Fire Management Plan 2020

Banff, Yoho, and Kootenay National Parks

Resource Conservation - Fire Management Section

Parks Canada Parcs Canada

Canada

Approval Page

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Executive Summary

This document encompasses fire management planning for Banff, Kootenay and Yoho national parks (BKY). The plan integrates up-to-date policy, strategic direction, and field-level actions in the attainment of ecologically positive and socially responsive outcomes. It is founded upon principles of the Parks Canada Agency (PCA) that emphasize long term sustainability, cross-functional delivery, and a nationally consistent approach to fire management.

The first Banff Fire Management Plan (White, 1984) set the stage for progressive, science-based fire management to address the negative impacts of fire exclusion on lands in the mountain national parks. More than three decades later, monitoring and research have determined that focused intervention is required to: 1) protect the public and infrastructure as necessary; 2) allow wildfire to fulfill its ecological role with minimal interference wherever possible; and 3) conduct prescribed fires to offset the detrimental effects of fire suppression.

The primary mandate of the protection of the public and infrastructure from the negative effects of wildfire are addressed in this plan through clearly defined minimum resourcing levels, preparedness guidelines and wildland fire zoning. Furthermore, fuel management implementation guidelines are focused on maintaining or improving existing fuel management units in the wildland-urban interface and creating landscape level fuel breaks to assist in the safe implementation of prescribed fire in BKY.

Despite restoration efforts over the past 30 years, monitoring indicates that ecosystem health within the parks continues to decline due to previous fire exclusion policies resulting in significant fire cycle deficits. This plan establishes a framework for the continued use of prescribed and managed wildfire to improve ecological integrity. The PCA wildland fire zoning approach focuses on a landscape that is tolerant of as many intermediate and extensive zones as possible, is a step towards a more fire resilient landscape.

Fundamental to the success of Parks Canada's fire program is a socio-cultural acceptance of fire as a process vital to the maintenance of biological structure, function and diversity. The need to embrace the concept and practice of living with fire while mitigating its impacts is necessary if these trends are to be reversed and national park ecosystems protected. The communications, public engagement and visitor experience section addresses the integrated delivery of the fire program to foster the public's understanding of the important role fire plays in the ecosystems of Banff, Kootenay and Yoho national parks.

Contents

Introduction

Scope and Context

This Integrated Fire Management Plan (IFMP) is a blueprint for fire protection and fire restoration within Banff, Kootenay and Yoho national parks (BKY). In addition to the national parks, the plan applies to all of the national historic sites (NHS) within these National Parks, as well as Rocky Mountain House NHS, Kootenae House NHS and the Ya Ha Tinda Ranch.

Management actions are guided by clear strategic guidance, thorough consultation, and established performance measures (see Section 8.0) with a focus on science-based decision making. Preparation of this plan has involved consultation with managers within the Parks Canada Agency (PCA), Indigenous nations, stakeholders and adjacent land managers regarding shared opportunities and challenges, and mutually supportive management strategies.

Legal and Administrative Framework

The following is a general breakdown of the legal and administrative framework that guides wildland fire management activities in the Banff, Kootenay and Yoho national parks.

Canada National Parks Act

The main principles underlying wildland fire management at Parks Canada are derived primarily from the Canada National Parks Act, which indicates that:

The national parks of Canada are dedicated to the people of Canada for their benefit, education and enjoyment. Subject to this Act and the regulations, all the parks shall be maintained and made used of so as to leave them unimpaired for the enjoyment of future generations.

Maintenance or restoration of ecological integrity, through the protection of natural resources and natural processes, shall be the first priority of the Minister when considering all aspects of the management of parks.

Ecological Integrity

Section 2 (1) of the Canada National Park Act defines ecological integrity as 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.” The term ecological integrity provides a focus for ecosystem-based management that goes beyond legislated park boundaries to include the cooperation and consultation with a wide variety of internal and external stakeholders.

The concept recognizes that ecosystems are dynamic and self-organizing entities and what may have been natural in the past may not be the natural state for today. Therefore, a challenge for park managers is to determine the baseline for wildland fire management planning based on the current state of the ecosystem.

Wildland Fire Management Directive

The National Fire Management Directive (Parks Canada, 2017) provides direction on the requirement for demonstrated fire control capabilities prior to phased use of prescribed fire. It emphasizes that a balance must be achieved between ecological, social and economic criteria appropriate for the greater park landscape. Operational safety, air quality, stakeholder concerns, cost, and other variables must all be considered in the fire management planning process.

Specific guidelines for fire management indicated in these documents state:

National park ecosystems will be given the highest degree of protection to ensure the perpetuation of natural environments essentially unaltered by human activity.

National park ecosystems will be managed with minimal interference to natural processes. However, active management may be allowed when the structure or function of an ecosystem has been seriously altered and manipulation is the only possible alternative available to restore ecological integrity.

Where manipulation is necessary it will be based on scientific research, use techniques that duplicate natural processes as closely as possible, and will be carefully monitored.

Ecosystem managers and wildland fire managers are expected to add the following to their respective responsibilities:

- Know and understand the role of fire in the development of ecosystems before implementing a fire use program, and
- Reproduce all possible aspects of the fire regime when implementing prescribed burning within a park.

The Wildland Fire Management Directive (Parks Canada, 2017) provides direction on the control and use of vegetation fires in Canada's national parks and national historic sites. The directive states that all fire management activities in a national park will be detailed in a fire management plan. This plan will be developed in consultation with stakeholders in communities, surrounding jurisdictions, Indigenous nations, and with fire management specialists. Fire management plans are developed to direct the control and use of fire to achieve specific objectives.

Fire management is defined in the Management Directive as:

- Those activities associated with the protection of people, property, and landscapes from fire, as well as the use of prescribed fire to achieve land management objectives.

The national Standard Operating Procedure (SOP) for Wildland Fire Management Planning (Parks Canada, draft 2018), when complete, will be used to further guide and support fire management planning at the field unit level. This SOP details the planning requirements and review/approval procedures for fire management plans, prescribed fire plans and wildfire risk reduction plans.

Species at Risk Act

All fire management planning, actions and monitoring must be fully integrated with the legislative requirements of the Species at Risk Act (SARA). Under SARA, the following criteria have been established for all activities including fire that will potentially affect a species at risk listed under Schedule 1 as extirpated, endangered or threatened:

- All reasonable alternatives to the activity must be considered and the best solution must be adopted;
- All feasible measures to mitigate the impact of the activity on the species, critical habitat or residences must be identified; and
- It must be demonstrated that the activity will not threaten the survival or recovery of the species.

This fire management plan integrates all regional SARA recovery action plans and their goals as well as the approved multi-species action plans for BKY (Parks Canada, 2017).

The Species at Risk Act (SARA) provides protection for listed species at risk in Canada such as Woodland Caribou, White Bark Pine and other schedule 1 listed species found in Banff, Kootenay and Yoho national parks. The Act provides federal legislation to conserve and protect Canada's biological diversity. It fulfills a key commitment under the United Nations Convention on Biodiversity. All federal lands, including national parks, came under the regulations and prohibitions of SARA, in June 1, 2004. All wildland fire management planning, wildland fire suppression, prescribed fire operations, fuel management actions and monitoring are subject to SARA prohibitions and species at risk considerations. The Environmental Impact Assessment (EIA)

for prescribed fire and fuel modification plans will contain applicable SARA authorizations and considerations as outlined by an impact assessment satisfying the Canadian Environmental Assessment Act (CEAA, 2012).

The only exemption from SARA prohibitions applies to emergency wildland fire suppression with the exception of preplanning for park fire and related vegetation plans. While emergency suppression activities are set aside from SARA, every reasonable action will be made to reduce effects to and accommodate at risk species during suppression activities.

National Park Management Plans

There is a legislative obligation for park management plans to meet ecosystem restoration objectives and a policy requirement to have a current fire management plan to conduct fire-related actions. The park management plan (PMP) ensures a strategic investment of resources to maximize fire's ecological benefits while minimizing its negative socio-cultural and economic impacts. It also ensures that fire management activities support and strengthen other field unit priorities including species at risk recovery plans, conservation and restoration projects, and Visitor Experience and External Relations initiatives proposed for the same timelines.

Each of the three national park management plans (2010) provide specific goals and objectives regarding fire management include. Tables 1, 2 and 3 outline key goals and objectives from these plans that guide fire management activities within the park.

Table 1: Banff Park Management Plan Goals of the Fire Management Program

PMP Section 5.3.3.8 Where vegetation structure has been restored, use prescribed fire on a repeated basis to maintain grasslands and forest savannas.
PMP Section 5.3.3.9 Through prescribed and wildfire, work to ensure that all parts of the park achieve 50% of their long-term fire cycle.
PMP Section 5.3.3.1 Collaborate with scientists, interested community members, citizen scientists and park visitors on adaptive management experiments aimed at understanding and restoring key ecological processes (predation, fire, herbivory and dispersal) that sustain Banff's montane ecosystems.

Table 2: Yoho Park Management Plan Key Strategies and Actions of the Fire Management Program

PMP Section 4.1.3 Design and implement conservation measures such as prescribed fires, historic building restoration, salvage archaeology, and trail relocations in ways that provide opportunities for visitors to witness the action and learn about the reasons for undertaking these measures.
PMP Section 4.4.1 Develop partnering arrangements with the Town of Golden and other communities in the Columbia Valley that enhance mountain park outreach and education around restoration and conservation projects, including fire ecology, aquatic health, species at risk, and highway wildlife mitigation.
PMP Section 4.6.1 Restore fire to the landscape by using prescribed fires and carefully managed natural fires to achieve 50% of the long-term fire cycle and restore natural vegetation characteristics in all ecosystems, as detailed in the field unit fire management plan.
PMP Section 4.6.2 Maintain large, natural landscapes that support healthy grizzly bear populations and provide opportunities for wilderness recreation.

Table 3: Kootenay Park Management Plan Key Strategies and Actions of the Fire Management Program

PMP Section 4.1.3 Design and implement conservation measures such as prescribed fires, historic building restoration, salvage archaeology, and trail relocations in ways that provide opportunities for visitors to witness the action and learn about the reasons for undertaking these measures.

PMP Section 4.2.2 Use the historic and continuing presence of fire and forest regeneration along the length of the park as a way of differentiating Kootenay from other mountain parks.
PMP Section 4.4.1 Develop partnering arrangements with the Village of Radium Hot Springs and other communities in the Columbia Valley that enhance mountain park outreach and education around restoration and conservation projects, including fire ecology, Redstreak restoration, aquatic health, species at risk, and Highway 93 South wildlife mitigation efforts.
PMP Section 4.6.1 • Use prescribed fires and carefully managed natural fires to achieve 50% of the long-term fire cycle in areas currently below this target. • Complete the Redstreak Restoration Project to restore native grassland and open forest that provides important habitat for bighorn sheep and many other species. • Conduct periodic, low-intensity burns to maintain open habitat characteristics in the Redstreak restoration area. • Use research and monitoring of bighorn sheep movements and distribution to identify priority corridors between winter and summer ranges, and apply prescribed fire as a primary tool to achieve restoration objectives for bighorn sheep movement.
PMP Section 4.6.3 Develop and periodically update communication products as fire and forest patterns change, to build awareness and understanding of fire and vegetation dynamics.
PMP Section 5.1.3 Use prescribed fire to restore open meadow communities in the Kootenay River valley.
PMP Section 5.3.4 Complete remaining priority actions of the Redstreak Restoration Project, including the removal of remaining infrastructure on the west side of the highway and on the Redstreak Bench, and the completion of forest thinning and prescribed burning. Conduct low intensity prescribed fires to maintain the open forest-grassland ecosystem.

Site Description

Geographic Context

Banff, Kootenay and Yoho national parks, in conjunction with Jasper National Park, form a network of protected areas which are contiguous with three B.C. provincial parks (Mount Robson, Mount Assiniboine, Hamber and Height of the Rockies provincial parks). These contiguous protected areas combine to form the Canadian Rocky Mountain Parks World Heritage Site designated under the United Nations Education, Scientific and Cultural Organization (UNESCO) in 1983. Additionally, the 2.3 million contiguous hectares adjoin three provincial ecological reserves (Wilmore, Ghost, Siffleur) and several other provincial parks (Spray Lakes, Peter Lougheed, Bow Valley, Elbow-Sheep River, Kakwa, Elk Lakes, Top of the World) in both British Columbia and Alberta, adding another 500,000 hectares. Collectively, the 28,000 square kilometres form one of the largest contiguous terrestrial protected areas in North America, a landscape that depends on fire as the principal driver of biodiversity and ecosystem health.

These three national parks straddle the Continental Divide along the Rocky Mountain range, with Kootenay and Yoho to the west and Banff to the east (Figure 1). This range is characterized by thrust-faulted ridges that generally form a southeast to northwest alignment. This topography has been extensively modified by glacial activity, resulting in complex terraced floodplains, steeply-sloping features and alluvial fans. Throughout the parks, series of river valleys create pathways for fire spread. For example, in Banff the Bow River valley facilitates north-south fire spread in western Banff and east-west spread in eastern Banff. Other river valleys in Banff such as the Clearwater, Red Deer, North Saskatchewan and Panther create pathways

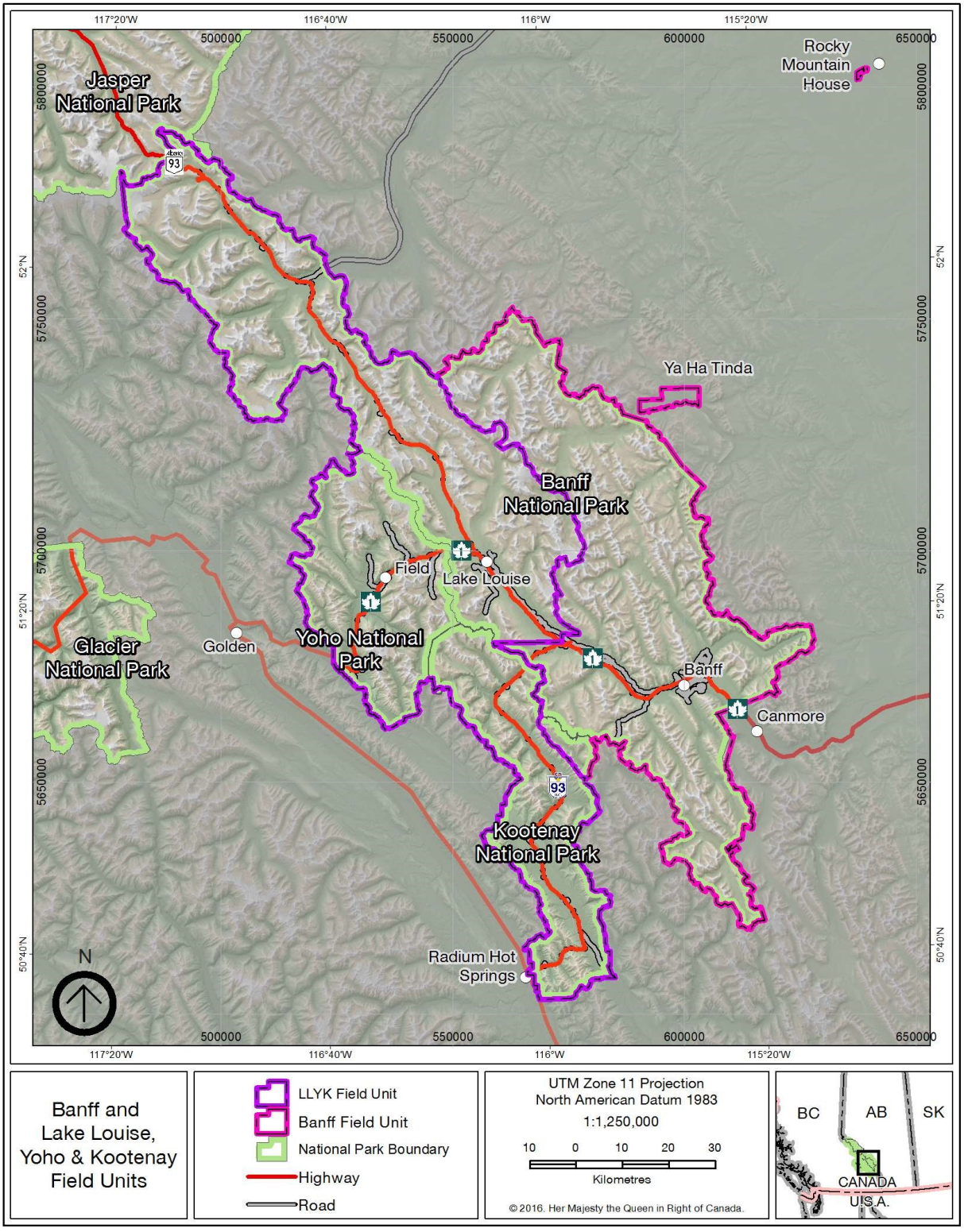


Figure 1. Regional context of the Banff, Kootenay and Yoho national parks

for fire spread in an east-west direction. While in Yoho, the Kicking Horse valley facilitates fire spread from east-west and in Kootenay, the Vermillion and Kootenay rivers facilitate spread north-south. South facing slopes in these valleys tend to have the most pronounced influence on fire behaviour due to insolation effects on forest fuels and the angle of incident sunlight. This factor, compounded by an alignment with regional wind directions create the potential for large, high intensity wildfires.

