

# DISTRIBUTION AND ABUNDANCE OF SPOTTED OWLS IN ZION NATIONAL PARK

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R. J. GUTIÉRREZ ♦ SARAH RINKEVICH  
DEPARTMENT OF WILDLIFE ♦ HUMBOLDT STATE UNIVERSITY  
ARCATA, CA

## ♦ INTRODUCTION

The recent listing of the Northern spotted owl (*Strix occidentalis caurina*) by the U.S. Fish and Wildlife Service as a threatened species (Federal Register 1990) raises heated debate concerning the long-term survival of the species and perceived economic cost to timber industry (Thomas et al. 1988). Long term studies of the owls's ecology are necessary to provide information needed for ecologically based management plans (Dawson et al. 1987). Much is already known about the natural and life history of the Northern spotted owl (Forsman et al. 1984, Gutiérrez et al. 1984, Gutiérrez 1985, Franklin et al. 1990) as well as the California subspecies (*S. o. occidentalis*) (Gutiérrez and Pritchard 1990). In contrast, the Mexican spotted owl (*S. o. lucida*) is the least studied of the three subspecies (Ganey and Balda 1989). It is known that this latter subspecies inhabits rocky canyonlands and coniferous forests in the southwestern United States and Mexico (Kertell 1977, Wagner et al. 1982, Webb 1983, Johnson and Johnson 1985, Ganey 1988, and Skaggs 1988) but there are few published studies on its ecology and habitat needs (Ganey 1988). Also, the effects of human activities, such as recreation, on the Mexican subspecies are unclear, particularly in isolated habitats (Gutiérrez 1985). Therefore, in 1989, we initiated a two year investigation of abundance and distribution of Mexican spotted owls in Zion National Park. This report summarizes our 1990 survey effort and research findings.

## ♦ METHODS

We located owls by imitating owl vocalizations during day and night surveys (Forsman 1983, Franklin et al. 1990) between April 1 and August 13, 1990. We used cruise, point and walk-in surveys (Franklin et al. 1990) with some modifications to account for the rugged canyon country of Zion Park. Cruise surveys were conducted by calling every 30-60 seconds while hiking canyons or trails. In addition, we called for 10 min at prominent canyon overlooks during these surveys. Point surveys were conducted on ridge and mesa tops using an 45.7 cm diameter plastic parabolic dish and microphone for 3-5 hour periods between 2000 and 0500 hours (Mountain Standard Time). During these listening periods we called for 10 minutes once every hour and listened for responses the remainder of the hour. We also conducted daytime walk-in surveys throughout canyons to locate owl roost sites. We allowed at least five days between our surveys at a particular location. Used roost sites were also located which were characterized by feathers, pellets and white wash. Sex of owls was determined by voice; females having a higher pitch than males (Forsman 1983). Our main emphasis in 1990 was locating new owls and resighting owls previously located. We also searched in historical owl sites. In addition, we assessed reproductive status (Forsman 1983).

We captured owls using a noosepole (Forsman 1983). Each individual was marked with an aluminum

U.S. Fish and Wildlife Service leg-band on one leg and a color-band on the other leg. A 2 cm long colored, vinyl tab was attached to each color band which provided unique combinations for individual identification (Franklin et al. 1987). We identified owls from our 1989 survey year by resighting their color band. We collected morphologic measurements from each captured owl. We estimated age by plumage characteristics and categorized owls as adult, subadult or juvenile (Forsman 1981). In addition, we collected pellets and recorded habitat characteristics at each owl site.

## ◆ RESULTS

We spent approximately 2,060 hours over the course of 103 days surveying owls. In addition, we hiked 618 km on and off trail to gain access and conduct surveys. One hundred and ten surveys were conducted; of these, 43 were conducted using the parabolic dish. We estimated that we had surveyed 90 percent of the available habitat at least once in Zion Park. Eight pellets were collected from two territories, which will be pooled with samples collected in 1989. Our food habit analysis will be presented in our 1991 Final Report.

