

FINAL REPORT

**FIELD SURVEYS FOR
MEXICAN SPOTTED OWLS (*Strix occidentalis lucida*)
AND NORTHERN GOSHAWKS (*Accipiter gentiles*)
IN THE GRAND CANYON NATIONAL PARK (2009)**

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Submitted To:

Grand Canyon National Park
Grand Canyon, AZ 86023
RM-CESU Cooperative Agreement CA H1200040001
Task Agreement Number J8227082004

FEBRURARY 2009

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INTRODUCTION

Understanding the distribution of sensitive raptor species is germane to their long term persistence and often a requirement of state and federal laws (Blakesley et al. 1992, USDI 1995, Bowden 2008). The purpose of the field surveys described in this report was to determine the current presence or absence, and potential breeding status of Mexican spotted owls (*Strix occidentalis lucida*) and Northern Goshawks (*Accipiter gentiles*) located within study areas identified in Grand Canyon National Park. Spotted owls and Northern goshawks are of special concern to the National Park Service due, in part, to their specialized habitat requirements (USDI 1995, Willey 1995); evidence for population declines in the southwest (Seamans et al. 1999); and status as sensitive species (e.g. USDI 1995).

The Mexican spotted owl was listed as a threatened species in 1993 due to threats from timber management and catastrophic fire (Cully and Austin 1993, USDI 1995). During the 1990s, Northern goshawks were identified as "a species of special concern" in response to various threats, including historic timber management, planned forest restoration, and threats to its habitat by fire (USDI 1995, Bowden 2008 Wolf and Mast 1998). Furthermore, as top-level predators, the spotted owl and goshawk may have fundamental roles in proper functioning ecosystems (Forsman et al. 1984, Franklin et al. 1990, USDI 1995).

Grand Canyon National Park represents one of the last large pristine landscapes (over 486,000 ha) of breeding habitat for both raptors in the southwest region (USDI 1995). Further, spotted owls and goshawks have been reported in numerous visitor accounts in Grand Canyon

since the 1920's (Natural Resources Office, GRCA), and more recently, surveys located spotted owls in over 45 territories in the park (Bowden 2008). Northern goshawks have established 100+ territories across the Kaibab Plateau (Rich Reynolds, pers. Com.). Therefore, the National Park Service initiated detailed surveys for both species within planned management project areas in the park's forest highlands (see Willey 2007, 2008, and Fig. 1).

Specifically, the field surveys had the following objectives:

