

Spotted Owl

Strix occidentalis

Joseph L. Ganey

DESCRIPTION. The scientific name, *Strix occidentalis*, translates as “owl of the west,” an appropriate name for this inhabitant of western forests. The subspecies found in Arizona, the Mexican Spotted Owl, is *S. o. lucida*—“light” or “bright” owl of the west. This race is generally lighter in color than Spotted Owls elsewhere in the range. The Mexican Spotted Owl can be distinguished from other subspecies on the basis of genetic evidence as well (Barrowclough and Gutiérrez 1990).

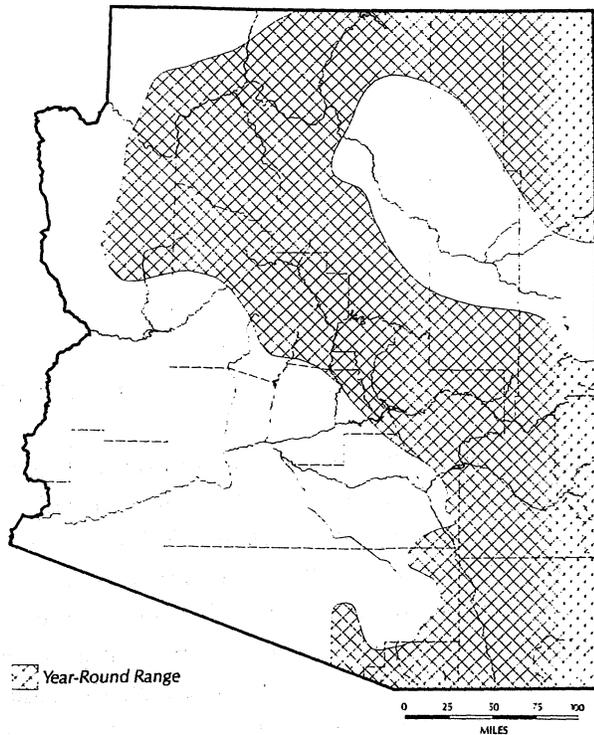
These attractive brown owls are about 16–19 inches long and have a wingspan of 42–45 inches (Walker 1974). Males are slightly smaller than females, but the sexes are difficult to distinguish visually (Johnsgard 1988). The Spotted Owl’s lack of ear tufts gives its large head a round appearance. The head and back are liberally covered with white spots, hence the common name. The breast and abdomen are brown barred with irregular rows of white blotches (plate 39). The dark brown eyes appear black at normal viewing distance, a unique trait among large Arizona owls. The facial disks surrounding the eyes are large and round, and indistinct concentric circles of darker brown surround each eye. The wings and tail are brown with distinct white barring (Johnsgard 1988). Spotted Owls are quite tame and will often tolerate observation from close range if the observer is quiet.

Juveniles can be recognized by their down, which persists around the head into the first autumn. After this down is lost, they resemble adults in all traits but one: adults have rounded tail feathers with a white terminal band mottled with brown, whereas owls less than 26 months old have pointed

tail feathers with a pure white terminal band (Forsman 1981).

Spotted Owls are quite vocal and are more often heard than seen. I have heard their calls in all months of the year in Arizona. With a little practice they are relatively easy to sex by voice; males have deeper voices than females and call more frequently. Spotted Owls have a wide repertoire of barking, hooting, and whistling calls (Forsman et al. 1984; Ganey 1990). Most of the calls are used by both sexes but in different proportions. Males commonly give a series of four unevenly spaced barks: *hoo—hoo-hoo—hoo*. Females frequently use a clear whistle ending with an upward inflection, *coo-weep*, or a series of sharp barks. Variations on all of these calls are common. Spotted Owls often engage in long and interesting vocal exchanges that can be heard at considerable distances.

DISTRIBUTION. Spotted Owls occur in mountains along the West Coast from British Columbia to southern California (Forsman et al. 1984). In the Southwest, they are found from Utah and Colorado south through Arizona, New Mexico, and west Texas into the mountains of Mexico (McDonald et al. 1991). They occur throughout much of Arizona except for the arid southwestern portion, primarily in forested mountains and canyons. Their distribution reflects the availability of such habitats (Ganey and Balda 1989a). South of the Mogollon Rim, Spotted Owls are scattered throughout the higher mountains. North of the Rim, concentrations occur in the White Mountains, along the Rim itself, and on the volcanic peaks near Flagstaff. Spotted Owls



Spotted Owl distribution in Arizona

have also been found at scattered sites in the Grand Canyon and on the Navajo Reservation, and there are historical records from the Hualapai Mountains (Ganey and Balda 1989a).

Because of their nocturnal habits and cryptic coloration, Spotted Owls are not often seen. The best way to experience them is to visit their canyon haunts at night and listen for their calls. The best times to listen are just after sunset and just before sunrise, from May through August. Do not imitate their calls or play tape recordings, however, as it can disturb the owls (which are federally protected as a threatened species) and may result in their spending time vocalizing when they should be foraging to provide food for their families.