Banff National Park occupies 6,641 km^2 within the front ranges of the Rocky Mountains and is located 134 km west of the City of Calgary. The Banff field unit is a 3,741 km^2 administrative subset of Banff National Park. The Banff Field Unit also includes management of the Ya Ha Tinda Ranch (39.45 km^2), the Cave and Basin National Historic Site and the Rocky Mountain House National Historic Site (Figure 1). The remaining 2,900 km^2 of Banff National Park forms part of the Lake-Louise, Yoho, Kootenay (LLYK) Field Unit and includes Kootenay National Park (1,406 km^2) and Yoho National Park (1,313 km^2). The LLYK Field Unit also includes management of the Kootenae House National Historic Site.

Services and Infrastructure

Banff, Kootenay and Yoho national parks have three embedded communities that are key components in park operations. Within the eastern portion of Banff National Park is the town of Banff in the Bow Valley. Banff is a tourism-based town with approximately 9,500 residents (Town of Banff, 2014), 1,300 businesses and 3,800 hotel rooms providing essential tourism services. Also within Banff National Park is the hamlet of Lake Louise. Located in Improvement District 9, which includes all Banff National Park outside of the town of Banff, Lake Louise has a population of 1,175 (2011 census). The town of Field is located in British Columbia within Yoho National Park, and has a population of 169 (2011 census).

Transportation infrastructure is a key component of BKY. The TransCanada Highway 1 runs through the middle of both Yoho and Banff national parks, along with the Canadian Pacific Railway. In addition, Banff also contains two secondary highways (Bow Valley Parkway 1A and Highway 93 North). Kootenay National Park is bisected by a secondary highway (Highway 93 South) that is busy during the summer months.

Additional infrastructure outside the Banff townsite boundary includes:

- Visitor Experience: 5 front country campgrounds with a total of 2,500 campsites that are accessible by vehicle. Tunnel Mountain Campground hosts more than 4,000 visitors per night during peak visitation periods.
- Outlying Accommodations and Visitor Services: 3 additional hotels, 3 front country commercial cabin operations, 1 marina, 2 hostels, 3 commercial backcountry lodges, 1 backcountry commercial horse outfitter operation, 2 backcountry public shelters, 2 ski areas and a gondola sightseeing operation.
- Utilities: major power line (Altalink) and additional smaller distribution lines (Fortis), the Minnewanka Dam and associated structures (TransAlta). Buried natural gas pipelines and interprovincial critical communications lines.

Additional infrastructure outside of the communities of Lake Louise and Field include:

- Visitor Experience: 14 front country campgrounds, 58 day use areas and 3 visitor reception centres.
- Outlying Accommodations: 8 additional hotels, 4 hostels, 3 commercial backcountry lodges, 10 Alpine Club of Canada huts, 1 backcountry horse outfitters, 1 ski area with a gondola sightseeing operation
- Utilities: major power line (BC Hydro) and additional smaller distribution lines and interprovincial critical communications lines.

Regional Socio-economic Attributes

Banff National Park receives the highest visitation of any national park in Canada with over 4.2 million visitors entering the park in 2017/18– the highest volume of visitors since 2000. Visitors to Banff generate both regional and federal revenues. Social and economic hubs of the Bow Valley include the towns of Banff, Canmore, Lake Louise and Exshaw; the hamlets of Harvie Heights, Dead Man's Flats, and Lac Des Arc; and the Municipal District of Bighorn and Improvement District 9.

Kootenay and Yoho national parks receive fewer visitors than Banff, at 531,000 and 712,000 in 2017/18 respectively. As with Banff, both Kootenay and Yoho have strong ties to embedded and neighbouring communities including Golden and Radium Hot Springs.

All of the communities that are within the national parks, or directly neighbouring them, have a well-informed and engaged constituency that embraces the concept of FireSmart or other applicable wildfire risk reductions activities for communities within healthy ecosystems. Parks Canada is committed to thorough consultation and collaboration with neighbouring jurisdictions, communities and businesses on all aspects of fire management.

Parks Canada has strong partnerships with its provincial neighbours: the Government of Alberta (Department of Agriculture and Forestry and the Department of Environment and Parks) and the Government of British Columbia (BC Wildfire Service and BC Parks). Parks Canada has completed several interagency prescribed fires and managed wildfire operations over the years with both of these provincial partners. It is a priority of this plan to strengthen interagency partnerships with all neighbouring agencies, thereby capitalizing on the substantial ecological gains and operational efficiencies inherent in co-managing fire across agency lines.

Climate and Weather

Under the Köppen climate classification, Banff, Kootenay and Yoho national parks have a subarctic climate (Dfc) with cold, snowy winters and mild summers. The climate is influenced by altitude with lower temperatures generally found at higher elevations. The period of highest fire danger occurs in late July and early August when average highs are above 20°C. The mountainous terrain and higher elevations, moderate summer temperatures and cold air subsidence occasionally trigger inversion conditions that can affect fire behaviour, air quality, visibility and highway safety during fire operations.

A west-to-east moisture gradient exists, as major weather systems transition inland from the Pacific Ocean. Located on the eastern side of the Continental Divide, Banff National Park receives 472 mm of precipitation annually. This is considerably less than in Yoho or Kootenay national parks which are on the western side of the Continental Divide in British Columbia, where 884 mm and 655 mm are received respectively. Being influenced by altitude, precipitation is also greater at higher elevations.

Prevailing winds are mainly westerly and southwesterly during the fire season, but interact with topography to produce surface winds that run parallel with valley orientation. Winds are generally stronger at upper elevations and in the transition from mountains to foothills. Dry chinook winds, typically occur east of the divide, where relative humidity values below 15% can occur during mid-winter, substantially reducing winter snow packs through sublimation. These chinook events can contribute to spring drought and often create ideal April prescribed burning conditions on south and west aspects where lingering snow cover persists on east and north aspects.

The pattern and density of lightning occurrence in the parks is largely influenced by the Continental Divide and orographic lifting of air masses as low pressure systems track from British Columbia into Alberta. A

distinct “lightning shadow” exists where the density of lightning strikes drops east of the Continental Divide before regaining intensity in the foothills. As indicated in Figure 2, most of the lightning fires in BKY are

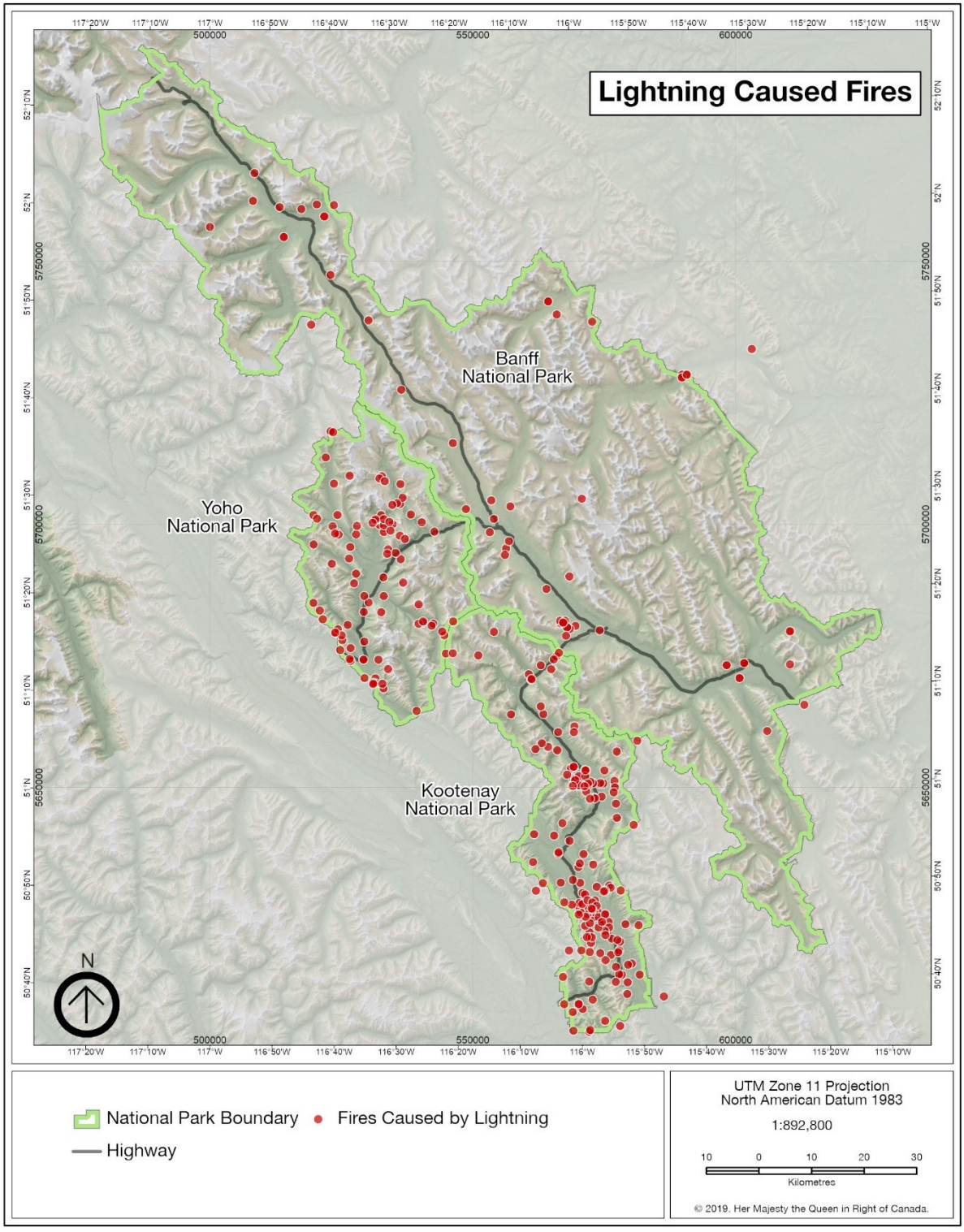


Figure 2: Lightning caused fires in Banff, Kootenay and Yoho national Parks (1980 – 2017) (Source: Parks Canada)

located west of the Continental Divide, in the Kicking Horse Valley (Yoho National Park) and in the Kootenay and Vermillion valleys (Kootenay National Park). In Banff National Park, lightning was recorded as the ignition source for 31% of all wildfires (1985-2017) but accounts for only 10% of total area burned. While in Yoho National Park, lightning accounts for 58% of all fires but only 3% of area burned. Kootenay National Park typically experiences the highest number of lightning-caused wildfires of all three parks, with 71% of all fires occurring from lighting accounting for 90% of the total area burned.

Summer in all three national parks extends from mid-June to mid-September. In the town of Banff, a centrally located Environment Canada weather station provides long-term weather data. The town of Banff has a mean temperature of 14° C, and an average high of 21.6°C (Figure 3). The maximum temperature recorded was 34°C in 1934. For all three parks, June is the wettest month on average, during which Banff receives 62mm of precipitation (Figure 4).

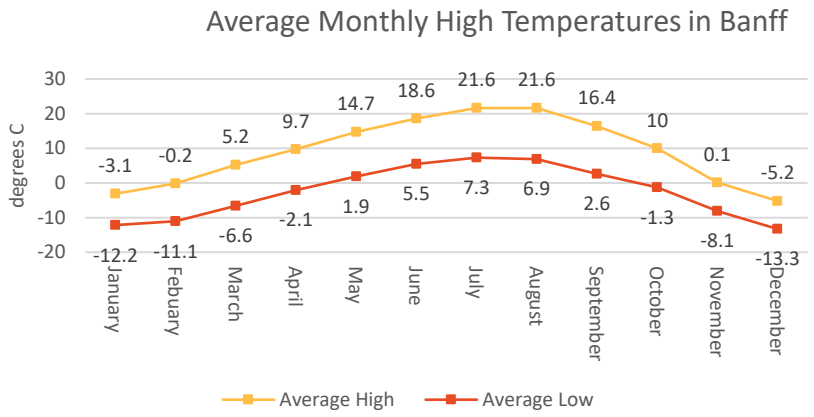


Figure 3: Average Monthly High Temperatures in Banff National Park. Yoho and Kootenay national parks follow a similar seasonal pattern, being a few degrees warmer or cooler depending on location.

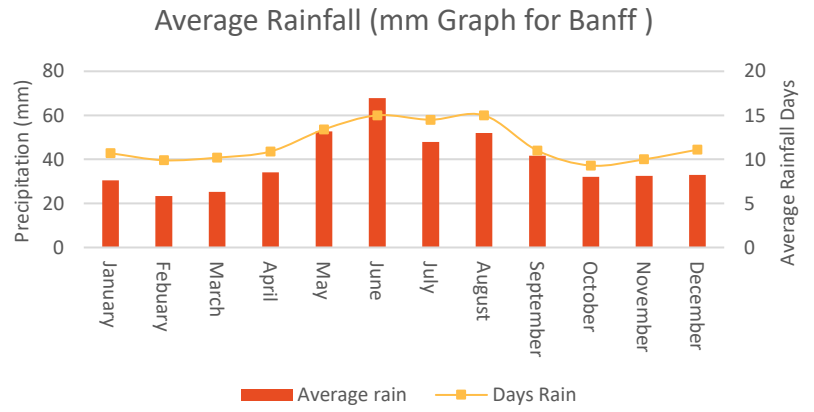


Figure 4: Average Monthly Precipitation in Banff National Park. Yoho and Kootenay national parks follow a similar seasonal pattern, with the highest precipitation events occurring in June.

Seasonal temperatures in Yoho National Park are similar to Banff (Figure 3). The mean temperature during this period is 12.5° C, with an average high temperature of 20°C. Due to the west-east moisture gradient, Yoho receives more annual precipitation on the east side of the park.

Kootenay National Park has very diverse temperature and precipitation profiles, as captured in the park's interpretive theme statement: "From cactus to glacier". Redstreak Campground near Radium Hot Springs in the south of the park will receive significantly less precipitation than the north in Vermillion Valley and is 2 to 6 °C warmer (Figure 5). This creates a longer fire season in the south of the park as snow melt occurs in this area as early as March. Temperatures and precipitation in the north of the park are similar to Banff as they near the Continental Divide. The wettest month in Kootenay National Park occurs in June, receiving 75mm of rain.

To illustrate temperature and precipitation variation between the three parks during the fire season, average daily high and low temperatures and monthly precipitation totals for the month of July are shown in Figure 5. July temperatures are typically cooler as you get closer to the Continental Divide, which forms the border between Banff National Park and Yoho and Kootenay national parks (green line in the centre of the map). Precipitation amounts are also typically higher closer to the Continental Divide, though Yoho National Park is typically the wettest of all three parks in July (Figure 5).

