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DISTRIBUTION OF OWLS ON THE CITY OF BOULDER'S
DOUDY DRAW AND ELDORADO MOUNTAIN
OPEN SPACE PROPERTIES

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28 October 1994

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INTRODUCTION

At the request of the City of Boulder's Open Space Department, I conducted a one season survey of owl populations on the Doudy Draw and Eldorado Mountain Open Space properties. The study's purpose was to determine the breeding status of all owl species and to evaluate potential habitat for owl species of special concern (Federally listed, State listed, and County listed species).

Nine owl species are known to nest in Boulder County (Boulder County Audubon Society 1975-94, Jones 1991). Two species, Long-Eared Owl and Burrowing Owl, are listed as "rare and declining" in the County Comprehensive Plan (three or fewer known nest sites-- Boulder County Parks and Open Space 1993). Both are also included in the Colorado Natural Heritage Program Species of Special Concern list. Flammulated Owl appears on the County's list of species with isolated or restricted populations (Boulder County Parks and Open Space 1993) and on the USDA Forest Service list of Rocky Mountain Region vulnerable species (Finch 1992). Eastern Screech Owl is included in the Audubon Society's Blue List of nationally declining species (Tate 1986).

Prior to 1994 only two breeding owl species, Great Horned Owl and Northern Pygmy Owl, had been documented within the study area (Jones 1993). However, the study area appears to contain suitable nesting habitat for seven of the nine Boulder County breeding species. The presence or absence of owl species of special concern has important management implications. For example, Flammulated

Owls appear to depend on mature or old-growth ponderosa pine/Douglas-fir forests and may decline or disappear when these forests are harvested (Reynolds and Linkhart 1987). Burrowing Owls require stable prairie dog colonies or other rodent colonies for nesting (Bailey and Niedrach 1965, Andrews and Righter 1992). Long-Eared Owls, which typically nest in dense cottonwood groves and Douglas fir stands, have declined rapidly as Boulder County has become urbanized (Betts 1913, Alexander 1937, Bailey and Niedrach 1965, Boulder County Parks and Open Space 1993). Since many owl species are sensitive indicators of environmental degradation, management practices that protect owls will benefit a variety of native birds and mammals.

STUDY AREA

The study area (Figure 1) lies in southern Boulder County and northern Jefferson County within T2S, R70W; and T1S, R70W and R71W. The area lies at the interface of the high plains and the Rocky Mountain foothills. Elevations range from 1710 m in lower Doudy Draw to 2541 m at the summit of Eldorado Mountain. The study area is bounded to the north by Eldorado Springs Drive and South Boulder Creek, to the west by Eldorado Canyon State Park, to the south by private land in Jefferson County, and to the east by the City of Boulder's Flatirons Vista Open Space property.

Dominant vegetation includes ponderosa pine/Douglas-fir forest, ponderosa pine woodland, foothills shrubland, riparian woodland, and grassland (Mutel and Emerick 1992). The ponderosa pine/Douglas-fir forest provides potential nesting habitat for Flammulated Owl, Great Horned Owl, Northern Pygmy Owl, Long-Eared Owl, and Northern Saw-Whet Owl. Riparian woodland in Doudy Draw and lower Bull Gulch provides suitable nesting habitat for Great Horned Owl, Eastern Screech Owl, and possibly, Long-Eared Owl. The study area lies on the western edge of the high plains breeding range of Burrowing Owl. Burrowing Owls have nested on Open Space 5 km east of the study area (Rod Moraga, pers. comm., Boulder County Audubon Society 1975-94).

Historical uses of the area have included mining and cattle ranching. Much of the ponderosa pine/Douglas-fir forest west of Doudy Draw consists of second growth stands of dense, stunted

trees. A few pockets of more open ponderosa pine forest, with relatively large trees (50 cm DBH or more), numerous standing dead trees, and a multi-layered canopy, occur along Spring Brook and along the edge of the mesa to the west of Doudy Draw. The mesa to the east of Doudy Draw supports a ponderosa pine woodland of evenly spaced, medium-aged trees. This area and some of the forest west of the draw have been thinned within the past 15 years to reduce fire hazard and damage from insect infestations. Riparian vegetation in the draw, consisting of scattered cottonwoods, willows, box elders, and mixed shrubs, has been extensively altered by cattle grazing. Tree cover in the draw consists of several small (less than 1 ha) cottonwood/willow groves.

The main line of the Denver and Rio Grande Western Railroad crosses the study area at the 2200 m level of Eldorado Mountain. The South Boulder Diversion Canal crosses the mesa between Eldorado Mountain and Doudy Draw. Public access to the study area is provided by a hiking trail in Doudy Draw and hiking access along a dirt maintenance road that follows the diversion canal.