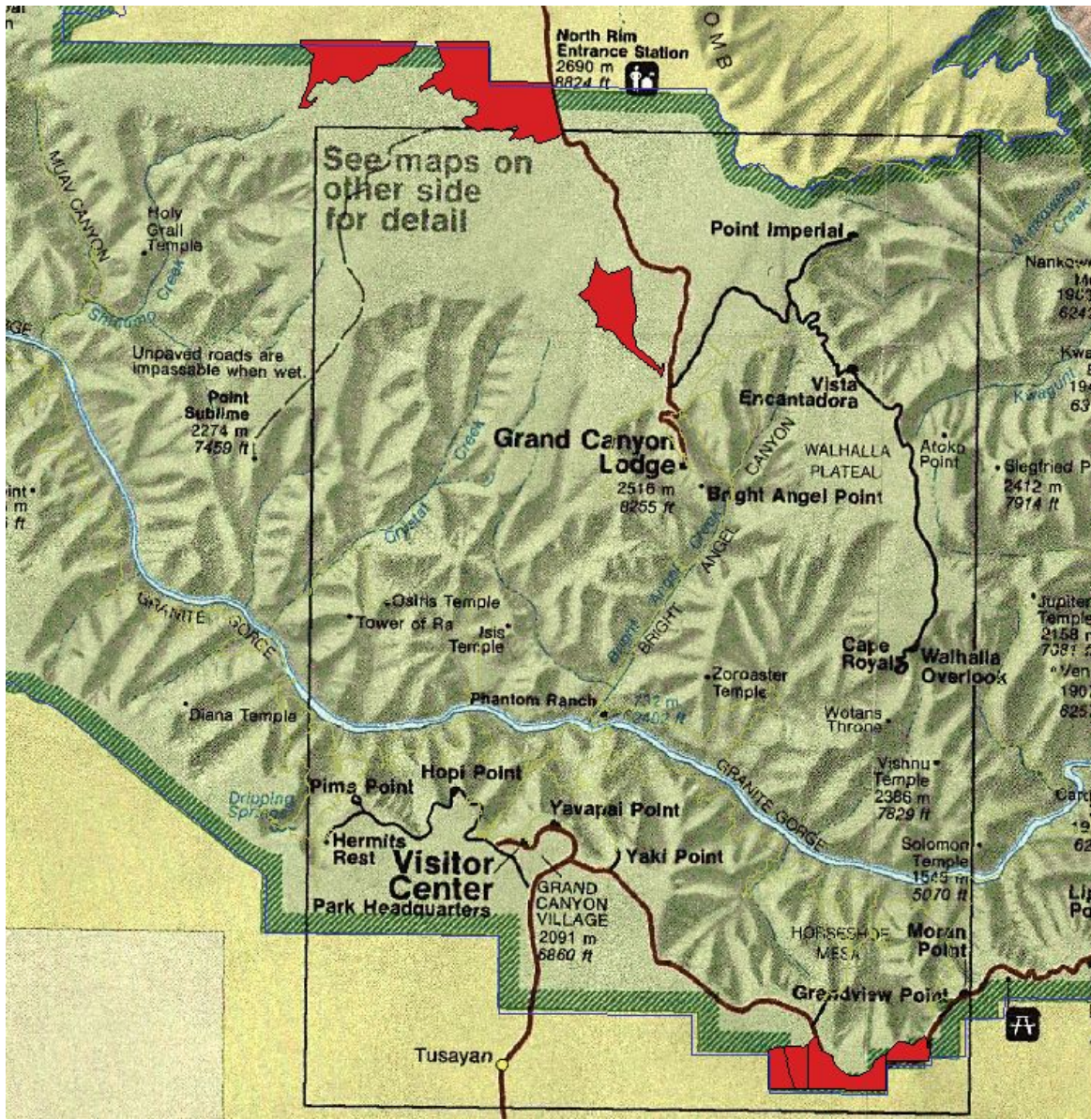
- Conduct surveys for spotted owls and Northern goshawks in designated project areas (Fig. 1).
- Conduct all owl and goshawk surveys using established standardized protocols.
- Conduct follow-up visits to all active owl and goshawk sites to search for nest site, and assess reproductive status.
- Document all techniques and survey results on standardized data forms.
- Create an ArcView GIS 3.2a project with supporting data files to show survey boundaries, survey points, and locations of all raptor species detected during field surveys.

METHODS

Study Area

The Grand Canyon National Park is located within the Colorado Plateau physiographic province of the western United States (Willey 1995, 1992; and Brown 1982). Grand Canyon National Park is located approximately 120-km northwest of Flagstaff, Arizona. Within the park, the raptor survey units were distributed among the forested highlands located on the north and south rims of Grand Canyon (Fig. 1 and Fig. 2). The park landscape is dominated by a deeply entrenched river corridor dissected by numerous tributaries and rimmed by high cliffs and benchlands. The rim habitats give way to relatively flat forested plateaus often including Ponderosa pine (*Pinus ponderosa*) forests and Mixed-Conifer Forests. While vegetation communities established below the canyon rims includes Pinyon-Juniper woodlands, Desert-

Figure 1. Location of the raptor survey areas on the North and South Rims of Grand Canyon National Park during summer 2009 (study areas are shown in red).