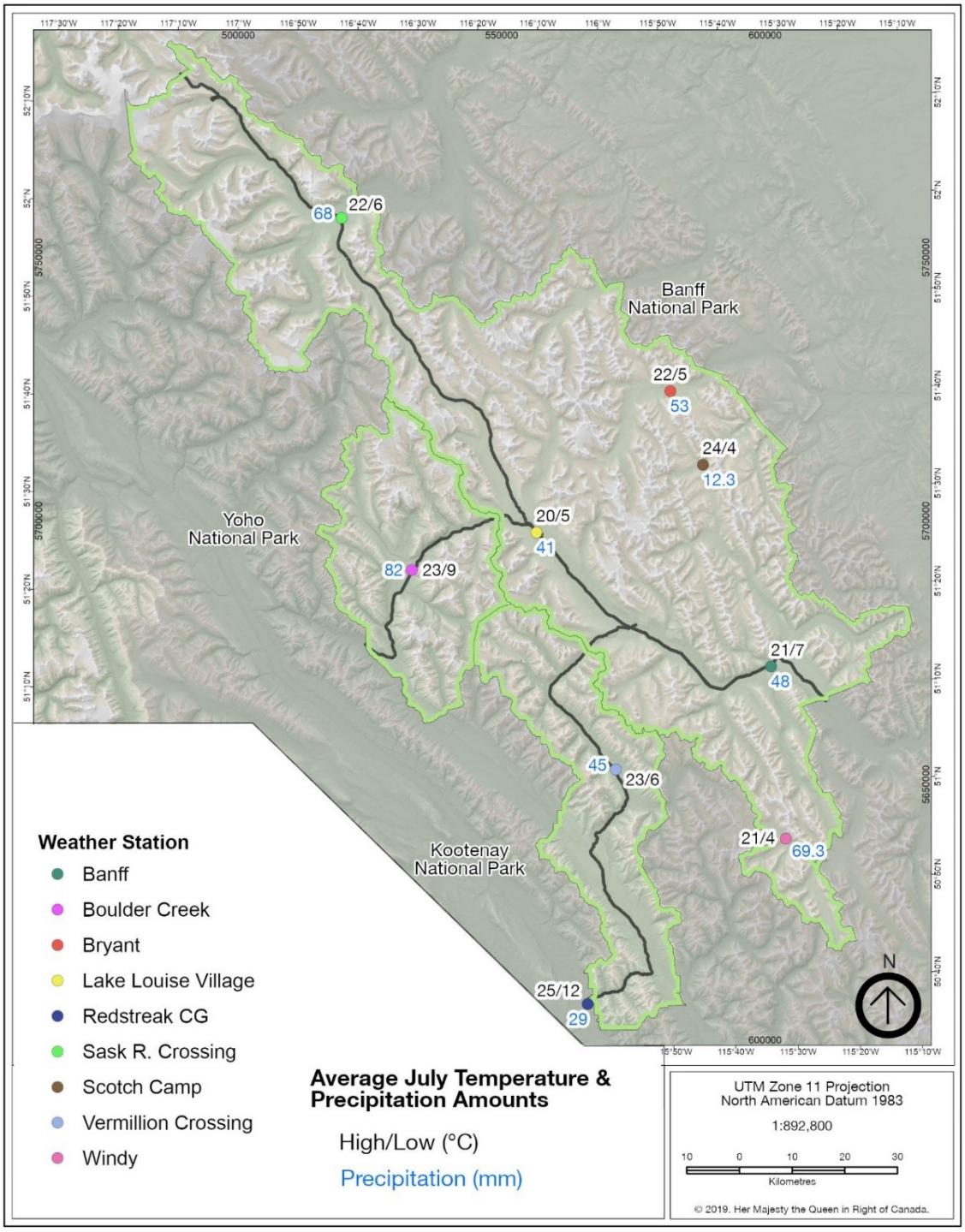


Figure 5: Average July Precipitation and High and Low Temperatures at Banff, Yoho national park weather stations in July. Figure illustrates the higher elevation stations recording cooler temperatures and a west – east moisture gradient.

Biophysical Description

Banff, Kootenay and Yoho national parks all lie within the Montane Cordillera Ecozone (Figure 6). This ecozone extends from the coastal mountains in the west to the foothills of Alberta in the east. It is predominantly represented by subalpine and alpine ecosystems characterized by mixed forests of lodgepole pine, white spruce, Engelmann spruce, and subalpine fir. Stands of Douglas-fir, trembling aspen and balsam poplar occur on the warmest, driest sites in the eastern reaches of major valley systems of the lower elevation montane.

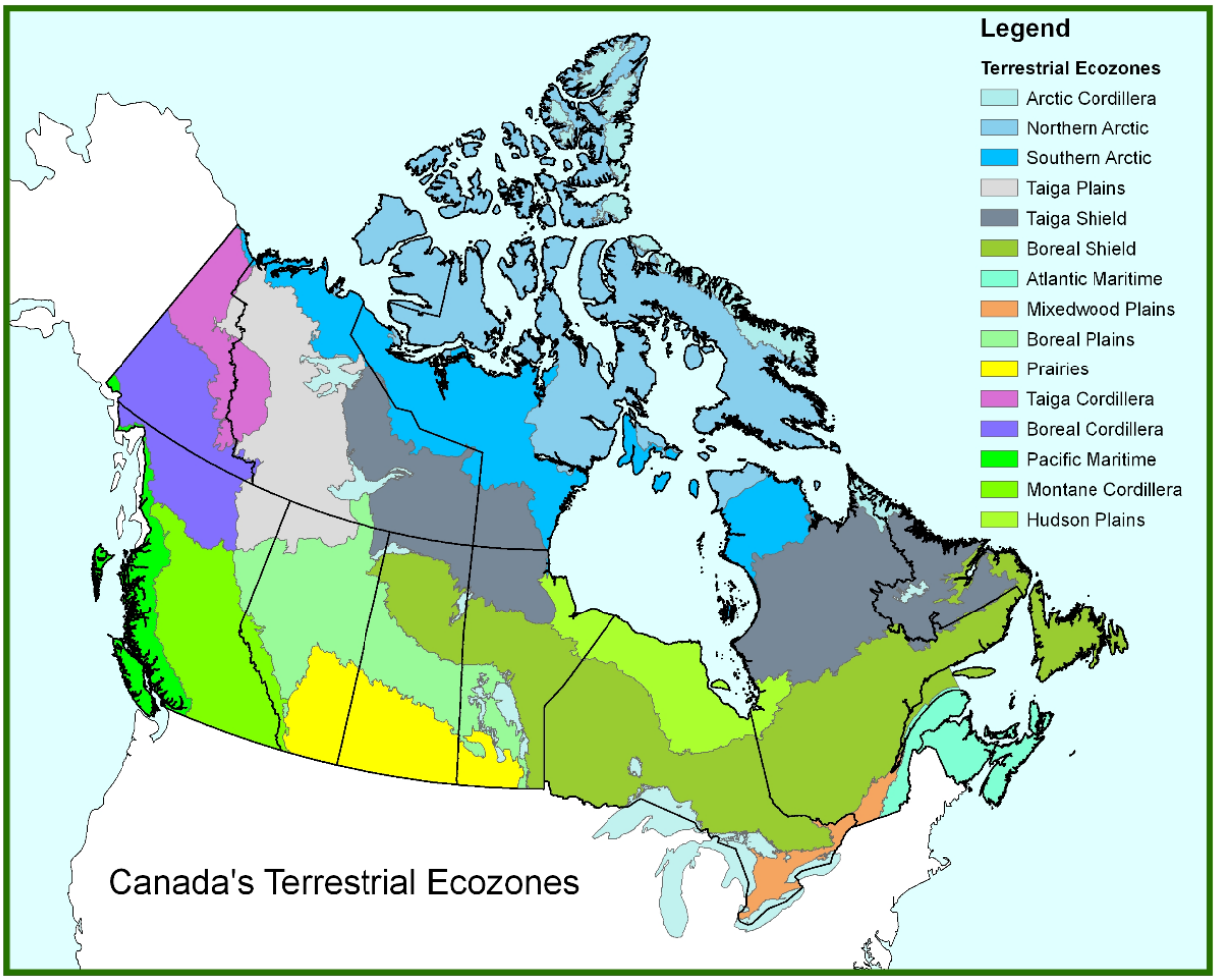


Figure 6. Canada's Terrestrial Ecozones (Source: Natural Resources Canada)

Banff, Kootenay and Yoho national parks are comprised primarily of three ecoregions (Figure 7): 1) the montane; 2) the subalpine and 3) the alpine (Holland and Coen, 1982). The montane ecoregion occurs at lower elevations (between 1350 and 1650 meters) and represents less than 3% of the park. However, the montane has the highest biodiversity and the highest historic fire frequency (30-50 years). Fire suppression during the 20th century has caused the most significant decline in ecosystem health and species diversity within this region, particularly impacting Douglas-fir and aspen grassland ecosites.

The subalpine ecoregion is found between the montane and treeless alpine ecoregion. It is divided into the lower (up to 2000m) and upper subalpine regions. The lower subalpine covers approximately 27% of the

three parks and is dominated by dense forests of lodgepole pine, Engelmann spruce and subalpine fir. The upper subalpine makes up 24% of the three parks and is characterized by mature Engelmann spruce and subalpine fir, interspersed with dwarf-shrub meadows and avalanche path communities.

At elevations between 1800 and 2100 m, open stands of whitebark pine, limber pine and larch are found. Fire exclusion, climate change, and mortality caused by white pine blister rust have put whitebark and limber pines at risk of extirpation in the three parks. In 2012, Whitebark pine was declared Endangered and added to Schedule I of the Species at Risk Act (SARA). Limber pine has been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Endangered but has yet to be added to Schedule I of SARA. However, limber pine has been designated as Endangered under Alberta's Wildlife Act (2009).

The alpine ecoregion (between 2100 and 3400 m) covers 38% of the three parks, with 35% of it being rock, talus, moraines and glaciers. This region generally acts as a barrier to the spread of fire and presents opportunities for indirect containment of managed wildfire to optimize ecological benefits.

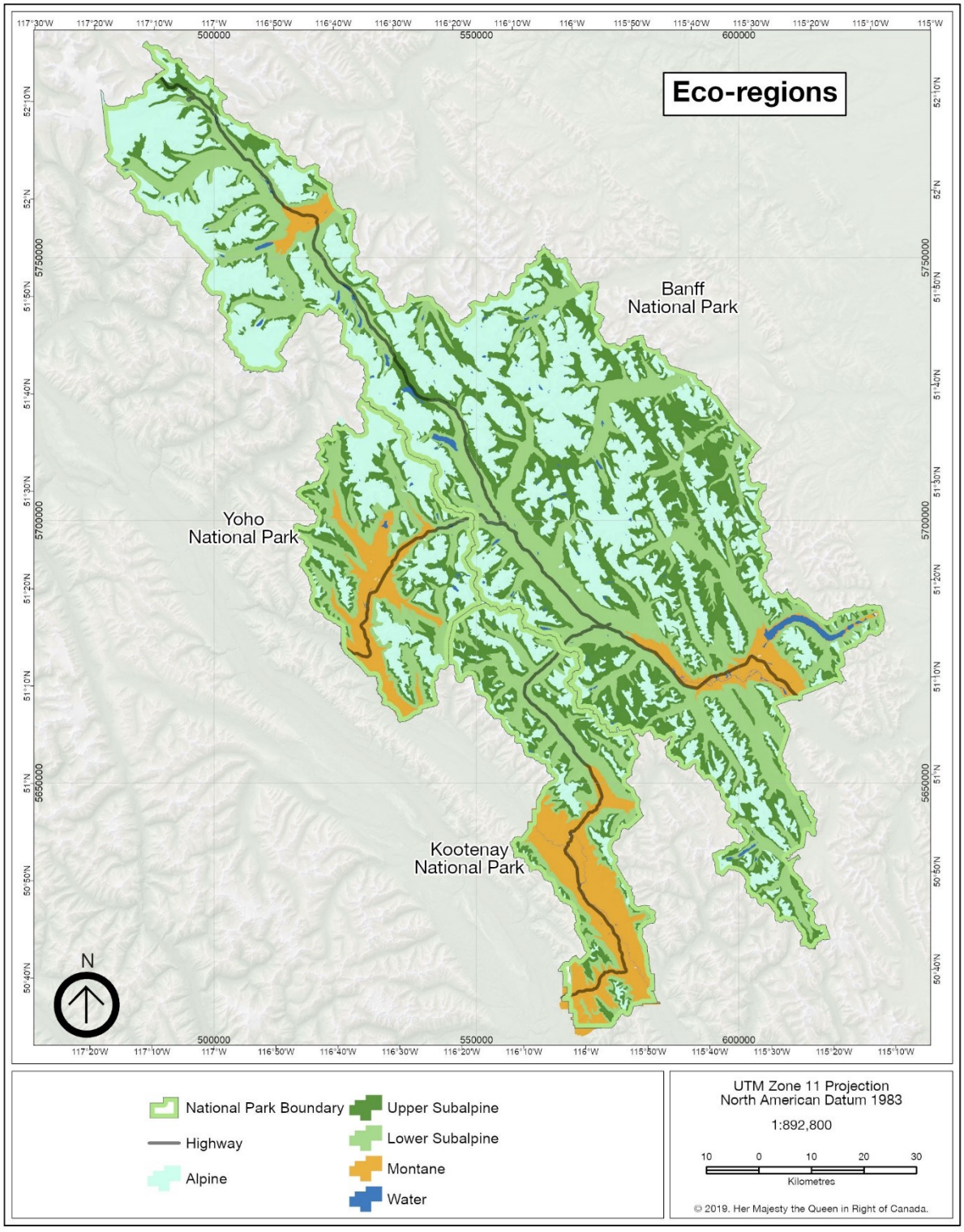


Figure 7. Ecoregions of Banff, Kootenay and Yoho national parks.

Wildland Fire Regime

As seen in Figure 8, historical fire frequencies ranged between 20-50 years in the montane forests, whereas forests at slightly higher elevations (lower subalpine) had longer intervals between 50-100 years on south and west-facing slopes and 100-150 years on north and east-facing slopes. The longest fire return intervals (400 years) can be found in the old growth, upper subalpine forests where climate and snowpack likely affect fuel moisture and ignition.

In Kootenay and Yoho national parks, reference fire regime areas are defined using the climax vegetation communities (Figure 8), as determined using the Biogeocliimatic Ecosystem Classification (BEC) system (Pojar et al. 1987). Fire history research from within each of these BEC zones is used to determine the reference fire cycle.

In Banff National Park, along the east slopes of the Canadian Rockies, lightning and lightning-caused fires do not occur frequently yet evidence from studies of fire history show that fires occurred frequently in the east in many of the montane and subalpine forests prior to the 1880s and the start of the era of European settlement and the construction of the railway. Furthermore, a majority of these fires burned during periods of infrequent lightning and before the typical season for major summer thunderstorms. This incongruence between fire frequency and season of burning has been hypothesized to have been the result of anthropogenic burning by local Indigenous people to draw game species into the valley bottoms for food (Pengelly, 1993). This strong linkage between a lowered fire cycle and anthropogenic burning is also evident in the short fire cycles (25-years) observed in the southern Kootenay Valley and the Columbia Valley portions of Kootenay National Park (Gray et al., 2004).

In addition to frequency, fire size, intensity and severity also may be influenced by elevation. In the valley bottoms, fires were often smaller, as well as less intense and severe, compared to higher elevations; anthropogenic burning in the spring to create habitat for game species may have contributed to these characteristics. In the lower and upper subalpine, fires likely occurred only in those years when weather and fuel conditions would support large, stand-replacing fires.

Stand replacing fires usually consumes any evidence of previous low to moderate intensity fires in the area. Historical data beginning in 1891 can be used to identify smaller fire occurrences (Table 4). Fire suppression may have kept some fires smaller than would have naturally occurred, however this data can be used as an indication of fire starts in the park. In the Canadian Rockies, 3% of the lightning caused fires account for 95% of the area burned (Johnson and Wowchuk, 1993). Historical data from 1891 indicates 5% of the wildfires in Banff, Kootenay and Yoho in the past 120 years account for 95% of the area burned.

Table 4: Fire Occurrence by Size in Banff, Kootenay and Yoho 1891 to 2010

Fire Size	≤ 1.0 ha	1.1-10 ha	10 – 100 ha	100 – 1000 ha	≥ 1000 ha
Total Fires	460	52	77	90	35

Studies have shown that due to decades of fire suppression and climate change, the natural fire regime has been altered from a more frequent low to moderate fire regime to less frequent but high intensity fires. For example, the Verendrye Fire of 2003 in Kootenay National Park burned approximately 16,000 ha, 41% resulting in high burn severity.

