

Flammulated Owls in the Spring Mountains, Nevada

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Flammulated Owls were systematically surveyed in the Spring Mountains, southern Nevada, in ponderosa pine forests mixed with pinyon, juniper, mountain mahogany, and Gambel oak at lower elevations; and aspen, limber pine, and white fir at higher elevations. One hundred and fifty survey points were visited from May through July, 2002, which covered approximately 4,900 ha of potentially suitable Flammulated Owl habitat. Fifteen territorial males were located at considerably lower densities than Flammulated Owls in other parts of their breeding range, but this was more owls than known to any other mountain range in Nevada. Nesting was confirmed in one territory and it was estimated that Flammulated Owls initiated breeding in late May and nestlings fledged in the middle of July in the Spring Mountains.

INTRODUCTION. Flammulated Owls (*Otus flammeolus*) are insectivorous, cavity-nesting, neo-tropical migrants (McCallum 1994). They breed in montane coniferous and mixed deciduous forests throughout a broad geographic breeding range in western North America, which extends from southern British Columbia south through the mountains of

central Mexico (McCallum 1994). Flammulated Owls are listed as a sensitive species in four U.S. Forest Service Regions (McCallum 1994), including Nevada (USFS Region 4). They are also listed as a species of concern in the Clark County Multiple Species Habitat Conservation Plan (RECON 2000) because very little is known about this species in Nevada, particularly in Clark County. However, Flammulated Owls have been documented during the breeding season in eleven mountain ranges in Nevada including the Spring Mountains, and they could potentially occur in an additional 18 ranges (Dunham et al. 1996). Despite their widespread distribution in Nevada, breeding had only been confirmed in a few areas including the Sheep Range, which has very similar montane forest as that in the Spring Mountains.

Flammulated Owls commonly breed in montane coniferous forest comprised of ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga menziesii*) (Bull et al. 1990, Reynolds and Linkhart 1992, Groves et al. 1997). This species will also breed in lower elevation ponderosa pine forest mixed with pinyon pine (*Pinus* spp.) and juniper (*Juniperus* spp.) (McCallum and Gehlbach 1988), as well as conifer forests (yellow pine and/or fir) mixed with deciduous trees including quaking aspen (*Populus tremuloides*) (Powers et al. 1996, Marti 1997), cottonwood (*Populus* spp.), and Gambel oak (*Quercus gambelii*) (Arsenault 1999). In Nevada, Flammulated Owls breed in montane coniferous forests comprised of ponderosa pine, white fir (*Quercus gambelii*), and limber pine (*Pinus flexilis*) and will use forest patches as small as 40 ha (Dunham et al. 1996).

The presence of suitable nesting cavities is an important component of Flammulated Owl habitat. In most areas, Flammulated Owls prefer cavities excavated by Northern Flickers (*Colaptes auratus*) (Arsenault 1999) and by species that excavate

similarly large cavities such as Pileated Woodpeckers (*Dryocopus pileatus*) (Bull et al. 1990). Flammulated Owls will also nest in cavities excavated by Acorn Woodpeckers (*Melanerpes formicivorus*), sapsuckers (*Sphyrapicus* spp.), and other smaller cavity excavators and will occasionally use naturally occurring cavities (Arsenault 1999). Nest sites may occur in both coniferous and deciduous trees that are alive or dead. The nest site location largely depends on the availability of cavities in good condition, which depends on the species and condition of trees in the area and the excavator species that occur there.

STUDY AREA. The vegetation of the Spring Mountains is comprised of a diverse assemblage of trees (Charlet 1996) and shrubs, some of which do not occur together in any other area. At lower elevations (1,500-1,800 m), Mojave desert often comprised of Joshua trees (*Yucca brevifolia*) transitions into singleleaf pinyon pine (*Pinus monophylla*; 1,525-2,425 m) and Utah juniper (*Juniperus osteosperma*; 1,700-3,035 m) forest interspersed with dense patches of mountain mahogany and Gambel oak. Ponderosa pine (2,150-2,745 m), white fir, limber pine (2,315-3,050 m), and Rocky Mountain juniper (*Juniperus scopulorum*; 2,300-2,770 m) occur at mid elevations with groves of quaking aspen in some areas. Bristlecone pine (*Pinus longaeva*; 2,500-3,330 m) and common juniper (*Juniperus communis*; 2,650-3,350 m) occur at higher elevations (Charlet 1996).

METHODS. Nighttime surveys were conducted throughout potentially suitable Flammulated Owl breeding habitat, which was determined according to habitat use reported in the literature (McCallum 1994) and D. Arsenault's personal experience with the species. The entire Mt Charleston Wilderness Area and surrounding national forest,

including Lee and Kyle Canyons, were scouted early in the breeding season (mid-May) for potential owl habitat, which includes a variety of montane forest types as described above. In the Spring Mountains, this included all montane forest patches containing suitable nesting cavities. Suitable habitat in the Spring Mountains extended from the lower limits of ponderosa pine (approx. 2,150 m) to the upper limits of white fir and limber pine (approx. 3,000 m).

