

**SURVEYS FOR MEXICAN SPOTTED OWLS WITHIN THE INTERIOR
CANYONLANDS OF GRAND CANYON NATIONAL PARK**

Annual Report of Accomplishment 2001 Field Season

PRINCIPAL INVESTIGATORS

DAVID WILLEY

Department of Ecology
Montana State University
310 Lewis Hall
Bozeman, MT 59717

RV WARD

Grand Canyon National Park
Grand Canyon Science Center
Grand Canyon, AZ 86023

DANIEL SPOTSKEY

Grand Canyon National Park
Grand Canyon Science Center
Flagstaff, AZ 86001

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INTRODUCTION

The Mexican spotted owl was listed as a "threatened species" in 1993 by the U.S. Fish and Wildlife Service (USDI 1995). The Recovery Plan for the Mexican Spotted Owl (USDI 1995) lists as Task Number 4213 the general inventory of Mexican spotted owls on NPS lands. Task Numbers 4131 and 4132 require research on habitat selection in areas occupied by Mexican spotted owls. The State of Arizona through its IIPAM list of sensitive species indicated that the owl needed further study in Arizona (Arizona Game and Fish Department, Heritage Program, Phoenix, AZ). In northern Arizona, the Mexican spotted owl occupies myriad tributary canyons of the Colorado River where it utilizes steep rocky habitat for breeding (Ganey and Balda 1989, Willey 1998). Patterns of habitat use by spotted owls in northern Arizona contrast sharply with owls using conifer forests further south (Ganey and Balda 1989).

The Mexican spotted owl has been the focus of agency concern in the southwest for nearly two decades because of the owl's apparent dependence on old growth timber (USDI 1995). However, in northern Arizona, subpopulations occur in rather unusual landscapes, the arid and rocky canyonlands of the Colorado Plateau (Forsman et al. 1984, Franklin et al. 1990, Willey 1998; Willey and Spotskey 2000).

Recently, Willey (1998) and Willey and Spotskey (2000) examined the extent and characteristics of Mexican spotted owl breeding habitat in Grand Canyon National Park using a geographic information system (GIS) and conducting preliminary field validation of GIS habitat models (Johnson 1990, Franklin 1995, Dettmers and Bart 1999). Willey and Spotskey (2000) used GIS to define suitable habitat (i.e., the range of environments needed for an owl pair to survive and

reproduce) within the park's core analysis area (Fig. 1). Steep canyon habitat was strongly associated with spotted owls in Grand Canyon National Park, and they identified large areas of unsurveyed habitat. Given the owl's threatened status and evidence of population declines in the southwest (Seamans et al. 1999), further surveys are needed to estimate the distribution and abundance of spotted owls and locate conservation areas to support long-term management and recovery (Simberloff 1987, USDI 1995, Thompson et al. 1998).

The large amount of potential habitat in the park, along with its rugged setting, precludes a complete census. Never-the-less, the status of the population in Grand Canyon, a potentially large "source population", is relevant to its conservation (Salwasser 1987, Rinkevich 1991, USDI 1995). Use and refinement of the predictive model in order to target areas of high probability of owl presence will focus our research effort. Information on the distribution and status of the owl is needed by park managers for long term Natural Resource planning. Baseline habitat data, linked to population abundance, can be used to assess long term trends for down-listing the species (USDI 1995). It hoped that this research will provide fine-grained estimates of habitat, generate habitat specific estimates of density (an index to abundance), and provide data to support planning decisions by state and federal land managers.

Project Objectives

Our primary goal during the 2001 field season was to conduct systematic field surveys within predicted suitable breeding habitat within the interior of Grand Canyon National Park (GRCA).

Accordingly, we implemented the following project objectives:

- (1)** Identified tributary canyons with accessible canyonland breeding habitat along the main Colorado River corridor through the Grand Canyon between Soap Creek and National Canyon.

