FLAMMULATED OWLS IN NORTHWESTERN CALIFORNIA

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Habitat selection and distribution of the Flammulated Owl (*Otus flammeolus*) in California is incompletely known. Grinnell and Miller (1944) noted only two locations in the northeastern part of the state. Johnson and Russell (1962) provided records of at least 33 individuals in seven additional northeastern California locations. The most comprehensive survey to date has been by Winter (1974), reporting 59 specimen and 89 sight records since 1860 in California. Two of the records Winter reported for the northwestern portion of the state are from Humboldt County and five are from Trinity County.

We collected records (visual or aural) in these two counties and conducted springtime, nocturnal surveys of Flammulated Owls, mostly on the Six Rivers National Forest, during 1976-1980 (see Appendix). The surveys were made primarily in potential timber sale areas. We elicited Flammulated Owl responses with recorded calls or vocal imitations of this and other owl species, at half-mile intervals along trails or roads. Flammulated Owls responded readily to Spotted Owl calls, which we often used. The surveys were made in conjunction with a study of Spotted Owls, and were conducted April to June under varying lunar phases and times of the night. Most surveys were conducted on fairly calm, clear nights.

To date, we have compiled previously unreported records of 75 territorial male Flammulated Owls. No territories have been located in either Del Norte County or western Siskiyou County, but lack of records probably reflects inadequate field surveys rather than an absence of the species. Thirty-eight territories were located in Humboldt County and 37 in Trinity County, generally in the southern portions along the common boundary (Figure 1), in the Northern Coast and Trinity Faunal Districts (Miller 1951, Winter 1974).

High, local concentrations of territorial pairs, as noted by Marshall (1939), Winter (1974) and Johnson and Russell (1962), suggest a propensity for forming loose breeding colonies. Similarly, we found "quasi-colonies" containing 2,3,4,5,6,7 and 10 territorial males, in areas ranging from 8 to 2400 ha in size. Crude densities (defined as number of birds per unit area, including areas of suboptimal habitat) ranged from 0.03 to 1.09 males/40 ha. These estimates are lower densities than found elsewhere (Table 1). The minimum density estimate (0.03 males/40 ha) from the present study may indicate

suboptimal habitat, but may also reflect the high variation in calling responsiveness that Flammulated Owls exhibit. We found that the "quasi-coloniality" of the Flammulated Owl leaves some apparently optimal habitat vacant, as suggested by Tyler and Phillips (1978).

Breeding habitat of the Flammulated Owl in California has been described as open or broken conifer woodlands, containing various mixes of true firs (*Abies* spp.), pines (*Pinus* spp.), Douglas-fir (*Pseudotsuga menziesii*), Oregon White Oak (*Quercus garryana*) and California Black Oak (*Q. kelloggii*) (Grinnell and Miller 1944, Johnson and Russell 1962, Marshall 1939). Winter (1974) reported that Flammulated Owls have a high affinity for yellow pine (*Pinus ponderosa* or *P. jeffreyi*) dominant habitat throughout their range. Upon intensively analyzing the vegetation composition of seven territory sites and extensively surveying many more, we found that California Black Oak was as ubiquitous in the sites examined (67% presence in study sites) as yellow pine (50% presence). At least one of these two tree species was present at all sites. Winter (1979) recognized the potential importance of California Black Oak for nesting to Flammulated Owls and other wildlife species. We speculate that Flammulated Owls may use the many natural cavities for nesting sites that California Black Oak provides. Other tree species present included Douglas-fir, Incense Cedar (*Calocedrus decurrens*), Jeffrey Pine (*Pinus jeffreyi*), and White Fir (*Abies concolor*).

Table 1. Crude density† of Flammulated Owl males in northwestern California, compared with that found in four other studies.

AREA	NO. MALES PER 40 HA	INVESTIGATOR
Northwestern California	0.03 to 1.09	Marcot and Hill (present study)
Placer Co., California	2.1	Winter (1974)
Tulare Co., California	1.4	Marshall (1939)
Chiricahua Mtns., southern Arizona	4	Balda (1977)
White Mtns., southern Arizona	5.1 to 5.3‡	Franzreb and Ohmart (1978)

†Crude density computations include areas of unsuitable habitat.

