DISTRIBUTION AND DENSITY OF OWLS AT MONTE BELLO OPEN SPACE PRESERVE, SANTA CLARA COUNTY, CALIFORNIA

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From March 1986 through June 1987 I censused owls 72 km south of San Francisco in the northern end of Monte Bello Open Space Preserve, in Santa Clara County. My objectives were to identify the species and determine the density of owls in various habitats. Vocal responses to tape-recorded calls were noted and compared to weather conditions, lunar phases, and time of year.

STUDY AREA AND METHODS

The study area, approximately 300 ha, includes Stevens Creek and its headwaters and ranges in elevation from 520 to 950 m. I used aerial photographs and vegetation maps to determine the areas of the five habitat types represented there. Douglas-fir forest, composed mostly of second growth Douglas-fir (*Pseudotsuga menziesii*) with some Canyon Live Oak (*Quercus chrysolepis*) and Madrone (*Arbutus menziesii*), encompasses 75 ha. Canopy closure by these species approaches 100%. This habitat is confined mainly to the northeast-facing slopes of Stevens Creek Canyon. Broadleaf evergreen forest encompasses 75 ha mainly of Canyon Live Oak. Other members of the community include Valley Oak (*Quercus lobata*), California Bay (*Umbellularia californica*), and Madrone. A meadow, covering 125 ha, is composed of non-native European annual grasses with a few scattered patches of native perennial bunchgrasses and native annuals. On more rocky areas Coyote Brush (*Baccharis pilularis*) grows in scattered clumps. Chaparral, composed of Chamise (*Adenostoma fasiculatum*) and manzanita (*Arctostaphylos* spp.), covers approximately 22 ha on south- and west-facing slopes. A thin strip along Stevens Creek and its main feeder streams is a riparian woodland of Big-leaf Maple (*Acer macrophyllum*), Tan-oak (*Lithocarpus densiflora*), California Bay, and some willow (*Salix* sp.). This habitat is bounded on both sides by the Douglas-fir community.

I used taped recordings of owl calls to elicit responses while I walked the census route. Tapes were played at stations at 100-m intervals. Calls of each species of owl were played for 15 seconds, followed by a minute of silence. Calling owls were then mapped. Often owls would not respond to the tapes immediately so I usually stayed at each station for 5 to 10 minutes.

I censused the area 2 or 3 times a month for a total of 38 censuses, spending a total of 69 hours in the field for an average 4.6 hours per month. The census route, limited to developed and some undeveloped trails, allowed coverage of 95% of the study area. Most of the censuses were conducted during calm, clear nights, but three were conducted during strong wind or rain for information on the relationship between owl calling and weather conditions. Censuses were generally conducted between 1 hour after sunset

and 1 hour before sunrise. In May and June 1987 I put in two all-night vigils to listen to unsolicited calling and to record on tape the owls' vocalizations.

RESULTS

Six species of owls were found in the study area: the Barn Owl (*Tyto alba*), Western Screech-Owl (*Otus kennicottii*), Northern Saw-whet Owl (*Aegolius acadicus*), Great Horned Owl (*Bubo virginianus*), Northern Pygmy Owl (*Glaucidium gnoma*), and Long-eared Owl (*Asio otus*). Owls were most vocal from late December through March. Calling of all owl species except the Pygmy decreased through the late spring and summer. The period from late September through mid-November was generally quiet. The phases of the moon seemed to have little effect on calling (Table 1). Weather conditions, however, did have an effect. Although only three censuses (less than 10% of the total) were during poor weather, calling was sharply reduced during these periods.

Western Screech-Owl

The most abundant owl encountered in the study area with a density of 0.4 pairs/ha. Calling males were often encountered approximately 100 m apart in preferred habitat. Western Screech-Owls showed a preference for the Canyon Live Oaks and were rarely encountered outside this habitat (Table 2).

