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THE BOREAL OWL AT THE SOUTHERN TERMINUS OF THE ROCKY MOUNTAINS: UNDOCUMENTED LONGTIME RESIDENT OR RECENT ARRIVAL?[1]

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Abstract: Twenty-three Boreal Owls (*Aegolius funereus*) documented from April 1987 to August 1993, including three fledged juveniles, unequivocally establish the species as a breeding bird in northern New Mexico where they responded at a rate of 0.17 owls/survey hr during both breeding and non-breeding seasons. Their congener, the Northern Saw-whet Owl (*A. acadicus*), was not recorded during the breeding season and responded at the rate of 0.03 owls/survey hr during the non-breeding season in the same areas. In mountain ranges apparently not occupied by Boreal Owls, Northern Saw-whet Owls responded at rates of 0.35 and 0.27 owls/survey hr for breeding and non-breeding seasons, respectively. Potential habitat for Boreal Owls away from the Rocky Mountains was typically in isolated, small patches that likely would not sustain viable populations. Paleontological, archaeological, and late 19th-early 20th century autumnal specimens from the southern Rockies support the hypothesis that the Boreal Owl has been present in Colorado and New Mexico for centuries, possibly since the Pleistocene. They remained largely undocumented because their high elevation sub-alpine conifer forest habitat is snowbound during their most vocal period (February–April).

Key words: Aegolius funereus; Aegolius acadicus; *Arizona; breeding range; Colorado; New Mexico; Rocky Mountains.*

INTRODUCTION

Breeding Boreal Owls (*Aegolius funereus*) in North America south of Canada were virtually unknown in the 1950s (American Ornithologists' Union 1957), but by 1989 species residency was well documented in the northern Rocky Mountains of Idaho, Montana, and Wyoming (Hayward et al. 1987), throughout the Colorado Rockies (Ryder et al. 1987, Andrews and Righter 1992), and to the range's southern terminus in northern New Mexico (Stahlecker and Rawinski 1990). Subalpine areas of eastern Washington and Oregon are also occupied by Boreal Owls (Whelton 1989). These observers have uniformly expressed the opinion that Boreal Owls have likely been present in the Rocky Mountains much longer, but were previously undocumented because few people had ventured into prime Boreal Owl habitat at night during the wintry months of February–April when males are most vocal. However, Johnson (1994), after reviewing nesting season records cited in Audubon Field Notes (1963–1970) and American Birds (1971–1992), felt that a case could be made that the Boreal Owl had expanded its range into or within the western United States since 1963.

Between 1989 and 1993, we conducted surveys for Boreal Owls in the mountains of New Mexico and Arizona. Our goals were to expand knowledge of Boreal Owl distribution within their recognized range in New Mexico (Stahlecker and Rawinski 1990), to attempt to locate Boreal Owls in potential habitat in other New Mexico and Arizona mountain ranges, to document breeding within occupied habitat, and to define the southern breeding limits of the species. Summarization of our results also provided an opportunity to examine the question of short versus long-term residency by Boreal Owls in the southern Rocky Mountains.

METHODS

We follow Hayward et al. (1987) by defining the northern Rockies as north of 42°N latitude. We