‡Inferred from a reported 10.2 to 10.6 Flammulated Owls per 40 ha, but Franzreb and Ohmart (1978) did not clarify how this density estimate was made.

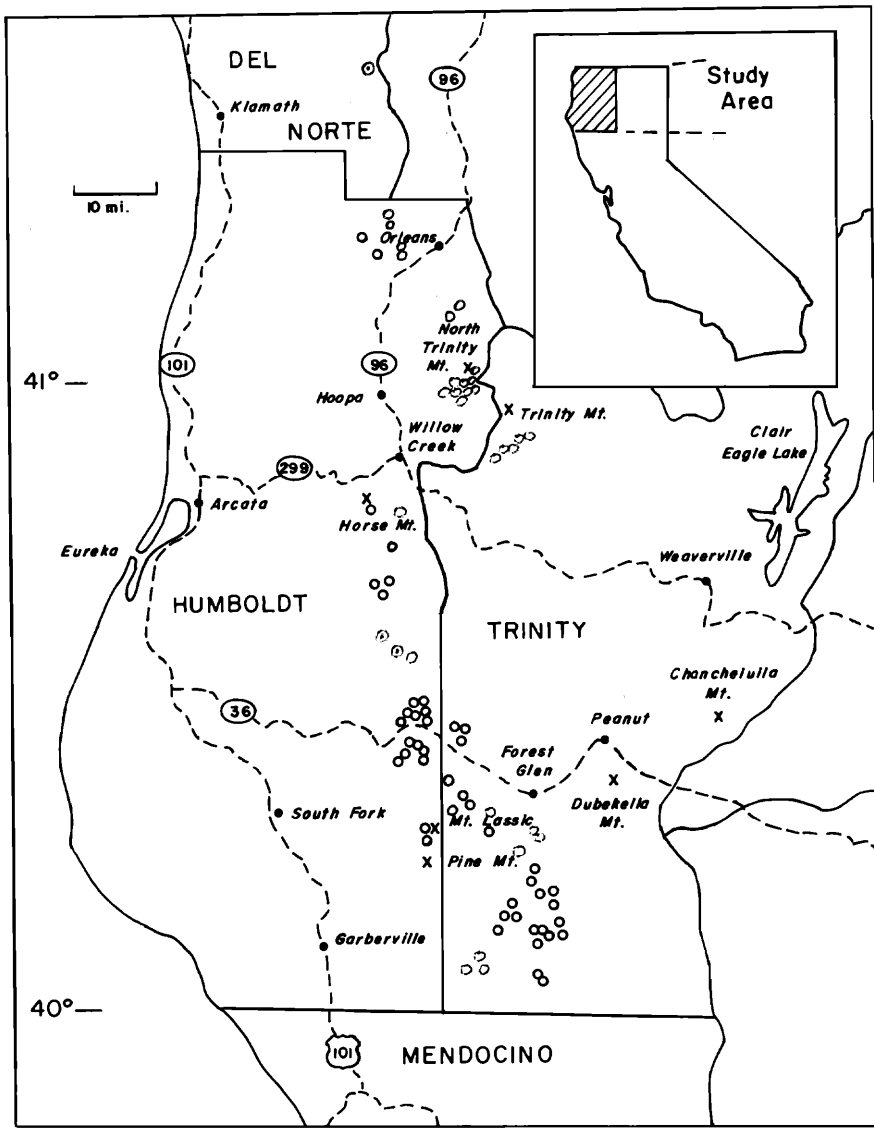

Figure 1. Location of 78 records of Flammulated Owl in northwestern California. Open circles denote encounters with territorial males; open circles with central dots denote non-territorial males; black dots represent towns; X's represent mountains.

Figure 2. Two territory sites of the Flammulated Owl in Humboldt County, northwestern California, showing a locally dense clump of tall trees with a high percent canopy closure Both are also adjacent to a break in vegetation type and canopy cover, with denser brush and understory components

Slope at territory sites varied from 0 to 55%. We found no correlation with slope aspect, as sites occurred on slopes facing all compass points. Elevations ranged from 830 to 1310 m. All territory sites surveyed were on xeric mid-slopes or near ridge tops. Canopy cover varied considerably, from 20 to 80%. Typically, two canopy layers were present in each territory core. Adjacent to or within this core stand was brush of 10 to 80% cover. Within the territory core, tree density averaged 1270 trees/ha (range 148 to 2473 trees/ha) and tree basal area averaged 58 sq m/ha (range 47 to 73 sq m/ha).

