

Mexican Spotted Owls in Zion NP: Inventory and Monitoring Methods

By Sarah E. Rinkevich

The recent listing of the Northern spotted owl (*Strix occidentalis caurina*) by the USFWS as a threatened species (Federal Register 1990) continues the debate over the long term survival of this species (Thomas et al. 1990). Following on the heels of this controversy, the Mexican spotted owl (*S. o. lucida*) currently is under consideration for federal listing as threatened or endangered (Wilcove 1987, Smith 1990). This subspecies already is listed as threatened by Arizona (Arizona Game and Fish Commission 1988).

While much is known about the Northern subspecies and the California subspecies (*S. o. occidentalis*), little information is available on home range, winter habitat use, or demography of the Mexican spotted owls of the southwestern United States. In addition, very little is known of the status and ecology of spotted owls in canyonland habitat such as Zion NP. It is crucial that Mexican spotted owl distribution and abundance be assessed in areas that are isolated (extinction prone) and receive heavy human use.

Early studies of spotted owls in Zion (Kertell 1976, Murphy 1988) reported only a few owl locations widely distributed throughout the park. Owls appeared to be associated with narrow, steep walled canyons as well as "hanging canyons." The rugged terrain of Zion park was a major obstacle for biologists conducting spotted owl surveys. According to Murphy (1988), the use of a parabolic dish proved instrumental in locating spotted owls in the park. Few published studies in the use of the parabolic microphone in avian studies exist in the literature. In 1989, Zion NP initiated a two year survey of Mexican spotted owls. During this study, Rinkevich and Gutierrez (1991) documented distribution and abundance of Mexican spotted owls in the park as well as the use of the parabolic dish.

This paper reports our methodology and protocol for surveying for owls using the parabolic dish used during the two year study. Our main objectives in this paper are to: (1) document our techniques of an inventory method using a parabolic dish for detection of Mexican spotted owls in Zion NP, (2) report on our results of the two year survey, and (3) make suggestions for using the parabolic dish as a tool for future Mexican spotted owl surveys in canyonland country such as Zion.

Methodology

Owls were located by imitating their vocalizations during both day and night surveys (Forsman 1983, Franklin et al. 1990) from May-August 1989 and April-August 1990. We used "point surveys" which were conducted by calling 10 minutes each hour at selected ridge and mesa-top vantage points within the park. We listened the remaining time, using a 45.7 cm diameter plastic parabolic dish and microphone (Fig. 1). These surveys were conducted for 3-5 hour periods between 2000 and 0500 hours (Mountain Standard Time). Once an owl(s) was heard, we attempted to locate the owl's roost site during a daytime walk-in survey.

Since many areas of Zion were canyon networks, the parabolic reflector was not oriented to any particular compass point. Instead, we pointed the microphone toward the direction of potentially suitable habitat as well as historical sightings of Mexican spotted owls. We recorded time and duration of the survey, temperature, wind speed, cloud cover, and other owl species detected. Sex of spotted owls was determined by their

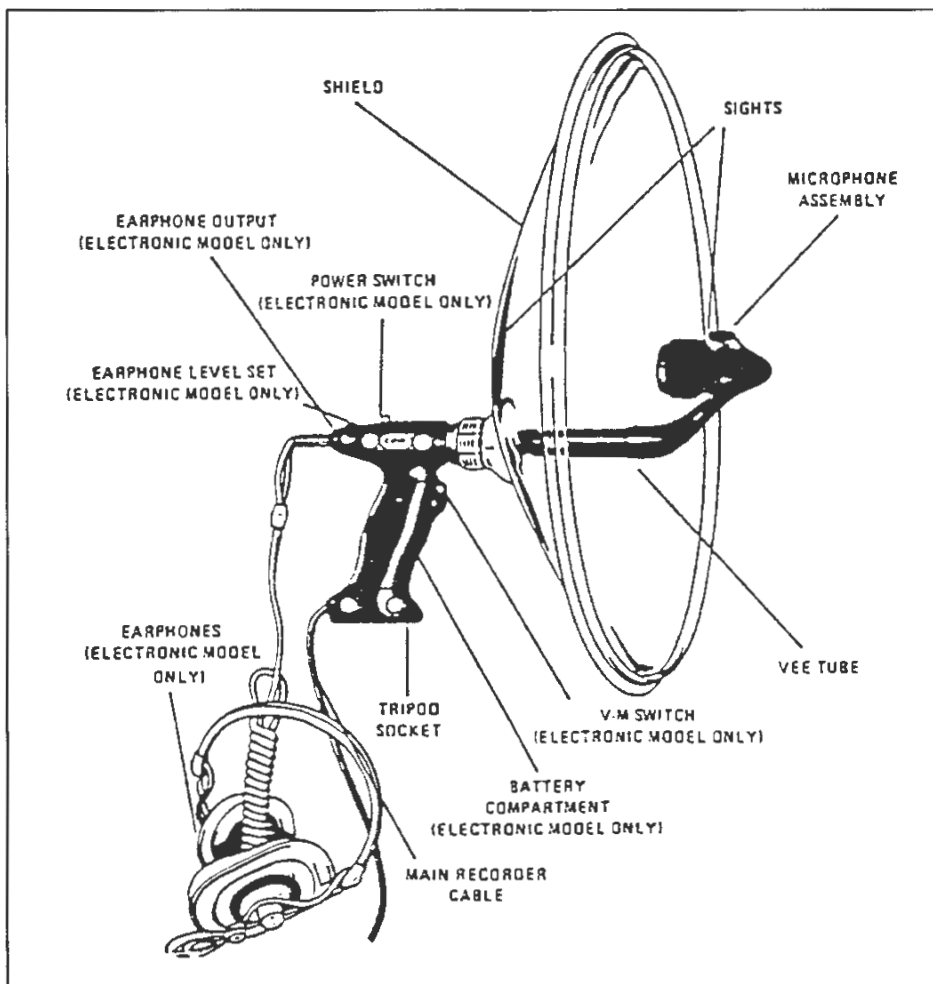


Figure 1. Parabolic microphone used to listen for Mexican spotted owls in Zion National Park.

voices; females have a higher tonal pitch. Plateau regions within the park also were intensively surveyed.