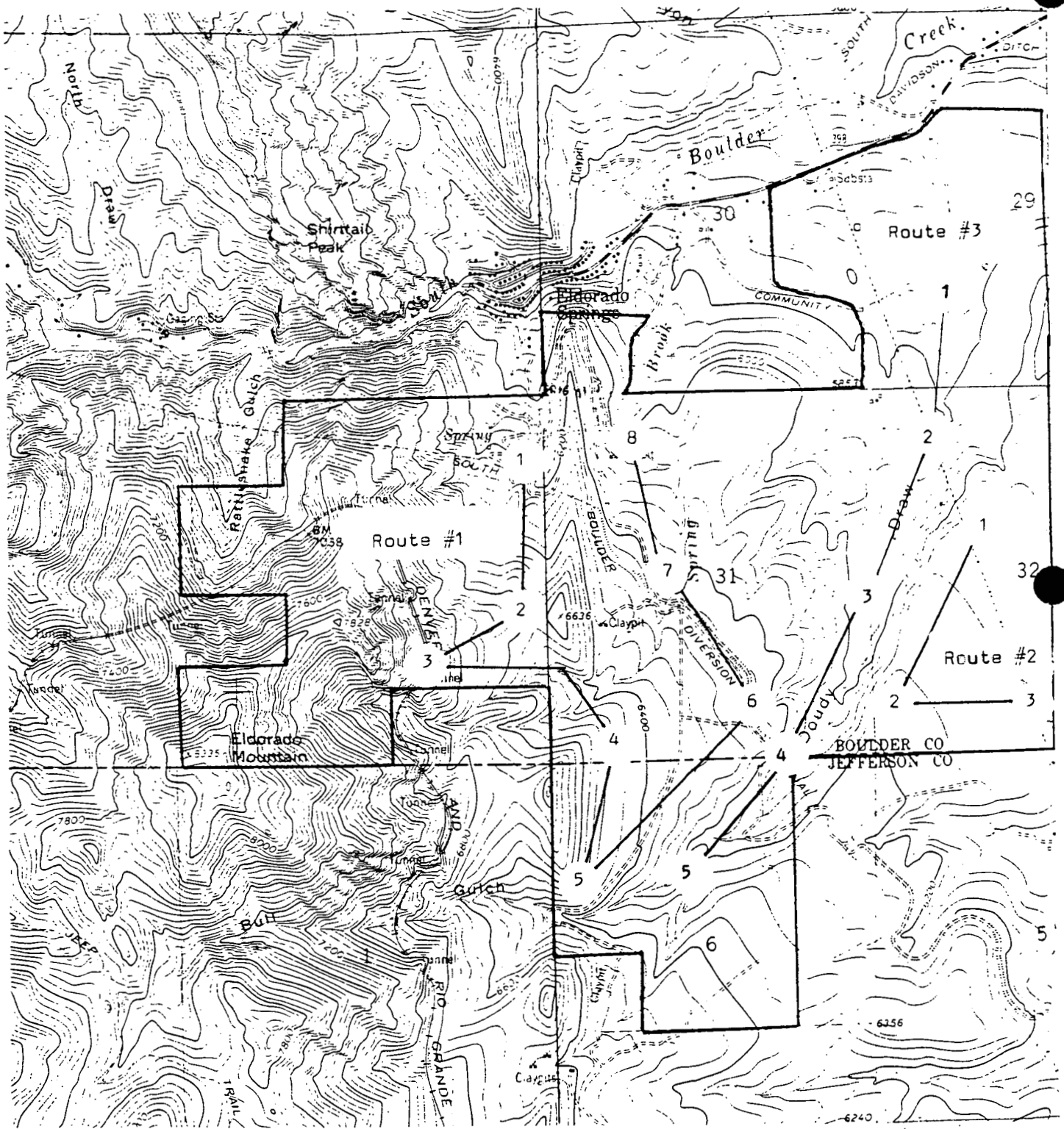


Figure 1. Survey Routes

METHODS

I searched for owls between 15 May and 25 September along three survey routes (Figure 1). Surveys were conducted between 2000 and 2400 hrs., beginning 30 minutes after sunset. I walked survey routes #1 and #2 four times each (15 May - 10 July), stopping every .8 km to listen for calling owls. At each stop I played tape recordings of Flammulated Owl and Long-Eared Owl territorial calls for five minutes each (30 seconds on and 30 seconds off), using a portable tape recorder. I walked survey route #3 two times (4 and 25 September), stopping every .8 km to listen and play an Eastern Screech Owl territorial call for five minutes (30 seconds on and 30 seconds off). Northern Pygmy Owls and Northern Saw-Whet Owls typically vocalize in early spring and rarely respond to tape playbacks in late spring and summer (Jones 1991), so I did not attempt to locate these species using tape playbacks. Great Horned Owls call spontaneously and frequently throughout the year (Walker 1974).

The location of all owls seen or heard was marked on a 7-1/2' topographic map. Due to time constraints, I made no attempt to locate nests.

RESULTS AND DISCUSSION

Five owl species were seen or heard within the study area in 1994 (Table 1). Great Horned Owls definitely nested within the study area (fledged young observed); Flammulated Owls, Northern Pygmy Owls, and Northern Saw-Whet Owls probably nested (agitated behavior or persistent territorial calls observed); and Eastern Screech Owls may have nested (individual observed in suitable nesting habitat). Species accounts follow.

Flammulated Owl

In Colorado, Flammulated Owls typically nest in mid-elevation ponderosa pine and aspen forests (Andrews and Righter 1992). About 20 nesting locations have been documented in Boulder County, all in ponderosa pine/Douglas-fir and aspen forests at 2,000-2700 m (Jones 1991). Because their populations are isolated and tend to be restricted to mature forests (Reynolds and Linkhart 1987, McCallum and Gehlbach 1988), Flammulated Owls have been placed on the USDA Forest Service's Rocky Mountain Vulnerable Species list (Finch 1992) and on the Boulder County Species of Special Concern list (Boulder County Parks and Open Space 1993).

I observed two singing Flammulated Owls in the Spring Brook drainage (Figure 2) on 20 May. Both individuals responded persistently to tape playbacks of their territorial call. No Flammulated Owls were seen or heard on three subsequent visits to this area. Flammulated Owls usually respond readily to tape playbacks throughout the month of June (Reynolds and Linkhart 1987,

Table 1. Owl Observations within Study Area, 20 May-25 September, 1994.

