

National Parks: Time to Burn (for Ecological Integrity's Sake)



By Andrea Johancsik, *AWA Conservation Specialist*

Standing at the peak of the east end of Rundle last month, my friends and I marveled at the sunny, spring day we were fortunate enough to witness from 2,530m high. The hike gives vistas of remote mountain peaks and forested slopes, as well as the highly visible town of Canmore and the Spray Lakes dam. However, arguably one of the biggest human-caused changes in the mountain national parks is much less obvious. Decades of fire suppression have changed the landscape in a dramatic way; had we been at the summit 80 years ago our view likely would have been very different.

History

Banff National Park was the first national park designated in Canada in 1885. Other parks sprung up across Canada in the following decades to preserve natural resources and wildlife and provide tourism opportu-

nities. In Alberta we saw the subsequent creation of Waterton Lakes National Park in 1895, Elk Island National Park in 1906, Jasper National Park in 1907, and Wood Buffalo National Park in 1922. The highly popular and newly accessible mountain parks became dominated by tourism and commercial development, roads, and removal of keystone species like the plains bison. Many of the 3.6 million visitors who passed through Banff National Park last year probably didn't realize they were looking at a drastically different landscape from the one of a century ago.

It's been decades, but fortunately we know from photographs what the mountain national parks looked like from the early days. Morrison Parsons Bridgland was a surveyor and alpinist in the early 20th century and used photogrammetry to systematically map much of the central Canadian Rocky Mountains by hand. He mapped Jasper

National Park this way in 1915. Eight decades later, then-graduate student Jeanine Rhemtulla, Dr. Eric Higgs, and other members of the Mountain Legacy project painstakingly retook all 735 of Bridgland's Jasper photos. They wanted to compare how the vegetation on the landscape had changed, if it had changed at all, over nearly a century. Their study found that vegetation has become less diverse and is now dominated by closed-canopy coniferous forests; in 1915 the landscape consisted of open coniferous forest, grasslands, young forests and some deciduous stands. Their work quantified the impacts of fire suppression in their study area of Jasper National Park, but it's obvious just from a look at the photos the dramatic change in vegetation that has occurred.

Early attitudes towards fire

Fire was seen as an enemy by the Parks agency in the early 20th Century. The Cana-



Looking north from Tunnel Mountain, 1888 and 2008. The conifer forest has spread extensively since James Joseph McArthur took his photo in 1888.

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dian Pacific Railway was a rolling fire-starter, every spark a potential cause of wildfire through the forested mountains. Fire threatened life, property, expensive infrastructure, and the “pristine” landscape that railway tourism depended on. In 1909, just 14 years after the inception of Banff National Park, the primary management objectives of the Park Warden service were to protect forest and game. Fire wardens were employed to enforce the laws and regulations which authorized control and suppression of fires. The agency’s early language about fire illustrates the mentality of fire as an enemy: fire was always “disastrous,” “dangerous,” and “devastating;” the fire warden engaged in a battle to “fight,” “combat,” and “resist” fire. This language appears too in news headlines and everyday language, and accounts. You find it too in a Parks Canada 1987 publication, *A History of Canada’s National Parks Vol.4*, where author W.F. Lothian wrote that all fire was bad:

“An ever-present threat to our national parks is forest fires, which, from the earliest days of exploration, have ravaged these areas. Conflagrations which marred the landscape and despoiled the habitat of native wildlife have been attributed to various causes... whatever their origin, all fires in national parks are of particular concern to the warden service.”

Attitudes towards fire, as Todd Kristensen and Ashley Reid point out elsewhere in this issue, were very different for indigenous peoples. Long before the arrival of European settlers, some First Nations of the prairies and mountains knew fire could not be extinguished in the long term, and instead used fire to their advantage to improve forage opportunities. Just how much of an influence indigenous peoples had on the fire regime is up for debate in anthropological research. However, we do know that the First Nations deliberately used fire to change the ecology and recognized that fire is an inevitable and even beneficial process.