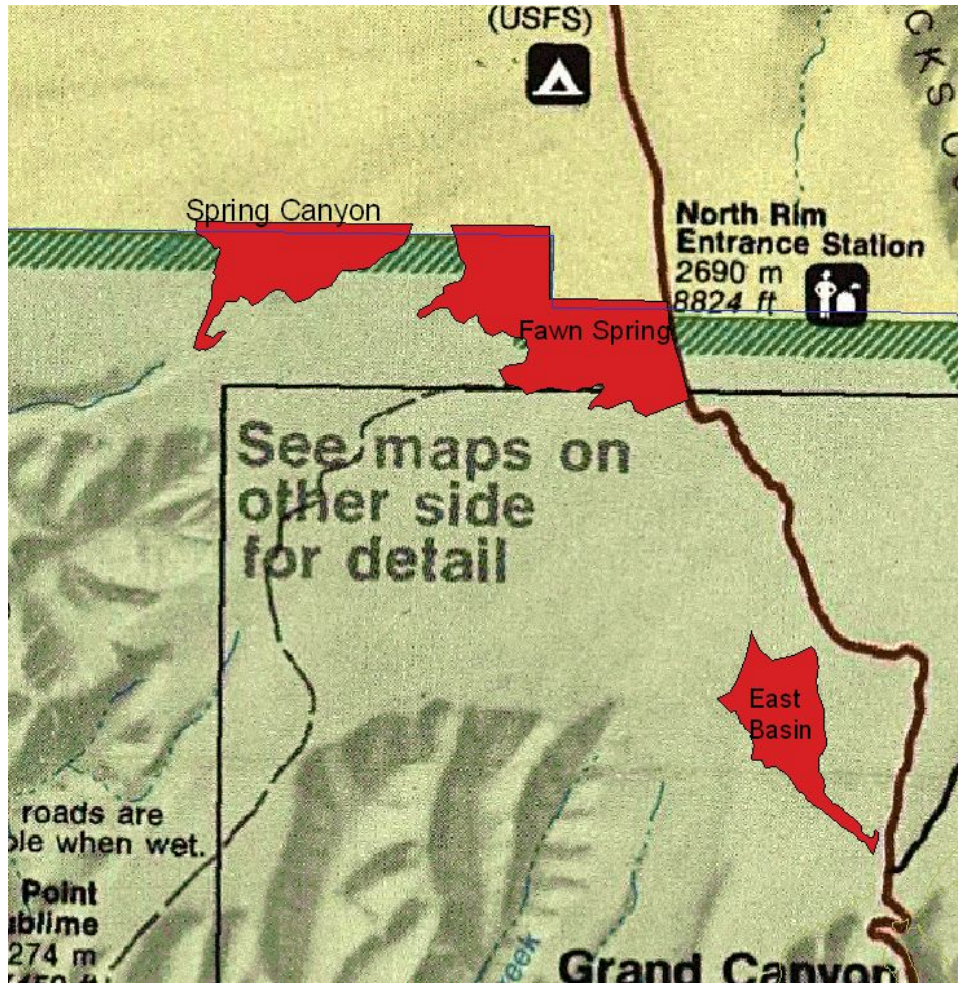


Figure 2. Location of three study areas, North Rim of Grand Canyon National Park.

Scrub uplands and benchland, and Riparian vegetation communities along canyon bottoms; the higher elevation plateaus are carpeted with dense and diverse coniferous Petran Montane Forests and present a vastly different environment in contrast to the desert scrub communities within the canyon (Brown 1982). Elevations throughout the park range from 1,109 to 3,960 m. Total annual precipitation averages 17 cm per year, and temperatures range seasonally from below 0 to 40°C (U.S. Weather Bureau, Climate and Precipitation Summaries, Arizona).

Raptor Survey Methods

Survey methods for spotted owls followed the standardized survey protocol (USDI 2003) that provides specific guidance for conducting clearance type surveys. The protocol allows observers to: (1) make inferences regarding the presence or absence of owls in a defined area; (2) assess occupancy and nesting status, and locate nests, in areas where habitat alterations or disturbances to owls are likely to occur; and (3) provide information to allow designation of Protected Activity Centers (PACs)(USDI 1995). It has long been recognized that the best way to detect the presence of spotted owls within potential habitat is to mimic their calls and listen for a response. The standard protocol uses calling points placed every 0.5 miles along survey routes stratified along ridges and canyon bottoms in the study areas to accomplish complete coverage of the area. The survey design uses designated **calling stations** to locate owls. The intent of establishing calling routes and calling stations is to obtain **complete coverage** of the survey area so that owls will be able to hear a surveyor calling and a surveyor will be able to hear the owl(s) responding. The number of calling routes and calling stations (see Fig. 3) depends on the size of the area, topography, vegetation, and access (Forsman 1983, Franklin et al. 1990, USDI 2003).