<u>Species</u>	<u>Number Seen or Heard</u>	<u>Dates</u>	<u>Estimated Number of Territories</u>
Flammulated Owl	2	5/20	0-1
Eastern Screech Owl	1	7/4	0-1
Great Horned Owl	10	5/20, 6/25, 6/30, 7/4, 9/4	2-3
Northern Pygmy Owl	2	5/20, 7/10	1-2
Northern Saw-Whet Owl	1	5/20	1-2
Unidentified Small Owl	4	5/20, 8/10	---

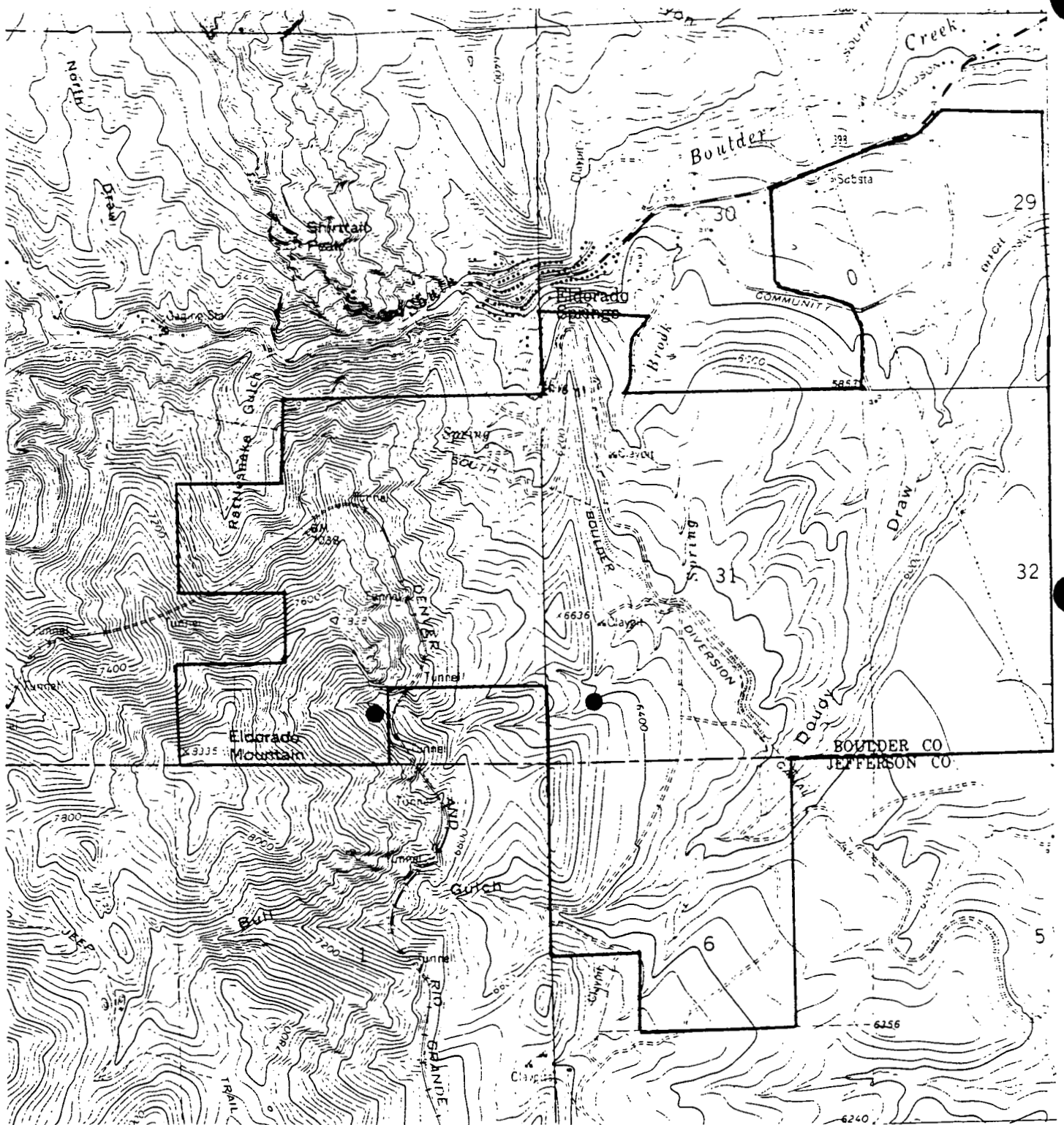


Figure 2. Flammulated Owl Sighting Locations, 20 May-10 July, 1994.

Jones 1991), so the absence of subsequent observations suggests these owls may have aborted their nesting attempt or moved farther up the mountain, out of range of tape playbacks.

The ponderosa pine/Douglas-fir forest along Spring Brook above the diversion canal exhibits characteristics of typical Front Range Flammulated Owl nesting habitat: large trees, large standing snags, a multi-layered canopy, and abundant shrub vegetation. During 1993 field surveys, I observed an agitated small owl in this same drainage but could not identify it. Flammulated Owls probably do breed along Spring Brook but may not nest every year.

Eastern Screech Owl

Eastern Screech Owls are considered uncommon to fairly common residents of riparian woodlands throughout northeastern Colorado (Andrews and Righter 1992). They have been placed on the Audubon Blue List due to declining populations in the eastern United States (Tate 1986). Nesting has been documented along South Boulder Creek, immediately north of the study area (Steve Borischevski, pers. comm.).

Two nocturnal surveys for Eastern Screech Owls on survey route #3 in Doudy Draw produced no responses, but a single screech owl did fly in while I was playing a Long-Eared Owl tape on the mesa east of the draw on 4 July (Figure 3). In 1990 I found screech owl pellets below a cavity in a box elder in lower Doudy Draw. Suitable nesting habitat for Eastern Screech Owls exists in Doudy Draw and lower Bull Gulch, but a scarcity of dead or dying cottonwoods probably limits nesting opportunities.