These owls readily responded to taped calls and were most vocal in late December and January. I usually heard screech owls while playing tapes; I rarely heard unsolicited calling. Often several minutes passed before an owl would respond to my calls. The first owl's response, in turn, would start other screech owls calling until several would be calling all around me. Western Screech-Owls responded to taped calls with the typical "bouncing ball" call (Tyler 1978). Mated pairs often responded and began to duet near each other. The initial calls switched to trilling as pairs approached one another. Other calls noted were loud barking by the adults accompanied by juveniles and puppy-like barking uttered primarily by fledged juveniles in June and July. Calling by the adults fell off markedly by the end of March (Figure 1).

Table 1 Effect of Lunar Phases on Numbers of Owls Heard

Lunar phase	Number of censuses	Number of owls heard	Average number heard per census
New	14	103	7.3
First quarter	7	43	6.1
Full	9	64	7.1
Third quarter	8	64	8.0

Northern Saw-whet Owl

Confined to the Douglas-fir forest and the associated riparian areas along Stevens Creek (Table 2), the Saw-whet is the second most common owl in the study area with density of 0.25 pairs/ha. Saw-whet Owls are very aggressive during the courtship and nesting season. They would respond to my taped calls instantly, and I often had to duck to avoid an attacking owl. Saw-whets, like Western Screech-Owls, tended to respond only to the taped calls, not to call unsolicited. Most vocal November through February (Figure 1), these owls responded to the taped calls with two types of calls. One call consisted of a single note repeated 120 to 180 times per minute. The pitch and volume increased as the owls became agitated. The other call was a nasal whine, increasing in pitch at the end, which lasted 1.5 to 2.0 seconds. Other calls included a loud angry chatter and various loud barks and whistles. To solicit food from adults juvenile Saw-whet Owls emit a call that resembles a soft hiss (Jon Winter pers. comm.). I observed a juvenile Saw-whet Owl along Stevens Creek in mid-August 1986.

Great Horned Owl

This owl ranged over all habitats in the study area (Table 2). Two pairs were present throughout the study. The one nest observed, a bulky platform of sticks, was in a large Douglas-fir 30-40 m from the ground and 3 m out from the trunk. A single owlet fledged in mid-June 1986 and continued to beg for food from the adults into June of 1987. Great Horned Owls in my study area responded to any owl call played but were located mostly by unsolicited calling. Other owl species (Western Screech-Owls in particular) became quiet around a calling Great Horned Owl.

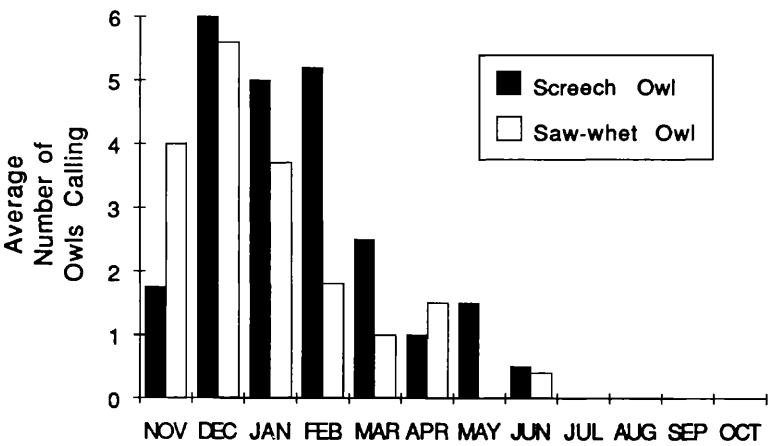

Figure 1. Average number of Western Screech-Owl and Saw-whet Owls calling per census each month.

Table 2 Distribution of Owl Occurrences by Species and Habitat

Habitat type	Percentage of study area	Percentage of Occurrences: W. Screech Owl	N. Saw-whet Owl	N. Pygmy Owl	Great Horned Owl
Broadleaf evergreen forest	25	98	4	5	31
Douglas-fir forest	25	2	80	65	39
Meadow	42	0	0	0	25
Chaparral	6	0	0	0	5
Riparian	1	0	16	30	0
Chi-square value		276.4	363.6	428.1	16.32
Significance level		$p < 0.005$	$p < 0.005$	$p < 0.005$	$p < 0.25$
Total observations		94	46	20	75

Northern Pygmy Owl

Northern Pygmy-Owls were restricted to the Douglas-firs and oaks bordering Stevens Creek (Table 2). Three pairs were encountered along the entire 4.8 km of the creek in the study area. The birds called in the two hours after twilight in the morning and the last hour of twilight in the evening (Figure 2). I never heard a Pygmy Owl call at night. The Pygmy Owls were generally located by unsolicited calling and were equally vocal throughout the year. I did not locate any nesting Pygmy Owls, but W. Bousman (pers. comm.) saw two juveniles in the study area in late July 1981.