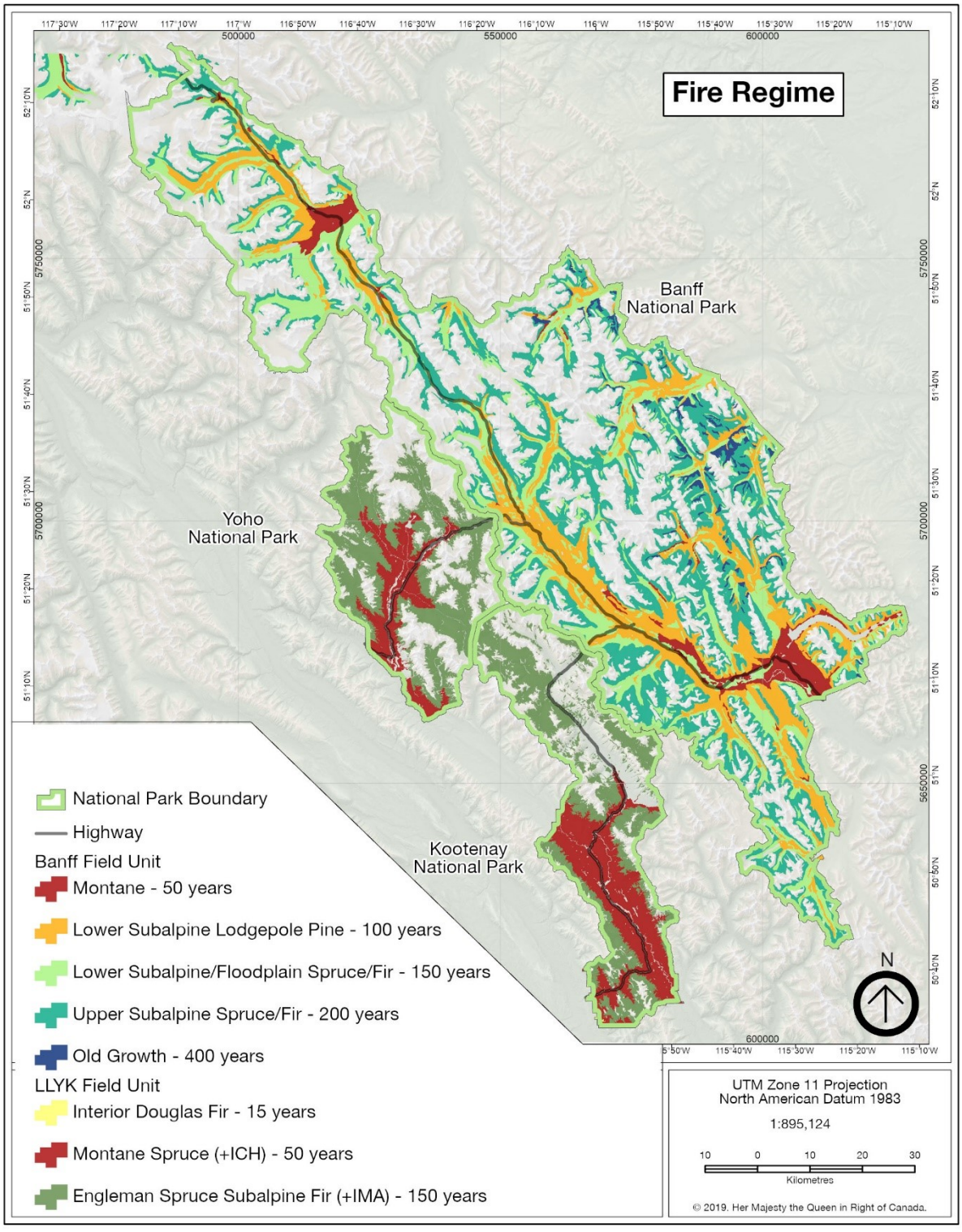


Figure 8: Reference Fire Regime areas for Banff, Kootenay and Yoho national Parks.

Wildfire Preparedness

Protecting the public, park infrastructure and neighbouring lands from wildfires is the first priority of the Parks Canada fire program.

Wildland Fire Risk Assessment

A recent national assessment of fire risk and potential consequences rated Banff, Kootenay and Yoho national parks in the highest category (Level 1 Risk, Level 5 Consequences) based on the probability of fire occurrence and potential consequences with respect to public safety, potential infrastructure losses, and disruption of critical services. Level 5 consequence is defined as "major potential for loss of life; serious injuries with long-term effects. Widespread displacement of people for prolonged duration. Extensive damage to properties (>10 houses) in affected area. Serious damage to infrastructure causing significant disruption of key services for prolonged period. Significant long-term impact on the environment."

This risk assessment process is used to determine the numbers and types of resources assigned to manage a park's wildfire response, prescribed fire, and forest fuel management capabilities. For all fire management actions, Parks Canada uses the Incident Command System (ICS) to determine the organizational model and resources appropriate to the complexity of potential fire incidents. According to the risk assessment, field unit fireline preparedness resources for both Banff and LLYK must include a Type 3 ICS organization supported by a dedicated four-person Type I fire crew and minimum of 8 Type II firefighters and other ICS position resources (Figure 9).

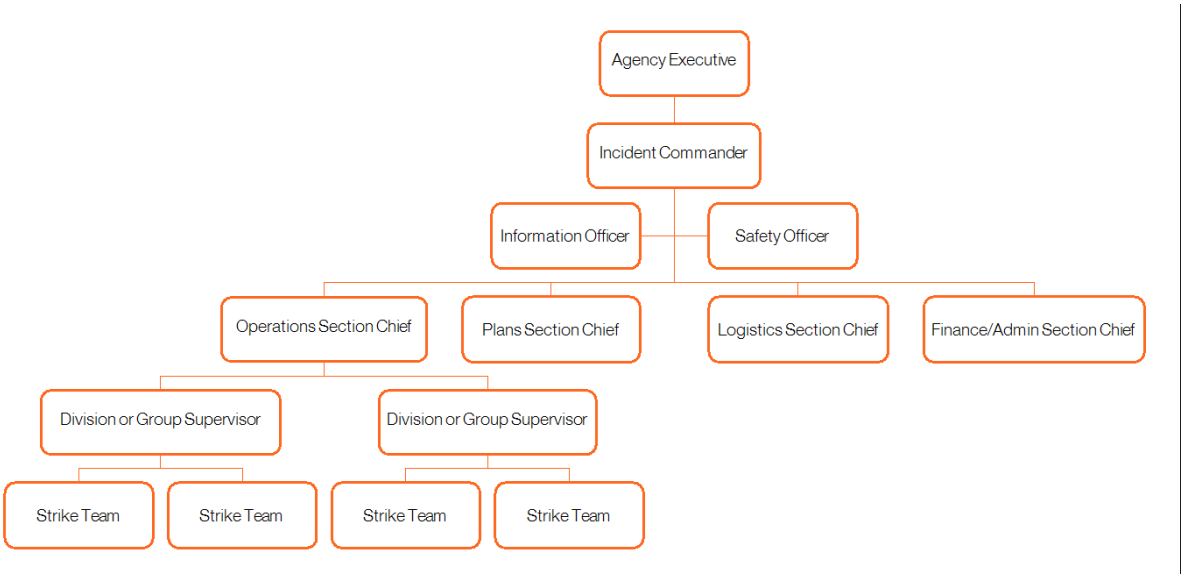


Figure 9: ICS Configuration of a typical Type III incident response – Resources are required from both LLYK & Banff Field Units as determined by the national risk assessment exercise.

As the complexity of a particular fire incident approaches field unit capacity, fireline resources can be requested through the National Duty Officer and supplied through Parks Canada resources as well as interagency resources. The Mutual Aid Resource Sharing (MARS) agreement and the Canadian Interagency Forest Fire Centre (CIFFC) facilitate these reciprocal exchanges of personnel and equipment across agency lines both nationally and internationally.

Fire Weather

The field unit Fire Duty Officer will use information obtained from up-to-date fire weather observations and fire behaviour forecasts to determine the wildfire potential and specific strategies and tactics to be employed (see section on Wildfire Response). The Parks Canada Fire Duty Officer Guidelines (Parks Canada, 2019) provide direction on the roles and responsibilities of the field unit fire duty officer. Fire weather observations will be obtained from multiple weather stations positioned within the field unit. At present, the Banff Field Unit has three permanent weather stations as well as a quick deploy mobile weather station (Figure 11). The LLYK Field Unit has six permanent weather stations and three quick deploy mobile weather stations (Figure 11). These weather stations provide up-to-date weather information and are used to calculate fire weather indices throughout the fire season, following the specifications of the Canadian Forest Fire Danger Rating System (Turner and Lawson 1978). When wildfires or prescribed fire units are not close to a fixed station or the fixed station is not representative, a quick deploy station will be positioned on site to provide accurate weather and fire weather indices for the specific location.

All weather data will be archived in a fire weather database to develop prescriptions for prescribed fires and for research and monitoring purposes.

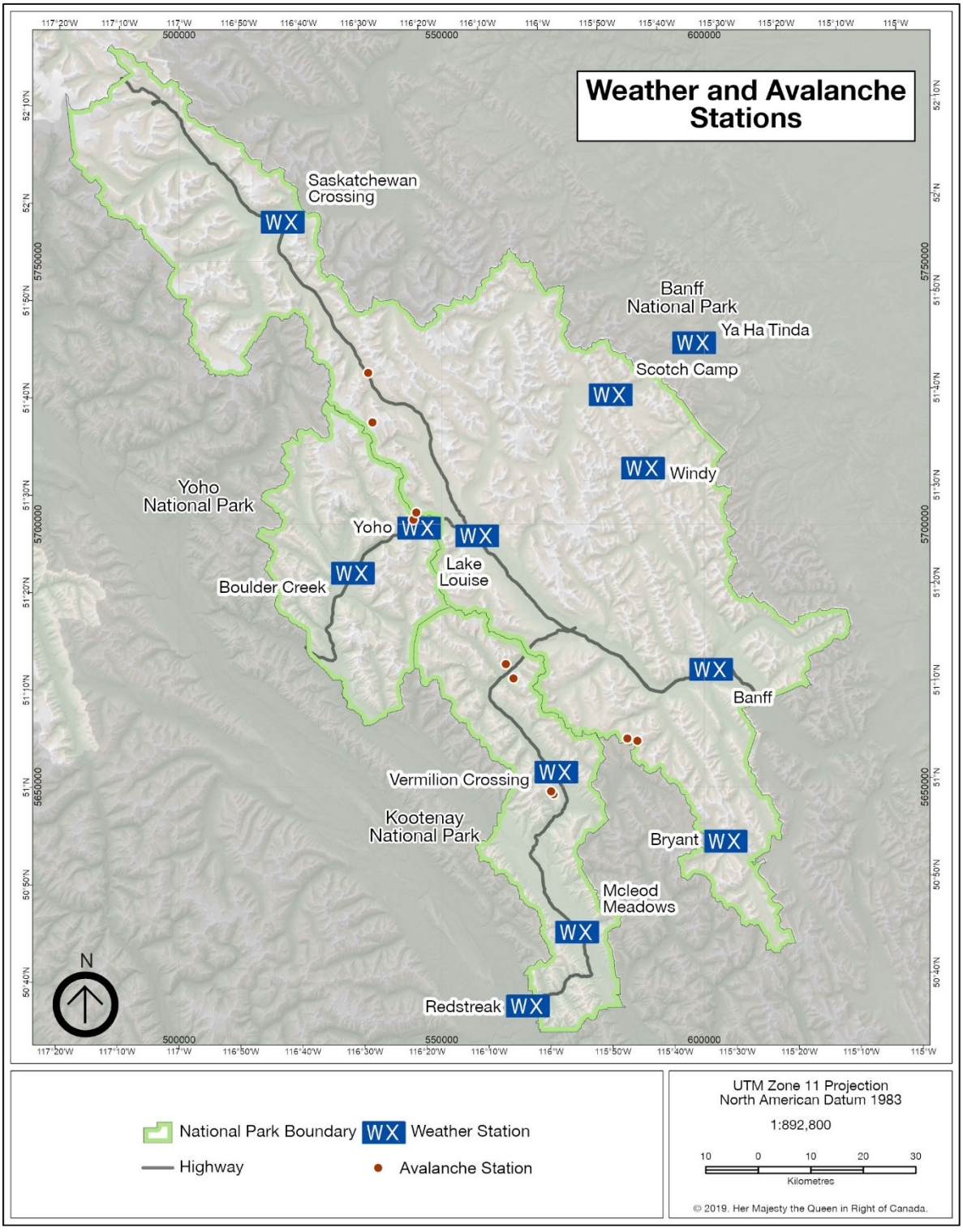


Figure 11. Fire Weather stations in Banff, Kootenay and Yoho national parks.

Fire Behaviour Prediction and Forecasting

For the purposes of fire behaviour prediction, vegetation cover within Banff, Kootenay and Yoho national parks is classified according to a national system of forest fuel types specifically intended for the prediction of fire behaviour (Taylor et al., 1997).

Throughout the fire season, fire management staff calculate fire weather indices based on the Canadian Forest Fire Danger Rating system (Taylor et al., 1997). These indices are an indication of the fuel moisture based on weather (e.g., relative humidity, temperature, wind, and precipitation). Once calculated, a field unit fire danger rating can be determined.

Predictions are derived for each fuel type using computer simulation models that calculate head fire spread rate, fuel consumption, fire intensity, crown fraction burned and potential fire growth. This information is used to determine fire danger and wildfire risk levels, formulate wildfire response tactics, develop burning prescriptions for prescribed burns and plan landscape-level fire management strategies.

The key fuel types found in Banff, Kootenay and Yoho national parks are (Figure 12):

- C2 – Boreal Spruce
- C3 – Mature lodgepole pine
- C7 – Douglas-fir
- D – Aspen
- O1 – Grass

However, other fuel complexes including C4 (immature pine) and slash type fuels are also present.

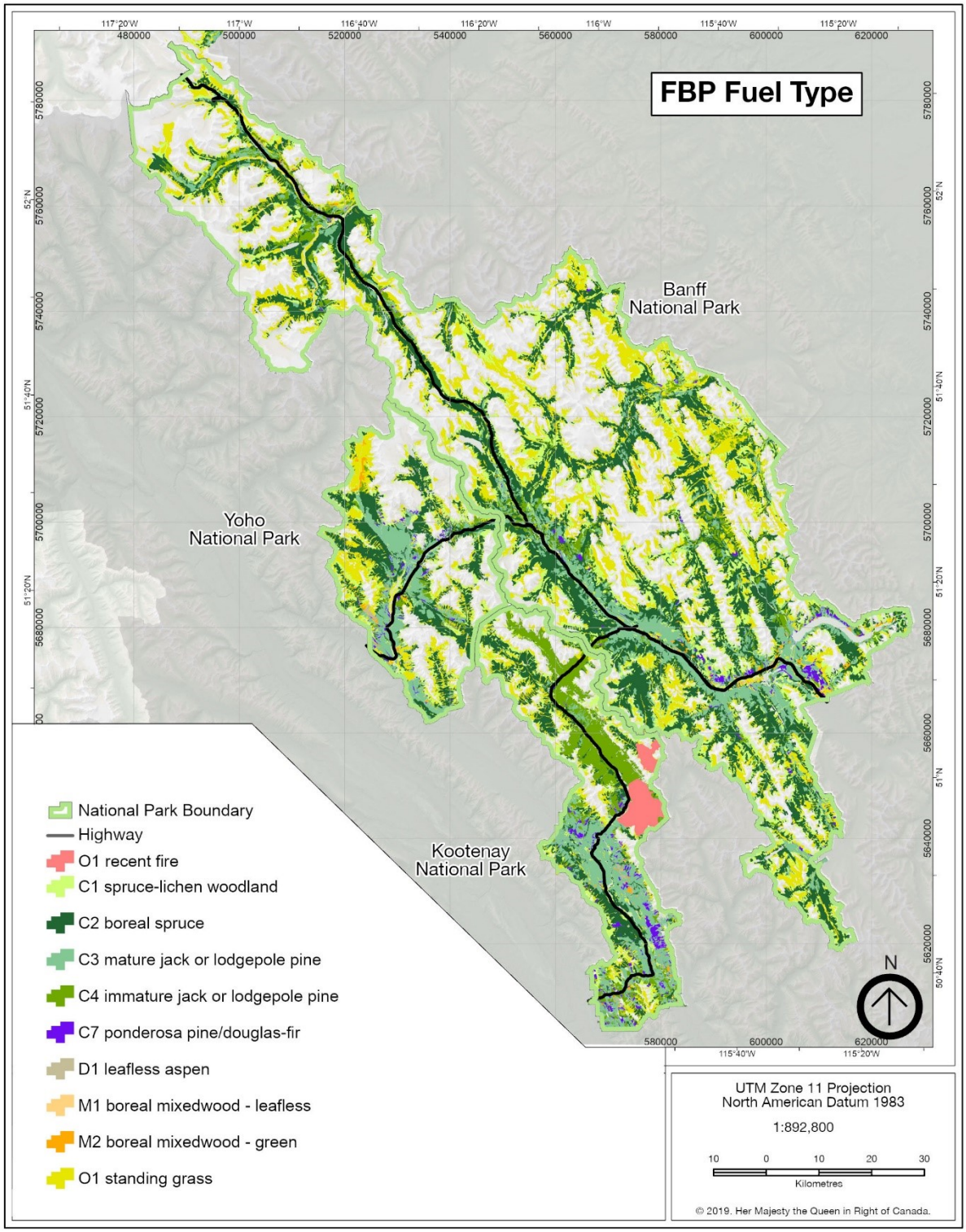


Figure 12: FBP Fuel Type Map – Banff, Kootenay and Yoho National Parks

Field Unit Daily Fire Danger Rating

Fire danger is determined through a matrix that takes into consideration the following:

- Season (Spring/Fall – cured grass vs. Summer)
- Fine fuel moisture and windspeed (Fine Fuel Moisture Code & Initial Spread Index)
- Amount of fuel available to burn (Build Up Index – BUI)

Tables 5 and 6 indicate the matrices for determining fire danger:

Table 5. Spring/Fall fire danger rating matrix (prior to green up, using C7 (Douglas-fir) fuel type to account for cured grass; danger classes: Low, Moderate, High, Very High/Extreme).