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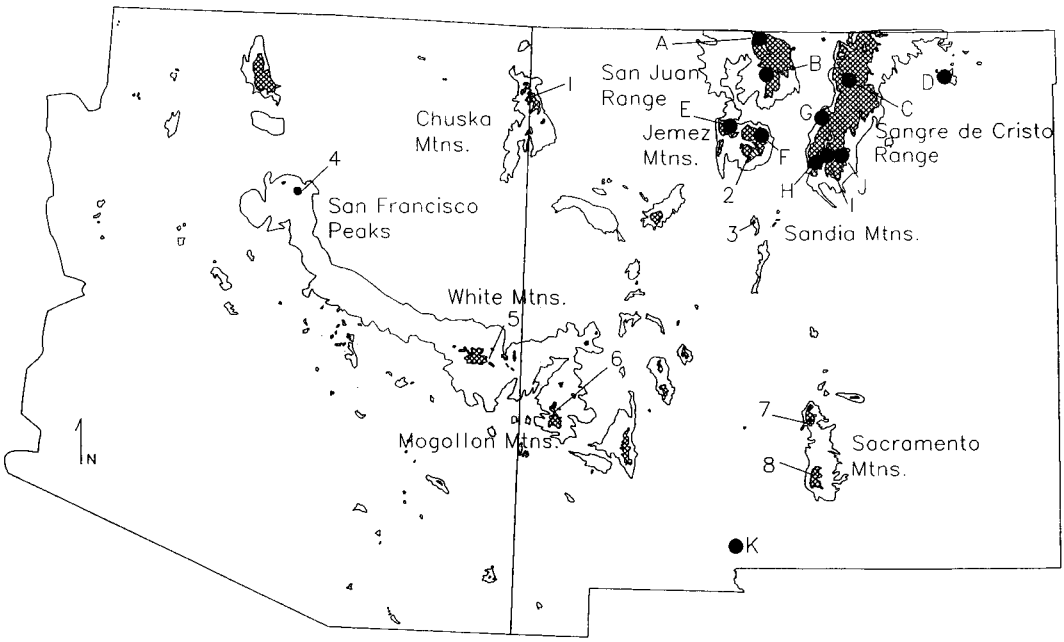

FIGURE 1. Modern and prehistoric Boreal Owl records (A–K) in New Mexico, additional survey areas in New Mexico and Arizona (1–8), and current distribution of Rocky Mountain Subalpine Conifer Forest (shaded) and Montane Conifer Forest (outlined) habitats in Arizona and New Mexico. For location details see Table 3 and Appendix A.

define the southern Rockies as south of 42°, excluding those portions of Utah west of 109°30′ that are geologically attached to the northern Rockies of Hayward et al. (1987). The northern and southern Rockies are separated by 175–200 km of lowlands known as the Wyoming Basin.

Our field work was limited to New Mexico and Arizona. We only surveyed ranges with Rocky Mountains Subalpine Conifer Forest habitat dominated by Engelmann spruce (*Picea engelmanni*) and subalpine fir (*Abies lasiocarpa*) (hereafter spruce-fir forest). Habitat classifications follow Brown, Lowe, and Pase (1979) and Brown and Lowe (1980). Spruce-fir forests can occur from 2,450–2,600 m to timberline at 3,500–3,800 m in this area (Fig. 1). Boreal Owls show a strong association with this forest type in the southern Rockies (Ryder et al. 1987, Stahlecker and Rawinski 1990). Other factors considered when selecting areas for survey included: the amount of spruce-fir habitat present in each range; the geographic extent of adjacent Rocky Mountain Montane Conifer Forest (hereafter mixed conifer forest) in each range (Table 1; Fig. 1); the availability of prey species (Table 1) taken by Boreal Owls elsewhere in North America (Bondrup-Nielson 1978, Palmer 1986, Hayward et al. 1993); and the proximity to other mountain ranges containing spruce-fir habitat, especially if occupied by Boreal Owls (Fig. 1).

We surveyed for Boreal Owls using the technique described by Palmer and Rawinski (1986), which involves tape playback of the species' primary "staccato" song (Bondrup-Nielson 1984) for 5-min intervals from calling stations spaced 200–800 m apart. We surveyed during both the breeding season (February–June), when males might respond with the staccato song, and the non-breeding season (July–December), when adult or young Boreal Owls can be seen or heard calling in response to tape broadcasts (Palmer and Rawinski 1986, Whelton 1989). Most surveys were conducted during the five nights preceding and including the full moon because moonlight allowed observers to better see owls in flight, helped with nighttime visibility during backcountry travel (Palmer and Rawinski 1986), and may induce male owls to initiate song or increase song intensity (Palmer 1987).

Though presence of spruce-fir forest was gen-

TABLE 1. Estimated available spruce-fir (SF) and montane conifer (MC) habitat derived from Brown and Lowe (1980) as adjusted by other data sources (U.S. Forest Service, unpubl. data; Navajo Natural Heritage, unpubl. data) and potential prey in nine mountain ranges in Arizona and New Mexico where Boreal Owl surveys were conducted, 1989–1993. For locations see Fig. 1.

