Immediate Post-fire Nesting by Black-backed Woodpeckers, *Picoides arcticus,* in Northern Alberta

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An active Black-backed Woodpecker nest was found in a forested area that had been severely burned the same summer. By backdating, nest excavation was estimated to have started within a few days after the passage of the fire. This observation indicates that the Black-backed Woodpecker is not only closely associated with recently-burned forests, but that it can nest successfully immediately after the occurrence of a forest fire.

Key Words: Black-backed Woodpecker, *Picoides arcticus*, forest fires, colonization of burned sites, source-sink dynamics, Alberta.

Several authors have reported the close association of Black-backed Woodpecker (*Picoides arcticus*) with recently-burned forests (Bock and Bock 1974; Apfelbaum and Haney 1981; Raphael et al. 1987; Villard and Beninger 1993; Hutto 1995). Hutto (1995) suggested that recent (0–6 years old) fire sites may represent source habitats (Pulliam 1988) for Black-backed Woodpeckers, in the sense that local reproduction exceeds mortality, whereas adjacent unburned forest patches may represent habitat sinks whose populations are maintained by individuals emigrating from burned sites when post-fire conditions become less favourable. Although presence and nesting activities of Black-backed Woodpeckers in recently-burned forests have been reported elsewhere, the minimum time elapsed between a forest fire and the (re)settlement of nesting pairs has not been documented.

Here, we report on a Black-backed Woodpecker pair that initiated a nest within the first two weeks after a severe fire in the boreal mixedwood forest of Alberta and successfully raised young. We do not have information on the location of the members of this pair prior to the fire, but the timing of their nesting suggests that Black-backed Woodpeckers may be able to colonize, or resume their nesting activities in burned areas immediately after the passage of a forest fire.

On 20 July 1995, we were surveying stands within a large (>110 000 ha) burn approximately 50 km south of Fort McMurray, Alberta (56° 17′ N; 111° 45′ W) when we heard the begging calls of young woodpeckers. We found the nest cavity in a Trembling Aspen (*Populus tremuloides*), approximately 4 m above the ground. A pair of Black-backed Woodpeckers was present in the vicinity. The male flew to the nest cavity and fed the young through the cavity entrance without having to enter the cavity. It appears that this pair successfully raised at least one young, as a group of three Black-backed Woodpeckers was seen foraging within 100 m of the nest tree on 8 November 1995 (Dave McKinnon, personal communication).

We backdated the onset of the nesting activities of the pair based on our observations and on data available in the literature. We estimated that the young were >1 week old on 20 July, because they were able to reach the nest entrance to take food from their parents. This estimate is conservative, as Short (1982) reported that nestlings' eyes open only at 8–10 days in the closely-related Three-toed Woodpecker (*Picoides tridactylus*). The duration of the incubation period is 14 days and the mean clutch size is four (Bent 1939). We estimate that the first egg was laid at least 24 days before we discovered the nest, assuming that incubation began with the fourth egg. The earliest date that the fire could have burned through the area (11 June 1995 - see below) was 40 days prior to our observations and thus, at most 16 days prior to the pair producing eggs.

We do not know whether the cavity was excavated prior to or after the fire, but Three-toed Woodpeckers are known to create a new nesting cavity every year (Short 1982). We could not find estimates of the time that this species, or the Three-toed Woodpecker, require to excavate a nesting cavity, but the Hairy Woodpecker (*Picoides villosus*) takes between one and three weeks to excavate a cavity (Bent 1939). Two types of evidence suggest that nest excavation may be similar in Black-backed and Hairy Woodpeckers: both species (1) are of similar size (Godfrey 1986), and (2) they usually excavate cavities through sound sapwood and into decayed heartwood (Miller et al. 1979). Therefore, if the cavity was excavated after the fire, the pair of Black-backed Woodpeckers we observed would have started excavation within a few days after the burn. The duration of pair formation activities and their location relative to the future nest have not been described in either the Black-backed or Three-toed Woodpeckers (Short 1982).

Prior to the fire, the area where the nest was found was dominated by Trembling Aspen, along with White Spruce (*Picea glauca*), and there were a few small pockets (ca. 1 ha) of Black Spruce (*Picea mariana*). The understory was dominated by Trembling Aspen and White Spruce seedlings. According to detailed fire progression maps produced by the Alberta Forest Service, we estimate that the area where the nest tree was located burned between 11 and 13 June 1995. The intensity of the fire appeared to have been high in that area, as the nest tree and all adjacent trees were dead on 20 July. The nest tree had no leaves, it was scarred at its base, on the trunk around the cavity, and on the upper branches. Adjacent trees were similarly scarred. The nest tree was located only 100 m away from a large patch that burned only lightly or not at all during the fire. It is possible that the woodpecker pair took refuge in that patch during the fire.

This is, to our knowledge, the first direct evidence that this species has the ability to start nesting within days after the passage of a severe fire. Early colonization of burned sites may be advantageous to Black-backed Woodpeckers, as they feed extensively on wood-boring larval beetles (Short 1982). Wood-boring insects rapidly colonize burned areas to oviposit on freshly killed trees (Evans 1966). Their eggs may hatch within a few weeks (e.g., 2 weeks in *Agrilus liragus*, Coleoptera: Buprestidae; Barter 1965). Trembling Aspens represent a suitable host for both Buprestid and Cerambycid beetle larvae (Barter 1965; Drouin and Wong 1975). However, beetle larvae populations may not reach high densities until two years after colonization (e.g., Zhong and Schowalter 1989 for long-horned beetles, Coleoptera: Cerambycidae).

We did not measure the abundance of beetle larvae at the site upon the discovery of the nest. Perhaps the pair we observed was foraging in the nearby patch of unburned forest. Nonetheless, the apparent success of the nesting attempt we document suggests that it is advantageous for Black-backed Woodpeckers to promptly colonize recent fires or to maintain territories after the passage of intense fires. Observations made by one of us (JS) in the summer of 1996 reinforce our impression that the 1995 nesting pair had been successful. A Black-backed Woodpecker pair was observed in the vicinity of the 1995 nest, and another pair was detected approximately 500 m to the west. The latter pair was also found in the burned area, at least 700 m from the edge of the fire, and 400 m from a 5 ha unburned patch of forest.

Our observations and the literature on Black-backed Woodpeckers suggest that this species may be sensitive to forest management practices altering the frequency or extent of natural disturbance events such as fires, windfalls, or spruce budworm outbreaks that leave sizeable patches of standing dead or dying trees. Landscape or regional-scale demographic studies would be useful to determine whether recent burns actually represent source habitats for this and other species.

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