	BUI					
ISI	21-30	31-40	41-60	61-80	81-120	121-160
4-5	L	M	M	M	M	M
6-8	M	M	M	M	M	M
9-12	M	M	M	M	M	H
13-17	H	H	H	H	H	H
18-26	H	H	H	H	H	H
30-34	H	H	E	E	E	E
39-45	E	E	E	E	E	E

Table 6. Summer fire danger rating matrix, using C3 (mature lodgepole pine) fuel type; (danger classes: Low, Moderate, High, Very High/Extreme).

	BUI					
ISI	21-30	31-40	41-60	61-80	81-120	121-160
4-5	L	L	L	M	M	M
6-8	L	L	M	M	M	M
9-12	M	M	M	H	H	H
13-17	M	M	H	H	E	E
18-20	M	H	E	E	E	E
21-34	H	E	E	E	E	E
35-45	E	E	E	E	E	E

Preparedness Guidelines

The Banff and LLYK field units have established guidelines that dictate the level of resourcing and service as it relates to daily wildfire danger throughout the field unit. Preparedness guidelines indicate the following (Table 7):

- Hours of duty and standby for fire personnel (fire duty officer, fire crews and additional support resources)
- Minimum response times
- Minimum resourcing levels
- Aircraft and other resource considerations
- Reporting responsibilities

Table 7. Field Unit Fire Preparedness Guidelines

Banff Dispatch collects all fire reports and contacts the Fire Duty Officer (FDO), who coordinates all Fire Operations / Activities: Banff Dispatch: (403) 762-4506 Banff FDO: (403) 763-8025 LLYK FDO: (250) 342-1059	
FIRE DANGER LEVEL	PREPAREDNESS GUIDELINE
I LOW	• **FDO** on shift and/or standby coverage 08:00-22:00. • **Initial Attack Crew (IAC)** on regular shift 08:00 – 16:30 hrs. • **Nomex** (fire-retardant) personal protective equipment (PPE) optional. • **Reporting**: FDO to update National Fire Information System (NFIMS) situation report at least weekly. • **Response** by park staff or IAC within 45 minutes of fire report.
II MODERATE	• **FDO** on shift and/or standby coverage 08:00-22:00 hrs. • **IAC** on regular shift 08:00 – 16:30 hrs. • **Nomex** PPE optional. • **Reporting**: FDO to update NFIMS situation report every 3 days. • **Response** by park staff or IAC within 45 minutes of fire report.
III HIGH	• **Coordination:** FDO to maintain contact with Resource Conservation Manager, Superintendent, and National Fire Duty Officer (NDO) to determine regional situation and obtain operational guidance regarding fire suppression and resource availability. • **FDO** on 24 hour shift and/or standby coverage. • **Helicopters:** Intermediate and/or medium may be hired based on forecast weather and regional operational requirements. • **IAC** on adjusted shift 10:00-18:30 hrs, shift hours may be extended if forecast lightning with minimal rain, may be on standby after end of daily shift, and may work through days off based on weather forecast. • **Nomex** PPE mandatory. • **Other park staff / resources** may be placed on standby. • **Reporting**: FDO will update NFIMS situation report daily. • **Response** by park staff or IAC within 20 minutes of fire report. • **Smoke patrols** may be carried out after lightning activity with minimal rain in high fire danger areas. • **Sustained action crews (SAC)** may be identified and placed on standby. • **Zoning**: may implement full suppression order for any new ignitions – regardless of

	park Fire Management Zoning – depending on conditions and availability of resources.
IV VERY HIGH or EXTREME	• **Closures:** trail or area closures may be activated in pre-identified areas. • **Coordination:** FDO to maintain daily contact with Resource Conservation Manager, Superintendent, and National Fire Duty Officer (NDO) (to determine regional situation and obtain operational guidance regarding fire suppression and resource availability) and with key provincial resources (Local DO) regarding location of adjacent resources (Crews/Helicopters/Air Tankers). • **Fire Bans** as per criteria outlined in Wildland Fire Preparedness Levels for the Mountain National Parks. • **FDO** on 24 hour shift and/or standby coverage. • **Helicopters:** minimum of one intermediate dedicated fire helicopter on site through daily peak burning period and as forecast requires. Medium helicopter may be hired if extreme fire danger is widespread or exacerbated by lightning or wind event forecasts. • **IAC** on adjusted shift 10:00-20:30 hrs, shift hours may be extended if forecast lightning with minimal rain, may be on standby after end of daily shift, and may work through days off based on weather forecast. • **Nomex** PPE mandatory. • **Other resources** may be identified and placed on standby, including water trucks/driver, type 3 incident management team, sustained action crew. • **Reporting**: FDO will update NFIMS situation report daily. • **Response** by IAC on shift within 5 minutes, and after shift within 20 minutes of fire report. • **Smoke patrols** may be carried out after lightning activity with minimal rain in high fire danger areas. • **Zoning**: may implement full suppression order for any new ignitions – regardless of park Fire Management Zoning – depending on conditions and availability of resources.
V FIRE ONGOING	• Resources for an existing fire to be determined via Parks Canada's Fire Analysis (if it extends beyond 1 operational period). • Preparedness activities for new fires to be according to the guidelines above.

Prevention and Detection

Banff, Kootenay and Yoho national parks focus on public education and awareness, risk reduction and reporting/enforcement to reduce the risk of negative wildland fire impacts. Public awareness and education will be discussed in the Communications, Public Engagement and Visitor Experience Opportunities section of this plan. This section will address reporting, fire bans, detection, and wildland fire risk reduction.

Reporting

An efficient system for reporting wildfires as they start is critical to preventing wildfires. The three parks have a reliable system in place for routing wildfire reports to the on-call Fire Duty Officer, involving close cooperation between the Parks Canada and provincial emergency and wildfire reporting dispatch systems

Fire Bans

Table 8 indicates the fire weather thresholds under which a fire ban may be instituted through a Field Unit Superintendent's Order as per the Canada National Parks Act. In certain other circumstances, depending on

fire danger, regional fire load and resourcing considerations, a fire ban may also be considered. Appendix I includes a list of acceptable devices for use during a fire ban.

Table 8. Types of fire bans and criteria for implementation in Banff, Kootenay and Yoho national parks

Location	Criteria	Restrictions*
Campfires while camping with a wilderness pass	Weather forecast continued hot and dry, BUI 100-120	Advisory Potential Ban
	BUI >120, park in level 4 or forecast for level 4	Fire Ban in Place
Fires in picnic areas and unsupervised campgrounds	Current or predicted rate of spread in grass fuel types is >60 m./min (level 4)	Fire Ban at sites with high grass fuel loading.
	BUI >120 and park in Level 4 or forecast for level 4	Fire ban at all unsupervised sites until park in Low Fire Danger
Supervised campgrounds and wood stoves in urban areas and lodges	BUI > 140 and Park in level 4 or forecast for level 4	Ban on all open fires until park returns to Low Fire Danger

*Note additional restrictions/exemptions may be included in a particular fire ban.

Detection

Throughout the fire season, fire management personnel use lightning detection infrastructure and software to monitor potential for fires following lightning producing events. If fire danger conditions are conducive to new fire starts, aerial detection flights using fire crews and rotary or fixed wing aircraft will be deployed. To increase likelihood of detecting human caused ignition, smoke patrol flights will also occur during periods of high and extreme fire danger.

Wildfire Risk Reduction

Since 1983, Banff, Kootenay and Yoho national parks have worked closely with the towns of Banff and Canmore, hamlets of Lake Louise and Harvie Heights, MD of Bighorn, villages of Field and Radium Hot Springs, local businesses, and the governments of Alberta and BC to advance all aspects of Community FireSmart Protection (Partners in Protection 2003) to mitigate wildfire risk to communities and facilities within and adjacent to the three national parks. These efforts have included forest fuel management (fuel reduction), tactical response plans, fire-resistant architectural guidelines and landscaping standards, interagency training and equipment compatibility testing, mutual aid fire response, public education and communication.

As of 2018, a total of 1500 hectares of forest fuels have been mechanically reduced in the Banff Field Unit (Parks Canada 2017). This includes 545 ha in the wildland-urban interface (WUI) and 955 ha in strategically placed landscape-scale firebreaks (Parks Canada 2017). At the two national historic sites within Banff Field Unit (Cave and Basin and Rocky Mountain), both fuel management and prescribed fire are used to contribute to wildfire risk reduction. Fuel reduction activities have been implemented in the vicinity of the Cave and Basin National Historic Site, and prescribed fire has been planned and implemented at the Rocky Mountain House NHS (2016 and 2017).

In Yoho national park, a total of 241ha of forest fuels have been mechanically reduced (Parks Canada 2017). Of this, 44 ha are in the WUI and 198 ha are strategically placed landscape-scale firebreaks. In Kootenay national park, 15 ha in the WUI and 273 ha of fuel breaks have been completed. A summary of Firesmart fuel reduction projects completed and proposed around townsites in Banff, Kootenay and Yoho date is

presented in Figures 13, 14 and 15. FireSmart work is planned to expand around the communities of Lake Louise and Field starting in 2017-2018 however these units have not yet been planned in detail.

Banff, Kootenay and Yoho national parks will continue to develop important proactive wildfire risk mitigations including tactical response plans, fire-resistant architectural guidelines and landscaping standards, interagency training and equipment compatibility testing, mutual aid fire response, public education and communication, and fuel reduction treatments.

The safe use of prescribed fire and indirect containment of managed wildfire using fire breaks are central to reducing fuels and mitigating wildfire risk, and will be used in some areas. Where the use of prescribed fire results in unacceptable risk or impacts to the public or values at risk, fuel management projects will be the primary tool to manage wildfire risk.

To ensure the effectiveness of fuel management units, regular monitoring and maintenance activities will be required. Monitoring of units that have been implemented should include assessment of coarse and fine woody debris loads, windthrow, and regenerating vegetation. If fuel accumulation is such that the effectiveness of the unit is affected, maintenance activities should be implemented. Without proper fuel maintenance (brushing, debris piling/burning, broadcast burning), fuel abatement areas may in fact become areas that increase the wildland fire risk to a community.

Given the vast amount of fuel management activities that have been implemented in Banff, Kootenay and Yoho national parks, the priority will be inventory, assessment and monitoring of existing fuel management areas and the identification and prioritization of any new areas that require wildfire risk reduction work. Priorities for implementation within the three parks as it relates to this fire management plan are listed in Appendix II.

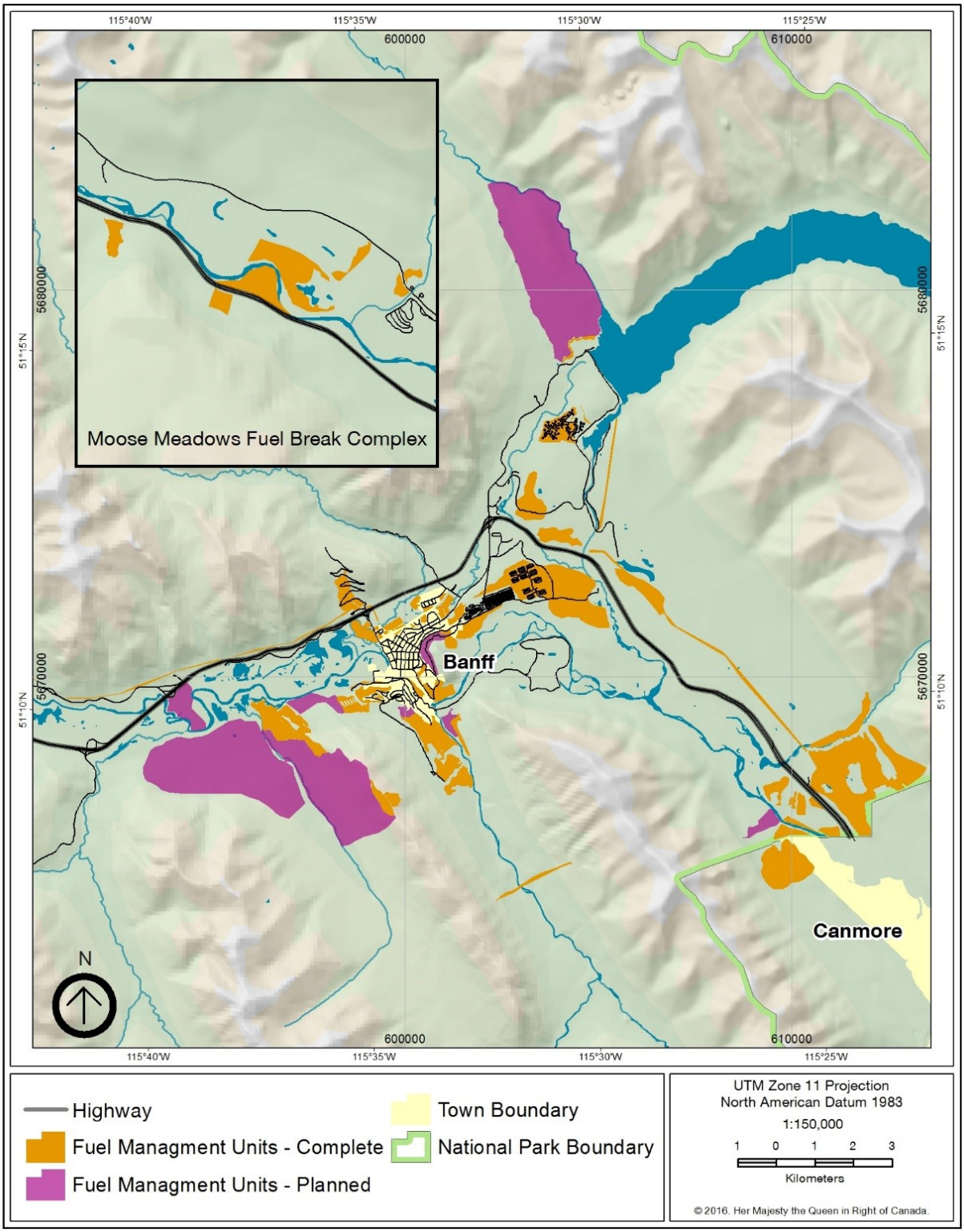


Figure 13. Completed and Proposed Fuel Management Units around the Banff town site.