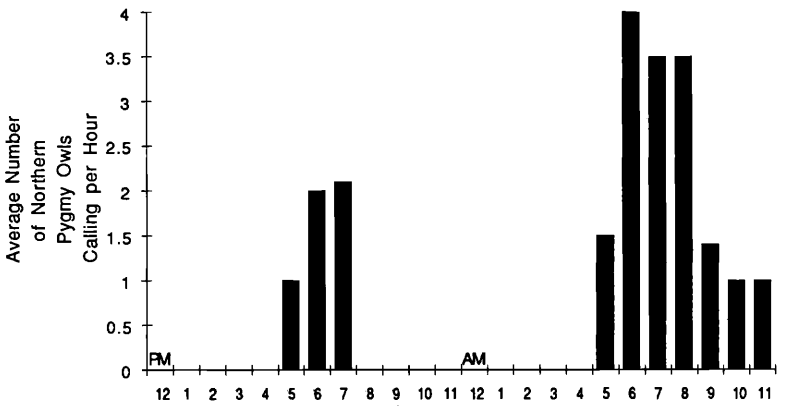

Figure 2. Calling frequency of Northern Pygmy Owls.

Barn Owl

Encountered only eight times during the study, this species was seen flying low over the grasslands or trees. I saw single birds in March, June, September, and November 1986 and in January, February, April, and June 1987. I found a possible nest site in a large dead Canyon Live Oak where I usually saw the owl, but I never saw any evidence of breeding.

Long-eared Owl

I first encountered this owl on 20 November 1986, hunting over a meadow. In late December I again saw this species calling from a willow copse. In February 1987 I witnessed a pair copulating at a potential nest site. On 14 May 1987 I saw three recently fledged young being fed by an adult close to the nest tree. The nest was placed in a Canyon Live Oak approximately 20 m from the ground and 5 m out from the trunk. It appeared to be an old flattened squirrel nest. Several pellets found below the nest contained the remains of California Voles (*Microtus californicus*); no other prey were identified. The male's call was a low hooting to which the female often responded with a higher-pitched call or cat-like mews. The fledglings' food-begging calls resembled a violin being lightly stroked. These calls were low in volume and did not carry far. The fledglings were attended by the adults until June 1987.

DISCUSSION

Population densities for Western Screech-Owls in the southwestern U.S. have been previously reported to be 2.25 pairs/ha with territories spaced closer than 100 m (Miller and Miller 1951). These densities are over five times greater than those I found during this study.

The distribution of Saw-whet Owls in California is not well known, owing in part to the species' retiring habits. Grinnell and Miller (1944) indicated that it was nowhere considered common, and that it inhabits woodland or broken forest. It has been found breeding in habitat similar to that where I found the owl in my study area in San Mateo County at Spring Valley Lakes (now Crystal Springs Reservoir). There the owls were nesting in Douglas-fir (Santee and Granfield 1939).

Information on Northern Pygmy-Owls is sparse as well, but the distance between pairs may be as low as 1.6 km where the population is dense (Tyler 1978). This distance is approximately the same as I found during my study.

The last reported breeding of Long-eared Owls in Santa Clara County was in the 1930s (Sibley 1952). No breeding has been reported from San Mateo County, which lies along the northern boundary of the study area, for 80 years. There is a February 1893 breeding record for the study area cited by Sibley (1952). There are a handful of winter records for the Long-eared Owl in Santa Clara County, but most of these are from the San Francisco Bay margin. In the winter of 1986 several Long-eared Owls were found on local Christmas Bird Counts, far more than had been found in previous years. These owls stage periodic irruptions, and, if conditions are favorable, they may stay and breed the following year.

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