Mountain Range	State	Habitat (km²)[1]		Potential prey[2]		
		SF	MC	Clga	Misp	Zasp
Sangre de Cristo	NM	895	1,075	P	P	P
San Juan	NM	144	907	P	P	P
Jemez	NM	90	535	P	P	P
Sandia	NM	0	99	A	P	A
Mogollon	NM	40	2,500	P	P	A
Sacramento	NM	10	1,100	A	P	P
Chuska	NM/AZ	6	215	A	P	A
San Francisco	AZ	10	2,100	A	P	A
White	AZ	120	4,700	P	P	P

[1] Spruce-fir forest dominated by *Picea engelmanni* and *Abies lasiocarpa*; Montane conifer forest dominated by *Pseudotsuga menziessii* and *Abies concolor* generally above 2,450 m with *Pinus ponderosa* prevalent at lower elevations. Large areas of MC connect mountain top SF habitat, e.g., San Juan to Jemez and San Francisco to White to Mogollon. Accuracy of area estimates vary and significant digits are indicative of quality of raw data.
[2] Presence (P) or Absence (A) of potential prey: Clga = *Clethrionomys gapperi*, Misp = *Microtus* spp., Zasp = *Zapus* spp.; distribution of prey derived from Findley et al. (1975) and Hoffmeister (1986).

erally a requirement for surveys within a mountain range, we also surveyed adjacent, upper elevation mixed conifer forests dominated by white fir (*Abies concolor*) and Douglas-fir (*Pseudotsuga menziesii*), particularly in southern New Mexico and Arizona. Approximately one-third of survey time in northern New Mexico was spent in revisits to occupied habitat in efforts to document continued occupancy by Boreal Owls and to search for fledgings as proof of breeding (Table 2). We repeatedly surveyed the same areas in southern New Mexico and Arizona (Appendix A) because spruce-fir forests were so limited (Table 1) and, since singing rates of Boreal Owls can vary greatly from year-to-year (Palmer 1987), to decrease the possibility of missing resident owls. We report our results in owls/hr of survey because more than 60% of our surveys were conducted on foot. We also calculated owls/km of survey route for comparative purposes.

TABLE 2. Boreal (BOOW) and Northern Saw-whet Owl (NSWO) numbers and responses per hour during Boreal Owl surveys in Arizona and New Mexico, 1989–1993.

Mountain range	Breeding season			Non-breeding season[1]		
	Total survey hours	Respondents		Total survey hours	Respondents	
		BOOW (hr)	NSWO (hr)		BOOW (hr)	NSWO (hr)
San Juan	11	3 (0.27)	0	6	4 (0.67)	0
Sangre de Cristo	5	1 (0.20)	0	9	1 (0.11)	0
Jemez N[2]	6	0[3]	0	21	1 (0.05)	1 (0.05)
Occupied Total	23	4 (0.17)	0	36	6 (0.17)	1 (0.03)
Jemez S[2]	4	0	4 (1.00)	0	0	0
Sandia	34	0	12 (0.35)	11	0	0
Mogollon	0	0	0	27	0	12 (0.44)
Sacramento	0	0	0	7[4]	0	0
Chuska	16	0	4 (0.25)	0	0	0
San Francisco	6	0	2 (0.33)	0	0	0
White	43	0	14 (0.33)	0	0	0
Unoccupied Total	103	0	36 (0.35)	45	0	12 (0.27)

[1] Non-breeding season surveys were not conducted in Arizona.
[2] The Jemez Mountains are subdivided here; the range is divided by the Valle Grande, and little spruce-fir habitat is in the southern portion; to date no BOOW have been identified in the southern portion.
[3] Although no BOOW were detected during these surveys, two breeding season records have been identified (Table 3).
[4] Includes 5 hrs of survey on 9 August 1995.

TABLE 3. Boreal Owl records for New Mexico. For locations see Fig. 1.