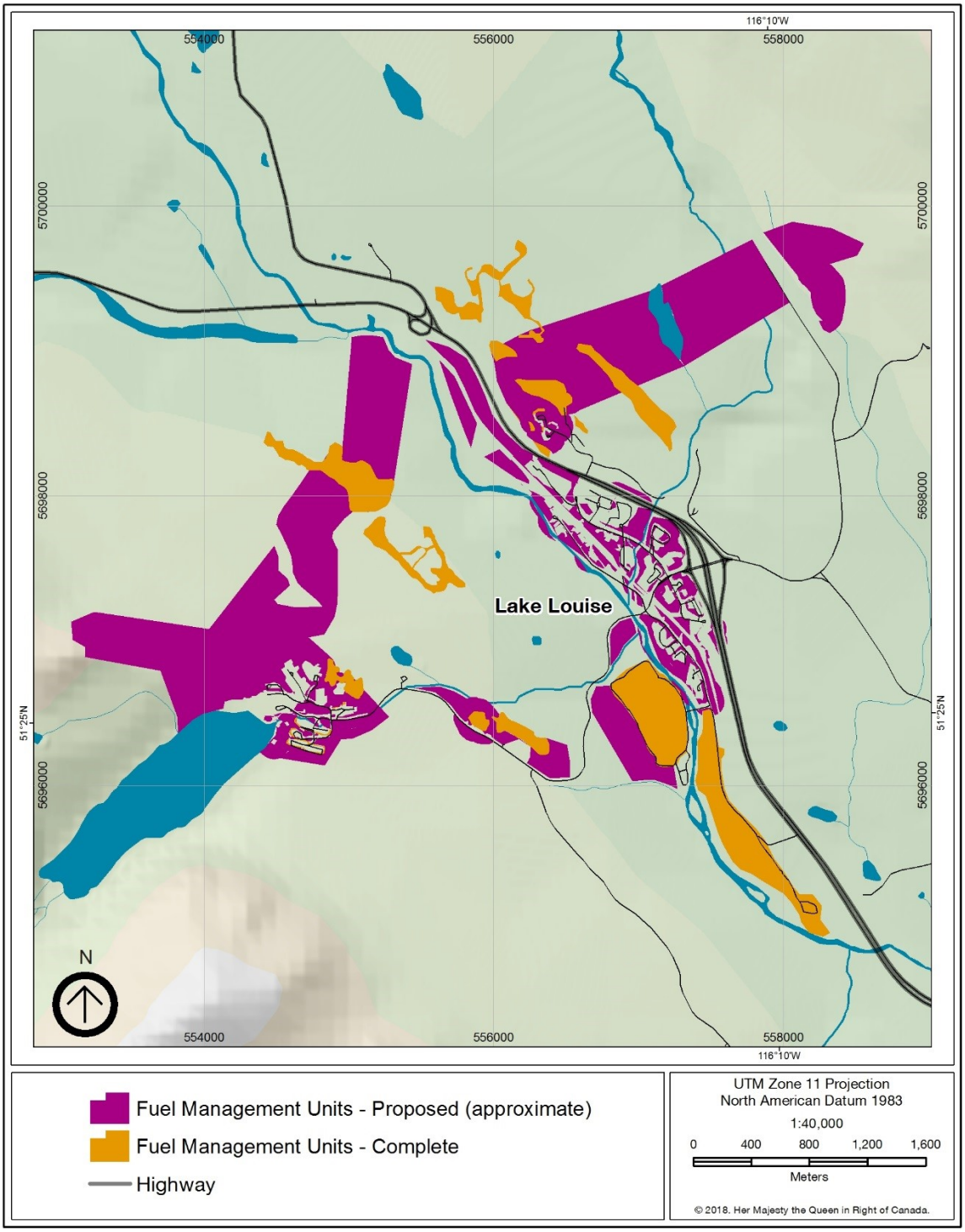


Figure 14. Completed and Proposed Fuel Management Units around the community of Lake Louise.

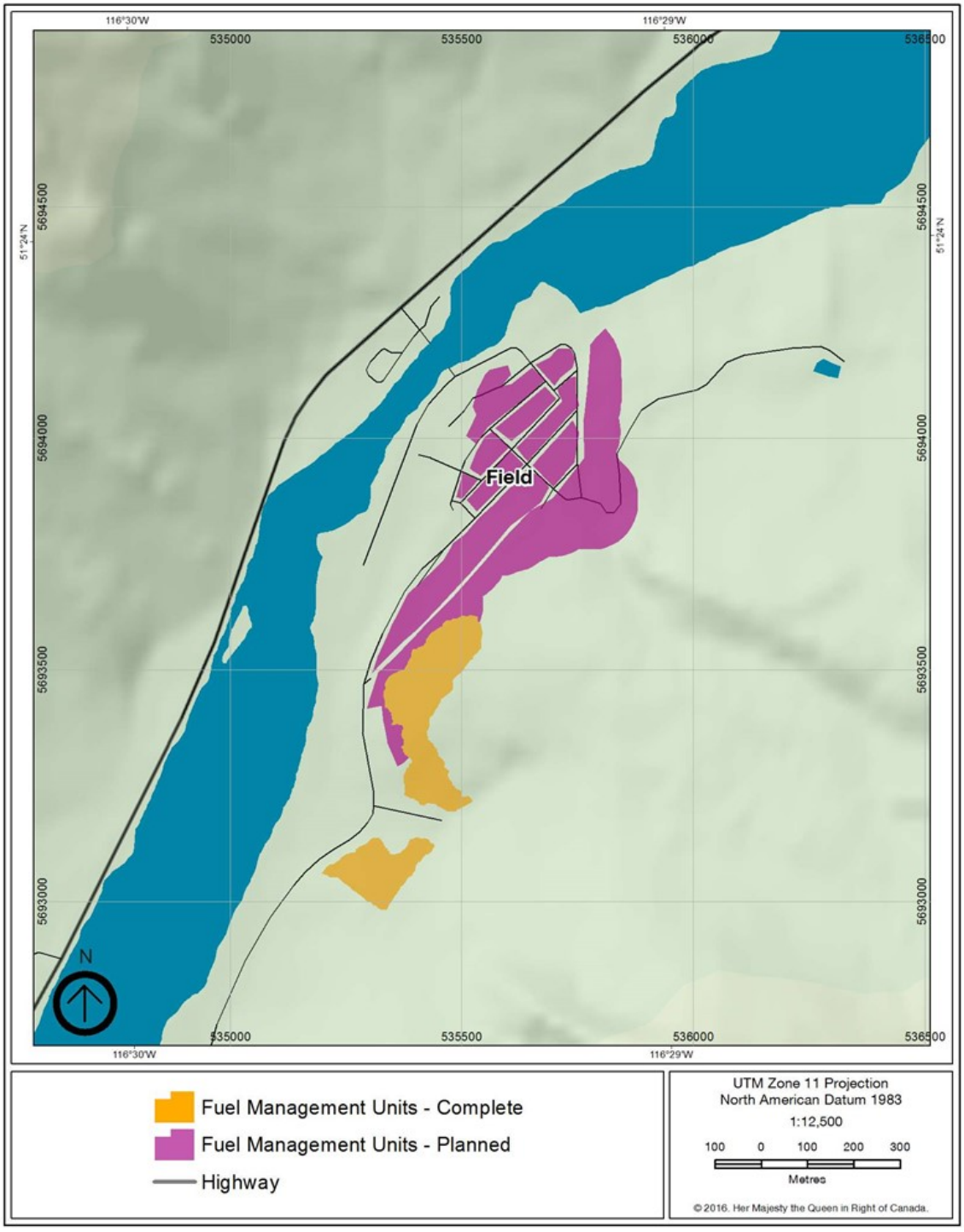


Figure 15. Completed and Planned Fuel Management Units around the community of Field, BC.

In addition to activities outlined in this fire management plan, additional vegetation management that includes fuel management and potentially prescribed fire will be described in the Developed Areas Vegetation Management Plan (DAVMP). The DAVMP documents for the parks are currently in development and will apply specifically to vegetation management in the vicinity of developed areas such as campgrounds, day use areas and other facilities.

Wildfire Response

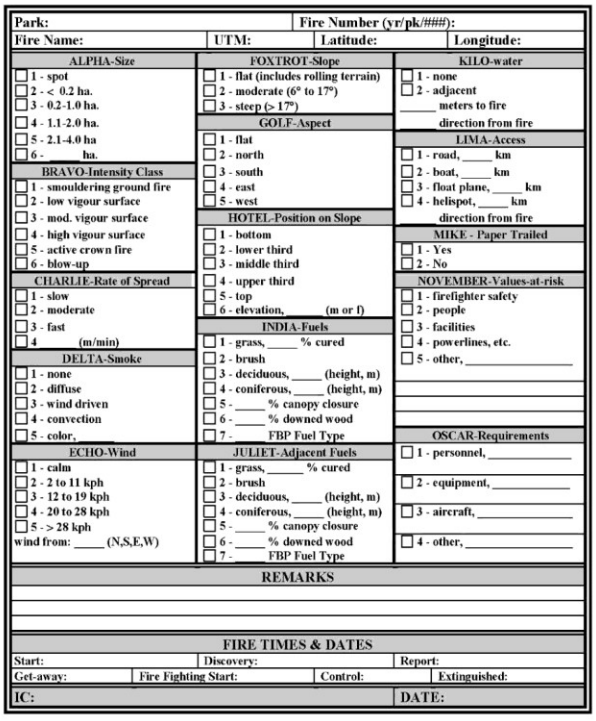
When wildland fires are first ignited in BYK, decisions on response strategies will be based on the mandated priorities of 1) protection of human safety, facilities and infrastructure, and neighbouring communities and lands 2) the restoration of ecological integrity and quality visitor experience. The protection of human life is the priority in all fire management actions. All wildfire management occurring in BYK will be conducted in the safest, most cost effective and environmentally sensitive manner possible.

Parks Canada will respond to wildland fires in BYK using a strategy of either full suppression response or modified response. Full suppression response includes immediate initial attack and/or sustained suppression action until the fire is declared out. Modified response includes a combination of suppression techniques as well as monitoring to steer, contain or otherwise manage fire activity within a pre-determined perimeter such that costs and impacts are minimized, and ecological benefits from the fire are maximized (CIFFC, 2017).

Decisions on wildfire response will consider a wide variety of criteria that affect our ability to meet these mandated priorities, including fire behaviour and growth potential (fuels, fuel breaks, terrain, fuel moisture, and forecast weather), proximity of the fire to values at risk (humans, facilities, infrastructure, communities), fire management resource availability, cost, and whether or not there are now or have recently been wildfire impacts to neighbouring communities (air quality, closures, and the economy).

The decision making process will include a variety of steps and tools to assist fire managers and park administrators make initial management decisions.

The initial fire report will follow the Parks Canada fire reporting process/form (Figure 16).



Park: | **Fire Number (yr/pk/####):**

Fire Name: | **UTM:** | **Latitude:** | **Longitude:**

ALPHA-Size
- ☐ 1 - spot
- ☐ 2 - < 0.2 ha.
- ☐ 3 - 0.2-1.0 ha.
- ☐ 4 - 1.1-2.0 ha.
- ☐ 5 - 2.1-4.0 ha
- ☐ 6 - _____ ha.

BRAVO-Intensity Class
- ☐ 1 - smouldering ground fire
- ☐ 2 - low vigour surface
- ☐ 3 - mod. vigour surface
- ☐ 4 - high vigour surface
- ☐ 5 - active crown fire
- ☐ 6 - blow-up

CHARLIE-Rate of Spread
- ☐ 1 - slow
- ☐ 2 - moderate
- ☐ 3 - fast
- ☐ 4 _____ (m/min)

DELTA-Smoke
- ☐ 1 - none
- ☐ 2 - diffuse
- ☐ 3 - wind driven
- ☐ 4 - convection
- ☐ 5 - color, _____

ECHO-Wind
- ☐ 1 - calm
- ☐ 2 - 2 to 11 kph
- ☐ 3 - 12 to 19 kph
- ☐ 4 - 20 to 28 kph
- ☐ 5 - > 28 kph

wind from: _____ (N,S,E,W)

FOXTROT-Slope
- ☐ 1 - flat (includes rolling terrain)
- ☐ 2 - moderate (6° to 17°)
- ☐ 3 - steep (> 17°)

GOLF-Aspect
- ☐ 1 - flat
- ☐ 2 - north
- ☐ 3 - south
- ☐ 4 - east
- ☐ 5 - west

HOTEL-Position on Slope
- ☐ 1 - bottom
- ☐ 2 - lower third
- ☐ 3 - middle third
- ☐ 4 - upper third
- ☐ 5 - top
- ☐ 6 - elevation, _____ (m or f)

INDIA-Fuels
- ☐ 1 - grass, _____ % cured
- ☐ 2 - brush
- ☐ 3 - deciduous, _____ (height, m)
- ☐ 4 - coniferous, _____ (height, m)
- ☐ 5 - _____ % canopy closure
- ☐ 6 - _____ % downed wood
- ☐ 7 - _____ FBP Fuel Type

JULIET-Adjacent Fuels
- ☐ 1 - grass, _____ % cured
- ☐ 2 - brush
- ☐ 3 - deciduous, _____ (height, m)
- ☐ 4 - coniferous, _____ (height, m)
- ☐ 5 - _____ % canopy closure
- ☐ 6 - _____ % downed wood
- ☐ 7 - _____ FBP Fuel Type

KILO-water
- ☐ 1 - none
- ☐ 2 - adjacent

_____ meters to fire

_____ direction from fire

LIMA-Access
- ☐ 1 - road, _____ km
- ☐ 2 - boat, _____ km
- ☐ 3 - float plane, _____ km
- ☐ 4 - helispot, _____ km

direction from fire

MIKE - Paper Trailed
- ☐ 1 - Yes
- ☐ 2 - No

NOVEMBER-Values-at-risk
- ☐ 1 - firefighter safety
- ☐ 2 - people
- ☐ 3 - facilities
- ☐ 4 - powerlines, etc.
- ☐ 5 - other, _____

OSCAR-Requirements
- ☐ 1 - personnel, _____
- ☐ 2 - equipment, _____
- ☐ 3 - aircraft, _____
- ☐ 4 - other, _____

REMARKS

FIRE TIMES & DATES

Start: | Discovery: | Report:

Get-away: | Fire Fighting Start: | Control: | Extinguished:

IC: | DATE:

Figure 16. Initial fire report form.

Once the pertinent fire report has been received by the fire duty officer, the FDO will continue with an initial wildfire assessment. This process will help the FDO compile the information that will assist fire managers in providing recommendations for management actions to park administrators.

The first step of the initial wildfire assessment process will be to determine what fire management zone the fire is located. If the fire falls within the Intensive fire management zone (Red) the fire will be suppressed as quickly as possible using the most appropriate fire management actions to ensure the protection of life and property. However, if a fire has been detected in the Intermediate (Yellow) or Extensive (Green) fire management zone, the following process will be followed.

1) Identify the immediate and projected threats to life and property (i.e. staff, visitors, communities, infrastructure)
2) Determine the fire management zoning of the fire location
3) Assess whether the fire is a wildland fire use candidate
4) If the fire is a candidate for wildland fire use, complete the wildfire use decision checklist (Table 9)
5) Determine the availability of necessary personnel and fire management resources to appropriately manage the fire
6) Assess fire growth potential under current conditions and forecasted
7) Location of natural barriers to fire spread – initial containment boundaries to consider

If the fire is a potential candidate for modified response strategies, the following checklist (Table 9) will be completed by the fire duty officer. Note that this process is meant to be a thorough but relatively rapid decision making tool (to be use in the first operational period since fire detection).

This checklist will help the fire duty officer and agency administrators to assess whether the situation is conducive to modified response action. This process is designed to assist the FDO and agency administrators in making an initial decision regarding management of wildfires. Extended response management decisions for fires beyond 24 hours will be made using the Parks Canada wildfire analysis process.

The fire duty officer must consult and use the most current information on fire behaviour (from a certified wildfire behaviour specialist) and fire weather to help inform these answers. Consultation with other experts in fire management (e.g. national duty officers, fire meteorologists) as well as agency administrators (e.g. managers and field unit superintendents) will help to ensure a well informed decision to minimize the risk to life and property while maximizing the ecological benefits of fire.

If the answer to any of these 5 questions is yes and factors cannot be mitigated, the appropriate fire management action should be a full suppression response.

Detailed explanations of considerations for each question in the checklist are as follows:

A) Considerations regarding firefighter and public safety should be assessed to answer this question. If the fire results in significant risks to either fire personnel or the public and cannot be mitigated, then managing the fire through modified response should not be considered.
B) An initial assessment of the historic fire cycle/regime and ecological and socio economic impacts should be undertaken at this step. Potential negative ecological impacts (e.g. extreme fire severity, habitat impacts, negative impacts to Species at Risk) should be an indication to avoid modified response.
C) The fire duty officer should assess (with consultation from other functional experts – if possible) the potential to impact other components of the Parks Canada mandate. These considerations should include, but are not limited to: visitation, stakeholder interests, ecological impacts etc.

D) This question addresses the local and regional (and occasionally national) fire situation. The fire duty office should be in discussion with the national duty officer and neighbouring fire agencies to ensure that resources are available to support a modified response fire in the particular location. Other considerations should be whether other fires are occurring in the area and whether it is possible to manage more than one fire on the landscape at once.
E) The final question in this assessment prompts the fire duty officer to determine whether there are any other issues that would preclude wildland fire use from an Agency administrator perspective. The agency administrator (e.g. Resource Conservation Manager or Field Unit Superintendent) has the discretion to provide direction to the fire duty officer with respect to issues that might be unbeknownst to the fire program that might be impacted by the response to the fire.