- (2) Using a GIS habitat model (Spotskey and Willey 1999) identified (1:24,000 spatial scale) the following prime breeding habitat classes (stratum): high-elevation Steep Slope Mixed Conifer Forest; low-elevation Steep Canyonlands; mid-elevation Steep Canyonlands.
- (3) Selected sampling units (i.e., within habitat replicates) within each habitat class within Grand Canyon National Park.
- (4) Systematically conducted point calling surveys for Mexican spotted owls within suitable tributary and river edge habitat accessible via the Colorado River between Soap Creek and National Canyon during field survey trips.
- (5) Systematically conducted point calling surveys for Mexican spotted owls within suitable upper tributary canyon habitat accessible via foot trails from the North and South rims between Yaqui Point and Bass Creek.
- (6) Measured habitat characteristics of spotted owl sites located during the 2001 field surveys.

METHODS

Field survey procedures followed standardized protocols developed by spotted owl inventory and monitoring experts (Franklin et. al 1990, Rinkevich 1991, Willey 1989). Along the Colorado River between Soap Creek and National Canyon, tributary side canyons and suitable stretches of the river corridor were identified as targeted study areas for field-work during the FY01 study year. We established replicate study sites within side canyons and conducted one survey visit to each site (Willey 1998a). At each survey site, we established calling routes that systematically traversed suitable patches of spotted owl habitat identified by the GIS model (Fig. 2). Along each calling route, we placed calling stations every 0.5 to 1.0 km. At each calling station, callers imitated spotted owls by producing a variety of standard calls (Ganey 1990) for 15 minutes. All calling points were surveyed once during the field season (i.e., FY01). In addition, we visited all known spotted owl territories located along the river to assess occupancy and reproductive status (D. Willey, unpublished data, Montana State University). Surveys at calling points which fell within the developed area from Hermit's Rest to Desert View (approximately 30 miles of South Rim

habitat) were funded separately through the compliance program at Grand Canyon and results from that survey are presented by Willey et. al. (2001).

Habitat variables were measured at each calling station to record habitat composition and structure. Twenty vegetation and topographic variables were recorded within 0.04 ha plots following methods modified from Rinkevich (1991). The microsite habitat variables included: ground cover type (e.g. rock, bare ground, litter, dead and down logs, grass, forbs, shrubs, and cactus); tree species composition and individual tree dimensions (height, DBH, condition, canopy cover); basal area of large trees; and several canyon structural features (width, height, number caves and ledges). Slope, aspect, and elevation of the survey points were also recorded.

RESULTS AND DISCUSSION

During the 2001 field surveys within the interior region of Grand Canyon, surveys for Mexican spotted owls were completed at 37 study sites (Table 1), including 251 distinct calling stations (Fig. 2). Mexican spotted owl single adults were detected at eight study sites, and pairs of spotted owls were detected at seven sites. Nesting behavior, including agitated contact calls and territorial defense was observed for all pairs, and two owlets, approximately 50 days old were observed at the Forster Canyon study site (Table 1; Fig. 3). Overall, the field surveys located fifteen new spotted owl territories in the interior canyon wilderness of Grand Canyon. All territories were located in the upper reaches of large tributary canyons within steep and rugged rocky canyon terrain. Habitat measurements were completed at each site and an analysis of habitat associations will be included with the project Final Report at the end of FY02.

The field surveys also detected western screech-Owls, flammulated Owls, great-horned owls, and pygmy owls within the canyon environments. Great-horned owls were quite common at were located in similar terrain to Mexican spotted owls. Flammulated owls were the most common owl observed on the canyon rims associated with Ponderosa Pine forests.

The success of the FY01 field surveys support the field techniques used to locate spotted owls in canyonland terrain, included GIS-based predictive models, field tests, river-based access to interior wilderness, and backcountry access via foot trails to the most remote regions of the park. No personnel were injured during the project despite countless hours spent in rugged and arid backcountry wilderness using foot trails and river expeditions. The project results for FY01 indicated that nesting and roosting areas used by spotted owls are located in the heads of steep walled canyons below the main canyon rims in desert habitat types. Although spotted owls may travel up onto rims and out into plateau forests, Willey (1998) located owls in these environments during only 10% of radio-tracking periods during a telemetry study in southern Utah's canyonlands.