Loc	Mountain range	Elev. (m)[1]	Lat./long.[1]	Date(s)	#	Source
A	San Juan	3,100	36°59′/106°27′	1987 to 1988	6	Stahlecker & Rawinski (1990)
A	San Juan	3,140	36°58′/106°26′	1992 to 1993	7[2]	This study
B	San Juan	3,220	36°36′/106°20′	24 Sep 1988	1	Stahlecker & Rawinski (1990)
C	Sangre de Cristo	3,300	36°34′/105°21′	3 Oct 1987	1	Stahlecker & Rawinski (1990)
D	none	2,130	36°35′/104°17′	19 Nov 1989	1	This study
E	Jemez	3,000	36°07′/106°45′	25 Sep 1991	1	This study
F	Jemez	3,230	36°02′/106°23′	Jun 1992	2	This study
G	Sangre de Cristo	2,240	36°12′/105°42′	1275 A.D.	1	Emslie (1981)
H	Sangre de Cristo	3,230	35°47′/105°46′	13 Mar 1992	1	This study
I	Sangre de Cristo	3,300	35°54′/105°38′	15 Apr 1989	1	Stahlecker & Rawinski (1990)
I	Sangre de Cristo	3,350	35°55′/105°38′	2 Aug 1993	1[3]	This study
J	Sangre de Cristo	2,810	35°51′/105°28′	10 Jul 1991	1	This study
K	Organ	1,430	32°12′/106°37′	Pleistocene	1	Howard (1931)

[1] Mean elevation or lat.-long for multiple sightings.
[2] Includes 3 owls present on 19 Aug 1992; at least 2 were fledglings.
[3] Fledgling.

RESULTS

Ten Boreal Owls were recorded during standardized surveys in northern New Mexico during 1989–1993. Response rates were identical for breeding and non-breeding (0.17 owls/survey hr) seasons (Table 2). Other respondents to the Boreal Owl tape included Great Horned Owls (*Bubo virginianus*), Northern Pygmy-Owls (*Glaucidium gnoma*), Spotted Owls (*Strix occidentalis*), Long-eared Owls (*Asio otus*), and Northern Saw-whet Owls (*Aegolius acadicus*). The latter, a congener of the Boreal Owl, responded most often. Northern Saw-whet Owl response rates were low in mountains occupied by Boreal Owls during both breeding (none recorded) and non-breeding (0.03 owls/survey hr) seasons. Where Boreal Owls were not encountered, however, Northern Saw-whet Owl response rates were considerably higher: 0.35 owls/survey hr during the breeding season and 0.27 owls/survey hr during the non-breeding season (Table 2).

Four additional Boreal Owls were documented incidental to other work. An owl photographed in Colfax County more than 100 km east of the Sangre de Cristo Mountains in November 1989 is the only New Mexico record below 2,800 m (Loc. D, Fig. 1). This bird matched the description of a hatching-year juvenile (Rawinski et al. 1993), and presumably had moved there after becoming independent. It was found in an oak (*Quercus gambelii*) woodland at 2,130 m, though there was Ponderosa pine (*Pinus ponderosa*) forest in the vicinity. Other casual encounters included two by the senior author (Loc. F, Fig. 1) and one by U.S. Forest Service Spotted Owl surveyors (Loc. J, Fig. 1).

September 1991 and June 1992 records of Boreal Owls in the Jemez Mountains at sites 35 km apart were the first registered in that range (Loc. E-F, Fig. 1). Spruce-fir forests in the Jemez Mountains are 55–60 km from similar habitat in the San Juan and Sangre de Cristo Mountains.

All together, 12 Boreal Owl records (14 owls) were gathered between November 1989 and August 1993 in north-central New Mexico. These, combined with the eight records between April 1987 and April 1989 (Stahlecker and Rawinski 1990), provide a total of 20 records at nine locales (Fig. 1, Table 3) in the state in seven years. Eleven records are from a 33 km² area in the northern San Juans (Loc. A, Fig. 1). Two fledglings were found there in August 1992. Another fledgling, found in the southern Sangre de Cristos (Loc. I, Fig. 1) on 2 August 1993, was within 1,500 m of the location of a singing male found on 15 April 1989 (Stahlecker and Rawinski 1990).

