nesting Habitat is Good: The majority of the Preserve is dominated by secondary growth forests with much of the canopy cover  $> 60\%$ . Areas with mature trees (DBH  $>$

61 cm (24 in)) are also multi-storied, both typical stand characteristics of occupied habitat. The occurrence of decadent snags or logs is also a good indicator of habitat quality (USFWS 2007), however data on these habitat features are not available. Logging was discontinued in 2000 and snags are generally widespread on the Preserve.

- Foraging Habitat is Poor to Moderate: Dusky-Footed Woodrats reach their highest densities in shrublands which are only found in areas surrounding the Preserve. These sites could serve as source populations for forest and woodlands in the Preserve, but the lack of integrate areas between these habitat types suggests that Woodrat populations may not be high. Narrow north-facing canyons preferred by this species for summer roosting and foraging sites (Solis 1990, Polite 1999) are available, some co-incident with high canopy cover areas.

*Habitat Patch Size:* High quality habitat of any single patch on the Preserve is not sufficient to support breeding owls. The amount of quality nesting habitat in an owl's home range can determine occupation by Northern Spotted Owls (USFWS 2007). The Preserve is located at the southern edge of the Northern Spotted Owl range where home range sizes are smaller (USFWS 2007). The best estimates of home range sizes (100% convex polygon method) in Coastal Redwood/Douglas Fir forest types are from Zabel et al. 2003 and Pious 1995 [as cited in Courtney et al. 2004]: 422 ha  $\pm$ 181sd to 817 ha  $\pm$ 214 sd (Zabel et al. 2003). Home range sizes of individual owls all fell between 150 and 650 ha (371-1606 ac). The proportion of the home range covered by quality nesting habitat (trees  $\geq$  53 cm DBH, canopy cover of trees  $\geq$  13 cm DBH  $\geq$  70%, canopy cover of dominant trees  $\geq$  20%) ranged from 43%  $\pm$  5 to 58%  $\pm$  9 (Zabel et al. 2003).

Assuming that roughly 50% of the home range needs to be occupied by quality habitat (Zabel et al. 2003), the amount of quality habitat of a 150 ha territory (slightly smaller than the smallest sized territory measured by Zabel et al. 2003) would need to be 75 ha (184 ac). The largest patch of contiguous quality nesting habitat in the Preserve including contiguous lands outside the Preserve (northeast corner) is 32 ha (79 ac), less than half the amount of habitat needed for the smallest Northern Spotted Owl territory.

*Configuration of Quality Habitat:* Configuration of quality habitat patches in the Preserve also does not allow owls to "cobble together" a network of high quality habitat needed for breeding. In the southern portion of their range where woodrats constitute a large part of their diet, Northern Spotted Owls occupy areas with stands of high quality habitat interspersed with edge habitats (Zabel et al. 2003). In these territories, the proportion of quality nesting habitat is still roughly 50% (Zabel et al. 2003).

For a Northern Spotted Owl breeding pair to occupy a territory the size of the Preserve (1485 ha, 3670 ac), they would need roughly 743 ha (1836 ac) of quality nesting habitat. The total amount of quality habitat in the Preserve is 125 ha (311 ac) (29 patches with average patch size of 4.0 ha (10 ac) ranging in size from 0.04 to 314 ha (0.1 to 79 ac)), only 17% of the total amount of quality habitat needed for one breeding pair.

*Nearest Occurrence:*



Documented Occurrences in the Galbreath Wildlands Preserve: This species has not been documented on the Preserve. To our knowledge no surveys have been conducted.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species has not been reported to occur in USGS quads adjacent to the Preserve. The nearest designated critical habitat are approximately 20 miles north of the Preserve located between Hwy 128 and Hwy 253 near Cassabonne Peak on BML lands in the Coastal Humboldt Unit (USFWS 2007). USFWS (2007) notes that some areas outside of critical habitat may be important for recovery of Northern Spotted Owl population even if they don't have habitat sufficient for breeding. These areas, instead can provide "demographic support and connectivity to facilitate dispersal among habitat blocks."

Both of these functions for Preserve habitat are unlikely: The Preserve is located south of all other habitat blocks, rather than between two habitat blocks. The site is also unlikely to act as demographic support to critical habitat blocks. The USFWS (2007) maximum allowable distance between adjacent habitat blocks to support connectivity among blocks is 19 km (12 mi); the nearest habitat block is 20 miles north of the Preserve.

*Summary:* We anticipate that this species is "Unlikely to Occur" in the Preserve because of the insufficient quality, quantity and configuration of potential nesting habitat. The Preserve is also unlikely to serve a support function for nearby protected populations due to its position and distance from the nearest designated critical habitat.

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**Species Account Description:** Emily Harvey

**Figure 99: Potential habitat for Northern Spotted Owl (*Strix occidentalis caurina*)**