We located six pairs and two single birds in eight locations. We located a pair of spotted owls with two juveniles in upper Pine Creek Canyon, and banded both juveniles. The female was never sighted and the male was banded the previous year. A second pair was located in Echo Canyon, with one juvenile. This pair had also been banded the previous year. A third, presumed pair was heard in Oak Creek Canyon in high cliff sites, inaccessible for capture. A fourth pair was found in Kolob Creek Canyon, 1.5 km north of the park boundary. A fifth, presumed pair was found in Orderville Canyon, and a sixth, presumed pair was heard in a hanging canyon below Lady Mountain. The two latter pairs were located using the parabolic dish, and were also inaccessible for captures. Other responses included a male in La Verkin Creek (Willis Creek vicinity), and a single male in Refrigerator Canyon. All adult owls from the 1989 survey were relocated except for the single male in Camp Creek, and the single male in South Fork of Taylor Creek (Larry Hays 1989, per. comm.).

## ◆ DISCUSSION

Spotted owls were uncommon, but widely distributed in Zion National Park, and appeared coincident with a patchy, disjunct habitat. All owls were found in steep-walled canyons or deep gorges. Access was a major problem encountered while surveying Zion, but our greatest problem was surveying hanging canyons where owls lived. Since the rate of erosion of these hanging canyons lags behind that of the main canyon, they drain a smaller watershed and thus, create a refuge for spotted owls that were generally inaccessible to biologists. Three of the eight owl sites located this year were in hanging canyons, and one other site contained hanging canyons within the main canyon (Table 1). Fewer pellets were collected during 1990 than in 1989. In several instances, our method for surveying these hanging drainages (climbing neighboring mesa tops to gain a vantage point) proved successful in finding owls. We believe the parabolic dish greatly improved our chances of hearing an owl when surveying this type of potential habitat.

Although six new adult spotted owls were located during intensive surveys (Table 2), we believe there is a low density of spotted owls in Zion Park relative to other spotted owl populations in North America. Absolute density provides an initial step in estimating owl abundance (Franklin et al. 1990), and can be further subdivided into crude density (i.e., measured with respect to all of the area containing the population) and ecological density (i.e., measured with respect to a particular habitat) (Johnson 1978:11, Tanner 1978:2). Although calculating the latter will require more knowledge of the owl's habitat requirements in the park, we will estimate crude density in our 1991 Final Report.

We suggest that hot weather may have decreased owl responses during 1989 surveys. We also suggest that low numbers of responses on the Colorado Plateau in general could be related to detectibility (i.e., owls were more difficult to hear in the canyon country) or reproductive activity (non-reproductive owls may have lower response rates). This may again explain the enigmatic situation of low owl responses which occurred throughout the Colorado Plateau and areas in Northern Arizona during 1990 surveys. However, we were unable to test these potential influencing factors on calling rate. Again, no owls were detected on Dixie National Forests lands in southern Utah (S. Boyce,

pers. comm.) but two owls were detected in Texas Canyon (Abajo Mountains) on the Mante LaSalle National Forest (D. Willey, pers. comm.). Willey (pers. comm.) also reported five owls sighted at Capitol Reef National Park, two sightings in Dirty Devil Canyon east of Capitol Reef (BLM), four owls in Canyonlands National Park and five birds near Mesa

Verde. Despite extensive surveys by the U.S. Forest Service no owls were located on the North Kaibab area in northern Arizona (K. Menasco, pers. comm.). Menasco (pers. comm.) also reported only three confirmed spotted owl territories on the South Kaibab Plateau.

Table 1. Summary of locations, status and brief canyon description of spotted owls found between 1 April — 13 August, Zion National Park, Utah.

LOCATION	NUMBER (N=14)	STATUS	CANYON DESCRIPTION
Echo Canyon	3	1 pair w/ 1 juvenile <sup>1</sup>	Narrow gorge
Kolob Creek Canyon	2	1 pair	High-walled canyon
Lady Mt. Canyon	2	1 pair <sup>1</sup>	Hanging canyon
La Verkin Creek	1	1 male, status	Steep-walls/cliff
Oak Creek Canyon	2	1 pair	Hanging canyon w/ cliff sites
Orderville Canyon	2	1 pair <sup>1</sup>	High-walledcanyon
Pine Creek Canyon	4	1 pair <sup>1,2</sup>	Narrow canyon w/ hanging canyons present
Refrigerator	1	1 male, status	Hanging canyon Canyon
<u>unknown</u>			

<sup>1</sup> New birds for 1990 that were undetected during the 1989 survey effort.

<sup>2</sup> Male (only) was detected in 1989.

Table 2. Location and number of spotted owl surveys conducted between 1 April - 13 August 1990, Zion National Park, Utah.