DISCUSSION

CURRENT BOREAL OWL DISTRIBUTION IN NEW MEXICO

Twenty records, totalling 23 Boreal Owls, between 1987 and 1993 firmly establish the species as a resident in the Sangre de Cristo, San Juan, and Jemez mountains of northern New Mexico (Table 3). Fledglings found in the New Mexico San Juans in 1992 and the Sangre de Cristos in 1993 plus others at two locations in the Colorado San Juans in 1992 (Rawinski et al. 1993) also

document breeding in the most southern portion of its North American range. That recently fledged Boreal Owls were attracted to tape playback of the staccato song suggests that systematic surveys during the full moons of July and August can document breeding in areas where Boreal Owls are present.

We covered approximately 100 km of trails and roads during standardized surveys in occupied habitat in northern New Mexico, encountering one Boreal Owl for every 10 km of survey route. Of previously published distributional studies, only Whelton (1989) surveyed multiseasonally and entirely with tape playback, like us, and reported distances travelled. Whelton (1989) reported a maximum of 49 Boreal Owls in 160 km of surveys in eastern Washington and Oregon (3.3 km/owl). Even if three separate reports of five owls each within adjacent 1-min blocks on the same night are reduced to only five owls that were following the surveyor, he recorded a minimum of 37 Boreal Owls (4.3 km/owl). Thus, Boreal Owls were encountered 2–3 times more often in eastern Washington and Oregon than in northern New Mexico. This may be indicative of a greater density of owls there, but it may also be a function of habitats sampled or other unknown variables. In sum, distributional studies (Hayward et al. 1987, Ryder et al. 1987, Whelton 1989, Stahlecker and Rawinski 1990) have shown that, given a reasonable amount of effort in suitable habitat over a 2–3 year period, searchers have been able to document multiple Boreal Owls.

Our efforts to locate Boreal Owls in mountain ranges of New Mexico and Arizona peripheral to the Rocky Mountain chain were unsuccessful. We cannot say absolutely that there are no Boreal Owls in these mountains. However, we expended more than twice the effort in these mountains (148 hrs) than in occupied habitat (59 hrs) (Table 2) and surveyed 288 km in the best available habitat in these apparently unoccupied mountains without encountering Boreal Owls. The largest spruce-fir areas in Arizona (White Mountains) and New Mexico (Mogollon Mountains) (Table 2), were surveyed in multiple years. Site specifics on areas where unsuccessful surveys were conducted away are summarized in Appendix A so that surveys can be repeated in the future.

Spruce-fir forests were much less extensive away from the Rocky Mountains (Table 1) and Northern Saw-whet Owls were more common (Table 2). Boreal Owls were predominantly found in spruce-fir forests and Northern Saw-whet Owls were predominantly found in Douglas-fir dominated forests in northern Colorado (Palmer 1986) and Idaho (Hayward and Garton 1988). The current extent of spruce-fir habitat in the isolated mountain ranges of New Mexico and Arizona is apparently too limited to maintain viable populations of Boreal Owls. We believe that the preponderance of mixed conifer habitat (Table 1) in these mountain ranges is more favorable for Northern Saw-whet Owls than Boreal Owls.

PRE-1963 BOREAL OWL DISTRIBUTION IN THE SOUTHERN ROCKIES

Are Boreal Owls longtime residents or recent arrivals in the southern Rocky Mountains? The collection of a fledgling Boreal Owl in northern Colorado in 1963 (Baldwin and Koplin 1966) was the first indication of breeding populations south of Canada. Johnson (1994), while admitting that most records after 1957 in western North America were the result of surveys such as ours, attempted to make the case for a recent range expansion based on two assumptions. First, he considered six cases of incidental records (four specimens, two sightings) published in *American Birds* since 1975 as evidence that increased numbers of owls had raised the probability of random encounters. Second, he felt that even if Boreal Owls were uncommon at the turn of the last century, they would not have been overlooked by naturalists active in the region at that time.