If the answer to any of these 5 questions is yes and factors cannot be mitigated, the appropriate fire management action should be a full suppression response.

Some of the primary issues that affect the ability to use a modified response approach to a wildfire for ecological benefits include, but are not limited to:

- Prolonged drought conditions (existing or forecast)
- No qualified manager available to assist with decision making
- Preparedness levels – local or regionally
- Smoke impacts
- Proximity to zoning boundaries
- Resourcing
- Current fire load
- Risks to values cannot be mitigated

Visual assessments by the fire duty officer and agency administrators (if necessary), of the fire location, behaviour, spread potential and management potential should also be conducted to assist in decision making. Additional documentation can be included to support the decision to use full suppression or modified response.

An additional tool developed by the Canadian Forest Service in collaboration with Parks Canada for Banff, Yoho and Kootenay national parks, is a wildfire hazard map that combines seasonal burn probability and fire intensity. Fire duty officers will also be able to determine the relative hazard of a fire in a particular season, depending on its location. As wildfire risk assessment tools continue to be developed, Parks Canada will use the most up to date fire science to help inform their decisions and adaptively manage fire on the landscape.

Fire Analysis

Any fire that is not extinguished within 24 hours will be assessed under the fire analysis process (including those chosen for modified response), which provides a more thorough review of alternatives and documentation of these decision making criteria. This process has been laid out in the Parks Canada Wildfire Analysis Process (Parks Canada, 2019).

The fire analysis will document the approved fire management strategy taking into account fire management zoning, incident complexity, resource requirements, present and future wildfire risk reduction, opportunities for restoring ecological integrity, and estimated costs. It will define the area within which the fire will be contained, strategies and tactics to monitor or control the fire, and trigger points that may require a change in strategy or further analysis. The fire analysis will be prepared by fire management specialists, reviewed by Parks Canada's National Fire Management specialists, and then be approved by the Field Unit Superintendent.

Table 9. Wildland fire use decision checklist.

Date: Fire Number:	Coordinates:		Location:	
Fire Management Zone (circle one)	Intensive	Intermediate	Extensive	
Cause	Natural Ignition	Illegal	Unknown	
Current Condition Class in Fire Management Unit	Good	Fair	Poor	
Suitable for Wildland Fire Use? (WFU)	YES (continue with rest of checklist)	NO – suppress immediately	Initials	Date/Time
A) Is there a threat to life, public or fire personnel safety that cannot be mitigated?	YES	NO		
B) Are potential effects on cultural and natural resources outside the range of historic variability?	YES	NO		
C) Are there any additional risks that cannot be mitigated that may be unacceptable to the Agency mandate? (check with PC-03, Res Con Manager and/or FUS)	YES	NO		
D) Are there any other fire operations in the area that might affect the safe and effective management of this fire?	YES	NO		
E) Are there any other agency issues that preclude wildland fire use in this situation?	YES	NO		
Additional documentation: ☐ Daily situation report indicated current and forecast FWI and weather ☐ Explanation of mitigating factors (attached document) ☐ List of specialists, administrators consulted (if required)				
Prepared by (FDO)	Recommended* by:	Approved* by (RCM or FUS)*		

*Recommendation/approval can be obtained via email/phone with documentation attached to file in circumstances when timely physical signatures are not possible.

Fire Management Zoning

Fire management zones were delineated based on values at risk (human safety and facility protection), potential fire behaviour (fuels and terrain), and wildfire barriers such as firebreaks, rivers, lakes and rock ridges. This zoning will be used to inform and direct decisions on strategies and tactics for wildfires, especially when they are first reported (Figure 17). Each zone identifies specific protocols for fire detection and control, as well as the spectrum of response strategies and tactics that will be considered (Table 10). Zone boundaries will be updated as needed based on changes in values at risk, or firebreaks (including wildfires and prescribed fires).

Table 10. Summary of management actions and considerations for each fire management zone.

Fire Management Zone	Preferred Response	Considerations						
		Public Safety	Infrastructure	Tactics				
				Heavy Equipment	Air Tankers	Fuel reduction	Prescribed Fire	Modified Response
Intensive	*Full Response**; minimize fire risk and fire growth to a limited perimeter using the most appropriate suppression strategies	• Communities • Infrastructure • Neighbouring lands	• Transportation corridors • Utility lines	✓	✓	✓	✓	NA
Intermediate	*Full Response or Modified Response**; manage fires to confine fire spread to defined perimeter considering ecological objectives	• Mid- to Backcountry locations • Backcountry trails and campgrounds	• Backcountry commercial operations • PCA facilities	Indirect attack tactics preferred unless other factors* indicate full suppression		Small to medium areas around facilities and boundaries	✓	✓
Extensive	*Modified response**; manage fires with minimal intervention and ecological benefits	• Low visitor use • Backcountry trails and campgrounds	• Backcountry commercial operations • PCA facilities	✗	✗	Small areas around backcountry lodges	✓	✓

*Table indicates preferred goals, however other consideration factors include: current and forecast weather conditions, adjacent fuels and topography, fire potential (current and forecast fire behaviour), local and regional fire situation, values at risk, tactical complexity, cost of alternatives, and availability of resources. Wildfire analysis process (>24 hours after detection) will be followed as per national Wildfire Analysis Process Standard Operating Procedures.

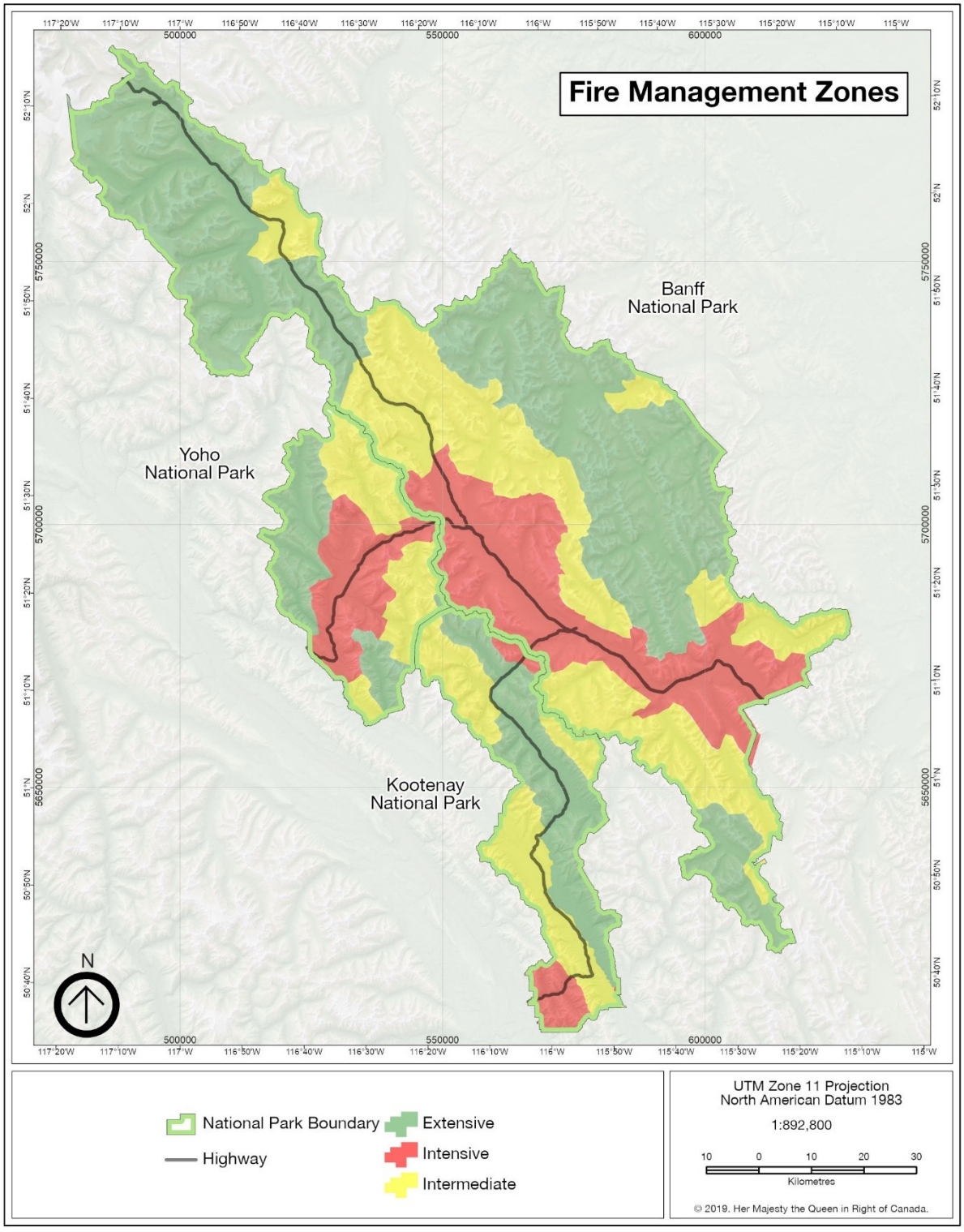


Figure 17: Fire Management Zone Map – Banff, Kootenay and Yoho national parks

To determine whether a fire will be a modified response wildfire (i.e., ***not*** a full response fire that is subject to immediate suppression) in either the extensive or intermediate zones, the following will be taken into consideration:

- Current and forecast fire weather
- Current and forecast weather
- Local, regional and national resource levels
- Local, Regional and National Priorities

Intensive Fire Management Zone (Red)

Intensive zones contain communities, infrastructure, neighbouring lands, and other values that may be adversely impacted by wildfire. In the intensive fire management zone, wildfires will be managed on a priority basis to minimize fire spread using a full range of tactics. Prescribed fires that reduce wildfire risk and fuel reduction projects may be planned and conducted using intensive tactics to meet specific risk management and ecological objectives. Management actions will be focused on reducing fire risk and restricting fire growth to a very limited perimeter.

Tactics - rapid detection and initial attack. Air tankers may be used to deliver foam and long-term retardants; use of dozers, skidders, chippers and other heavy equipment are acceptable. The use of heavy machinery in these areas must be considered carefully using minimum impact suppression tactics and with a heavy emphasis on early planning for reclamation, including cost estimate and timelines for reclamation. Extensive fuel management will be carried out in this zone. Low priority sectors of larger fires may be burned out to anchor containment lines to natural barriers.

Intermediate Fire Management Zone (Yellow)

Intermediate zones are adjacent to intensive zones, and may contain limited facilities or infrastructure, where careful consideration is needed in determining modified suppression activities. Wildfires in the intermediate fire management zone will be managed to confine fire spread to a defined perimeter with the possibility of achieving ecological objectives. Prescribed fires will be planned and conducted using tactics that meet risk management and ecological objectives. Acceptable fire perimeters will be defined based on natural and man-made barriers and operational considerations.

Tactics: Indirect attack is the preferred response unless regional fire load, forecast weather and fuel moisture conditions indicate the need for full suppression as determined by fire analysis process. Small to medium areas of mechanical fuel reduction may be carried out around outlying facilities and park boundaries.

Extensive Fire Management Zone (Green)

In the extensive fire management zone, wildfires will be managed with minimal intervention. The extensive fire management zone is located in backcountry areas with no vehicle access. There is limited infrastructure and low visitor use.

Prescribed fires will be planned and conducted using tactics that meet ecological and risk management objectives. A prescribed fire plan using a limited range of tactics will be developed. Management actions will be focused on containing fire growth to within the fire zone.

Tactics - The extensive zone is the area wildfires will be managed for their ecological benefits. This zone has the most restrictions on fire control tactics. This includes using indirect containment and limited mop up. Limited use of helicopters for bucketing is acceptable but the use of air tankers is discouraged. Outlying

infrastructure will be protected with hose lines, sprinkler systems and burning out where possible. Fuel management will be limited to small areas around backcountry lodges.

Tactical Plans

Tactical response plans for specific wildfire scenarios have been developed to protect communities, other facilities, and neighbouring lands. The Town of Banff Tactical Response Plan (Town of Banff, 2007), the Field Wildfire Operations Plan (2009), and the Lake Louise Wildfire Operations Plan (2007) each outline specific tactics for the protection of values within the town boundary as well as established staging areas, reception centres and evacuation routes.

Wildland fire evacuation plans are also in place for all major campgrounds and outlying commercial facilities within Banff, Kootenay and Yoho national parks will be recommended by the field unit Fire Duty Officer if there is a potential threat of wildfire impingement on a facility or location. Implementation of evacuations in remote areas (e.g., backcountry campgrounds) will be led by the Parks Canada Visitor Safety team. Evacuation within the Banff townsite will be led by the Town of Banff Fire Department, whereas evacuation of the hamlet of Lake Louise will be led by Parks Canada and the RCMP. Evacuation of outlying commercial facilities is led by the facility owner/operator (e.g., Banff Gondola) with support from Parks Canada (e.g., via ferrata, ski area leaseholds, backcountry lodges). All evacuation recommendations will be approved by the Field Unit Superintendent (or designate) and will be carried out in communication with the Fire Duty Officer and the Incident Commander for the incident.

Personnel Resources

National Incident Management Teams (NIMT) are primarily tasked with responding to wildland fires and conducting prescribed fires, but may also be deployed in response to other national scale incidents or events (e.g. flooding). In addition to field unit responsibilities, the Banff and LLYK field units are each required to supply a minimum of six individuals to the NIMT program. While the primary responsibility for fire management falls within Resource Conservation, the field unit has a responsibility to contribute to the integrated NIMT program by providing staff from various functions.

From within each of the Banff and LLYK field unit fire management programs, the following positions will contribute directly to the NIMT program.

- PC-03 Fire and Vegetation Specialist
- EG-05 Fire Management Officer
- EG-04 Vegetation Restoration Specialist
- EG-03 Fire Technician

In addition to these four dedicated fire staff, two additional personnel are needed to meet each field unit's required support for the NIMT program. In the past, Fire Information Officers from the External Relations and/or Visitor Experience functions have participated on a NIMT. The field unit management team will ensure the minimum NIMT contributions are met on an annual basis. Individuals identified as NIMT resources shall be available for shifts throughout the fire season; during which they can be deployed for up to 14 days at a time (not including travel).

Type 1 fire crews are able to perform safely and efficiently on all types of wildland fires. The Banff Field Unit will have one Type I fire crew (4 person), and LLYK Field Unit will have two Type I fire crews (Total 8 personnel).

Type II fire crews are able to respond safely and efficiently to low vigour fires (Intensity class 1 and 2). The Banff and LLYK field units will each also ensure there are a minimum of 20 Type II fire crew members (for a total of 40) available for fire management response.

Interagency Cooperation

While Parks Canada maintains the responsibility and authority for wildfire management within Banff, Yoho, and Kootenay national parks, the provinces of Alberta and British Columbia share boundary zones with these parks. Other agencies share responsibility or provide support for Parks Canada for emergency management including during wildfires. Parks Canada will continue to cooperate with these other agencies on training and exercises, information and communications, tactical planning, public awareness and education, wildfire risk reduction, and resourcing for wildfire incidents.

Memoranda of understanding between Parks Canada and the provinces of Alberta and British Columbia with respect to wildland fire management within the boundary zone between national park and provincial lands are in place (PCA-AB, 2009; PCA-BC, 2005) and reviewed annually. These documents outline cooperative fire management approaches with respect to:

- Fire reporting/discovery
- Responsibility
- Single and dual jurisdictional control responsibility
- Fiscal relationships and reimbursement conditions
- Liability
- Fire and vegetation management planning
- Fire prevention planning

Current MOUs do not include Rocky Mountain House National Historic Site, but Parks Canada is working with the Government of Alberta to ensure that timely wildfire response occurs on the site through regional and provincial wildfire services.

Schedule of Activities

A Fire Duty Officer will be on duty for the duration of the fire season from April 1 and October 31 (or later if significant fall precipitation has not yet accumulated). The Type I fire crews will be functional from April 1 to September 30 annually. Between September 30 and October 31, Type I response will be limited. Any Type I resources required after September 30 will be filled using import resources. Figure 18 indicates the typical schedule of fire management activities and resource availability throughout the year.