LOCATION	NUMBER OF SURVEYS	RESULTS
Beartrap Canyon	1	No response
Camp Creek	1	No response
Canyon Overlook Trail <sup>2</sup>	2	No response
Court of Patriarchs	2	No response
Deep Creek <sup>4</sup>	2	No response
Echo Canyon <sup>2</sup>	3	1 pair (banded 1989) w/ juveniles
Gifford Canyon <sup>2</sup>	5	No response
Goose Creek <sup>4</sup>	4	No response
Heaps Canyon <sup>2</sup> (top)	4	No response
Hepworth <sup>2</sup> (top)	2	No response
Hidden Canyon <sup>2</sup>	4	1 male (Echo Terr.)
Kolob Arch Canyon	2	No response
Kolob Creek Canyon	4	1 male, 1 female(pair)
La Verkin Creek	1	1 male
Lady Mt. Canyon <sup>4</sup> (top)	1	1 male, 1 female (unconfirmed pair)
Lava Point <sup>2</sup>	1	No response
Left Fork (top)	1	No response
MIA Road (call route)	2	No response
Middle Fork Taylor Creek	2	No response
North Fork Taylor Creek	2	No response
Oak Creek <sup>2</sup>	7	1 male, 1 female (unconfirmed pair)
Orderville Canyon <sup>2,4</sup>	5	1 male, 1 female (unconfirmed pair)
Pine Creek <sup>2</sup>	4	1 male (banded 1989), 1 female w/ 2 juv. (banded 2 juveniles)
Phantom Canyon (top)	3	No response
Potato Hollow <sup>2</sup> , and top of Imlay Canyon	3	No response
Refrigerator Canyon <sup>2</sup>	7	1 male (social status unknown)
Right Fork North Ck (top)	2	No response
South Fork Taylor Creek	3	No response
Telephone Canyon	1	No response
West Rim Trail (route)	3	No response
Wildcat Canyon (top)	1	No response
Willis Creek	1	No response
Canyon 4 (3293E, 41205N)	1	No response
Canyon 5 (3299E, 41209N)	1	No response
Canyon 6 (3301E, 41211N)	1	No response
Canyon 7 (3305E, 41214N)	1	No response

*Table 2 cont.*

<u>LOCATION</u>	<u>NUMBER OF SURVEYS</u>	<u>RESULTS</u>
Canyon 8 (3312E, 41213N)	1	No response
Canyon 9 (3314E, 41215N)	2	No response
Canyon 10 (3314E, 41224N)	1	No response
Canyon 11 (3327E, 41217N)	1	No response
Canyon 13 (3327E, 41213N)	2	No response
Canyon 14 (3316E, 41210N)	1	No response
Canyon 15 (3308E, 41209N)	2	No response
Canyon 16 (3299E, 41213N)	1	No response
Canyon 17 (3288E, 41212N)	1	No response

<sup>1</sup> L. Hays, Resource Officer, Zion National Park.

<sup>2</sup> The approximate historic sighting location.

<sup>3</sup> Universal transverse mercator coordinates represent location at the mouth of the given canyon; 7.5 Minute Series (topographic) Springdale East Quadrangle, Utah.

<sup>4</sup> New areas, not surveyed during the 1989 survey.

C. Dargon (pers. comm.) reported 98-100 spotted owl territories on the Coconino National Forest. During 1989, Joe Ganey (pers. comm.) reported only 70 responses on the Coconino National Forest.

In general, the low number of spotted owl responses maybe the result of a low density of spotted owls throughout southern Utah, northern Arizona and parts of the Colorado Plateau. We are unable to speculate if there is a relationship between habitat quality and the number of owls detected at this time. Further population characteristics are needed to fully understand Mexican spotted owl since density alone is not an indicator of habitat quality (Van Horne 1983).

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#### ◆ PERSONAL COMMUNICATIONS

Boyce, S., Dixie National Forest, P.O. Box 580, Cedar City, Utah 84721-0580.

Dargon, C., Coconino National Forest, 2323 E. Green Lane, Flagstaff, Arizona 86004.

Ganey, J., Dept. Biology, Northern Arizona Univ., Flagstaff, Arizona 86001.

Hays, L., Resource Management, Zion National Park, Springdale, Utah 84767.

Menasco, K., Kaibab National Forest, 800 South 6th Street, Williams, Arizona 86046.

Willey, D., High Desert Research Collective, P.O. Box 136, Torrey, Utah 84775.

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