These two points have convincing counter arguments. First, during the period of interest to Johnson (1994), there has been a substantial increase in human populations in the southern Rockies, greatly increasing the probability of encounters between the two species. The population of Colorado, New Mexico and Wyoming has grown fifty-fold from less than 100,000 in 1860 to 5.3 million in 1990 (U.S. Department of Commerce 1990). In 1920, 240,000 people visited Rocky Mountain National Park (NP) and 80,000 visited Yellowstone NP, where the four specimens identified by Johnson (1994) were procured. Each park had about 2.8 million visitors in 1990 (National Park Service, unpubl. data). We also note that there are seven additional Boreal Owl specimens from Colorado for the period 1970–1984, mostly victims of automobile collisions (Ryder et al. 1987). It is more likely that the increase in random encounters is the result of an increased human population that is more

active in Boreal Owl habitat, including increased traffic traveling at higher speeds on all-weather roads, rather than increased owl populations. Further, a better educated public is in the field as the result of increased environmental awareness since the 1960s. Agency professionals and birdwatchers are also now aware that Boreal Owls are present in the Rockies and some are actively searching for them. For example, the 1992 "chance" sighting of a juvenile owl (Johnson 1994) was made by the Bird Reports Committee Chairman for Colorado while conducting field work for the Colorado Breeding Bird Atlas (Rawinski et al. 1993).

Two other factors have greatly increased human encounters with Boreal Owls (Hayward and Hayward 1993, Hayward 1994). The sophistication of recording equipment and the use of tape playback are post-1960s technological improvements. Second, modern backcountry equipment has made Boreal Owl habitat more accessible in late winter. One measure of backcountry activity in retail sales of outdoor equipment. Recreational Equipment, Inc. (REI), a Seattle based cooperative, had 100,000 members and two stores in the early 1970s. In 1994, there were 3.8 million members and 41 retail outlets (REI, unpubl. data).

Johnson's (1994) confidence in turn-of-the-century naturalists also seems misplaced; not in their abilities but in the amount of time they spent in Boreal Owl habitat. Bailey (1928) provides a comprehensive listing of itineraries of 57 scientists in the field in New Mexico between 1820 and 1920. None spent time in Boreal Owl habitat prior to 20 June, when singing males might have been heard. V. and F. M. Bailey camped and collected in the vicinity of Location I (Fig. 1) between 21 July to 17 August 1903, north of Taos and above 3,500 m between 17 July and 8 August 1904, and in the high elevation of the Mogollon Mountains of southwestern New Mexico between 17 and 29 October 1906. J. S. Ligon packed through the upper elevations of the Sangre de Cristos between 20 June and 19 July 1919, passing through considerable Boreal Owl habitat (again including Location I, Fig. 1). No chance encounters with Boreal Owls occurred during these relatively brief visits to suitable habitat.

There are no historic records for the Boreal Owl in Arizona (Swarth 1914; Anderson 1934, 1972; Phillips et al. 1964; Monson and Phillips 1981), even in potential habitat (Carothers et al. 1973, Rosenberg and Terrill 1986). Not only did these seven publications not identify Boreal Owls but they also contained few references to Northern Saw-whet Owls. Phillips et al. (1964:51) considered them resident, " . . . perhaps fairly common but not often detected." As with the Boreal Owl, Northern Saw-whet Owls call most often during the months of Feb–Apr (Palmer 1987, Swengel and Swengel 1987). Since the latter species prefers high-elevation habitat in Arizona that is also snowbound during most of this period, the lack of records is indicative of minimal time spent in potential *Aegolius* habitats during the proper season.

Early Colorado ornithologists spent little time in high mountain Boreal Owl habitat (Rockwell 1909), but encountered the owl on its margins. Single Boreal Owls were collected at Crested Butte (elev. 2,700 m), Gunnison County, on 14 October 1896, in Pitkin County (county seat of Aspen; elev. 2,450 m) in November 1903, and at Fraser (elev. 2,650 m), Grand County, on 11 November 1929 (Bailey and Niedrach 1965; Ryder et al. 1987). Since these specimens were taken after the breeding season, they could have migrated into Colorado. Evans and Rosenfield (1977) reported a late October/early November movement of Boreal Owls at a Duluth, Minnesota banding station, now known to be less than 150 km from occupied Boreal Owl breeding range (Hayward 1994). Catling (1972) found that three invasions into southern Ontario during the 1960s occurred in late winter, peaking in late February and early March, while 38 of 39 Boreal Owls were observed after 1 January 1960 in a Saskatchewan invasion (Anweiler 1960). That the three early Colorado specimens were collected within the heart of the Colorado Rockies, surrounded by mountains that are known to be currently occupied by Boreal Owls (Ryder et al. 1987), suggests that they were not long distance migrants.