The vocal repertoire of owls consists of a variety of hooting, barking, and whistling calls (Ganey 1990). Three call types accounted for 86 percent of calling bouts heard in Arizona: four-note location call, contact call, and bark series. The four-note call appears to be used the most frequently by owls defending a territory. Therefore, surveyors during this study used all three of these calls during surveys, with the four-note call used as the primary call. Surveyors spent at least 15 minutes at each calling station: 10 minutes devoted to calling and listening in an alternating fashion, and the last 5 minutes devoted to careful listening to detect an owl response. Each calling point was called four times during the 2009 field season in Grand Canyon (USDI 2003).

The northern goshawk protocol required two complete surveys between April 15 and Aug 31. The standardized protocol for goshawks included use of taped playback to produce goshawk alarm and

begging calls with a broadcast caller (FoxPro, Inc.). Surveyors used the callers while traversing line transects that were systematically placed every 300 meters throughout each targeted study area (see Fig. 3). For both types of raptor surveys, once an owl or a goshawk was detected, surveyors recorded the following information: location of the raptor by UTM (Universal Transverse Mercator); sex and age of raptor (if possible to identify); habitat type of raptor's position; time; date; weather conditions; moon phase; and a description of the type of raptor response.

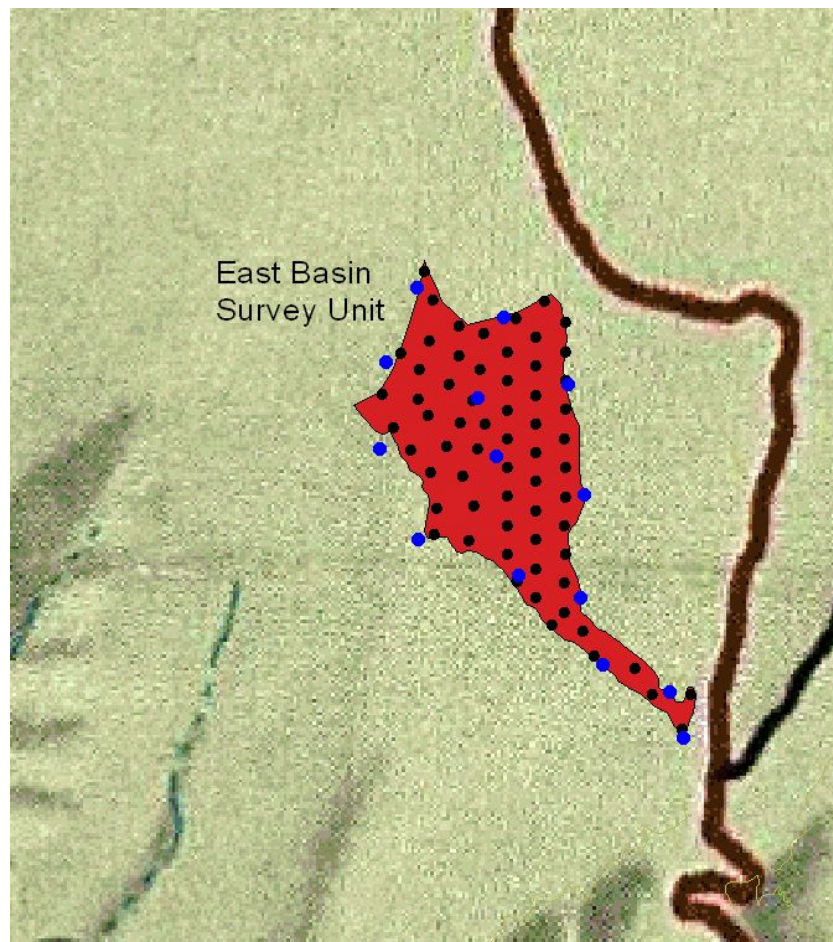


Figure 3. Location of Goshawk (blue dots) and Mexican Spotted Owl (black dots) survey stations in the East Basin Study Unit on the North Rim of Grand Canyon National Park, 2009.

