

## Flammulated Owls in the Spring Mountains, Nevada

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### ABSTRACT

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, on 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 documented in any other mountain range in Nevada. Nesting was confirmed in one territory and we 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, neotropical migrants (McCallum 1994). They breed in montane coniferous and mixed deciduous-coniferous 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, Intermountain Region). 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 (Johnson 1965), which has similar montane forest habitats as 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 are known to breed in montane coniferous forests comprised of ponderosa pine, white fir (*Abies concolor*), 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 other areas, Flammulated Owls select larger cavities excavated by species such as Northern Flicker (*Colaptes auratus*) (Arsenault 1999) and Pileated Woodpecker (*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 they will occasionally use naturally occurring cavities (Arsenault 1999). Nest sites may occur in both coniferous and deciduous trees that are alive or dead. 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 (Arsenault 1999).

## STUDY AREA

Vegetation communities of the Spring Mountains are comprised of a diverse assemblage of trees (Charlet 1996) and shrubs, some of which do not occur together in any other area. Lower elevation (1,500-1,800 m) Mojave desert communities, 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 and include 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 in all of the potentially suitable Flammulated Owl breeding habitat located in our study area, which included the Mt Charleston Wilderness Area and some of the adjacent (within 1 km) National

Forest (Fig. 1). Our study area encompassed Clark, Foxtail, Kyle, Lee, Macks, McFarland, Scout, and Wallace Canyons, Buck Spring, Mud Springs, and Cold and Deer Creeks (Fig. 1). The Mount Sterling Wilderness Study Area was not included in our study area. The study area was scouted early in the breeding season (mid-May) for potential owl habitat. Suitable habitat includes montane forest types as described in the Introduction above, and was determined according to habitat use reported in the literature (McCallum 1994) and D. Arsenault's personal experience with the species. In the Spring Mountains, this included most montane forest (except the highest elevation forest dominated by Bristlecone Pine) that contained suitable nesting cavities. Suitable habitat in our study area 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 systematically established in accessible locations, which included roads, trails, drainage bottoms, and along ridges. Survey points were situated so they were no more than 500 m from the edge of potentially suitable habitat and were spaced no further than 500 m apart (generally 350-450m). The survey area is a 500 m buffer around survey points (Fig. 1). This survey method is 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.

In some accessible areas in which owls were detected during nighttime surveys, 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 it was limited to cavities within reach (probably <50% in the Spring Mountains) and accessible areas to which the camera system could be transported. Tree scratching (with a stick) was also used in areas where owls were detected, 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, a few 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, within an area encompassing approximately 4,900 ha (12,110 acres, 49 km<sup>2</sup>) of potentially suitable Flammulated Owl habitat. Fifteen Flammulated Owl territories, located in Wallace, Clark, McFarland, Macks, Lee, Scout, and Kyle Canyons and Mud Springs (Fig. 1), were occupied by

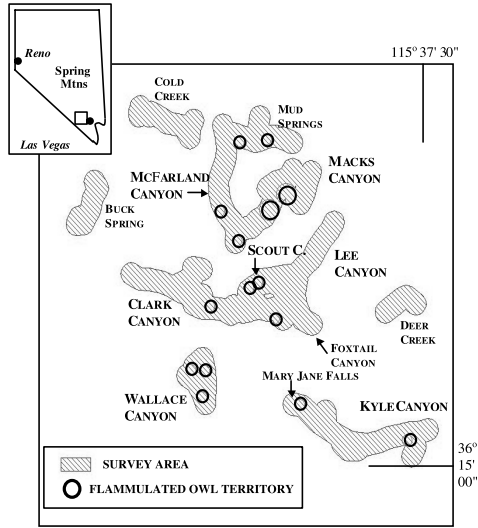


FIGURE 1. The area surveyed (500 m buffer around survey points) for Flammulated Owls in the Mt. Charleston Wilderness Area and some adjacent National Forest. Owl territories are circled.

calling males. Twelve territories occupied by calling males contained suitable nesting cavities, but nest sites were not located and some of the males may have been unmated. One territory in Scout Canyon had a presumably paired male and female, but a nest was not located. The excessive calling behavior of a male at Mary Jane Falls (Kyle Canyon) suggested that he was an unmated individual. One Flammulated Owl nest was located along the Bristlecone Trail (Lee Canyon). The male on this territory was detected during surveys and the nest was located by tree scratching.

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% (estimated using a spherical densiometer and averaging four readings taken around the tree 1 m from base). The forest within a 0.04 ha (11.3 m radius) plot centered on the nest tree, was open and comprised primarily of ponderosa pine (4 shrubs; 11 trees, 6.5-90 cm dbh, mean =  $30.5 \pm 25.6$  cm dbh) and white fir (13 shrubs; 5 trees, 9-25 cm dbh, mean =  $14.8 \pm 6.2$  cm dbh). There was also one Rocky Mountain juniper (5.5 cm dbh) and two currant (*Ribes* spp.) shrubs in the plot. The understory was comprised of grasses and forbs.

## 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 Ruby 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 consistent with 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. 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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