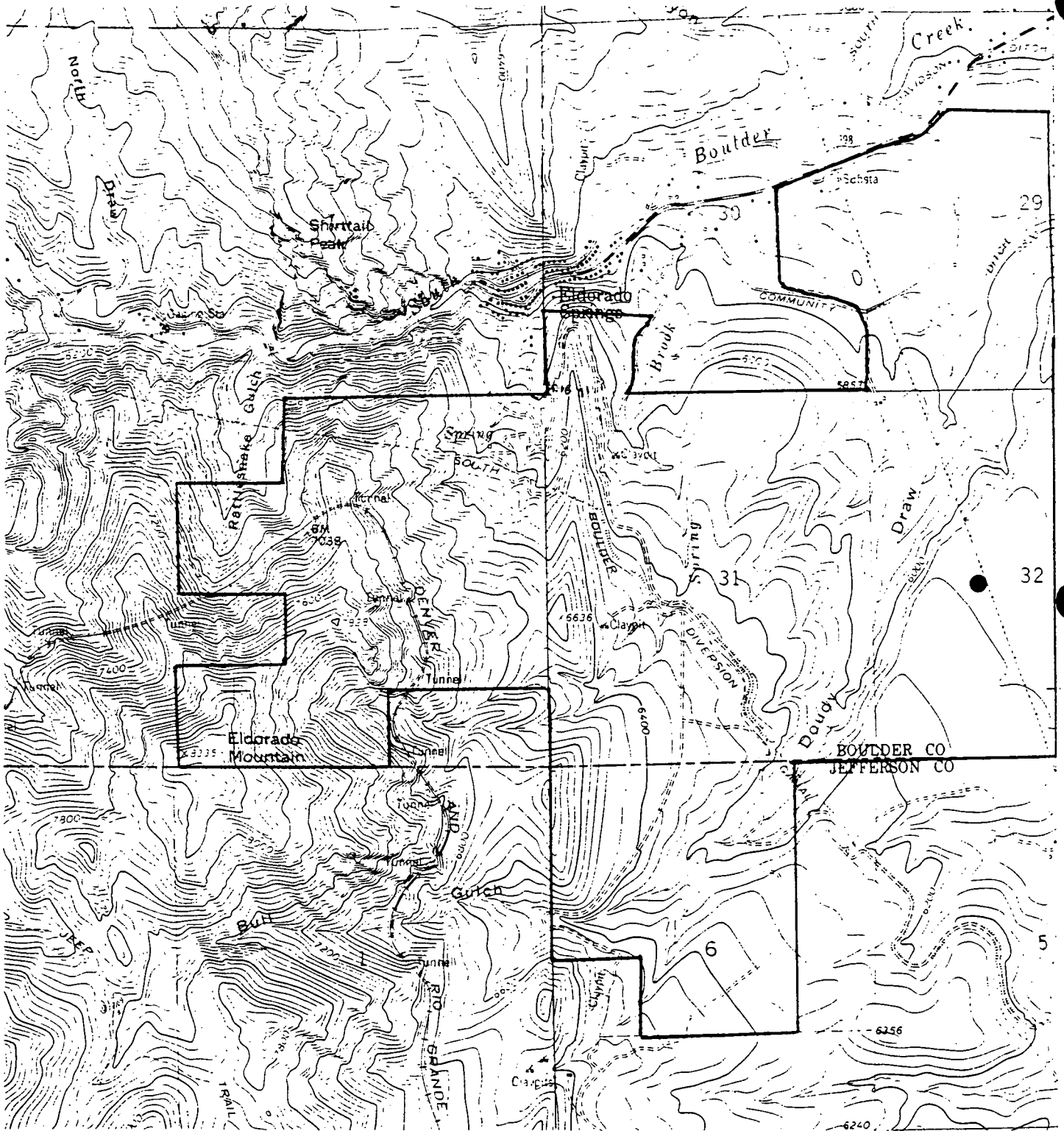


Figure 3. Eastern Screech Owl Sighting Location, 20 May-25 September, 1994.

Great Horned Owl

Great Horned Owls nest throughout Boulder County, from the plains to the high mountains (Boulder County Audubon Society 1975-94). Local populations appear to have increased since the turn of the century (Betts 1913, Alexander 1937, Boulder County Audubon Society 1975-94). Great Horned Owls are habitat generalists that may benefit from human disturbance of natural ecosystems (Marti 1973, Walker 1974).

I observed Great Horned Owls throughout the study area (Figure 4), and I observed fledglings on the mesa between Doudy Draw and the diversion canal in June, 1994. At least two pairs probably breed within the study area.

Northern Pygmy Owl

Northern Pygmy Owls inhabit coniferous forests throughout the foothills and mountains of Colorado (Andrews and Righter 1992). Little is known of their populations or nesting habits in Colorado (Webb 1982, Jones 1991). Only four nests have been documented in Boulder County. Three were located in cavities in ponderosa pines in the foothills at 1800-2400 m (Jones 1991); the fourth was located in a cavity in a cottonwood near Lyons at 1650 m (D.W. King pers. comm.). Since Northern Pygmy owls require snags for nesting, they may be sensitive to deforestation or forest thinning.

I observed a singing Northern Pygmy Owl along Spring Brook west of the diversion canal on 20 May and a second singing owl in lower Bull Gulch on 10 July (Figure 5). Both these areas contain suitable nesting habitat for this species.

