



Resource Bulletin

Fire and Birds

Burned Forests Provide Critical Habitat

Historically, prior to European settlement, fire was one of the most widespread, natural disturbances in the western United States. While the predominant fire regime in low elevation forests and in grasslands in the Northern Rocky Mountains is frequent, low-severity, understory burns, the predominant fire regime in mid- to high-elevation forest types is one of infrequent, high-severity, stand-replacement fires. Therefore, the origin of many forest stands in Glacier can be traced to stand-replacement fires.

In the Northern Rocky Mountains, over 80 bird species nest and forage in burned areas following stand-replacement fire. Fifteen of these species are more abundant in early post-fire communities than in any other major cover type. At least one species, the Black-backed Woodpecker, is nearly restricted to the standing dead forests created by stand-replacement fires. The composition of bird communities in recently burned forests is different than those in other Rocky Mountain cover types. Woodpeckers (Hairy, Three-toed, and Black-backed), flycatchers (Olive-sided and Dusky and the Western Wood-Pewee), and seedeaters (Clark's Nutcracker, Chipping Sparrow, and Pine Siskin) are especially abundant in these recently burned areas.

Standing dead trees, known as snags, provide nest sites and foraging opportunities. Many cavity-nesting species nest in burned forests. Woodpeckers create their own cavities, whereas "secondary" cavity nesters, such as Mountain Bluebird and Northern Hawk Owl, use old woodpecker holes or other natural



Northern Hawk Owl juvenile sits on a burned log in Glacier National Park. This is one of several broods discovered in the park in recent years.

cavities (for example, holes that are created where limbs break off). Cavity-nesting species tend to nest disproportionately more often in broken-topped snags and deciduous trees (aspen and birch) than other choices in these burned forests.

Not all burned forests are equally suitable for any particular species. Bird species favoring stand-replacement burned areas are less abundant in areas that were burned by understory fire. Further, it is likely that older, more mature forests with large trees and snags would be more favorable areas for cavity-nesters post-fire than young trees would be. Therefore, mature and old-growth forests not only provide habitat for some species of concern when they are green but for other species of concern after they burn.

Bird Succession

After a fire, forest succession occurs: in early stages, dead trees, tree seedlings, shrubs, grasses, and forbs predominate; after 15 to 50 years, a young forest emerges; eventually, the young forest grows into a mature forest. Just as the dead trees are succeeded by a young forest and then an old one, succession is also seen with birds. How long a particular species is found in a burned area probably depends upon the availability of foraging and nesting resources. Black-backed Woodpecker, Mountain Bluebird, and Northern Hawk Owl are three of the species found primarily in the first few years after burns. Other species have different responses. Lewis's Woodpecker can be abundant in recent (2-4 years) and older (10-25 years) burns. Old-growth associated



This male Black-backed Woodpecker is perched at the opening of an excavated nest site - excavated by both the male and female.

species, such as Winter Wrens, Golden-crowned Kinglets, and Townsend's Warblers, return as the forest ages.

The Black-backed Woodpecker is nearly dependent on high-severity, stand-replacing fires. They breed in severely burned areas for approximately the first 5 years after the burn. After that, they seek other recently burned forests to nest in. These medium-sized woodpeckers have solid black backs that make them hard to detect when they are foraging on the charred bark of the dead trees, searching for the larvae of wood-boring beetles, engraver beetles, and mountain pine beetles.

Mountain Bluebirds are numerous in new burns, especially after high-severity, stand-replacing fires, but decline in mid-successional stages. Bluebirds often perch on dead trees and fly to the ground, to vegetation, or into the air to capture insects. They prefer to hunt in short vegetation or bare areas, places where the vegetation is shorter than their legs.

The Northern Hawk Owl is an uncommon species that has nested in recently burned forests in Glacier National Park, with the first documented nesting in 1994 (a state record). Before then, they had rarely been found in Montana. The Northern Hawk Owl, a boreal species, nests in woodpecker holes or other natural cavities in dead or dying portions of trees. With some behaviors that are similar to those of hawks, their flight is rapid, strong, maneuverable, and often low to the ground. From perches, this owl swoops down on prey, primarily small mammals, especially voles.

Glacier's Management Strategy

In general, in the western United States, 80 years of fire suppression and silvicultural practices have altered fire regimes in many habitat types. However, the forests in Glacier, especially those on the west side of the park, have been less affected by fire suppression activities than forests elsewhere. Because most

forests in Glacier have long fire-return intervals, most forests are within natural fire return intervals. Further, the natural role of fire has been allowed to return through the annually updated Fire Management Plan which allows for the ecological process of fire through "Appropriate Management Response" of all fires. The diversity of the landscape is now perpetuated by a more natural history of wildland fires, enabling different stages of succession and habitat diversification.

These burned areas offer an outdoor laboratory for burned area research. It is from this research we may learn how much connectivity among burned patches is required for the survival of certain species. Habitat for many species of fire-dependent or fire-associated birds has greatly expanded in recent years, and monitoring efforts are underway to quantify and further clarify the benefits of fire. Without periodic stand-replacing fires within the detection distance for these species, these benefits could be transitory.



A male Mountain Bluebird brings food back to a nest site, feeding nestlings in natural cavity.



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Resources for More Information

Glacier National Park Staff:

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Documents and web sites:

Composition of bird communities following stand-replacement fires:
http://avianscience.dbs.umt.edu/2__1995conbiol-fire.pdf.pdf/

Effects of fire and post-fire salvage logging on avian communities:
http://avianscience.dbs.umt.edu/research_pub/pdf/2002SAB-fire.pdf

Several recent important papers on birds and fire:
http://www.rms.nau.edu/lab/4251/birdsburns/fire_avian_ecol.shtml

Avian Science Center's (University of Montana) publication web site:
http://avianscience.dbs.umt.edu/research_pub.htm