1988.
ODFW Nongame
Rept 87-3-02.

HABITAT USE BY THREE-TOED AND BLACK-BACKED WOODPECKERS, DESCHUTES NATIONAL FOREST, OREGON

by

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Nongame Project Number 87-3-02
Oregon Department of Fish and Wildlife
U.S.D.A. Deschutes National Forest

ABSTRACT

Patterns of habitat use for home ranges, foraging, nesting, and roosting, were described for three-toed (Picoides tridactylus) and black-backed (Picoides arcticus) woodpeckers on the Deschutes National Forest, Oregon, during April-September, 1986 and 1987. A severe mountain pine beetle epidemic had created an abundance of dead and dying trees, and an agressive pest management and timber salvage program had created a patchwork of logged areas, primarily shelterwood cuts, on the study area.

All nests excavated by three-toed and black-backed woodpeckers were in portions of lodgepole pine (Pinus contorta) trees with heartrot. Evidently, both species require soft wood for excavating cavities, because of morphological adaptations associated with 3 toes on each foot. Habitat selection for mature and overmature forest stands, and against younger stands and logged areas, was documented for three-toed woodpeckers using 16 nests, 493 forage bouts, and 16 roosts, and for black-backed woodpeckers using 35 nests, 395 forage bouts, and 20 roosts. Home range sizes for 3 radio-tagged three-toed woodpeckers were 751, 351, and 131 acres (n=170, 352, and 131 locations, respectively). Home range sizes for 3 radio-tagged black-backed woodpeckers were 810, 303, and 178 acres (n= 124, 86 and 112 locations, respectively). Intra-specific home range overlap among both species appeared limited or nonexistent, except among paired individuals near the nest site. Inter-specific home range overlap was common between three-toed and black-backed woodpeckers and other Picidae.

Guidelines for management included establishing Management Areas which retain the characteristics of mature and overmature lodgepole pine or lodgepole pine-mixed conifer forest stands. Recommended sizes of Management Areas were 528 acres per pair of three-toed woodpeckers, at a minimum elevation of 4500 ft, and 956 acres per pair of black-backed woodpeckers, with some Areas at elevations less than 4500 ft. One Management Area could be designated for both species, if the respective habitat needs were met.

SUMMARY

INTRODUCTION

Three-toed and black-backed woodpeckers are two of the least known species of woodpeckers in North America. They are sympatric over most of their North American range and both are nonmigratory residents on the east slope of the Cascade Mountain Range. The woodpeckers are associated with trees characterized by scaly or flaky bark, but differ in the species of trees with which they are associated; the three-toed woodpecker is more closely associated with spruce (Picea spp.), and the

roosts were on the lower study area where only lodgepole pine forest type was available. Mean canopy closure at roost sites was 40%. Mean dbh of trees in the roost stand was 6.0 in. Mean basal area of roost stands was 115 ft^2/acre. Lodgepole pine trees were used for 14 roosts. Mean dbh of roost trees was 11.0 in. Mean tree height was 65 ft.

MANAGEMENT IMPLICATIONS

Mature and overmature forest stands have a high incidence of disease, decay and mortality. Trees with disease and decay are undesirable components of a managed forest, but were used by three-toed and black-backed woodpeckers for home range, nesting, roosting, and foraging habitat. Nests were excavated in trees with heartrot, roosts were in diseased portions of trees or decayed snags, and forage sites were in mature and overmature stands, which have abundant disease and decay, and consequently abundant wood-boring insects. Conversion to and maintenance of lodgepole pine and lodgepole pine-dominated mixed conifer stands in a young, vigorous condition may eliminate or severely restrict incidence of wood-boring insects and heartrot, leading to declines in populations of three-toed and black-backed woodpecker.

Acreage of mature and overmature lodgepole pine forest stands are declining throughout the Oregon Cascades, because these stands are the prime target of the mountain pine beetle. Stands which experience high mortality nonetheless provide habitat for three-toed and black-backed woodpeckers. Individual trees within a stand may remain standing 10, 15 or 20 years, thus providing a continuum of habitat. Treating these stands, by logging, immediately converts them to a vigorous condition where incidence of death and decay is severely restricted, thus potential nesting and foraging substrate is drastically reduced. Although in time, stands without treatment may be structurally similar to treated stands, the time to reach that condition differs significantly. Because stands without treatment continue to provide habitat over a longer time than treated stands, thus there is a shorter period when old growth lodgepole pine is absent or scarce on the Deschutes or other National Forests. Consequently, a larger population of woodpeckers may survive,

thereby increasing the potential for maintening viable populations of both species.