The ecosystems react

The fire suppression policy was very ef-

fective and burned areas in the major, tourism-oriented national parks were virtually eliminated. For example, in Banff National Park, the area burned per decade decreased from 400 square kilometres down to five by the 1950s. However, while there are fewer fires now, they burn more intensely. This is because without fire, potential fuel builds up. When a fire finally occurs, it may be much larger and hotter than a fire which may start in a more recently fire-disturbed area. That’s what studies in the U.S. ponderosa pine forests show. The WLA’s editor recalls helicopter pilots who were fighting the Lost Creek fire in the Crowsnest in 2003 telling him that they had never seen a fire that burned as hot as that one. The research on fire in pine forests doesn’t mean, of course, that this is necessarily the case in all forests in all regions.

Ecological interactions are complicated; it wasn’t until the 1970s and 1980s that more sustained attention started to be paid to the detrimental effects of fire suppression. Today we are still learning about fire disturbance and recovery in our forests. For instance, fire has had a role in the complex interactions between trembling aspens, humans, wolves, and elk. A 1998 paper by White et al. told this story: aspen has existed throughout all Rocky Mountain national parks in Canada and the U.S. and its presence indicates biodiversity. Elk browsing keeps aspen from dominating the forest, and wolves keep the elk population in check. Fire kills aspen too, but it’s also one of the first plants to regenerate after a fire. This has been the historical balance until increased human land use displaced wolves, leading to higher elk populations and fewer aspen stands. As Bridgland’s photos show clearly, open areas would have provided a more diverse choice of meadows for aspen to grow and for elk to browse. Knowing this, prescribed fire can be a management tool that has cascading influences. It’s not the only piece of the puzzle, but it can assist in solving problems like an overabundance of elk.

Whitebark pine and ponderosa pine are also species that thrive after a good scorching and are not currently represented at

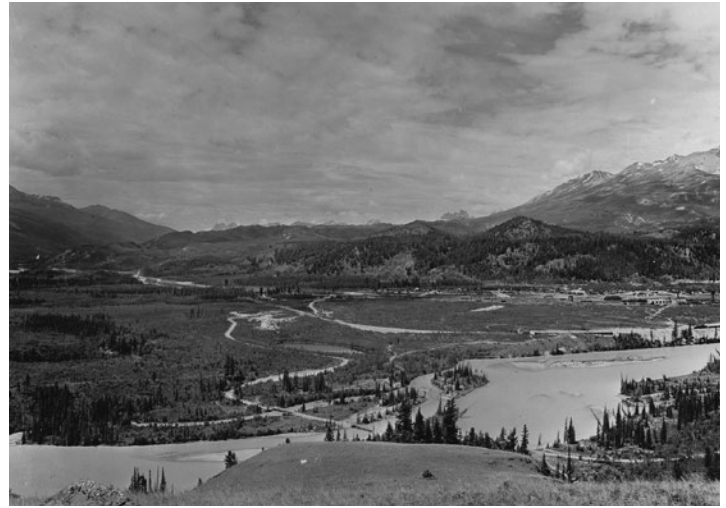
historical levels. The impacts of fire suppression are hurting the whitebark pine at the same time as the white pine blister rust fungus, climate change, and an over-abundance of mountain pine beetle are threatening the pine’s presence on the landscape. The species is now endangered and this promises to harm the 110 species that (used to) consume whitebark pine seeds in high-elevation ecosystems. It’s burning the candle at both ends, if you will – without the burning. Climate change, too, will add another element of risk. All of Alberta’s five national parks are predicted to experience an increased frequency and intensity of fire, because of drier summer conditions, and, in the mountain parks, increased fuel from stands infested by mountain pine beetle.

Prescribed burns as restoration

Fortunately, prescribed fire is bringing back some of the natural processes caused by fire. These projects can thank the *Canada National Parks Act* which now directs Parks Canada to maintain and restore natural processes, to value ecological integrity. In the *Act*, ecological integrity means “a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes.”