HABITAT. Mexican Spotted Owls occupy a range of habitats. I have seen breeding owls in Arizona at elevations ranging from 3,700 to 9,600 feet. They

appear to be most common in mature and old-growth forests in steep canyons, but they are also found in canyons featuring prominent cliffs with little forest habitat.

Some of this variability appears to be related to geography. A much wider variety of habitats is occupied south of the Mogollon Rim, where breeding Spotted Owls can be found in canyons containing mixed conifer, Madrean pine-oak, and/or ponderosa pine forests (forest types after D. E. Brown et al. 1980); encinal oak woodlands; and associated riparian forests (Ganey and Balda 1989a; Ganey et al. 1992). Mixed conifer forests are dominated by Douglas fir and/or white fir. Pine-oak forests are dominated by an overstory of Apache and/or Chihuahuahua pine and have an understory of evergreen hardwoods, primarily oaks.

Habitat use is more restricted north of the Mogollon Rim. From the Rim north to approximately the Flagstaff area, Spotted Owls breed primarily in mixed conifer forest, although some pairs breed in ponderosa pine forest (Ganey and Balda 1989a). Owls breeding in ponderosa pine forest usually occupy areas with well-developed understories of Gambel oak (Ganey et al. 1992).

North of Flagstaff, Spotted Owls appear to drop out of the forests and are found primarily in steep, rocky canyons, often without extensive forested habitat. This trend appears to hold in northern New Mexico, Colorado, and Utah as well as in northern Arizona (e.g., Kertell 1977; McDonald et al. 1991; Rinkevich 1991).

Where Spotted Owls do inhabit forests, they often occupy mature or old-growth stands with a complex structure (Ganey and Balda 1989a; McDonald et al. 1991). These forests are typically uneven-aged, with multilayered canopies and overstory trees older than 200 years. These areas typically have high (greater than 70 percent) canopy closure, large trees, and many snags and fallen logs (Ganey 1988; Ganey and Balda 1994).

The winter habitat can be very different from the breeding habitat. In Arizona, some Spotted Owls

remain on their territory throughout the year and others migrate (Ganey and Balda 1989b; Ganey et al. 1992). Migrating owls generally move to lower elevations, where they can be found in pinyon-juniper woodlands and riparian areas from November through March. Recent examples of known wintering areas include the Verde Valley (pers. observ.), Tonto Creek (R. Mesta pers. comm.), and Sabino Canyon (R. B. Duncan pers. comm.). They move back to the higher elevations as the breeding season approaches, even though these areas are still covered with snow when they arrive.

LIFE HISTORY. Courtship begins in March with pairs roosting together during the day and calling softly to each other as dusk approaches. These courtship vocalizations may continue for several hours. About two weeks before the eggs are laid, the female becomes very sedentary and the male does all the foraging. The female spends the night perched near the nest, waiting for the male to arrive with food. The male announces his arrival by calling to her, then the two owls approach each other and prey is transferred from beak to beak. This courtship feeding is probably extremely important in getting the female into peak breeding condition. If the male is unable to provide sufficient food, the female does not lay eggs.

Spotted Owls do not build nests; instead they use already existing structures for nests (Forsman et al. 1984; Ganey 1988). In Arizona, such structures include potholes and ledges on cliffs or in caves, cavities or debris platforms in trees, and stick nests built by other birds. The owls do not improve these structures.

Eggs are normally laid in early April, although the timing can vary somewhat from area to area and year to year. Incubation lasts about 30 days and is performed solely by the female. The eggs thus typically hatch in early May. The owlets fledge in early to mid-June, often before they are able to fly. The young birds remain with their parents throughout the summer, perfecting their flight

skills and learning to hunt. By late August the young can be found roosting alone. They apparently disperse in September and October. Dispersal is a period of high vulnerability, and many juveniles die during this time (Gutiérrez et al. 1985; G. S. Miller and Meslow 1985; Laymon 1988; G. S. Miller 1989).

Spotted Owls breed sporadically and do not nest every year. The reasons for this pattern are unknown, but likely involve fluctuations in prey abundance. The reproductive rate is relatively low and variable. Usually only one or two eggs are laid, rarely three. Only 46 percent of 44 pairs observed in Arizona between 1984 and 1987 fledged young. The reproductive rate averaged only 0.64 young per pair during this period (Ganey 1988). Fletcher (1990) reported that 55 percent of 65 pairs monitored in Arizona and New Mexico in 1989–90 successfully fledged young.

Spotted Owls range over relatively large areas in Arizona. The home ranges of eight northern Arizona owls equipped with radio transmitters averaged 1,600 acres (Ganey and Balda 1989b). The home ranges of three mated pairs averaged 2,092 acres and contained an average of 995 acres of old-growth forest. Owls did not use the entire home range uniformly. They concentrated their foraging, nesting, and roosting activities in the unlogged portions (Ganey and Balda 1989b; Ganey and Balda 1994), which suggests that old-growth forests are important to them.