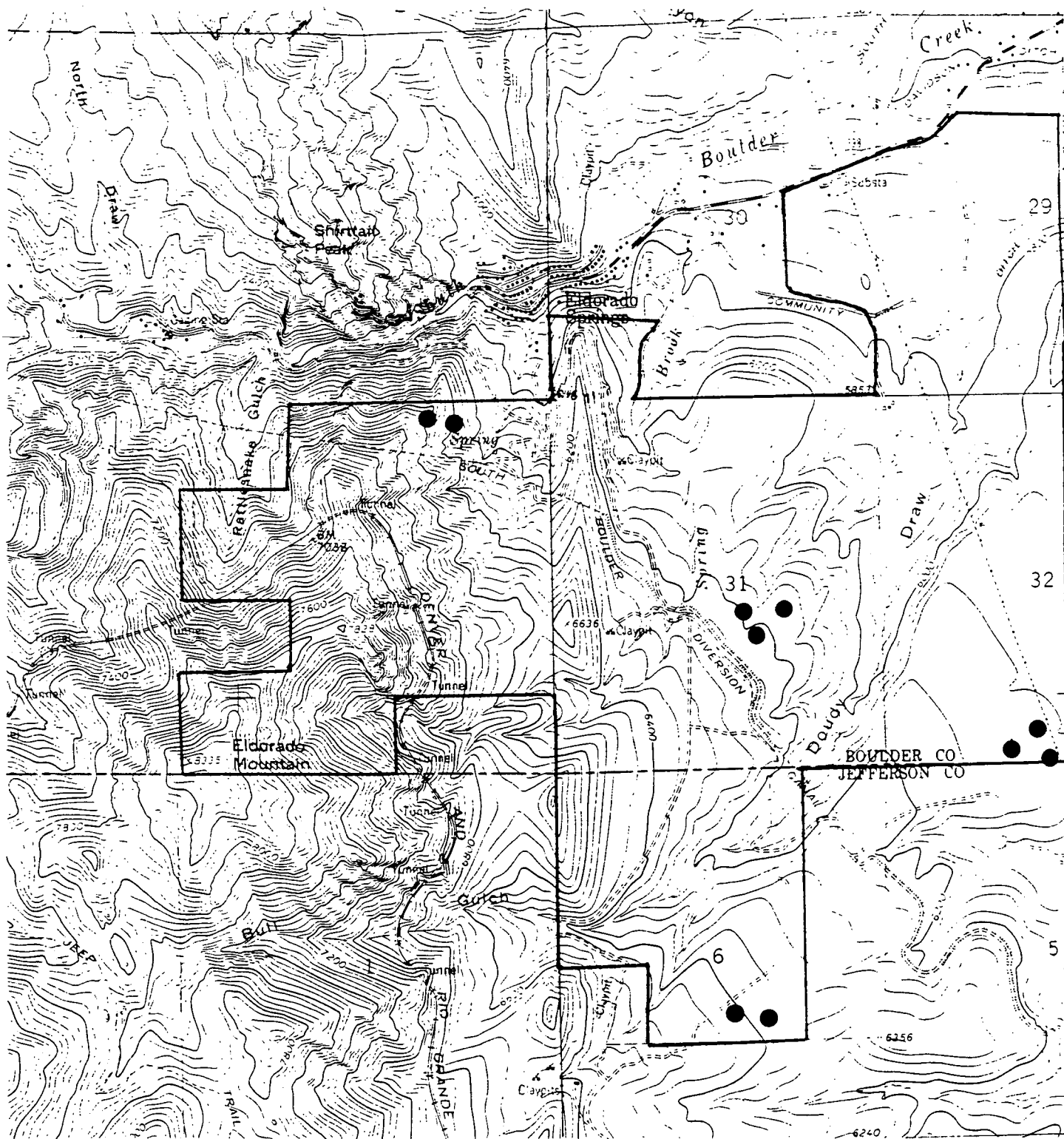


Figure 4. Great Horned Owl Sighting Locations, 20 May-25 September, 1994.

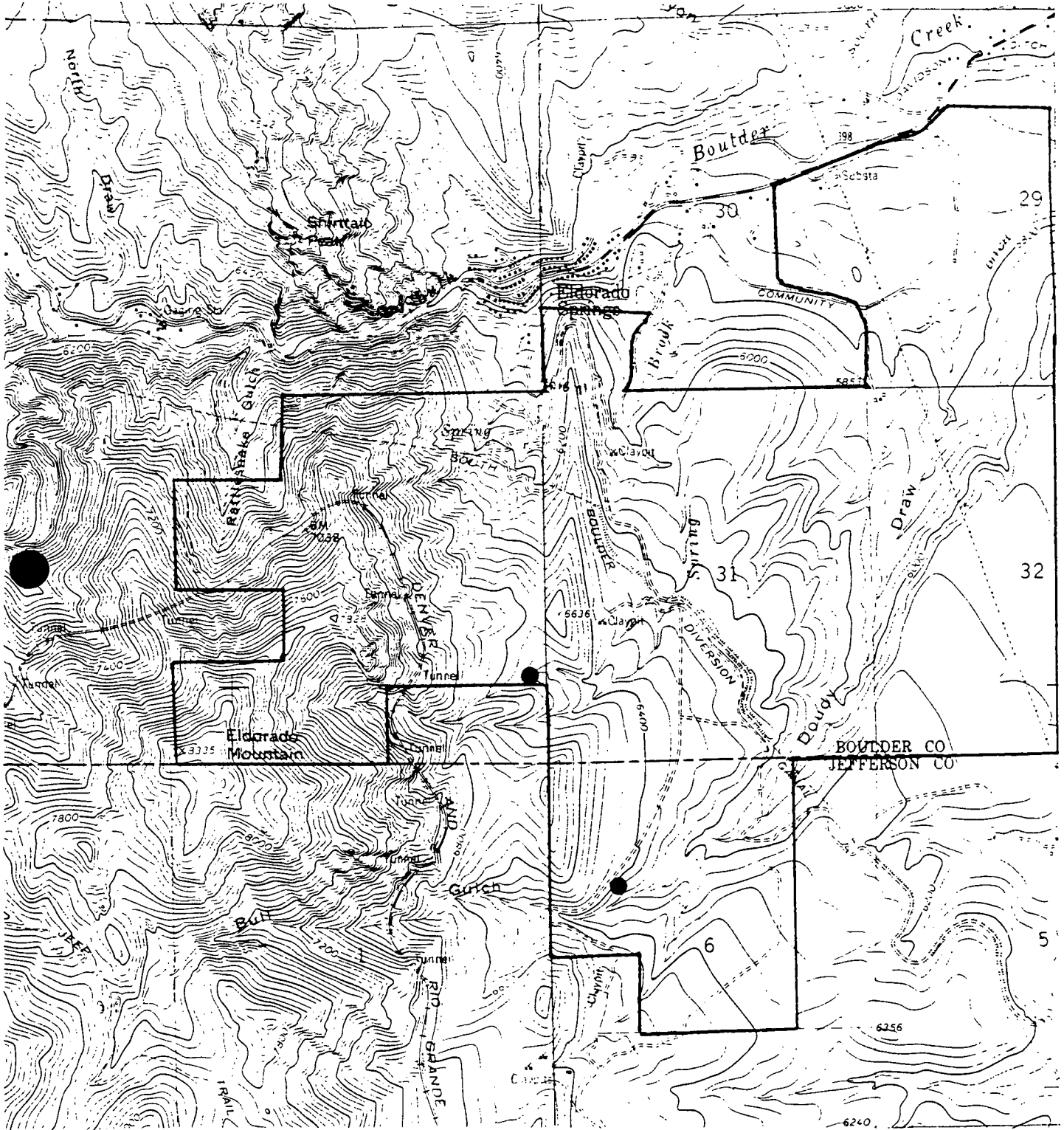


Figure 5. Northern Pygmy Owl Sighting Locations, 20 May-10 July, 1994.