Ecological integrity wasn’t always the first official priority of national parks. Stephen Woodley, a leading expert in protected area management, writes of four eras of management in the Canadian Parks Service: protection, preservation, management, and ecosystem management. Management approaches have changed through the decades with the realization that national parks were no longer “natural” areas untouched and unregulated by the (European settler) human hand.

One of the biggest risks to ecological integrity in national parks is historical fire exclusion. To counter this, the national target for Parks Canada is to burn 20 percent of the historic fire cycle within an area. In



Looking west from Old Fort Point in Jasper National Park in 1998 a sea of conifer forest has transformed the landscape photographed by Morrison Bridgland in 1915. CREDIT: These photos are courtesy of the Mountain Legacy Project (mountainlegacy.ca) and their use is governed according to Creative Commons Attribution-NonCommercial 4.0 International License.

the mountain national parks, this target is 50 percent. Jane Park, a fire and vegetation management specialist for Parks Canada in Banff National Park, explains that prescribed fires are conducted to fulfill high-level directives and policies, as well as site-specific ecological integrity objectives.

The planning process for a prescribed fire might take one to two years from start to finish and actual implementation depends on conditions such as wind speed and fuel moisture. The target is close to being met in Banff; despite being behind on the long term goal, Park says Banff National Park has reached 45 percent burned of historic fire cycle through wildfire and prescribed fires. Banff has the added advantage of having implemented prescribed fires since the 1980s, with areas even being able to be re-burned. These former mature lodgepole pine forests have reverted to the grassland habitat unguilates love.

Ecological integrity is the objective, but fire teams in mountain parks must also delicately balance public safety, restoration of species like whitebark pine, and protection of species like endangered woodland caribou. This is a very complex task. For instance, last spring staff at Jasper National Park burned five square kilometres of forest in the Vine Creek fire unit after eight years of preparation and waiting for the right conditions.

It's somewhat ironic that to get back to ecological integrity we need to manage and

manage some more. Ecological integrity may be the official management priority, but the unwritten and no-brainer first priority is protecting human life and property. Park describes how socio-economic and political factors also influence deciding where and when a prescribed fire will take place. You won't find many prescribed burns taking place during long weekends and peak summer visitation times! A prescribed fire near the Rocky Mountain House National Historic Site conducted in early April, 2016 could be seen as a management tool used to reduce wildfire risk to the historic site. Bonuses from such a prescribed burn listed on the Parks Canada website include "improving the quality of forage for bison, and the removal of non-native vegetation."

Reaching the goal

Ecological integrity is an important goal, but there's a long way to go before fire is "a condition that is determined to be characteristic of its natural region and likely to persist." Prescribed fires are only conducted in ways that are safe for people and that gain public acceptance, and the 5,777,108 visitors to Banff and Jasper National Parks combined during the 2015-16 season is a huge audience to educate. Landscapes and ecosystems seldom fit well with the jurisdictional boundaries of governments. So, while Parks Canada only conducts prescribed fire operations within park boundaries the Agency

works closely with the Alberta government. In one case, Alberta had done prescribed fires outside of Banff National Park so that when a wildfire occurred in the Clearwater Valley, the Banff fire team could allow the fire to grow and monitor conditions, rather than extinguishing it. Collaboration that results in successful prescribed burns and wildfire management can be a model for what happens throughout Alberta, resulting in representative and healthy ecosystems.

Fires are inevitable. There is no stopping fire in the long-term. The best we can do is to try to manage the conditions in which it will occur. A survey of residents in Banff in 2008 suggests that the public can be brought on board to using fire as a management tool. Although it found some gaps in the knowledge of residents it identified general support and acceptance for fire in the park and general knowledge about fire ecology.

Even if the best available science informs vegetation specialists about fire management, the public's acceptance can still have a big influence on how policy is interpreted and implemented. Despite success and improvements in fire management, our fire debt still holds. How and when that debt will be repaid is shaped to a large part by how we choose to try to manage fire in our parks. Success hinges on understanding fire as an integral part of the ecosystem, an unavoidable process that yes, may inconvenience us or worse, but is also necessary for life. 🌲