Exactly why the Spotted Owl breeds in these particular habitats is not known. Barrows (1981) suggested that they are intolerant of high temperatures and require closed-canopy old-growth forests to avoid high daytime temperatures. Ganey et al. (1993) compared metabolic rates of Spotted and Great Horned Owls in Arizona. Relative to the Great Horned Owl, a habitat generalist, Spotted Owls had higher metabolic rates and were less able to dissipate metabolic heat via evaporative cooling. This may partly explain the range of habitats used in Arizona. All of the forest types used by Spotted Owls

provide shady roost sites, and the shaded cliffs and caves present in deep rocky canyons also provide refuge from high temperatures.

Spotted Owls are generally active at night and spend the day sleeping on a shady perch, although they sometimes hunt during the day when feeding young (G. M. Miller 1974; Laymon 1991).

Spotted Owls prey on small mammals, birds, reptiles, and insects (Ganey 1992; Reichenbacher and Duncan 1992). In Arizona, woodrats, white-footed mice, voles, rabbits, and pocket gophers constitute the bulk of the diet (Ganey 1992). These prey groups are generally part of the diet statewide, but their relative proportions vary from region to region. Owls inhabiting rocky canyons prey extensively on woodrats, whereas voles increase in importance in high-elevation mixed conifer forests. Owls in the mountains of southeastern Arizona have the most varied diet and prey more on bats, birds, reptiles, and insects than do owls in northern Arizona (Duncan and Sidner 1990; Ganey 1992; Reichenbacher and Duncan 1992).

Spotted Owls are ambushers rather than pursuers. They hunt almost exclusively at night, moving from perch to perch, watching and listening for prey. They often cache uneaten portions of large prey items on tree limbs against the trunk, on rock ledges, or in tall grass next to a rock, log, or tree. The owl usually perches near enough to watch the cache. Twice when I attempted to examine a cache near a roosting owl, the owl awoke, beat me to the spot, and retrieved the prey!

Little is known about the mortality factors affecting this species. Dispersing juveniles in California and Oregon apparently suffer high mortality due to starvation, predation, and various accidents (Gutiérrez et al. 1985; G. S. Miller and Meslow 1985; Laymon 1988; G. S. Miller 1989). Great Horned Owls are the main enemies of Spotted Owls, and they prey on adults as well as juveniles (Ganey 1988). Other raptors, particularly the Northern Goshawk, may also take Spotted Owls from time to time (pers. observ.). In general, however, the ex-

tent and seriousness of such predation has not been documented.

STATUS. The Mexican Spotted Owl is listed as threatened by the U.S. Fish and Wildlife Service (Federal Register 58:14248-14271). Current population estimates are crude but suggest that there may be 600-1,200 Mexican Spotted Owls in Arizona (Fletcher 1990; McDonald et al. 1991).

The most serious threat to Spotted Owls appears to be habitat loss due to human activities. This owl once bred in low-elevation riparian forests in Arizona (Bendire 1892). These forests have been drastically altered or eliminated in most areas, and breeding Spotted Owls have not been found in low-elevation riparian forests in recent years (Ganey et al. 1988). The riparian forests may have provided dispersal corridors between isolated mountain ranges as well as breeding habitat (Federal Register 58:14254-14255).

Fuelwood harvesting may also eliminate or degrade Spotted Owl habitat. This problem may be most serious in the ponderosa pine forests of northern Arizona, where large Gambel oaks provide shade for roosting owls and cavities for nesting (Dargan 1992; Ganey et al. 1992). Illegal harvesting of these large trees reduces the availability of nest sites and may also reduce overall habitat suitability. Such poaching occurs regularly (Dargan 1992) and in time could eliminate an important component of Spotted Owl breeding habitat in ponderosa pine forest.

Timber harvesting may pose the most serious threat to Spotted Owls, particularly those inhabiting coniferous forests along the Mogollon Rim. Most of the owls in this region are found in national forest lands; many occupy remnant stands of mature or old-growth forest now threatened by logging (Ganey and Balda 1989a). Harvesting these forests could reduce Spotted Owl numbers or eliminate them from portions of their current range. This is particularly worrisome because the Mogollon Rim country is the largest contiguous area of occupied

Mexican Spotted Owl habitat in the state. Dispersal of juveniles from this population may be important for the survival of smaller, more isolated populations in surrounding regions. Thus, habitat fragmentation in this area might affect not only the local population but more distant populations as well.

Efforts are now under way to alleviate this potential problem. The U.S. Forest Service has issued interim guidelines for protecting Spotted Owl habitat (Federal Register 54:27416-27418). Concurrent with listing the Mexican Spotted Owl as threatened, the U.S. Fish and Wildlife Service appointed a recovery team to address conservation of the species.

This team is developing a recovery plan intended to safeguard the owl and its habitat. The ultimate goal is to provide sufficient protection for the owl and its habitat so that it can safely be removed from the list of threatened species.

Past management of habitat for the Mexican Spotted Owl has involved protection of mature and old-growth forests, in some cases leading to reduced timber harvests and economic hardship for some individuals and communities. One of the great challenges will be to provide sufficient protection for the owl and its habitat while minimizing the economic and social costs of such protection.

The Raptors

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