Survey points were spaced no further than 500m apart (generally 350-450m), a standard methodology based on the distance owls can be heard on a calm night (at least 1.0 km) and the average size of territories (<500 m across) (Reynolds and Linkhart 1984, Van Woudenberg and Christie 1997). Surveys consisted of visiting a point for ten minutes to listen for Flammulated Owls calling, and if no owls were heard after the first five minutes, a male territorial call was imitated or played from tape for one minute to elicit a response. After listening for an additional four minutes, the observer then walked to the next point while still listening for calling owls.

Nest sites were searched for using a pinhole camera system attached to a telescoping pole that reaches approximately 11 m high (Proudfoot 1996). This is an effective nest finding technique, but is limited to cavities within reach (probably <50% in the Spring Mountains). Tree scratching (with a stick) was also used, which imitates a predator climbing the nest tree and often stimulates incubating or brooding females to look out of the nest cavity entrance (Bull et al. 1990). Finally, potential nesting cavities were observed at dusk for owl activity, but this technique is limited because many possible nesting cavities are available within a territory, each of which has to be observed independently.

RESULTS. One hundred and fifty survey points were visited at least once from May 23 through July 10, 2002, which covered approximately 4,900 ha (12,110 acres, 49 km²) of potentially suitable Flammulated Owl habitat. Fifteen Flammulated Owl territories were occupied by calling males (Fig. 1). A Flammulated Owl nest was located along the Bristlecone Trail (Lee Canyon). A presumably paired male and female were heard in Scout Canyon (off Lee Canyon). The excessive calling behavior of a male at Mary Jane Falls (Kyle Canyon) suggested that he was an unmated individual. The remaining twelve territories contained suitable nesting cavities and were located in Wallace, Clark, McFarland, Macks, Lee, Scout, and Kyle Canyons and Mud Springs (Fig. 1).

The Bristlecone Trail Flammulated Owl pair nested at 2,282 m elevation in a large ponderosa pine snag (standing dead tree) that was 73 cm in diameter at breast height and 23.1 m high. The cavity entrance faced to the north (350°) and was 12.9 m high. The tree was on a 17° slope that faced North-North East (15°). The canopy closure around the nest tree was approximately 25%. The forest around the nest tree was open and comprised primarily of ponderosa pine (4 shrubs; 11 trees, 6.5-90 cm dbh, mean = 30.5 ± 25.6 cm dbh) and white fir (13 shrubs; 5 trees, 9-25 cm dbh, mean = 14.8 ± 6.2 cm dbh). There was also one Rocky Mountain juniper (5.5 cm dbh) and two currant (*Ribes* spp.) shrubs. The understory was comprised of grasses and forbes.

DISCUSSION. Despite the widespread distribution of Flammulated Owls in Nevada (Dunham et al. 1996), breeding has only been confirmed in a few areas. Nesting was confirmed in the Sheep Range, Clark Co., by the presence of eggs and a brood patch in a female specimen collected in 1963 (Johnson 1965) and a female with fledgling

located in 2000 by J. Beason and D. Arsenault (NV Breeding Bird Atlas data). Johnson (1965) also reported two Flammulated Owls in the Clover Mountains, Lincoln Co., that “repeatedly returned to a probable nest cavity in the dead top of a pine”. Ryser (1985) noted that nesting Flammulated Owls had been reported from Rudy Lake National Wildlife Refuge, but details of these records were not provided.

Previous published records of Flammulated Owls in the Spring Mountains include one in Lee Canyon (detected in 1993), one in Macks Canyon (1963), four in Scout Canyon (1963), and one in Clark Canyon (1961) (Dunham et al. 1996). Owls were detected in all of these areas and occurred at similar densities (as far as can be extrapolated from Johnson (1965)). An unpublished record for the Flammulated Owl in the Spring Mountains is a male heard by Ted Floyd (pers. comm.) in Deer Creek in 2000, but no owls were located there during this study. Owls were detected in several locations previously unknown to be occupied including Wallace, McFarland, and Kyle Canyons as well as Mud Springs. More owls may occupy areas yet undiscovered, but most of the potentially suitable habitat in the Spring Mountains was surveyed during this study.

On July 4, the female in the Bristlecone Trail nest cavity was observed during the day and both adults fed nestlings at a rate of approximately one visit every three minutes on average for 45 minutes after dusk. A second daytime visit was also made on July 11, during which the female was still brooding. Based on these observations, this nest was probably initiated the first week in June. Male calling behavior (spontaneous vs. elicited) also indicated that owls began nesting in the first week of June and young fledged in the third week of July. However, more observations of Flammulated Owl nests are needed to clarify the timing of owls breeding in the Spring Mountains.