RAPTOR SURVEY RESULTS

Mexican Spotted Owls

Field surveys for spotted owls were conducted in three survey areas on the North Rim of Grand Canyon during May-August 2009 (Table 1). Mexican spotted owls were not detected in any survey unit during 2009, nor have spotted owls been detected during several previous studies on the Kaibab Plateau (Willey 2008). However, spotted owls may infrequently use the Plateau areas during foraging although not detected during the summer 2009 field season (Bowden 2008). The field surveys did detect several other owl species (Fig. 4), including: Northern Flammulated Owl, Western Screech-Owl, Northern Sawwhet Owl; and Long-eared Owl. It was surprising that no Great-Horned Owls were detected during the 2009 surveys because this species has been historically quite common in the North Rim forests (Willey 2007). Detection of other owl species may have a seasonal influence, e.g., owl detections seem to peak in early summer and fewer owls are detected during the final visits to study areas (Willey 2007, 2008).

Northern Goshawk Surveys

Northern goshawks were detected within several project areas during the 2009 field season, including detections in Spring Canyon (North Rim), Hearst-Buggeln and Watson-Hance study areas (South Rim) (Figure 4; Figure 5; and Table 1). Juveniles were seen in the Spring Canyon Study area on the north rim, but no nest site was located during the diurnal searches. Goshawks were frequently seen flying through the south rim study areas but no nests or roosts were located during the 2009 field surveys. Although extensive ground searches were conducted during followup visits, no nest sites were located in the south rim study areas despite frequent detection of goshawks during playback surveys. In addition, two other diurnal raptors were also detected, including Red-tailed Hawks and a Cooper's Hawk, who both responded to juvenile goshawk playbacks (Table 1; Figure 5). Raptors often respond to tape playbacks used to attract birds, in particular, goshawk calls can frequently elicit territorial responses (Rich Reynolds personal communication).