Northern Saw-Whet Owl

Northern Saw-Whet Owls nest in coniferous forests, piñon/juniper woodlands, and montane riparian forests throughout central and western Colorado (Andrews and Righter 1992). In Boulder County they nest primarily in coniferous forests at 1700 - 3200 m (Jones 1991). Abundance data for this cavity-nesting owl are lacking, and only a half dozen active nests have been documented in Boulder County (Webb 1982, Jones 1991). Northern Saw-Whet Owls favor open forests where voles are plentiful (Palmer 1986).

A single Northern Saw-Whet Owl responded to a Flammulated Owl tape playback along Spring Brook west of the diversion canal on 20 May (Figure 6). The open ponderosa pine forest growing on the mesas on either side of the diversion canal is structurally similar to known Saw-Whet Owl nesting habitat in other parts of Boulder County.

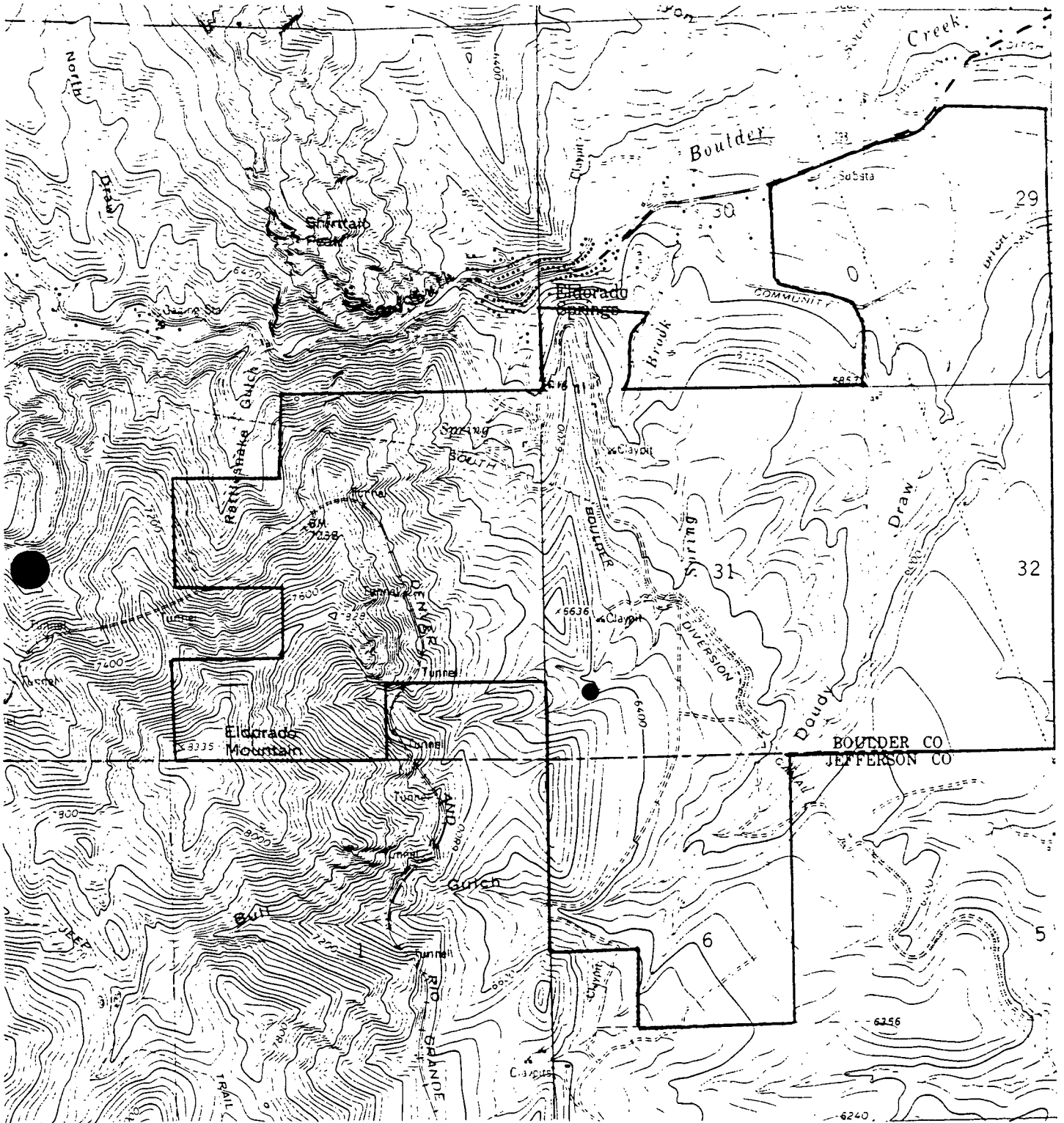


Figure 6. Northern Saw-Whet Owl Sighting Location, 20 May-10 July, 1994.