The habitat around the Bristlecone Trail nest was an open stand of mature ponderosa pine with white fir in the understory and scattered Rocky Mountain juniper, currant shrubs, grasses, and forbs. This is similar to habitat commonly used by Flammulated Owls throughout western North America (McCallum 1994). All owl territories were in areas dominated by ponderosa pine and/or white fir, but some had dense components of mountain mahogany, aspen, and/or Gambel oak. Although Flammulated Owls nest in aspen and oak in some areas, these trees did not grow large enough in the Spring Mountains to support woodpecker cavities. Dense stands of pine, fir, aspen, oak, or mahogany may be preferred roosting areas (McCallum and Gehlbach 1988, Arsenault 1999), but open stands of large trees with grassy understories are also necessary for foraging (McCallum 1994).

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LITERATURE CITED

- Arsenault, D.P. 1999. **The Ecology of Flammulated Owls: Nest-site Preferences, Spatial Structure and Mating System**. M.Sc. Thesis, University of Nevada, Reno.
- Bull, E.L., A.L. Wright and M.G. Henjum. 1990. Nesting habitat of Flammulated Owls in Oregon. **Journal of Raptor Research** 24:52-55.
- Charlet, D.A. 1996. **Atlas of Nevada Conifers, a Phylogeographic Reference**, University of Nevada Press, Reno, pp. 320.
- Dunham, S., L. Butcher, D.A. Charlet and J.M. Reed. 1996. Breeding range and conservation of Flammulated Owls (*Otus flammeolus*) in Nevada. **Journal of Raptor Research** 30:189-193.
- Groves, C., T. Frederick, G. Frederick, E. Atkinson, M. Atkinson, J. Shepherd and G. Servheen. 1997. Density, distribution and habitat of Flammulated Owls in Idaho. **Great Basin Naturalist** 57:116-123.
- Johnson, N.K. 1965. The breeding avifaunas of the Sheep and Spring Ranges in southern Nevada. **Condor** 67:93-124.
- Marti, C.D. 1997. Flammulated Owls (*Otus flammeolus*) breeding in deciduous forests. *In*: J. R. Duncan, D. H. Johnson and T. H. Nicholls, eds., **Biology and Conservation of Owls of the Northern Hemisphere**: 2nd International Symposium, General Technical Report NC-190. USDA Forest Service, Winnipeg, Manitoba, Canada, pp. 262-266.
- McCallum, A.D. 1994. Flammulated Owl (*Otus flammeolus*). *In*: A. Poole and F. Gill, eds., **The Birds of North America**, No.93. The Academy of Natural Sciences,

- Philadelphia, PA, and The American Ornithologists' Union, Washington, DC., pp. 24.
- McCallum, D.A. and F.R. Gehlbach. 1988. Nest-site preferences of Flammulated Owls in western New Mexico. **Condor** 90:653-661.
- Powers, L.R., A. Dale, P.A. Gaede, C. Rodes, L. Nelson, J.J. Dean and J.D. May. 1996. Nesting and food habits of the Flammulated Owl (*Otus flammeolus*) in southcentral Idaho. **Journal of Raptor Research** 30:15-20.
- Proudfoot, G. A. 1996. Miniature video-board camera used to inspect natural and artificial nest cavities. **Wildlife Society Bulletin** 24:528-530.
- RECON. 2000. **Clark County Multiple Species Habitat Conservation Plan and Environmental Impact Statement**. Clark County Department of Comprehensive Planning, Las Vegas, NV and U.S. Fish and Wildlife Service, Reno, NV.
- Reynolds, R.T. and B.D. Linkhart. 1984. Methods and materials for capturing and monitoring Flammulated Owls. **Great Basin Naturalist** 44:49-51.
- Reynolds, R.T. and B.D. Linkhart. 1992. Flammulated Owls in ponderosa pine: evidence of preference for old growth. *In*: M. R. Kaufmann, W. H. Moir and R. L. Bassett, eds., **Old-growth Forests in the Southwest and Rocky Mountains Regions**, General Technical Report RM-213. USDA Forest Service, pp. 166-169.
- Ryser, F. A. 1985. **Birds of the Great Basin, a Natural History**. University of Nevada Press, Reno.
- Van Woudenberg, A.M. and D.A. Christie. 1997. Flammulated Owl (*Otus flammeolus*) population and habitat inventory at its northern range limit in the southern interior of British Columbia. *In*: D. H. J. J. R. Duncan, T. H. Nicholls, eds., **Biology and**

Conservation of Owls of the Northern Hemisphere: 2nd International
Symposium, General Technical Report NC-190. USDA Forest Service, Winnipeg,
Manitoba, Canada, pp. 466-476.

FIGURE 1. The area surveyed for Flammulated Owls in the Spring Mountains and the location of owl territories.