Although potential affects of rim-based management actions to the owl's habitat is currently unknown, these results suggest that most territories are located below the zone of proposed management activities, including trail construction along the south rim and prescribed fire. Because prescribed fires have been designed to reproduce a natural fire regime, the long-term health of the forests may be restored (Mast et al. 1999, Wolf and Mast 1998); however, the effects to suitable habitat for spotted owls may, or may not be, enhanced. Using radio-telemetry, Willey (1997) examined the effect of prescribed fire on the movement of several spotted owls in Saguaro National Park's Rincon Mountains. Following low-intensity ground fires, several spotted owls continued foraging within heavily burned ponderosa pine stands, and no significant influence of fire on home range size and shape was identified.

Our results support the idea that the owl primarily occupies rugged canyonland terrain below the main canyon rims. However, owls do move up to the rims to respond to imitated spotted owl calls. All known breeding sites in Grand Canyon, and thus the associated nesting cores areas, have so far been located below the canyon rims within steep walled sandstone canyons. Although typically associated with mature forest habitat, Rinkevich (1991) and Willey (1995) located numerous breeding Mexican spotted owls within arid canyonlands widely scattered across southern Utah and northern Arizona. In these locations, the owl was associated with steep sandstone

canyons covered by relatively open Great Basin Desert scrub and Great Basin Conifer Woodland vegetation communities (Brown 1982). These canyonland breeding habitats are rather unusual considering the classic late seral forest habitat requirements typically reported for the owl (Gould 1977, Forsman et al. 1984 Zwank et al. 1994, Seamans and Gutierrez 1995, Miller et al. 1997). Our results in Grand Canyon, and surrounding canyonland environments, indicate that rocky canyon habitat is a common and important cover type for the owl and the region clearly supports numerous source populations.

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Table 1. Study site locations of Mexican spotted owl field surveys in the interior wilderness of Grand Canyon National Park, Arizona, 2001.

STUDY SITE	NO. CALL PTS.	OUTCOME
16-Mile Canyon	4	no owls
Hot Na Na	4	great-horned owl
19-mile Canyon	3	great-horned owl
24.5 Mile Canyon	4	no owls
Buckfarm Canyon	4	great-horned owl
Saddle Canyon	5	great-horned owl
Little Nankoweap	5	northern pygmy-owl
Nankweap	12	male spotted owl
Unkar Creek	12	single male, spotted owl pair (nest)
Red Canyon	6	male spotted owl
Sinking Ship Point	10	spotted owl pair , flammulated owl
Cremation Canyon	8	male spotted owl
Boulder Canyon	8	spotted owl pair
Salt Creek Canyon	5	spotted owl pair
Pipe Creek	8	spotted owl pari
Boucher Canyon	3	spotted owl pair (nest)
Travertine Canyon	5	no owls
Slate Creek	5	spotted owl pair
Turquoise Canyon	5	male spotted owl
Topaz Canyon	6	no owls
Ruby Canyon	6	no owls
Shinumo Canyon	10	no owls
Waltenburg Canyon	6	male spotted owls
Forster Canyon	4	spotted owl pair, 2 owlets
Tapeats Creek	15	western screech-owl
140-mile Canyon	8	great-horned owl
Deer Creek	4	no owls
Fishtail Canyon	7	no owls
150-mile Canyon	4	no owls
Tuckup Canyon	12	single male, spotted owl pair (nest)
National Canyon	15	great-horned owl
Mohawk Canyon	4	no owls
The Cove	4	no owls
Spring Canyon	6	no owls
Parashant Canyon	8	no owls
Trail Canyon	8	northern pygmy owl
Indian Creek	8	western screech-owl

Figure 1. Distribution of predicted Mexican Spotted Owl breeding habitat, showing the primary cover types, and including surveyed and unsurveyed regions in Grand Canyon National Park, Arizona.

Figure 2. Location of the 2001 field season survey study sites for Mexican Spotted Owls in the interior lands of Grand Canyon National Park, Arizona. Shown are study site boundaries, calling routes, and calling point locations.

Figure 3. Locations of Mexican spotted owls located during the 2001 field season in Grand Canyon National Park, Arizona.