5. Fire in the Crown

Born to Burn

Fires are as inevitable in the Crown of the Continent as earthquakes along a fault line, hurricanes in warm seas, and high water along floodplains. For thousands of years, aboriginal humans left their mark on this landscape by setting fires, while lightning provided a natural source of ignition. But in recent decades, people have left their mark on this landscape by suppressing fires.

From a modern human perspective, wildfire is usually viewed as a destructive army on the march, threatening property, endangering lives, and filling the sky with black, acrid smoke. To our sensibilities, a green forest is a thing of beauty, while a blackened one represents death and ugliness. Nature reacts differently.

Like rainfall and wind, natural fires are a basic thread in the fabric of the Crown of the Continent. Many species of the Crown of the Continent are superbly adapted to fire. They not only survive and recover from regular burns, but need fire to thrive. Fire has several ecological benefits:

- It is a major factor determining the structure and composition of forests and grasslands.
- The heat generated by forest fires opens lodgepole pine cones so the seeds can germinate.
- By killing trees, fire provides food for insects and the birds that eat those insects.
- Fire kills trees which grow into grassland boundaries, keeping the grasses healthy and providing food for ungulates like mule deer and bighorn sheep.

The plants and animals of the Crown demonstrate countless adaptations to fire. The thick, corklike bark of ponderosa pine is an armor against small fires. The plumage of the black-backed woodpecker is a nearly perfect camouflage against the burned tree trunks where it forages for insects. Prairie grasses also have evolved with the beneficial recycling effects of periodic fire. Fast-burning grass fires destroy plant leaves, leaving their ashes to enrich the soil, but the deep roots of native grasses are unharmed. Shrubs such as huckleberry (a favorite of black and grizzly bears) and red-stem ceanothus (a favorite food of deer and elk) are also regenerated by fire. Lodge-

pole pine cones pop open under hot fires to disperse their seeds, while whitebark pines require fire to clear mountain slopes of competing trees, preparing potential seedbeds for a new generation of saplings.

The Complexities of Fire

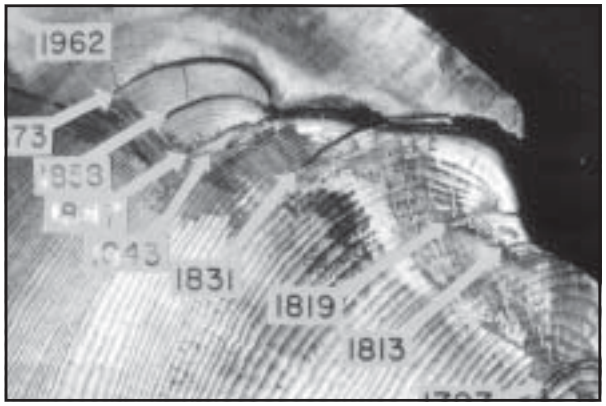
There are few simple facts about fire in the Crown of the Continent. Over most of the ecosystem, the primary fire ignition source is lightning; the second is human beings. Even that is not true everywhere. In Waterton Lakes National Park, lightning starts fewer fires than do humans. Over the broader ecosystem, however, the electrical storms and drier weather of late summer coincide with the fire season.

The size, frequency, and severity of fire vary from one corner of the Crown to another. These variations reflect factors like the type and age of plants, amounts of local snow and rain, temperatures, topography, and wind. Fires historically created a mosaic pattern on the landscape.

Drier, south-facing slopes and grasslands may have burned more frequently, while fires skipped cooler, streamside areas and north-facing slopes. Occasionally, under particularly dry and windy conditions, fires may have burned those sites as well, killing all but the largest, most fire-resistant trees.

Avalanche Creek, a popular stop along Going-to-the-Sun Road in Glacier National Park, is a good example of this. This forest is cool and moist, composed of stately western hemlock and western red cedar. By studying tree rings, we have learned that fires here are rare, but intense. The trees at Avalanche Creek have stood for 500-700 years since the last fire. Traditionally, that forest burned every 200 years or so. When fires did burn here, they burned in intense conflagrations, or stand-replacing fires that ripped through the crowns of the trees, leaving few survivors, but eventually establishing a new forest where the old one stood.

Now travel to the grassland foothills of



Waterton Lakes National Park, Alberta. Here, grass dries annually under hot sun and frequent winds. Historically, wind and lightning combined to sweep fires across the grassland. Even more frequently, aboriginal people set grass fires to drive animals, communicate with friends, confound foes, clear trails, and to create better grazing for prey animals. Fires also started simply by accident, as cooking fires blazed out of control. The edge between the prairie and forest at Waterton Park evidently burned every 20-40 years under historic conditions. The prairie itself probably burned even more frequently. Under these conditions, fuels rarely accumulated to feed intense burns.