Designation of the three-toed woodpecker as an Indicator Species for mature and old growth lodgepole pine appeared appropriate, but only at elevations greater than 4500 ft. Much of the pure lodgepole pine on the east slope of the Cascade Mountain Range in Oregon occurs at elevations less than 4500 ft. We recommended the black-backed woodpecker as an Indicator Species for mature and old growth lodgepole pine, instead of the three-toed woodpecker. Unlike the three-toed woodpecker, the black-backed woodpecker used a range of elevations coincident with lodgepole pine. Futher, it responded to play-back recordings more frequently, over a longer time period, and with louder vocalizations than the three-toed woodpecker, thus may be more effectively monitored than the three-toed woodpecker.

Until more information is available, we believe the most effective method of insuring habitat for three-toed and black-backed woodpeckers is to exempt areas (i.e. Woodpecker Management Areas) from commercial or salvage timber management and place these areas under a special management strategy, which retains the characteristics of mature or overmature lodgepole pine habitat as long as possible, without treatment. Woodpecker Management Areas should be in lodgepole pine or lodgepole pine-dominated stands with the greatest probability of surviving the longest time, but if these stands no longer retain the characteristics of mature and overmature stands, or if the number of trees remaining is inadequate to support a pair of woodpeckers, then the designated Woodpecker Management Area should be relocated to a selected replacement. Replacement stands should be selected now, to provide the earliest possible replacement for declining Woodpecker Management Areas. Woodpecker Management Areas, and replacement areas, may be within areas previously designated as protected, such as old-growth areas, Spotted Owl Habitat Areas, winter recreation sites, Research Natural Areas, etc. Management Areas for each pair of three-toed woodpeckers should be 528 acres of lodgepole pine or mixed conifer forest in mature and overmature condition and at an elevation of 4500 ft or higher. Management Areas for each pair of black-backed woodpeckers should be 956 acres of lodgepole pine or lodgepole pine-dominated mixed conifer forest in mature and overmature condition. One Management Area of 956 acres, at an elevation of

4500 ft or higher, could be designated for 1 pair of both species. However, Management Areas for black-backed woodpeckers should not be restricted to elevations greater than 4500 ft because this species may be better adapted to conditions at lower elevations.

Black-backed woodpeckers are not currently assigned a special status (e.g. Indicator Species), thus designation of Woodpecker Management Areas may not be practical at this time. An alternative management strategy can be applied on a sale-by-sale basis. On each sale, habitat can be preserved for each pair of black-backed woodpeckers by removing 956 acres of inter-connected blocks of mature/overmature habitat from harvest. For example, if a sale area is 9500 acres of mature or overmature lodgepole pine-dominated habitat, management at 60% of potential would be for 6 pairs, or 6 areas of 950 acres each. The traditional approach for management of cavity-nesters at 60% of potential by retaining 60% of the snags and live replacement tree may be ineffective for black-backed and three-toed woodpeckers for two reasons. One - snags provide more than nesting habitat; snag retention at the 60% level is unlikely to occur in sufficient amounts to provide adequate feeding substrate for species dependent on wood-boring insects associated with trees with flaky/scaly bark. Two - this approach addresses a singular, albeit a key, component of the species' habitat. The interrelationships of an old growth, or mature/overmature ecosystem, and the species associated with it, are little known, but likely complex. Land managers do not, at this time, have the information necessary to manipulate habitat and insure these interrelationships will be maintained.

The figures for home range sizes and the amount of mature or overmature stands used by woodpeckers were estimated under conditions of abundant food supply. As the mountain pine beetle epidemic runs its course, and prey abundance declines, it is likely that the amount of area required to support a pair of three-toed or black-backed woodpecker will increase.

Three-toed and black-backed woodpeckers should be monitored to track changes in population levels as the mountain pine beetle epidemic runs its course and as the forest becomes increasingly managed, resulting in reduced levels of disease and decay. Survey routes to document number of woodpecker responses