These stand characteristics closely correspond to those measured by Bull and Anderson (1978) at four Flammulated Owl nest trees in northeastern Oregon. Of special note is the presence in most territories of a locally dense clump of tall, mature trees located near a break in canopy closure and vegetation type (Figure 2). A Flammulated Owl territory site in the Klamath National Forest in Trinity County, that we did not survey, also had similar characteristics: California Black Oak and Ponderosa Pine, with Douglas-fir, Incense Cedar and Oregon White Oak; and nest tree, a mature dying oak located on a ridge and near a break in vegetation type (dense firs and pines to the north, and more open stands with oaks to the south) (D. Claypole pers. comm.). We found Flammulated Owls calling from the dense foliage of mature trees, but the owls may need brush cover as habitat for additional insect prey and feeding cover when foraging is done near the ground. Edges and broken woodlands seemed to offer both high dense canopies and low dense brush.

On the night of 23 March 1978 J. Gardetto and C. Cox (pers. comm.), while playing a recorded tape of Spotted Owl calls, heard two male Flammulated Owls in a dense, mature stand of Douglas-fir along Bluff Creek in Humboldt County. Prior to this discovery, the earliest spring record in California was 19 April in Monterey County (Winter 1974); and the earliest spring record north of Mexico was 26 March in Arizona (Phillips et al. 1964). Flammulated Owls are thought to be highly migratory (Winter 1974, Balda et al. 1975). Johnson (1962) hypothesized that they may remain torpid near the breeding grounds during winter, but Winter (1974) presented circumstantial evidence against this notion. To test the conjecture that some individuals are overwintering in the North Coast area, Marcot spent the evening of 1 February 1979 playing a recorded tape of Flammulated Owl calls at five known territory sites in southern Trinity County and received no response, but snowy, subfreezing weather conditions may have biased the results. More surveys are planned for future winter seasons.

Based on our surveys, we recommend the following for management of Flammulated Owls in northwestern California: 1) More noc-

turnal surveys, using tape recorded calls or vocal imitations, are needed to locate addition "quasi-colonies," especially in broken coniferous woodlands with yellow pine or California Black Oak. 2) Identify and preserve the locally dense stand of mature trees that forms the core of each territory. Such stands may vary roughly from 0.8 to 4 ha in size and often occur on mid-slopes or ridge tops, near breaks in vegetation type and canopy closure. 3) Maintain brush adjacent to the core stand. 4) Leave undisturbed all conifers and hardwoods, especially yellow pine and California Black Oak, having natural cavities or cavities excavated by woodpeckers, in and adjacent to the stand. Importantly, allow for snag recruitment within and adjacent to the core stand by continually retaining the larger, overmature trees. Franzreb (1977), Balda (1977) and many others have described the importance to secondary-cavity nesters of snag retention and recruitment. Management for Flammulated Owls may in part involve a more general, multi-species, habitat approach by establishing criteria for managing snags and hardwoods. Although we have found Flammulated Owls calling from dense stands next to roads and clear-cuts, more information is needed about the effects of disturbance on the long-term viability of breeding pairs and "quasi-colonies."

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APPENDIX

Flammulated Owl records listed below are of birds heard calling in Humboldt and Trinity counties, California, 1975 through 1980. All are believed to have been territorial males except the two birds west of Grouse Creek on 30 June 1978 and one bird in Elk Valley on 24 July 1979. Additionally, eight specimen records (all in Trinity County) and six non-specimen records (four in Humboldt County and two in Trinity County) are listed by Winter (1974, 1979). Township and range data refer to Humboldt Base Line and Meridian, except as noted.