Between these extremes are broad variations in local fire behaviors, each depending on local conditions. A lodgepole pine stand may burn every century or so, in intense, stand-replacing cycles. A ponderosa pine forest may have frequent, mild underburns that create a parklike stand, but allow the mature pines to live for centuries. Spruce and Douglas fir stands may burn intensely, but burn only every other century or so. Forest edges and aspen stands on the Rocky Mountain Front burned in mixed-severity fires every few decades.

Like topography and microclimate, fire

helped create a mosaic of habitats and added to the region's biodiversity. However, humans have changed that dramatically in the past 100 years.

European Settlement and Fire

Fire was the most powerful tool aboriginal people had for altering the landscape to improve their lives. But to white settlers, fire was simply dangerous and a destroyer of buildings and fence posts. Like the native people, many settlers accidentally set fires when their cooking or camp fires burned out of control. The railroads also added to the number of fires burning in the West. Sparks from wheels commonly set off grass fires, and sparks from the engines caused many forests to burn.

Between 1910 and 1940, extensive fires burned in the Crown of the Continent. As more people settled the Rocky Mountain West, they increasingly demanded that the government step in to fight fires. Early firefighting efforts were largely ineffectual. The most effective strategy was to extinguish fires before they grew large. But by the 1930s, extensive trail networks, telephone lines, and lookout stations laced the Crown of the Continent, and crews did what they could on foot and with hand tools. Technology improved rapidly after World War II, and new tools made firefighting efforts increasingly more effective. Both the Canadian and U.S. federal governments developed firefighting agencies patterned after the military. In the 1950s-1970s, firefighters effectively extinguished thousands of small fires. For the first time, fire was significantly reduced for decades at a time. Some fires continued to burn the backcountry, but far fewer than in previous centuries.

Issues in Fire Management

Over the past 150 years, humans have invested billions of dollars in homes, farms, and businesses in the Crown of the Continent. Fire seasons such as 1910, 1988, and 2000 have demonstrated how destructive fires can be to human property. In 1910, for example, scores of people died fighting fires, and entire towns were destroyed in the Rocky Mountains. People have also begun to realize that the question is not whether there will be fires, but when will fires burn and how big will they be. Efforts to protect human lives, property, timber, and range have had unanticipated effects on the ecosystem.

Over the decades, we have tried to exclude fire from this ecosystem but we are now coming to realize this is impossible, and not always even desirable. The effects of fire suppression are as variable as the landscape itself. While some individual stands are probably unaffected by the lack of fire, the forest landscape is becoming older and more uniform because of the widespread lack of fire.

In some places, like Montana's Seeley-

Swan Valley, fire suppression has created a dense understory of Douglas fir, which has crowded once-spacious ponderosa pine stands. These Douglas firs act as ladder fuels, allowing ground fires to climb into the crowns of larger trees, and thus burn the forest more intensively than would have happened in previous centuries.

On the eastern foothills in Waterton Lakes National Park and the National Bison Range, Douglas firs are also encroaching on grasslands, converting adjacent edges of prairie to forest. Prairies that burned every few years have not burned for 60-70 years. This allows sagebrush and other shrubs to spread, at the expense of native grasses and forbs.

On many high ridges, where lightning sparked fairly frequent fires, subalpine fir has grown dense under whitebark pine, effectively crowding out any new generation of pine that might otherwise occur.

Fire suppression carries dramatic local impacts up the food chain. For example, range for bighorn sheep and mule deer diminished as trees crowded winter range. Without periodic burning, foothill grasslands become less attractive to elk, which now wander to neighboring hay and alfalfa fields to find winter forage. But inevitably, drought, lightning, and wind coincide and fire returns.

One of the results of 80 years of fire suppression is the buildup of fuels in some areas, setting the stage for more intense fires than might have historically occurred. Fuels tend to be more continuous and uniform, lending themselves to larger fires that have more severe effects on soils, plants, and animals.

The Future of Fire

Fire poses a quandary in the Crown of the Continent Ecosystem. Rural landowners and timber interests are justifiably concerned about losing property and wasting timber. The economy demands wood fiber, and many consider it wasteful to see fires burn trees. Smoke is considered a pollutant, since it is unpleasant to smell and potentially unhealthy. Taxpayers, so far, have been willing to spend millions of dollars protecting homes and stopping fires.

On the plus side, many plant and animal species depend on fire-killed trees in their life cycles. Fire can return an unnaturally uniform forest to a more natural mosaic of openings, young forest, and old forest. The nutrients from burned logs and debris are recycled into the forest itself, if not hauled to the mill or sold as firewood.

Judicious logging and prescriptive fires can help restore impacted ecosystems, particularly in the fringes between forest and residential areas where most homes and logging roads exist. Hunters now realize that periodic fires increase deer and elk populations.