EVIDENCE OF SNOW-PLUNGING BY BOREAL AND BARRED OWLS

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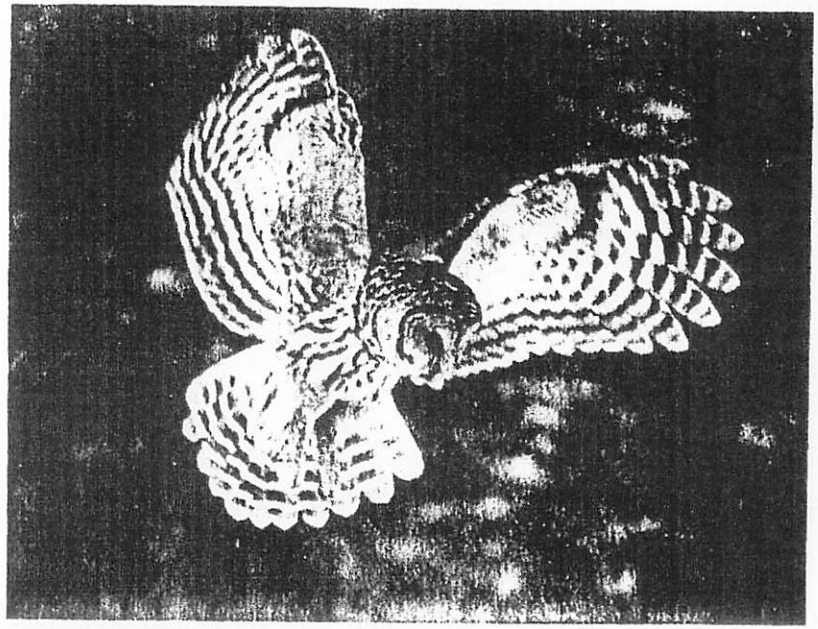
In 1978, Curry-Lindahl, in his foreward to a major reference on technical publications about owls, noted that "...many species of owls rely not only on a sensitive vision, but, if necessary, to a considerable extent also on remarkable auditory powers when hunting rodents and shrews during the winter when these mammals often move under the snow cover. At least the tawny owl, Short-eared Owl (*Asio flammeus*) and Long-eared Owl (*A. otus*) are able to localize from the air, invisible small mammals and to catch them 'blindly' on the right spot below the snow surface. Probably also other species of owls use this technique; I am almost certain that the Boreal (Tengmalm's) owl (*Aegolius funereus*) does it."[2]

Snow-plunging as a method of obtaining prey under deep snow conditions is so common a characteristic of the Great Gray Owl that plunge-marks can be used to prove the presence of this species.[1,5,6] Norberg, in a review of feeding behaviour of northern forest owls, pointed out that the large size of the Great Gray Owl's head and face "improves its probabilities of auditory detection of concealed prey and enhances localization accuracy. The asymmetry of the external ears improves sound localization.... Its large weight enables it to make deep plunge-holes in the snow and to catch prey deep below the snow surface where lighter owls could not possibly get at the prey."[6] Norberg cites one report of a Great Gray Owl that plunged through a snow crust hard enough to bear an 80-kg man.[6]

Typically, a perching or hovering owl — and the broad wings of the Great Gray owl suit it admirably for hovering or gliding slowly — locates prey by sound, then drops head downward and forcibly into the snow, breaking its fall with its wings and reaching deep with its long legs for its prey. Mikkola writes: "As it dives downward its head is suddenly directed towards its prey and it almost seems that the head hits the surface of the snow first. However, both Eero Kemila [whose photo beautifully illustrates this behaviour] and Leinonen ... believe that in the instant before hitting the snow the owl will draw back its head, extend its legs and stretch its feet forwards with the talons fully spread. However, the high speed of the dive renders it impossible to prove precisely what does happen by direct observation."[4] Not all plunge-marks made by Great Gray Owls are of the same size; in some cases, birds drop only their feet into the snow, barely touching with their body. At times there may not even be any mark left by the wings. Small mammals feeding or tunnelling at or near the surface of the snow — and this is not uncommon — may be taken by a shallow pounce, rather than by a full-out dive. Thus interpretation of plunge-marks requires some caution.

Brief mention has been made of an observation by Richard Knapton



Snow-plunging Barred Owl. *James R. Duncan*

of snow-plunging by a Boreal Owl.[5] Because of the apparent scarcity of this behaviour in this species, Knapton's note is presented here in detail for the first time. The following is from a letter he sent to Soren Bondrup-Nielsen on 25 January 1979: "A Boreal Owl has been seen in the Assiniboine 'Forest' here in Winnipeg for the past two days; today (25 January) I observed the bird for about 35 minutes at noon while it was hunting along ski trails and in open spots in the wood. On one occasion the bird plunged into the snow from a perch about 2 metres up in an aspen; the plunging behaviour seemed similar to that of the Great Gray Owls — that is, the bird finished its plunge into the snow with its wings open and resting on the surface of the snow (primaries were traced on the snow). The plunge hole was about 10 cm deep (estimated, not measured) and the shape resembled those of Great Grays — large body indentation with 'bulges' on the side presumably caused by wings. It evidently failed to capture prey, as it flew onto a nearby perch with nothing in its talons. It continued hunting by flying distances up to 30 metres, perching and looking intently at the ground for up to 2 minutes, then off to another perch, and so on. The day was cloudy, totally overcast, hence the bird's activity at midday" (pers. corres., 26 October 1987, R. W. Knapton).