LOCATION	DATE	NO. BIRDS	OBSERVER
HUMBOLDT COUNTY			
Horse Mt. T6N, R4E, Sec 33	15 Jun 1975	1	S. Harris, T. Harris
Bluff Ck. T11N, R4E, Sec 29,33	23 Mar 1978	2	J. Gardetto, C. Cox
West of Sims Mt. T4N, R5E, Sec 8	13 Jun 1978	3	B. Marcot, J. Brack
West of Grouse Ck. T3N, R4E, Sec 1 T3N, R5E, Sec 18	30 Jun 1978	2	B. Marcot, R. Escano
Nelson Flat T2N, R5E, Sec 35 T1N, R5E, Sec 1,2	24 May 1976	7	R. Hill
North of Buck Mt. T1N, R5E, Sec 22, 23	9 Aug 1976	6	R. Hill
West of Mt. Lassic T1S, R5E, Sec 36	18 May 1978	2	C. Hohenberger, D. Rudholm
Slate Ck. Butte T11N, R4E, Sec 13	2 May 1979	1	M. Delamore

Ammon Station T5N, R5E, Sec 16	16 May 1979	1	M. Delamore
Corral Ck. T8N, R6E, Sec 21	15 Jul 1979	2	W. Brock
Oak Knob T6N, R5E, Sec 33	8 Apr 1980	1	G. Leisten, J. Mattison
So. of No. Trinity Mt. T8N, R6E, Sec 11, 15, 22	10 Jun 1980	4	M. Stohl, J. Mattison, J. Shipman
Mt. Lassic T1S, R6E, Sec 31	7 Jun 1980	2	L. Doerflinger, R. LeValley, G. Friedrickson, H. Genger
Bret Hold T8N, R6E, Sec 22	10 Jun 1980	2	J. Mattison, M. Stohl
Grogan Hole T8N, R6E, Sec 11	10 Jun 1980	1	J. Mattison, M. Stohl, J. Shipman
Twin Lakes T11N, R4E, Sec 25, 36	24 Mar 1978	2	J. Gardetto
Le Perron Pk. T10N, R6E, Sec 29,32	12 May 1980	2	J. Miller
TRINITY COUNTY			
Hasting Ck. T1N, R6E, Sec 5,8	17 May 1978	3	B. Clow
Mad River Rock T1S, R6E, Sec 14	10-14 May 1978	1	E. Payne
Mad River Rock T1S, R6E, Sec 14	24-28 May 1978	2	R. Hill
Van Duzen River T1S, R6E, Sec 8,22	7 June 1979	2	B. Marcot
Long Ridge T4S, R7E, Sec 11,14,15	14 Apr 1980	3	K. O'Halloran, Hadley
Ruth Lake Campground T1S, R7E, corner Sec 28, 29,32,33	15 May 1974	1	R. Wilmarth
Hetten Ck. T2S, R7E, Sec 9	26 May 1978	1	J. Gardetto, C. Cox
Swim Ridge* T3S, R12W, Sec 13,24 T3S, R11W, Sec 30	28-30 Jun 1976	5	R. Hill
Jones Ridge and Mad River* T3S, R12W, Sec 34 T4S, R12W, Sec 9,10,11,12,14 T4S, R11W, Sec 7	28-30 Jun 1976	10	R. Hill

Mikes Rock* T4S, R12W, Sec 26	28-30 Jun 1976	2	R. Hill
Lone Pine Ridge T7N, R6E, Sec 22	27 May 1980	2	M. Stohl, J. Mattison, K. Baker
Lone Pine Ridge T7N, R6E, Sec 22	28 May 1980	1	M. Stohl, J. Brack
Lone Pine Ridge T7N, R6E, Sec 23	29 May 1980	1	M. Stohl, J. Brack
Lone Pine Ridge T7N, R6E, Sec 21,22	5 Jun 1980	2	B. Marcot, M. Stohl, C. Sakai
SE of Hettenshaw Pk. T2S, R7E, Sec 34	30 Apr 1980	1	G. Leisten, K. O'Halloran
Blue Slide Ck. T2S, R7E, Sec 12	29 Apr 1980	2	G. Leisten, K. O'Halloran
DEL NORTE COUNTY			
Elk Valley T14N, R4E, Sec 23	24 Jul 1979	1	B. Marcot

*Mount Diablo Meridian.