Two prehistoric records provide further evidence that Boreal Owls occurred in the southern Rockies prior to this century. Bones attributed to *Crypotoglaux* (= *Aegolius*) *funerea richardsoni* were found among Pleistocene remains in Shelter Cave, Doña Ana County, in southern New Mexico (Howard 1931). Long pluvial periods in the Southwest during the Pleistocene supported larger tracts of boreal forests than currently exists (Van Devender and Spaulding 1979, Betancourt et al. 1990). When the Pleistocene ended about

11,000 years ago, boreal forests receded to the higher elevations in the Rockies and isolated mountains of Arizona and New Mexico. The present distribution of the Boreal Owl (Fig. 1) and some of its prey, e.g., *Clethrionomys gapperi* (Table 1), in Arizona and New Mexico are reflections of this isolation.

The second instance of a pre-Columbian Boreal Owl in New Mexico was a bone excavated at Picuris Pueblo, Taos County, New Mexico, and dated by ceramic typology to 1200–1350 A.D (Emslie 1981). The owl was likely taken by hunting or trapping near the pueblo, which today lies in piñon-juniper (*Pinus edulis-Juniperus* spp.) woodland at 2,243 m. To date no Boreal Owls have been reported among avian remains from archaeological or paleontological sites in Arizona.

Similar use of pre-1960 records and logic (Hayward and Hayward 1993, Hayward 1994) have been presented as evidence of long-term Boreal Owl residency south of Canada, but not in the detail provided herein. These five pre-1960 records provide circumstantial evidence of long-term Boreal Owl residency in the southern Rocky Mountains and suggest that Johnson's (1994) premises for including the Boreal Owl as a recent colonizer of the western United States are probably invalid. Although we cannot prove that breeding Boreal Owls were present in the southern Rocky Mountains prior to 1963 (Baldwin and Koplin 1966), the Picuris record from 1200–1350 A. D. (Emslie 1981) provides a link between the Pleistocene and the twentieth century that suggests continuous occupancy. In addition, the secretiveness of the species, the inhospitable nature of its habitat during courtship, and the lack of modern technology and conveniences such as tape players, paved roads that are maintained during winter, and modern winter camping and skiing equipment contributed to keeping its presence unknown to science until this late date in ornithological history.

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APPENDIX A. Areas surveyed unsuccessfully for Boreal Owl in New Mexico and Arizona. For locations see Fig. 1.

Loc	Mountain range	Place name	Predom. habitat[1]	Lat./long.-center	Total km of surveys by season[2]		No. of different seasons	
					NB	B	NB	B
1	Chuska	Tunitcha	MC	36°26′/109°05′		18		1
2	Jemez (S)	Highway 44	MC	35°52′/106°27′		14		2
3	Sandia	Summit	SF-MC	35°13′/106°26′	16	46	3	1
4	San Francisco	Inner Basin	SF	35°21′/111°39′		9		1
5	White	Escudilla Peak	MC-SF	33°56′/109°08′		7		1
		Mt. Baldy	SF-MC	33°57′/109°33′		30		2
		Burro Mountain	MC-SF	33°58′/109°28′		38		1
		Coleman Creek	MC-SF	33°48′/109°11′		13		2
		Hannigan Meadows	SF-MC	33°37/109°19′		39		2
		Green's Peak	MC-SF	34°05/109°34′		16		1
	Subtotal					131		2
6	Mogollon	Bearwallow Mountain	MC	33°25′/108°37′	12		1	
		Hummingbird Saddle	MC-SF	33°21′/108°38′	8		2	
		Mogollon Baldy Mtn.	MC-SF	33°17′/108°38′	8		1	
		Turkeyfeather Ridge	SF-MC	33°19′/108°36′	6		1	
	Subtotal				34		2	
7	Sacramento	Sierra Blanca	MC-SF	33°23′/105°47′	2		1	
8	Sacramento	Sunspot Highway	MC	32°52′/105°47′	18		1	
	TOTALS				70	218	4	2

[1] Predominant habitat: MC = Mixed Conifer, SF = Spruce-fir
[2] Seasons: B = Breeding (February–June), NB = Non-breedings (July–January).