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Note

Observations of Notable Parental Behaviours of Northern Spotted Owls (*Strix occidentalis caurina*)

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Northern Spotted Owl (*Strix occidentalis caurina*) is a medium-sized forest owl of conservation concern in the Pacific Northwest of North America. We report two sightings of previously unreported parental behaviour: a Northern Spotted Owl feeding avian nestlings to its young and a Northern Spotted Owl defending a fledgling against a Black Bear (*Ursus americanus*). Further research may be warranted on the influence of brood size and habitat quality on dietary breadth. Although Black Bears have not been previously documented as Northern Spotted Owl predators, we suggest that they should be considered potential predators of nestling and fledgling owls.

Key Words: Nest predation; nest defense; diet; Northern Spotted Owl; *Strix occidentalis caurina*; Black Bear; *Ursus americanus*

Northern Spotted Owl (*Strix occidentalis caurina*) is a medium-sized owl native to western portions of northern California, Oregon, Washington, and southern British Columbia. It primarily inhabits mature forests with complex canopy structure (Forsman *et al.* 1984, 2015; LaHaye 1988; Solis and Gutierrez 1990) and preys primarily on medium-sized nocturnal rodents, such as Bushy-tailed Woodrats (*Neotoma cinerea*), Northern Flying Squirrels (*Glaucomys sabrinus*), and Red Tree Voles (*Arborimus longicaudus*; Thomas *et al.* 1990; Forsman *et al.* 2004).

In the United States, Northern Spotted Owl has been listed as “threatened” under the *Endangered Species Act* since 1990, largely because of habitat loss, and it is currently under review for increased protection because of competition with invasive Barred Owls (*Strix varia*) and other emerging threats, including disease and climate change (USFWS 2015). It has been listed as “endangered” since 2000 (COSEWIC 2008) under Canada’s *Species at Risk Act* (SARA Registry 2017) for the same reasons. United States federal agencies conduct regular monitoring of Northern Spotted Owls in areas that may be altered by management activity under a protocol established by the United States Fish and Wildlife Service (USFWS 2012). In this note, we report two observations of previously unreported parental behaviours recorded during sanctioned nest monitoring activities: a Northern Spotted Owl feeding avian nestlings to

its young and a Northern Spotted Owl defending its fledgling against a Black Bear (*Ursus americanus*).

On 26 June 2014, we observed a Northern Spotted Owl feeding avian nestlings to its young. The observation occurred when we followed an adult male Northern Spotted Owl to an active nest site about 15 km south of Leavenworth, Washington, on the Wenatchee River Ranger District of Okanogan-Wenatchee National Forest. Several passerines were mobbing the owl when we located it at 1925. At 1940, the owl took a mouse from us and led us to its mate and two fledglings. From 1940 to 2045, the pair of owls took four mice from us, delivering two of them to the fledglings, eating one, and caching the other. The male owl also brought two avian nestlings to the fledglings from outside our field of view (one at 2006, the other at 2020). The fledglings had difficulty eating the mice — repeatedly dropping them and requiring piece-by-piece feeding by the female after an hour spent attempting to eat them whole on their own — but had no difficulty eating the nestlings. This could indicate familiarity with avian prey, but it could also simply be a function of the nestlings’ size and frailty compared with mice.

The nestlings could have been retrieved from a cache or taken directly from an active nest, but they were not alive by the time they entered our view. They appeared to be in an early stage of development. Neither nestling had yet developed feathers. Both were approximately

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the size of the mice we were using to document nest status. Based on the vegetation composition of the nest stand, the size of the nestlings, and the bird songs we have heard in the area, we believe nestlings may have been American Robins (*Turdus migratorius*) or Hermit Thrushes (*Catharus guttatus*).

Northern Spotted Owls are known to feed on avian species, but these species make up only a small part of their diet: 1.4–2.8% (Hamer *et al.* 2001), 4.4–6.4% (Forsman *et al.* 2001), 4.4–5.6% (Forsman *et al.* 2004). Researchers have witnessed Northern Spotted Owls feeding on avian species (S. G. Sovern, personal communication), but, to our knowledge, Northern Spotted Owl predation on avian nestlings had not been directly observed previously. This observation indicates that avian nestlings, which are much more easily captured than adult birds, make up some portion of these owls' avian prey and are potentially a seasonally valuable resource. It is impossible to know from one observation whether this was opportunistic or selective behaviour. In either case, however, broadening of the owls' diet may have been driven in part by the increased energetic needs of owls with two nearly fledged owlets. Further research on the role of brood size in diet selection may be warranted.

This behaviour may have been driven by marginal availability of preferred prey in the breeding territory. Northern Spotted Owls have been found to prey predominantly on Bushy-tailed Woodrats and Northern Flying Squirrels in the eastern Washington Cascades (Forsman *et al.* 2001). In this area, woodrat abundance has been found to correlate well with the abundance of large snags, mistletoe brooms, and downed logs (Lehmkuhl *et al.* 2006a), while flying squirrel abundance has been found to correlate positively with canopy cover (Lehmkuhl *et al.* 2006b). We believe that this breeding territory, which has relatively little canopy or ground structure and a fairly open canopy, is unlikely to support high densities of either of these prey species. Despite the apparent unsuitability as woodrat and flying squirrel habitat, this breeding territory has been occupied (often with successful reproduction) for over a decade, indicating that either some unaccounted-for factor allows for continued high woodrat and/or flying squirrel densities or that the owls in this territory rely on other prey species.

On 7 June 2016, while visiting a different active nest site in the same area, we observed a female Northern Spotted Owl defending its fledgling from a Black Bear. We arrived at the nest site and located a fledgling owl at 2010. It was in a large Ponderosa Pine (*Pinus ponderosa* Douglas ex Lawson & C. Lawson) within 30 m of the nest, at roughly nest level (15 m above the ground). Although it was no longer in the nest, it appeared that it could not yet fly. An adult male owl arrived at 2013, and an adult female arrived shortly thereafter. At 2040, before either of the adult owls took a

mouse, a Black Bear walked through the drainage below the nest tree. The female immediately flew down toward the bear and dove to harass it. The bear continued moving down the drainage and past the nest tree to an opening downhill of it, where the bear spotted us and ran out of the stand. Although brush obscured our view of both the owl and the bear in the drainage, we saw the owl dive at the bear at least once. The female followed the bear down the drainage, roosting low enough to continue harassing the bear. She returned to the nest area only after the bear had departed the area.

Nest defense by Northern Spotted Owls has been documented in response to humans climbing nest trees or approaching owlets that had left the nest but could not fly, as well as against Common Ravens (*Corvus corax*) and Cooper's Hawks (*Accipiter cooperii*; Forsman *et al.* 1984). Researchers have also witnessed defensive behaviour against domestic dogs (J. Reid and D. Herter, personal communication) and bobcats (S. Gremel, personal communication). We found no evidence in the literature or through communication with other Northern Spotted Owl researchers that Black Bears are Northern Spotted Owl nest predators, but the female's aggressive behaviour indicates that she recognized the bear as a potential predator, and Black Bears are known predators of other young raptors (McKelvey and Smith 1979) and cavity-nesting birds (Fisher and Wiebe 2006; Tozer *et al.* 2009), even accounting for about 10% of predation events in one study of cavity-nest predation in Washington (Kozma 2011). Large, vocal owlets with limited mobility could certainly be attractive prey for foraging Black Bears. Although we believe predation on nestling and fledgling Northern Spotted Owls by Black Bears is likely uncommon, our observation coupled with known predation on the young of other raptors and cavity nesters suggests that Black Bears should, nevertheless, be considered potential predators of these young owls.

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