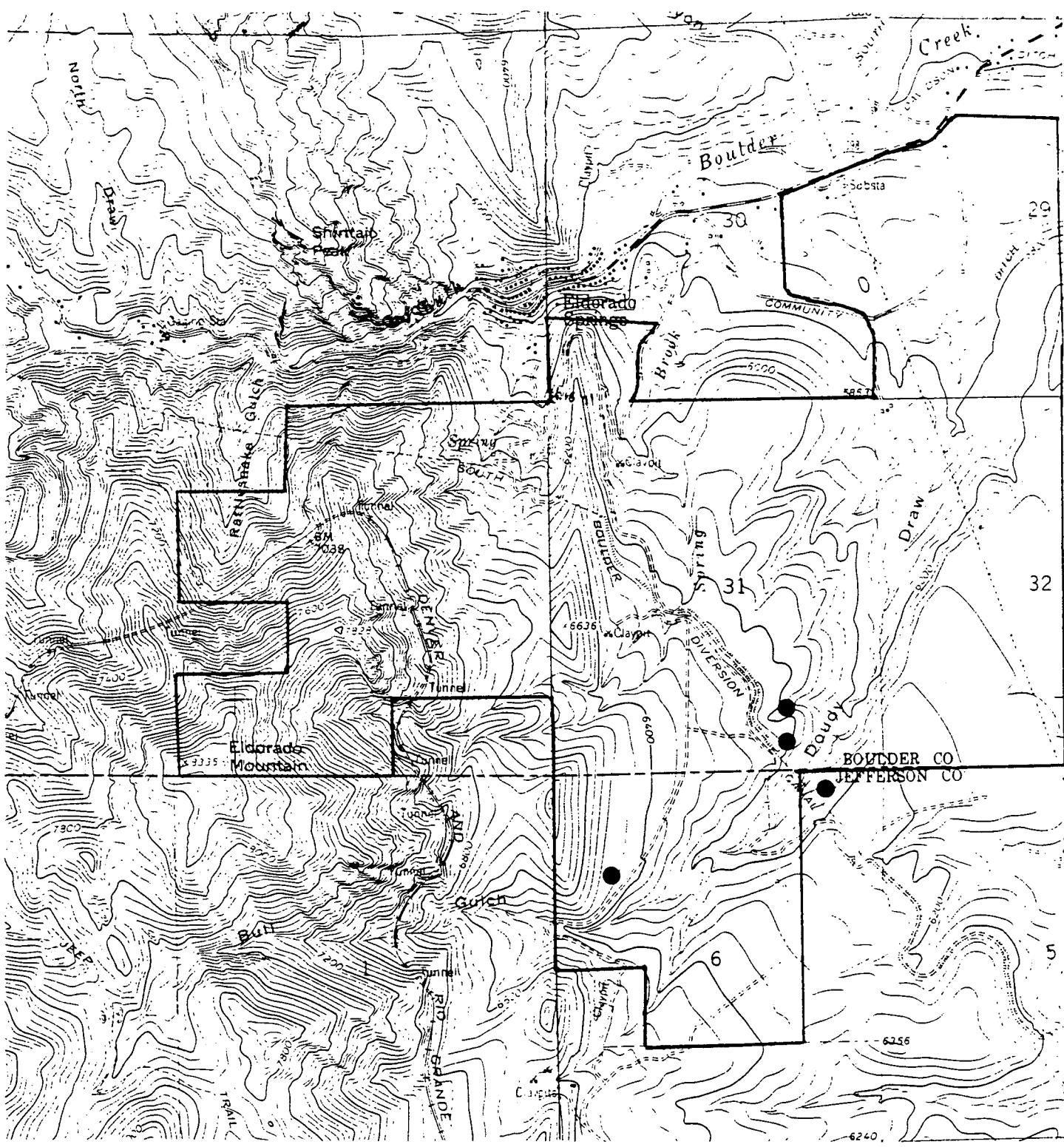


Figure 7. Unidentified Small Owl Sighting Locations, 20 May-25 September, 1994.

SUMMARY

Five owl species were documented within the study area between 20 May and 25 September, 1994. Great Horned Owls definitely nested within the study area. Flammulated Owls, Northern Pygmy Owls, and Northern Saw-Whet Owls exhibited territorial behavior suggestive of nesting. A single, non-territorial Eastern Screech Owl was observed within the study area.

Small forest owls (Flammulated, Northern Pygmy, and Northern Saw-Whet) will benefit from management practices that retain existing snags, protect grasslands and riparian shrublands, and foster natural processes in coniferous forests. Eastern Screech Owls will benefit from management practices that encourage growth of cottonwoods and retention of cottonwood snags in Doudy Draw. Great Horned Owls are habitat generalists that are less sensitive than the preceding four species to environmental change.

Future research within the study area should focus on distribution and nesting success of species of special concern, including Flammulated Owl, Burrowing Owl, Long-Eared Owl, and Eastern Screech Owl. Any Long-Eared Owl or Burrowing Owl nests or territories discovered within the study area should be carefully monitored and protected, since these species appear to be on the verge of extirpation from Boulder County.

ACKNOWLEDGMENTS

Many volunteers and Open Space staff members contributed to this report. I would like to thank Alex and Gillian Brown, Mike Figgs, Nancy Lederer, Clint Miller, Rod Moraga, and John Tumasonis for providing data and breeding bird observations; and Nancy Dawson, Marty Dick, Arian Hampel, Tim Hogan, Dan Murphy, Jim Turley, and John Weller for helping with breeding bird surveys.

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APPENDIX

Revised Breeding Bird List
for Eldorado Mountain
and Doudy Draw Open Space Properties.

This list is based on 1993-94 breeding season observations and Boulder County Wildlife Inventory records from 1985-92. All entries are for the 1993-94 breeding seasons, unless noted. A total of 98 breeding species have been documented.

