

## **Twenty-five Years of Research Yields Some Surprising Results**

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Paddling against a brisk north wind, we worked our way slowly past the protection of an island. Our eyes swept the dancing waves for the entrance to Devil's Walk Bay, our destination. The previous spring, we had put a permanent research plot in the beautiful jack pine forest that grew along much of the south shore of Saganaga Lake. Devil's Walk was a deep bay with two protected campsites surrounded by an open pine forest where pink ladyslippers grew through deep moss that covered the forest floor. Blackburnian and Bay-breasted Warblers were common in the trees, and the rich song of Ovenbirds rang in the understory.

As I looked toward the entrance to the bay, my heart sank. Instead of the graceful forest of jack pines, all I could see was the blackened remains from a fire. Perhaps, I hoped, the fire had not reached the campsites or the forest along the east side of Devil's Walk Bay where we had put our research plot. Twenty minutes later, however, we realized that nearly the entire south shore of Saganaga had burned the previous August in what was called the Roy Lake Fire. In despair, I suggested to our research crew that we rest for the night, then travel on north to Saganagons Lake where another of our research plots was to be located along the north channel in a young forest that had burned 15 years previously.

My associate, Steve Apfelbaum, of Applied Ecological Services, however, saw an opportunity in the Roy Lake Fire. Because we had carefully documented the vegetation and birds on the Devil's Walk Bay plot the previous year, we could evaluate the first-year response to fire in a way not often available to fire ecologists. After surveying the site, we discovered the tattered remnants of some plastic flagging we had used to mark the corners of our plot. Since it was May 26, 1977, too early for most of the vegetation to have responded to the fire, we decided to continue on to Saganagons, and return to Devil's Walk the following week.

Now, nearly 25 years later, we have revisited the Devil's Walk site 5 times. We've also conducted repeated studies on 49 other sites scattered throughout eastern BWCAW and the Quetico Provincial Park. By comparing fire history to vegetation and bird populations, and by following the successional development of forests after they have burned, we have gained several new insights into how the upland forest communities of the Quetico-Superior respond to fire. Our conclusions are often surprising to those who think of fire only as a catastrophic disturbance in the forest.

Previous scientists used fire scars on trees and charcoal in lake sediments to piece together evidence that suggested fire was a regular, recurring event on upland communities in the Quetico-Superior. On average, upland communities in the region

burned every 70 to 100 years. This fire regime has apparently continued since the retreat of the glaciers, although the intensity and frequency of fire has varied with climatic fluctuations. Indeed, every species that inhabits upland communities is adapted to fire, directly or indirectly, such that each survives even the most extreme fire events. Naturally, some species cannot persist on badly burned sites within the region, but they persist on other, more protected sites until the forest develops sufficiently to again accommodate their offspring at some future time.

Consider, for example, the Northern Goshawk. This species likes to nest in mature, mixed conifer and deciduous forests, usually in the crotch of a deciduous tree, such as quaking aspen. About 70 to 90 years after fire, upland sites generally support a mixture of mature jack pine, black spruce, and aspen, ideal habitat for nesting Goshawks. Goshawks prey heavily on Ruffed Grouse in the spring as their young are maturing. Our research reveals that Ruffed Grouse like the heavy undergrowth of recent burns where they feed on seeds from fringed bindweed, among other things. Thus, fires create good Ruffed Grouse habitat within 3 to 5 years and good Northern Goshawk nesting habitat within 70 to 90 years. Without fire, the mature spruce-fir forests would be less suitable for both Ruffed Grouse and Northern Goshawks.

Every species we have studied fits into the post-fire successional pattern. Flycatchers like the open habitats the first several years after fire. Likewise, Northern Black-backed Woodpeckers find in fire-killed trees readily available insects and good nest cavity sites. Flickers feed heavily on the carpenter ants that invade fire-killed trees, and their nest cavities make secondary nesting sites for American Kestrels. Brown Creepers also feed on insects that abound on fire-killed trees and build their nests under the bark slips of dead trees.

Bears like to forage on recent burns where rose hips, raspberries, blueberries, and mushrooms are common. Beaver and moose prefer the abundant young aspen and willow that is stimulated by fire. Voles feed heavily on fringed bindweed and other seeds in the open forests after fire. Where there are more abundant beaver and voles, wolves are more likely to find food.

Plant species also fit into the successional pattern. In addition to fringed bindweed, fireweed is common in recently burned forests. Calypso orchids, on the other hand, are most common in forests 70-120 years after fire. They are less likely to be found in forests that have not been burned for longer periods of time. Without periodic fire, both fringed bindweed and calypso orchids would become less common in the Quetico-Superior.

We have come to regard fire more as a friend and less as the enemy of diversity in the boreal forest. None of us like to see a beautiful forest burned or our favorite campsites ruined, but now we know that many species benefit directly from fire, and most, if not all of the others benefit indirectly. So, next time you paddle past a recent burn, you might take a few minutes to look for Northern Black-backed Woodpeckers, or the nesting cavity

of a Flicker. And if you are fortunate enough to spot the beautiful calypso orchid, remind yourself that its preferred habitat was established by a fire several decades earlier.