Results and Discussion

Two hundred and nineteen surveys were conducted throughout canyons and plateau areas in Zion NP. Approximately 4200 working hours were spent conducting surveys during 1989 and 1990. Mexican spotted owls were uncommon but widely distributed in the park and appeared coincident with the patchy canyon habitat.

All spotted owls were found in deep, steep walled canyons in nine locations (Table 1). The crude density of owls in the park was 0.03 owls/km², which is lower than the density of such birds in other western states. Bias and Gutierrez (1988) reported a density of 0.20 owls/km² for a population of the California subspecies in the Sierra Nevada, California. Density estimates for two California spotted owl populations inhabiting habitat islands in southern California were 0.19 owls/km² and 0.64 owls/km² (Gutierrez and Pritchard 1990).

This density estimate provides an initial step in estimating owl abundance in the park and also represents the first comparison of density among populations of the three subspecies. Although Zion owls apparently occurred in a much lower density than other spotted owl populations, I do not know that this reflects poor

habitat quality (Van Horne 1983); our results also could be due to low vocal response rates of owls, weather, or a sampling problem related to the park's inaccessible terrain.

Access to owl sites was the major limitation encountered. Surveying potential habitat was difficult due to the extremely rugged park terrain, which has few roads and trails. Relatively few avian studies have been conducted in areas with rugged terrain (Dawson 1981). In several instances, my method for surveying inaccessible areas (e.g. climbing neighboring mesa tops to gain a vantage point) proved successful in finding owls. In many instances, the parabolic was needed to confirm a response at these vantage points because of the great distance (>5 km) between observed owls. Moreover, 37 percent of detections I encountered were naturally (as opposed to elicited responses) calling owls, even though spontaneous calling by spotted owls is considered infrequent (Forsman 1983).

Although gusts of wind and noise from stream flow posed some problems, the parabolic dish greatly improved the chances of hearing an owl, especially given the variety of topographic conditions in Zion park.

Hanging canyons appeared to be an important habitat type for Mexican spotted owls in Zion. Fifty-six

percent of owls I detected were located in hanging canyons. The remaining 44 percent were in canyons with inaccessible cliff sites. The rate of erosion of these hanging canyons lags behind that of the main canyon, resulting in a smaller watershed. Because these hanging canyons are generally inaccessible to biologists, the parabolic dish was necessary for surveying this type of habitat. I attempted to survey all hanging canyons that I could traverse or survey from a vantage point. I am unable to speculate on the total number of suitable hanging canyons within the park and I believe there is more potentially suitable owl habitat left unsurveyed because of inaccessibility.

Recommendations

The use of the parabolic reflector combine with calling surveys proved a useful tool in Zion's rugged canyon country for detecting Mexican spotted owls. The dish should not be used when wind gusts exceed 20 mph. Areas with potentially suitable habitat should be revisited even if not response has been heard, since it often takes several visits to elicit a response (Franklin 1986).

Although parabolic reflectors are not useful for locating roosting owls during daytime searches, it provided information on distribution and density estimates that is crucial for species management in Zion NP. The parabolic unit is light (about 3 lbs.) easily disassembled and portable through dense vegetation, and can be quickly reassembled when a vantage point is located. Current cost of the parabolic reflector unit begins at \$600.

Knowledge of the biology of Mexican spotted owls in Zion is limited and changing rapidly. Long term monitoring plans and habitat studies have been initiated within Zion park, and the overall knowledge gained will benefit from similar studies in other parks as well. Monitoring of known sites is crucial in determining population stability and productivity and will increase understanding of spotted owl biology. Studies focusing on owl prey base and juvenile dispersal also should be considered. In order that proper management criteria can be set, better understanding of the Mexican spotted owl throughout its range in the southwestern United States is needed.

Rinkevich is a seasonal wildlife biologist, working at Zion NP.

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Table 1. Summary of canyon names, owl status and a brief description of the site used by Mexican spotted owls during 1989-1990, Zion National Park, Utah.

Canyon Name	Owl Status N=17	Description of Site
Echo Gorge ¹	1 pair, juveniles	Narrow gorge
Kolob Creek Canyon	1 pair	High-walled canyon
Lady Mt. Canyon ³	1 pair	Hanging canyon
La Verkin Creek/Willis Creek ³	1 male, status unknown	Steep-walls/cliff
Oak Creek Canyon ³	1 pair	Hanging canyon w/cliff sites
Orderville Canyon ²	1 pair	High-walled canyon
Pine Creek Canyon ¹	1 pair, juveniles	Narrow canyon w/smaller, hanging from canyons present
Refrigerator Canyon ¹	1 male, status unknown	Hanging canyon
Right Fork ²	1 pair	Narrow canyon

¹Access to owl site was moderately difficult requiring minimum rock climbing (class I, II) (Brereton and Dunaway 1988).

²Access to owl site was difficult and required intense rock climbing; a rope and harness was needed for belays and repel (class III-V) (Brereton and Dunaway 1988).

³Owl site was completely inaccessible.