As Norberg indicated, the Boreal Owl may be too light in weight to successfully snow-plunge. Unless the snow is especially soft, it probably couldn't go deep and, moreover, its legs are relatively short compared to those of the Great Gray Owl. The Barred Owl, in the same genus as the Great Gray Owl, and considerably heavier than the little Boreal Owl, conceivably could snow-plunge. Yet this behaviour is apparently uncommon in this species. Mark Elderkin, who studied Barred

Owls in Nova Scotia, notes: Although I have never actually witnessed this be- haviour, I have some evidence that it does occur and have seen plunge marks along wooded-field edges. Usually small bits of feathers betrayed the species of owl and in one instance, drops of blood indicated a successful capture. I would suggest that in severe winters when snows are deep and alternative foods are scarce, subnivean capture of small mammals are more frequent than in mild years. An eyewitness account of snow plunging conveyed to me by a local man confirmed the existence of the behaviour. In this instance, an unsexed Barred Owl was observed hunting along a wooded-field edge during daylight hours in 1985. Of three plunges made by this owl, only one was successful in the capture of an unidentified small mammal" (pers. corres., 6 September 1987).

Upon enquiry, Dave Johnson, who studies Barred Owls in north-central Minnesota, responded as follows: "Have never actually witnessed a Barred plunge, but have one observation from Jan. 1983, Becker County, MN, of a nice plunge hole made by a Barred. It was near one of my nest boxes, and I had seen a Barred in the vicinity on four occasions during that week. I have looked for Barred plunge holes for five years now. The plunge hole occurred in a small marsh pocket (30 yards across) in a northern hardwood forest type, where overhanging trees provided a perch. I recall snow depths of 15-18 inches in the marsh pocket" (pers. corres., 3 September 1987). The late Don Follen, a Wisconsin owl student, had this to say: "Snow plunging: I've seen Bd's [Barred's] on several occasions in the snow up to their pits. This is of course soft fluffy snow" (pers. corres., 24 August 1987).

Despite our many years in the field in winter in southeastern Manitoba looking for owls, Herb Copland and I have only three indications of snow-plunging by Barred Owls. Late in the afternoon of 4 January 1981, along the Glen road east of East Braintree, we found fresh signs of snow-plunging by a bird of Barred Owl size. There were at least six plunge-holes in the snow over a grassy field. Except for the small size, they resemble marks made by Great Gray Owls. The holes were close to trees. Again, and in the same vicinity, on 11 January 1981 we saw similar plunge-holes in the afternoon, and then at 8:00 p.m. a Barred Owl came out and perched in a nearby tree. We assumed that it was the bird that had made several Barred Owl-size plunge-holes at a new site several kilometres away. At one plunge-hole there was an imprint of the owl's face showing the bill, just as we have seen at numerous Great Gray Owl plunge-holes. This imprint was the size of a Barred Owl's face.

In our experience, Barred Owls are seldom seen here, especially in winter. The species, as noted by Johnsgard, "is essentially a semi-nocturnal to nocturnal hunter."[3] Apparently less bold and seemingly more restricted to hunting within woods than Great Gray Owls, only six Barred Owls have been seen by Herb Copland and myself over the past 20 winters. Jim and Patsy Duncan, on the other hand, recorded three sightings of Barred Owls in winter 1986-87: one at 5:00 p.m. - 12 December; one at 2:22 p.m. - 2 February; and one at 4:49 p.m. - 16 March. The latter bird, which they captured when it came into a lure, was reported as noticeably thin (pers. corres., 1987). Herb and I captured one at 3:15 p.m. on 4 February 1979, northeast of Lac du Bonnet. Upon seeing what we assumed to be a Great Gray Owl back some distance from the road in a grove of aspens, we set out to capture the bird; on the third cast of the lure, the owl came out from the trees in pursuit of it. We were surprised to see, when it was close, that it was a Barred Owl. It turned away at the last minute, but landed nearby and a moment later came in to a live mouse and was netted by Herb. Its belly plumage was wet and there was even a little ice on some parts. We guessed that it had roosted in wet snow in a tree cavity. It was kept in the car long enough to dry out its plumage before we released it.

I am particularly grateful to Richard W. Knapton for allowing me to use his observations of the Boreal Owl. Thanks for their information are also owing James R. Duncan, Patricia A. Duncan, Mark F. Elderkin, David H. Johnson and the late Donald G. Follen, Jr. For congenial companionship on owl forays, I am indebted to Herbert W. R. Copland.

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"Recently, estimates on the number of species [of plants and animals] on earth have been revised dramatically upward, from around 5 or 10 million to between 30 and 50 million. The point is, no one knows. Only 1.4 million species have been classified." *Verlyn Klinkenborg, Audubon Jan-Feb/92*