Raptor Detections in Spring and Fawn Units

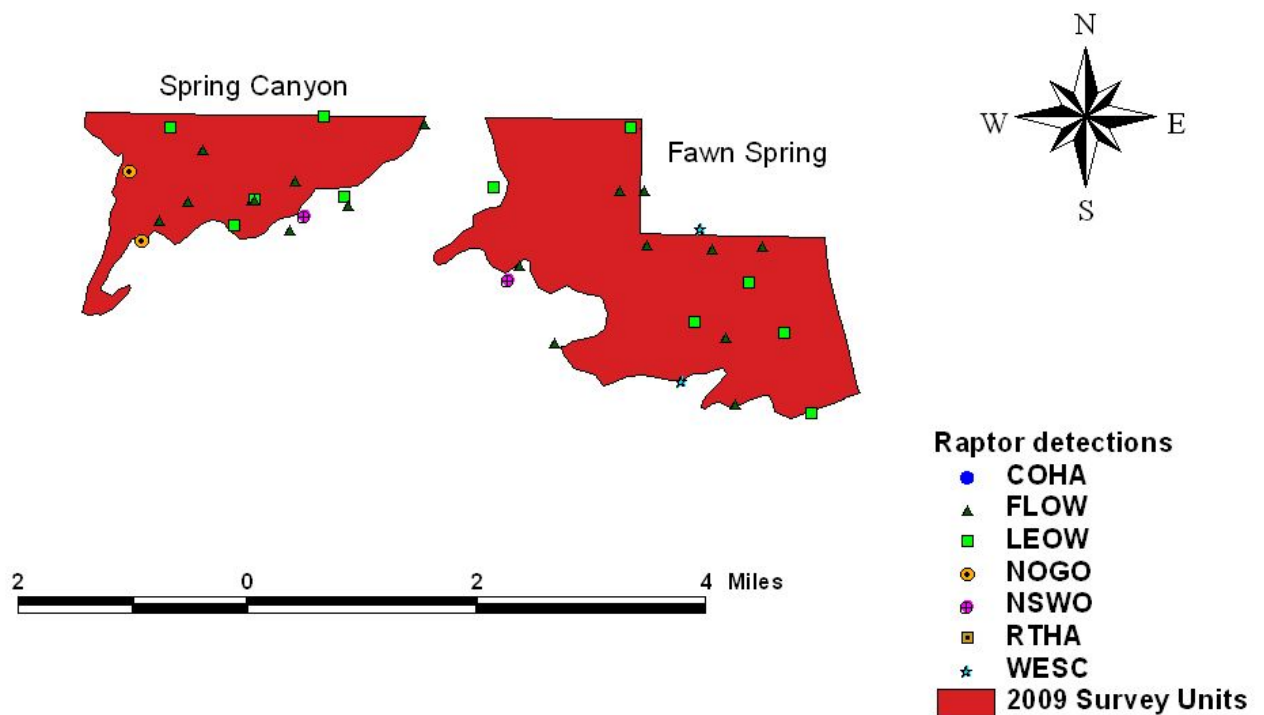


Figure 4. Raptor detections in the two North Rim survey units during summer 2009. Species Key: COHA = Cooper's Hawk; FLOW = Flammulated Owl; LEOW = Long-eared Owl; NOGO = Northern Goshawk; NSWOW = Northern Sawhet Owl; RTHA = Red-tailed Hawk; and WESC = Western Screech-owl .

South Rim Study Areas Raptors Detected

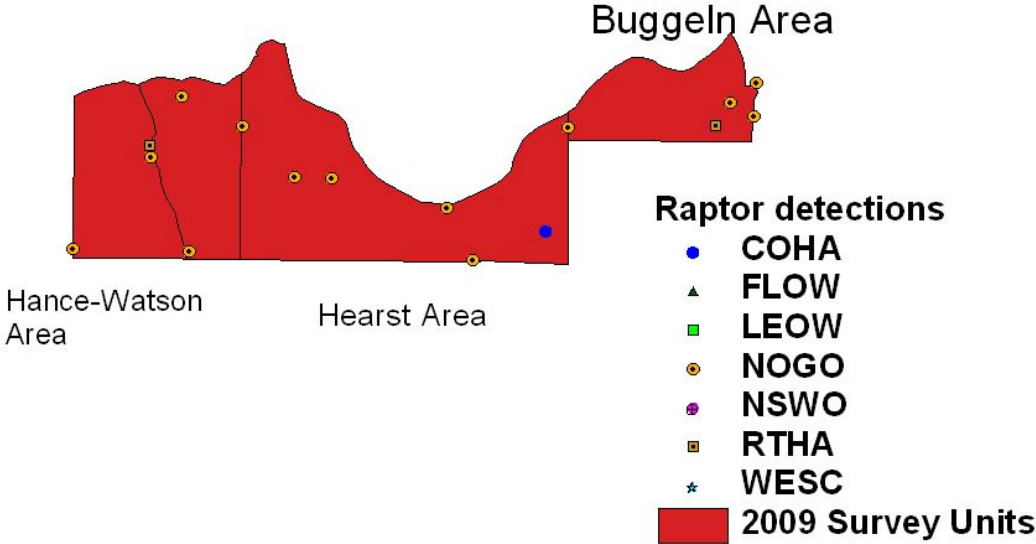


Figure 5. Diurnal raptor detections in the South Rim survey units during summer 2009. Species Key: COHA = Cooper’s Hawk; NOGO = Northern Goshawk; RTHA = Red-tailed Hawk.

Table 1. Results of field surveys for spotted owls and northern goshawks within survey areas in Grand Canyon National Park, summer 2009.