Breeding Codes: Po--Possible Breeder, Pr--Probable Breeder,
Cf--Confirmed Breeder

Habit Codes: C--Coniferous Forest, G--Grassland, L--Lakes and Ponds,
R--Riparian Woodland, S--Shrubland, T--Rock and Talus

Abundance Codes: 1: 1 Breeding Pair, 2: 2-10 Breeding Pairs,
3: 11-100 Breeding Pairs, 4: 101-1,000 Breeding Pairs,
5: More than 1,000 Breeding Pairs

<u>Species</u>	<u>Habitat</u>	<u>Abundance</u>	<u>Status</u>	<u>Breeding Behavior</u>
Turkey Vulture	T	1	Pr	Pair
Sharp-shinned Hawk	C	1	Pr	Fledged young
Cooper's Hawk	C	1	Cf	Nest with young, 1987
Northern Goshawk	C	1	Po	Seen
Red-tailed Hawk	C	1	Cf	Fledged young
Golden Eagle	T	1	Cf	Nest with eggs, 1984 ¹
American Kestrel	C,R	2	Pr	Pair
Prairie Falcon	T	1	Cf	Nest with young
Blue Grouse	C	2	Po	Heard
Wild Turkey	C	2	Po	Seen
Killdeer	L	1	Pr	Distraction display
Common Snipe	L,G,S	1	Pr	Territory
Rock Dove	T	2	Cf	Used nest
Mourning Dove	C,R,S	3	Cf	Nest with young
Flammulated Owl	C	2	Po	Heard
Eastern Screech Owl	R	1	Po	Seen
Great Horned Owl	C	2	Cf	Fledged young
Northern Pygmy Owl	C	2	Cf	Occupied nest, 1985 ²
Northern Saw-Whet Owl	C	2	Po	Heard
Common Nighthawk	C	2	Pr	Courtship
Common Poorwill	C	2	Pr	Singing males
White-throated Swift	T	2	Pr	Territory
Broad-tailed Hummingbird	C,R,S	3	Cf	Fledged young

¹Figgs and Lederer, 1992

²Mike Figgs, pers. comm.

<u>Species</u>	<u>Habitat</u>	<u>Abundance</u>	<u>Status</u>	<u>Breeding Behavior</u>
Belted Kingfisher	R	1	Po	Seen
Williamson's Sapsucker	C	2	Po	Seen
Downy Woodpecker	C,R	2	Po	Seen
Hairy Woodpecker	C	3	Cf	Occupied nest
Northern Flicker	C,R	3	Cf	Occupied nest
Olive-sided Flycatcher	C	1	Po	Seen
Western Wood-pewee	C,R	4	Cf	Feeding young
Hammond's Flycatcher	C	3	Pr	Territory
Dusky Flycatcher	R	2	Pr	Territory
Cordilleran Flycatcher	C	3	Pr	Territory
Tree Swallow	C	1	Po	Seen
Violet-green Swallow	C,T	3	Cf	Nest with young
Cliff Swallow	G,R	---	Po	Seen
Barn Swallow	G,R	---	Po	Seen
Steller's Jay	C	3	Cf	Fledged young
Blue Jay	R	1	Po	Seen
Scrub Jay	R,S	2	Cf	Fledged young
Black-billed Magpie	C,R	2	Cf	Nest with young
American Crow	C	1	Cf	Used nest
Common Raven	T	1	Cf	Occupied nest
Black-capped Chickadee	R	2	Cf	Fledged young
Mountain Chickadee	C	3	Cf	Fledged young
Red-breasted Nuthatch	C	3	Pr	Territory
White-breasted Nuthatch	C	3	Pr	Territory
Pygmy Nuthatch	C	3	Cf	Fledged young
Brown Creeper	C	2	Po	Seen
Rock Wren	T	2	Po	Heard
Canyon Wren	T	2	Cf	Occupied nest
House Wren	C,R,S	4	Cf	Feeding young
Ruby-crowned Kinglet	C	2	Po	Singing male
Blue-gray Gnatcatcher	C,R	1	Cf	Fledged young
Western Bluebird	C	1	Po	Seen
Townsend's Solitaire	C	3	Cf	Feeding young
Hermit Thrush	C	2	Cf	Fledged young
American Robin	C,G,R	4	Cf	Fledged young
Gray Catbird	S	2	Cf	Feeding young
Northern Mockingbird	S	1	Po	Seen, June, 1987
Sage Thrasher	S	---	Po	Seen
Cedar Waxwing	R,S	2	Cf	Fledged young
Loggerhead Shrike	G	---	Po	Seen, August 1986 ⁴
Starling	R	2	Cf	Occupied nest
Solitary Vireo	C	3	Cf	Occupied nest
Warbling Vireo	C,R	3	Pr	Territory
Virginia's Warbler	C,S	3	Pr	Territory
Yellow Warbler	R	2	Cf	Feeding young
Yellow-rumped Warbler	C	3	Pr	Territory

³Confirmed nester along Coal Creek, 3 km east of Doudu Draw.

⁴Boulder County Wildlife Inventory.

<u>Species</u>	<u>Habitat</u>	<u>Abundance</u>	<u>Status</u>	<u>Breeding Behavior</u>
American Redstart	C,R	---	Po	Seen
Macgillivray's Warbler	R	2	Pr	Territory
Yellow-breasted Chat	S	3	Cf	Feeding young
Western Tanager	C	3	Pr	Territory
Black-headed Grosbeak	C,R	3	Cf	Fledged young
Blue Grosbeak	S	1	Cf	Nest building
Lazuli Bunting	R,S	3	Cf	Feeding young
Indigo Bunting	S	1	Pr	Territory
Green-tailed Towhee	C,R,S	3	Cf	Fledged young
Rufous-sided Towhee	S	3	Cf	Fledged young
Chipping Sparrow	C	4	Cf	Feeding young
Vesper Sparrow	C,G	3	Cf	Fledged young
Lark Sparrow	G	---	Po	Seen
Savannah Sparrow	G,L	---	Po	Seen
Grasshopper Sparrow	G	2	Cf	Fledged young
Song Sparrow	L,S	2	Pr	Territory
Gray-headed Junco	C	3	Pr	Territory
Red-winged Blackbird	L	1	Cf	Occupied nest
Western Meadowlark	G	3	Cf	Fledged young
Brewer's Blackbird	R	---	Po	Seen
Common Grackle	R	2	Cf	Used nest
Brown-headed Cowbird	C,R,S	3	Cf	Nest with eggs
Northern Oriole	R	1	Cf	Occupied nest
Wainwright's Finch	C	2	Po	Seen
House Finch	R,S	2	Po	Seen
Red Crossbill	C,R	---	Po	Fledged young
Pine Siskin	C	4	Pr	Pair
Lesser Goldfinch	C,R,S	3	Cf	Feeding young
American Goldfinch	R,S	3	Cf	Feeding young