Windy Point burn provides food for through, and for moose, hares

by Ed Berg

It has been five years since I visited the 1994 Windy Point Burn south of Tustumena Lake, and the vegetation has grown up dramatically. Doghair-thick stands of birch saplings five to eight feet high hide fallen burn poles and uprooted throw mounds of tipped-over snags. It can take an hour and a well-scratched hide to travel 1,000 meters in this thicket. It would be a good candidate for an article in Alaska Magazine about Alaska's 10 worst hikes.

From the point of view of hungry moose in the winter, however, the burn is about as close to heaven as most moose get. These birch saplings are prime eating size and there is a virtually infinite supply of them. We saw abundant piles of winter moose pellets, so we know the moose are putting the area to good use.

This burn will be good hare habitat when the hare cycle rises again in the next few years. We saw only two or three hare pellets in three days of tramping through the burn. We have been in the low part of the 10- to 14-year Kenai cycle since about 2000. At the high point of the cycle I would expect to see dozens of pellets per square meter in a place like this.

The Windy Point fire in 1994 was an extremely severe, mineral soil-exposing fire, 2,800 acres in size. It started from a campfire Aug. 30 at the end of a long dry summer and kept burning until fall rains extinguished it. Much of the forest was mature upland black spruce with a foot-thick peat moss carpet. The "residence time" of the fire at a given spot was probably many days, providing complete consumption of the organic layer. It was as if someone had simply picked up the vegetative carpet and taken it out of the room, leaving the mineral soil floor completely exposed.

When we surveyed the burn in 1995 we found a muddy "moonscape" with soil that had been thoroughly sterilized. Nevertheless, we saw thousands of baby birch seedlings sprouting in the soil. Birch trees drop their seeds in the winter and the seeds are blown far and wide across the crusty snow. We found seeds especially profuse in swales where they had been concentrated by spring melt waters.

I remember seeing only a few spruce seedlings in 1995 and wondering if the burn area would ever host a spruce forest again. Now, 10 years later, we saw numerous spruce both white and black growing up in the understory, as textbook examples of "shade tolerance."

According to ecological theory, these spruce seedlings should ultimately overtop the birch trees and shade them out to produce a continuous old growth spruce forest. On the Kenai, however, spruce bark beetles and fire tend to derail ecological theory. Our white spruce forests see some degree of bark beetle thinning every 50 years on average and the black spruce forests typically burn on a rotation of about 90 years, so our forests never reach the kind of genuine old growth stage that one sees in Southeast orthe Pacific Northwest.

In 1997 we installed four permanent survey plots in the burn, which we revisited in 1999 and 2004. The plots are 20 by 50 meters, and we measure densities of woody seedlings, herbaceous plants, mosses and lichens, as well as estimating tons per acre of dead and down woody fuels and duff and litter thickness. This year it took my technicians, Doug Fisher and Matt Bowser, and myself five hours of crawling over and under fallen logs to survey each plot.

For these surveys we always camp on the beach at Windy Point on the south side of Tustumena Lake and use a Zodiac to motor down the lake to a spot where we can take the shortest route from the lake to a plot. This usually involves trying to pull the Zodiac up on a gravel beach not much bigger than the boat itself in a dense shoreline alder thicket. We have learned from experience to take the motor off the boat and park it well above the water level. When we come back to the beach six to eight hours later, the wind may have come up and waves can be crashing on the beach, swamping the boat.

In 1995 we returned late in the day to the beach and found Tustumena Lake had gone berserk with down-glacier winds and four to six foot waves, in what we later found out was a typhoon. Fortunately we had Mustang suits and a tarp, so we built a fire, ate a few candy bars and hunkered down for a rather long night.

By morning the wind and rain had slacked off, so we bailed out the boat and headed back to camp.

We have seen some dramatic changes in seedling density since we started counting seedlings in 1997. Like most plants, birch trees produce a lot of seeds. Only a few of these seeds germinate as seedlings and each year these seedlings try to crowd each other out. On one plot we counted 1,628 tiny birch seedlings in 1 square meter in 1997. On the same square meter this count had fallen to 890 in 1999 and to 304 in 2004. Still, 304 seedlings per square meter works out to 1.2 million stems per acre. Most of these stems were less than six inches tall, which shows that seedlings still are being recruited. Nevertheless, in a mature birch forest we might expect only several hundred stems per acre, so we know that most of these seedlings will never make it to adulthood.

On our two less prolific plots we had counts of 5,000 and 8,000 birch stems per acre and many of the saplings were six feet high or more quality growth rather than quantity, and still very difficult to walk through. These plots showed similar values for black spruce seedlings, which still are much shorter than the birch.

The most aggressive colonist of the post-fire bare soil was fire moss (ceratodon). This is a short green moss with copper wire-like stalks that often is seen in sidewalk cracks and on roof shingles. A year after the fire, ceratodon covered 90 to 100% of the bare ground. Three years after the fire, ceratodon was being over topped by juniper haircap moss (*polytrichum juniperinum*), which today forms a continuous brown ground cover over much of the burn. As the birch grows up, however, the trees shed leaves and the developing leaf litter layer is starting to shade out the juniper haircap moss.

We saw very little grass in the Windy Point Burn. People often have remarked about how fast our native bluejoint grass (calamagrostis) seems to take over after a forest has been beetle-killed or logged. In truth, this rapid takeover is an illusion. The calamagrostis was already there but mostly underground as buried stems (rhizomes). When the forest canopy is thinned or removed, sunlight hits the ground and the calamagrostis rhizomes shift into high gear for grass production.

If, however, you start with hundreds of acres of sterilized seedbed, the grass seed must be transported by wind and germinated on the bare soil. The underground network of rhizomes must then be rebuilt, which can take many decades.

Extreme mineral soil-exposing fires like the 1994 Windy Point fire are somewhat rare on the relatively wet Kenai Peninsula. The forest rarely dries out enough to allow full consumption of the organic layer. The 1969 Kenai-Swanson River Fire was such a fire, occurring during a second summer of drought, separated by a low-snow winter. Again, the 1969 burn produced phenomenal amounts of birch and has been the prime wildlife area on the refuge in recent decades. The 1969 burn is the favorite habitat of moose, hares and everything that eats moose and hares.

The 1987 prescribed burn in the Skilak Loop Recreation Area was, inadvertently, another extreme mineral soil-exposing fire. In this area the trees were mechanically crushed in 1984, and allowed to dry for three years. After the fire was ignited, a low-pressure system moved in and the wind died down. The fire smoldered for weeks, smoking out Anchorage and consuming the entire organic layer, just like Windy Point. Today much of the area is covered with doghair-thick birch saplings. The moose and hares love this area, as does everything that eats moose and hares.

When I first visited the Skilak Loop burn in 1994, seven years after the fire, the area still looked like a moonscape, with acres of sterile soil and only a sprinkling of fireweed. I thought this was an extreme example of "over achievement" with prescribed fire and that it was something I should seek to avoid in my new job as the refuge ecologist.

As the years pass, however, and I watch these burn areas grow, I have come to view the most severe burns as the best burns for wildlife. As the climate warms, we will no doubt have more and longer dry periods and more opportunities for mineral soil-exposing fires. We humans will lament these dry periods as threats to our homes and fortunes, but the fires will be a great boon to the moose and hairs and everything that eats moose and hairs.

Ed Berg has been the ecologist at the Kenai National Wildlife Refuge since 1993. Previous Refuge Notebook columns can be viewed on the Web at http://www.fws.gov/refuge/kenai/.