Project Name	Plateau	Acres	MSO Detected	NOGO Detected
Spring Canyon	North Rim	1517	None	Yes
East Basin	North Rim	1322	None	None
Fawn Spring	North Rim	2356	None	None
Hearst-Buggeln	South Rim	1228	No Survey	Yes
Hance-Watson	South Rim	703	No Survey	Yes

DISCUSSION

Mexican spotted owls appear to be highly selective in choosing nest and breeding-season roost locations (Ganey 1988, Ganey and Balda 1989, Franklin 1995, Willey and Van Riper 2007, Bowden 2008). Further, the amount and distribution of suitable breeding habitats may be a limiting factor for the sub-species (USDI 1995). In 1993, the Mexican spotted owl was listed as threatened in response to concerns over the loss of forest habitats (Cully and Austin 1993) to which the owl is widely associated within the southwestern US and northern Mexico. In forest habitats, nests and roost sites are placed within a restricted set of forest types (distinguished by species composition and structural characteristics) in comparison to the wide range of forest types that are used for foraging (USDI 1995).

Across the range of Mexican Spotted Owls, habitats selected for nesting and roosting vary regionally (USDI 1995). In southern Utah, owls always established nests and located roost sites on

shaded cliff ledges or in caves in steep rocky canyons (Rinkevich 1991, Willey 1995, Willey and Van Riper 2000). In Arizona and New Mexico, spotted owls placed nests in large diameter trees on debris platforms, or stick nests built by other species (Ganey and Balda 1989, Zwank et al. 1994, Seamans et al. 1999). Spotted owls also use oak cavities in pine-oak forests (*Pinus ponderosa* – *Quercus gambellii*) (USDI 1995).

Grand Canyon National Park contains both rocky-canyon and classic-forest habitats, and spotted owls in the Park may have a choice among several distinct nesting habitats (Willey and Spotskey 2000). However there is currently little information on spotted owl nest behavior and status in Grand Canyon (Bowden 2008). In the Grand Canyon, Bowden (2008) located spotted owl nest and roost areas in canyons where the Redwall Limestone formed vertical and overhanging cliffs that included ledges and caves that provided numerous potential sites for spotted owls. Although spotted owls used trees as roost sites, it was rare, and all nests were placed in caves or on ledges of cliffs. Using caves and ledges for nest sites in canyonlands terrain has been documented in other studies (Rinkevich 1991, Willey and Van Riper 2000). No spotted owl roosts, nests or owlets have been observed outside the rocky canyons in Grand Canyon National Park (Willey 1992, 2007, 2008, and see Bowden 2008).

In spotted owl homeranges located in Grand Canyon, piñon-juniper woodland, with an understory of Mormon tea and greasewood, was the primary vegetation present within owl core areas (Bowden 2008). Rocky cliffs with caves and ledges appear to provide habitat structure similar to mature forest stands with high canopy cover; providing shelter and thermal relief for roosts and nests (Ganey and Balda 1989). In the Grand Canyon, the steep Redwall cliffs, and the abundance of caves and cliffs above the canyon floor provide protection from both avian and mammalian predators as well as cooler, shaded post fledging areas.

During the 2009 field surveys, our results suggest that spotted owls are not occupying forest habitats along the rims or deeper within the plateau highlands. Therefore, effects from rim activities,

including prescribed fire, may be minimal since no spotted owls were detected in these habitats. Although historic surveys for Mexican spotted owls below the rims have located over 50 spotted owl territories and nesting was confirmed at many of the detected sites, Bowden (2008) did observe that spotted owls occasionally foraged and were heard calling from rim forests. Thus, Biologists should note that spotted owls occasionally use rim forests at night, and furthermore, Northern Goshawks clearly occupy the rim forests, and management activities in these areas should be planned with attempts made to preserve snags, mature trees, and a diversity of mammalian prey habitats used by these raptor species (USDI 1995). Planned management fires in rim forests may have minimal effects on spotted owl habitat given that core areas are located deep within the canyons (see Wolf and Mast 1998).

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