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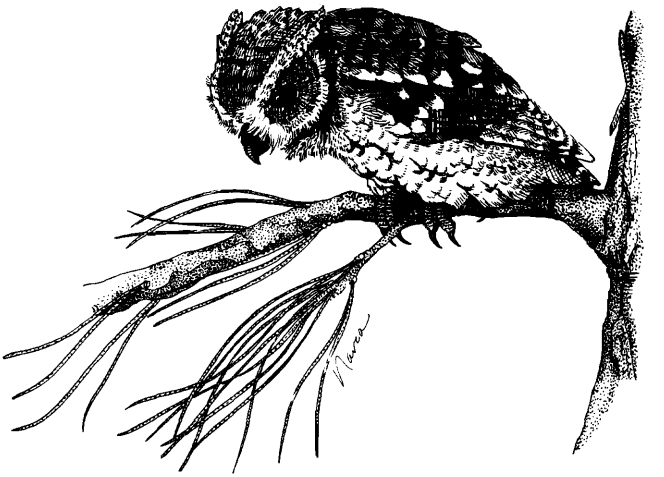

Flammulated Owl *Sketch by Narca Moore*

WESTERN FIELD ORNITHOLOGISTS' SIXTH ANNUAL CONVENTION ESTES PARK, COLORADO, 26 - 28 JUNE 1981

The sixth annual WFO convention is being held jointly with the Colorado Field Ornithologists at Estes Park, Colorado.

BOARD NOMINATIONS. There will be three vacancies on the WFO Board of Directors. If you wish to submit a nomination for consideration, please submit the name, address and phone number of the nominee to Jeanne Conry (address below).

CALL FOR PAPERS. If you have a presentation that would be of interest to the general membership (particularly bird identification, distribution or field observations), please submit an abstract for consideration to: Bruce E. Webb, EPO Biology Dept., University of Colorado, Boulder, CO 80309.

LOCATION AND TRANSPORTATION. Mt. Ypsilon Lodge at YMCA of the Rockies will be the convention headquarters. YMCA of the Rockies borders Rocky Mt. National Park, and is located 70 miles NW of Denver and 5 miles SW of Estes Park off spur 66. Bus service is available from Denver by Gray Line of Colorado. However for birding flexibility, vehicle rental at Stapleton International Airport in Denver is recommended. Early registrants will be provided with local maps. The YMCA offers lodging, meals, conference accommodations, and a variety of activities.

Registration will take place in the Mt. Ypsilon lobby from 2-8 pm on 26 June and from 8 am to noon on 27 June. Registration will be $5.00 per person. PREREGISTRATION BY 15 MAY 1981 is requested.

LODGING AND MEALS. Rates quoted for participants staying at YMCA include lodging, grounds fee and three meals per day, including banquet dinner. See enclosed registration details.

A group campground in RMNP will be available for campers and tents. No showers are available; meals and banquet dinner must be arranged upon arrival. Campers are charged a YMCA gounds fee for daily use.

CLIMATE. Participants will encounter temperature extremes from very hot on the Pawnee to cold on the alpine tundra. Mornings and evenings are always cool at this altitude, but daytime temperatures are pleasant. Afternoon thundershowers are common.

FIELD TRIPS. Planned field trips to RMNP and PNG will be led by CFO members familiar with the birds and best areas for birding. We intend to have many of the Colorado specialities pinpointed. Multi-passenger vans will probably be available for persons who have not arranged their own transportation at a charge of $10.00 for the PNG trip and $5.00 for RMNP (prices subject to increase). PREREGISTRATION FOR SCHEDULED FIELD TRIP VEHICLES IS NECESSARY.

June 29-30: A 2 day post convention CFO field trip to parts of eastern Colorado. Special arrangements can be made at the convention. Likely eastern species are Mississippi Kites, Red-bellied Woodpecker, Dickcissels and Bobolinks, possibly Black-billed Cuckoos, Scissor-tailed and Great Crested flycatchers to name but a few.

RESERVATIONS for the convention may be made immediately by sending the enclosed registration form and a check or money order payable to Western Field Ornithologists, C/O Dr. Jeanne Conry, Biology Dept., University of Colorado, 1100 14th St., Denver, CO 80202. The full name of each person for whom you are making the reservation and a STAMPED, SELF-ADDRESSED ENVELOPE must accompany each request. For further information call Jeanne Conry 303-629-2657. Persons preregistering will receive a packet containing an updated Colorado checklist, daily field cards of RMNP and PNG, and detailed maps for locating several species of interest.