The challenge for the future is to maximize the benefits of fire, while minimizing the

risks to safety, health, and property. As more and more people move into rural, forested areas, there is increased conflict between allowing fire to fulfill its natural, ecological role, while at the same time protecting property and lives. Different land managers have different political and economic mandates. Therefore, they treat fire differently.

Managers of forest reserves, municipal governments, corporate and small wood lot owners, and private property owners don't tolerate fires on their land, even if they realize their ecological benefits. The government forest services in both countries, however, have been evolving toward a more conservation-based mission, where timber production receives less emphasis than in the past, and promoting ecosystem health and forest restoration is an important goal. In wilderness areas, fire is often allowed to take a more natural role, both for ecological and practical reasons. In the Bob Marshall Wilderness Complex, for example, under certain conditions managers allow lightning-caused fires to be managed for "beneficial use."

Forest managers in both countries sometimes set prescribed fires to improve deer and elk winter range or obtain other ecological objectives. Forest managers also may try to reduce fuels, particularly by logging and thinning around rural homes. Burning, logging, and thinning may be used in combination. In Waterton Lakes National Park and on the National Bison Range, managers also have set prescribed

fires, though they rarely let natural fires burn due to the risk to neighboring property owners. The same is true in other national wildlife management areas, at Pine Butte Preserve and on the Theodore Roosevelt Memorial Ranch.

The U.S. National Park Service, which is mandated to preserve natural processes and resources, is also becoming more tolerant of permitting natural fires. In Glacier Park, during the 1990s, several backcountry fires were allowed to burn naturally, and those fires generally remained within their natural size and severity. Park managers believe such fires are manageable and provide important ecological benefits.

Throughout the western United States and Canada, so-called let burn policies have been loudly criticized when fires burn beyond the bounds of the prescription, sometimes destroying private property and forcing people to evacuate their homes. This chorus will grow louder, as more and more people move into the rural fringe between wildlands and urban areas.

Sources

Gadd, Ben. *Handbook of the Canadian Rockies*. 2000 edition. Jasper, Alberta: Corax Press.

Rockwell, David. *Glacier National Park: A Natural History Guide.* New York: Houghton Mifflin Co., 1995.

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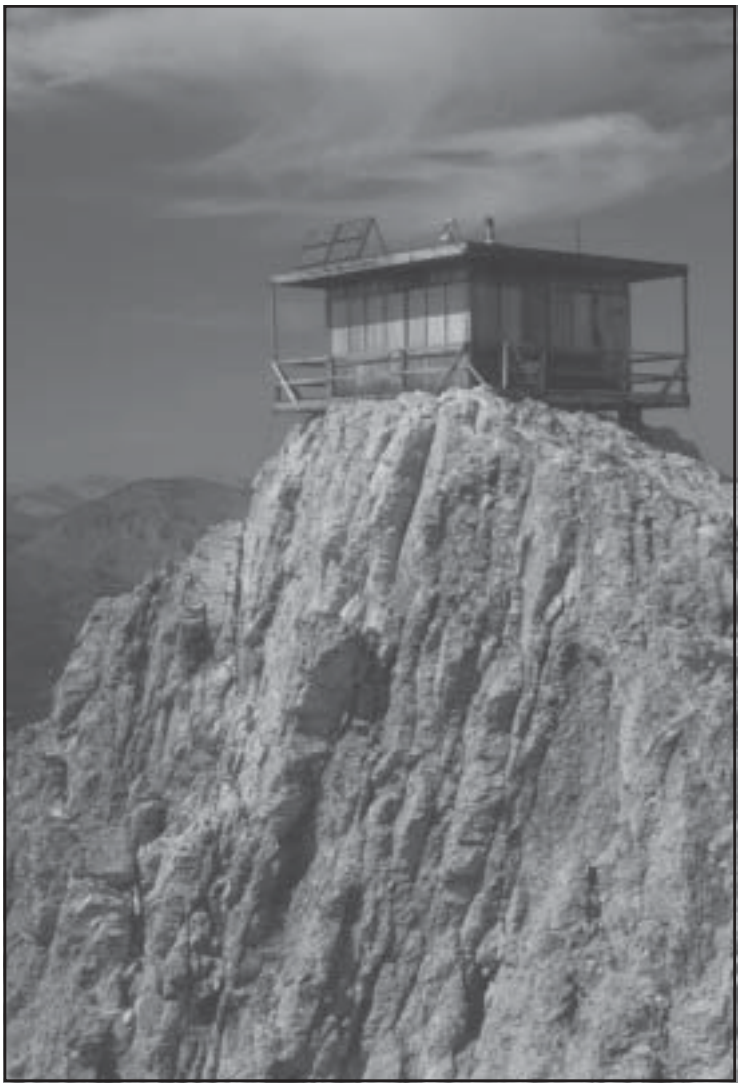

Flathead National Forest
Map of Historic Burns