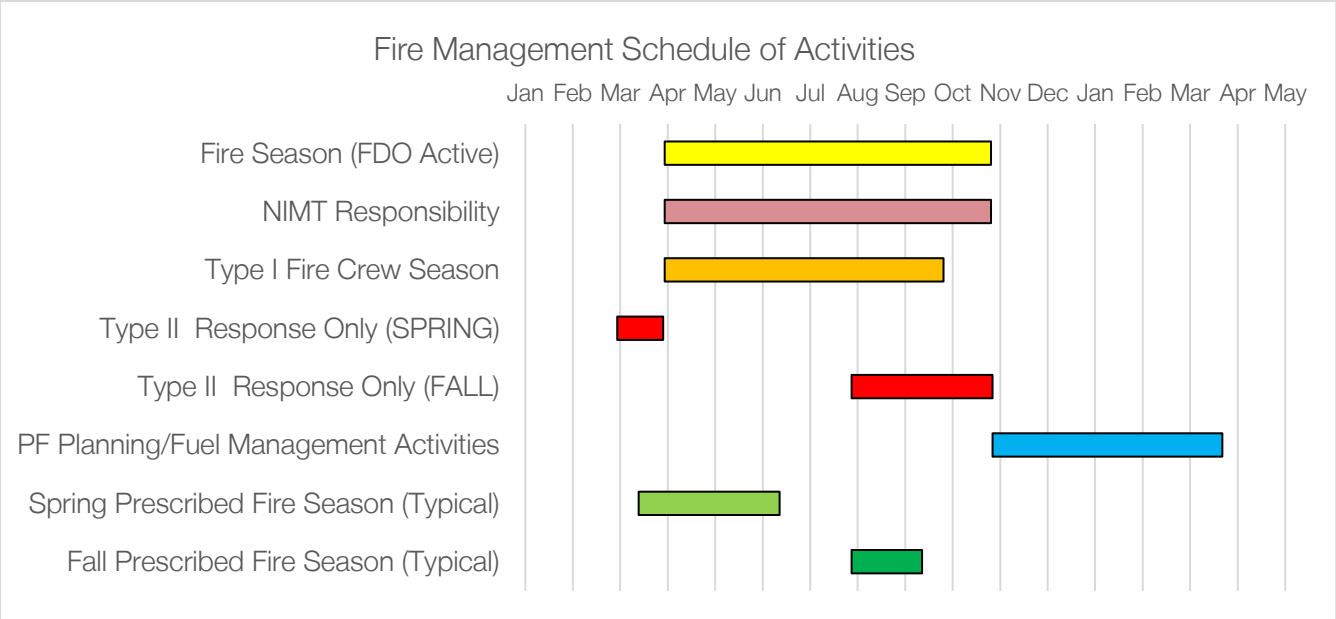


Figure 18. Typical schedule of activities and resource availability in Banff, Kootenay and Yoho national parks.

Ecosystem Restoration and Fire Use

The negative ecological consequences of altered fire regimes and need for fire restoration in Banff, Kootenay and Yoho national parks has been researched extensively. The reintroduction of fire into the ecosystem through managed wildfire and prescribed fire contributes to reversing these patterns, particularly in vegetation communities with shorter fire cycles such as grasslands, montane meadows, aspen and Douglas-fir forests that have suffered the greatest decline in biodiversity as a result of fire exclusion. The following sections describe how fire management activities are measured and defines ecological integrity monitoring targets over the long and medium term.

Area Burned Condition Class

The Area Burned Condition Class (ABCC) measure has been designated as a condition monitoring measure within the Ecological Integrity (EI) monitoring program for all three parks. This measure assesses the degree of departure from historic fire cycles or reference fire regime levels within a park. A full description of the development and calculation of ABCC can be found in Kafka and Perrakis (2003).

Although the Parks Canada National ABCC target is restoration of 20% of the historic fire cycle, the Management Plans for Banff, Kootenay and Yoho set a more ambitious target of achieving 50% of the long-term fire cycle.

ABCC assessments are weighted by area, which means that challenges in restoring fires in larger tracts of forest with long fire cycles differentially influence the overall park rating, obscuring the significant amount of fire restoration that has occurred in these mountain parks since the inception of the prescribed fire program in 1983 (Figure 19). The current area burned departure for Banff National Park (2017) is 82% (Table 11) with an area burned condition class of POOR. The current area burned departure for Yoho National Park (2017) is

90% (Table 12) with an area burned condition class of POOR. The current area burned departure for Kootenay National Park (2017) is 62% (Table 13) with an area burned condition class of FAIR.

Table 11. Banff National Park Departure from Historic Fire Cycles by Reference Fire Regime Area in 2017

Reference Fire Regime Area	Reference Fire Cycle (years)	Area Burned Departure (%)	Area Burned Condition Class
Lower Subalpine	150	-87	POOR
Montane	50	-66	FAIR
Old Growth	400	-27	GOOD
Subalpine (Lodgepole Pine)	100	-79	POOR
Upper Subalpine	200	-85	POOR
	Banff Overall	82	POOR

Table 12: Yoho National Park Departure from Historic Fire Cycles by Biogeoclimatic Ecosystem Classification in 2017

	Reference Fire Cycle (years)	Area Burned Departure (%)	Area Burned Condition Class
Montane Spruce	50	-94	POOR
Englemann Spruce + Subalpine Fir	150	-89	POOR
	Yoho Overall	90	POOR

Table 13: Kootenay National Park Departure from Historic Fire Cycles by Fire Management Unit in 2017

	Reference Fire Cycle (years)	Area Burned Departure (%)	Area Burned Condition Class
Interior Douglas-fir	20	-58	FAIR
Montane Spruce	50	-81	POOR
Englemann Spruce + Subalpine Fir	150	-54	FAIR
	Kootenay Overall	62	FAIR

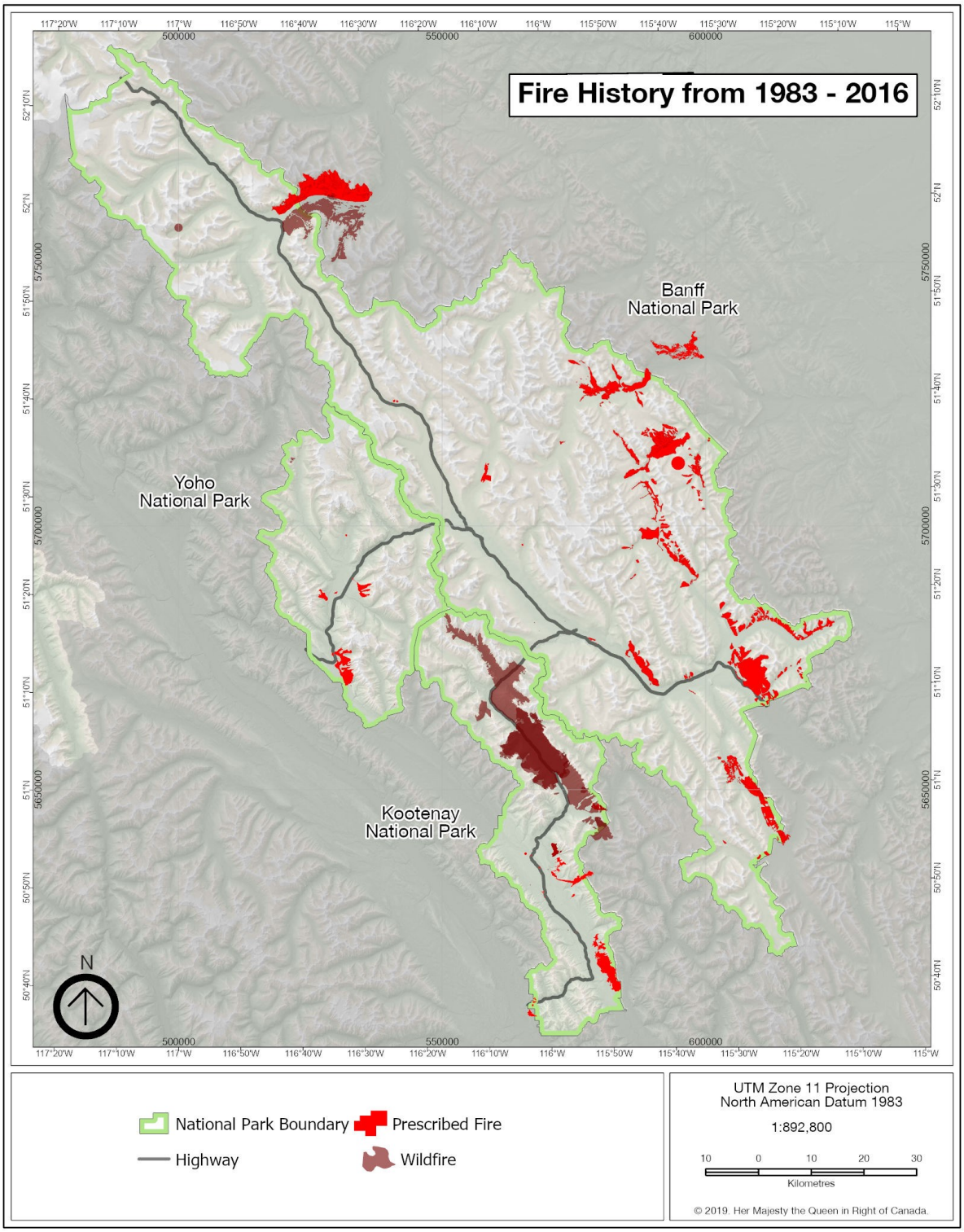


Figure 19: Prescribed Fires and Wildfires – Banff, Kootenay and Yoho national parks, 1983-2016

In addition to ABCC, which is the long term measure of fire restoration, Parks Canada has recently developed a medium term measure to assess the effectiveness of active management in the past two decades. This new measure assesses area burned in the past 20 years and represents the effectiveness of active management in the park. Figure 20 illustrates how the use of prescribed fire has increased the area burned in Banff National Park after four decades where fire was nearly absent. In recent years, Kootenay and Yoho have had a lower amount of prescribed fire compared to total area burned relative to Banff, due in part to the much higher amount of area burned by wildfire (Figure 21).

The 20 year percent fire restored for Banff National Park is 45%, a figure that is approaching the 50% target set by the park management plan. This 20-year management effectiveness value for Kootenay is 40% and for Yoho it is 6%. Results from these analyses are important to determine priorities for fire restoration and management intervention as well as reporting on the overall effectiveness of fire management actions and policies to date.

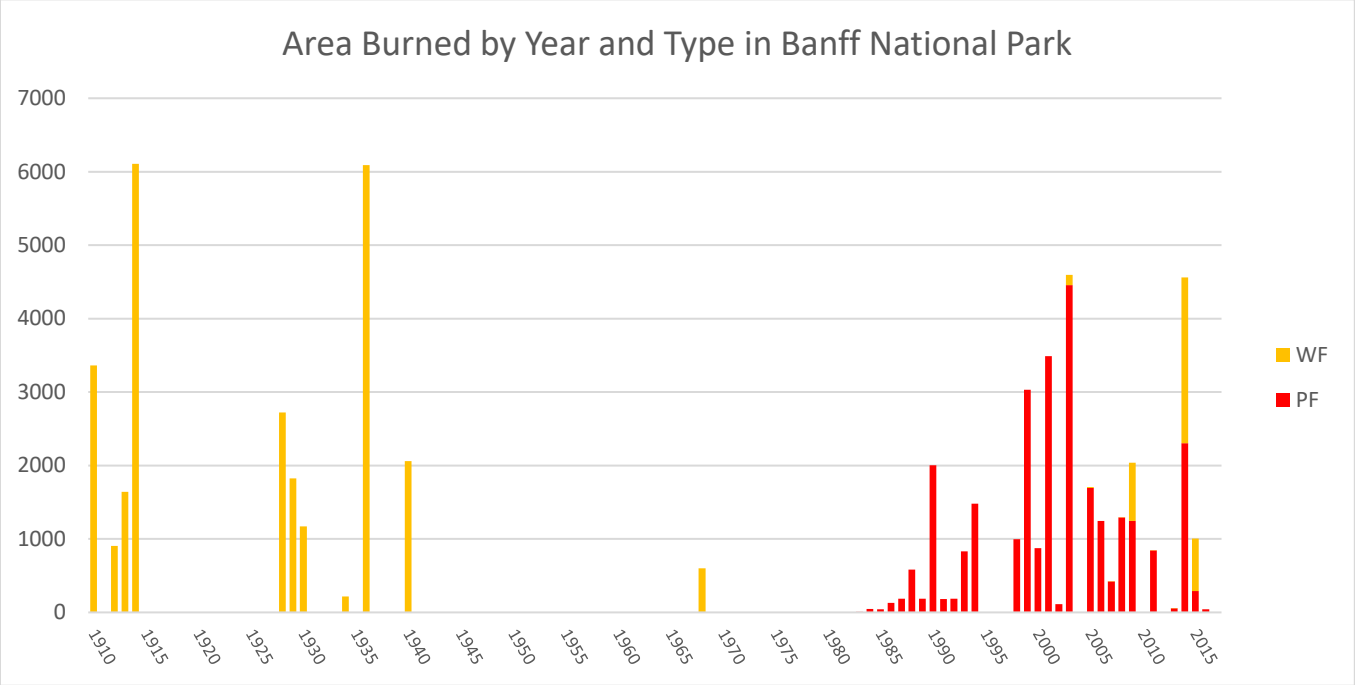


Figure 20. Area burned by wildfire (WF) and prescribed (PF) fire in Banff by year 1910-2017

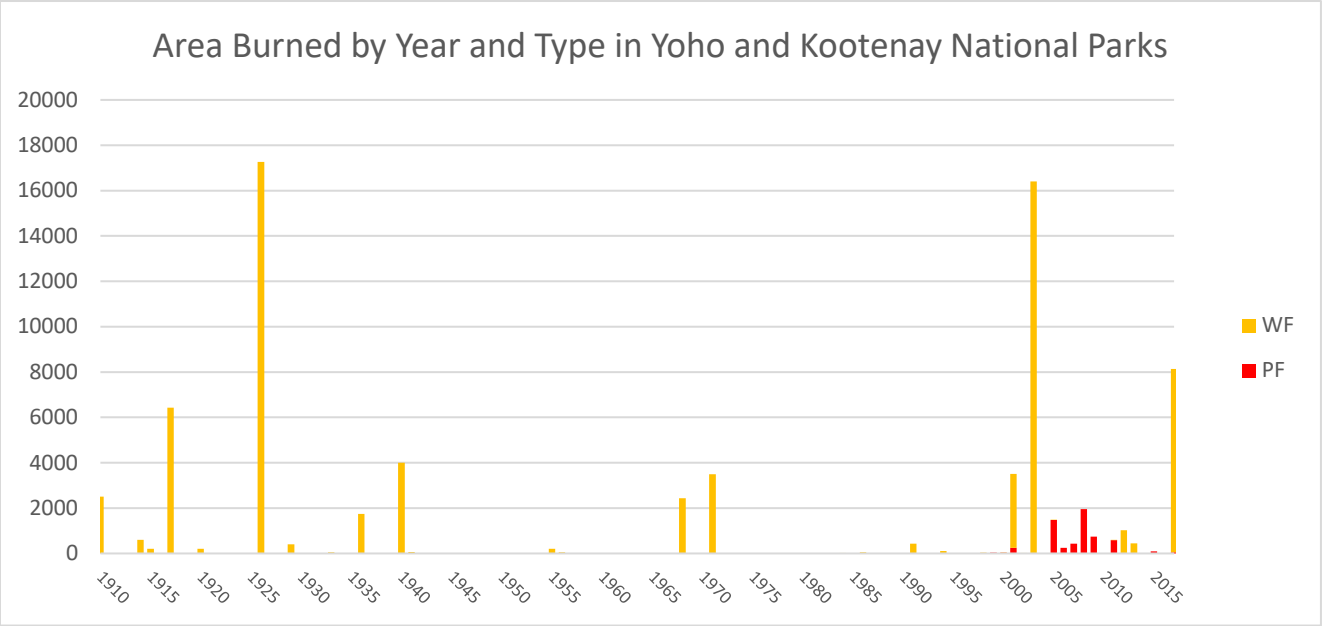


Figure 21. Area burned by wildland (WF) and prescribed (PF) fire in Yoho and Kootenay national parks by year 1902-2017

Work Program Scheduling

Prescribed fire projects require advanced scheduling and planning to ensure all necessary components are addressed. The following section details the prescribed fire and fuel management plans (completed and conceptual) for the next 5 to 10 years. The number of planned prescribed fires listed in this fire management plan outnumber the prescribed fire units that can potentially be implemented during the next 5-10 years. However, by developing plans for many prescribed fire units, park managers can prioritise and implement units based on multiple objectives and take advantage of favourable fuel and weather conditions over time. Having many plans in development or completed, increases the likelihood that fire managers can implement plans and maintain operational flexibility if priorities or resources change.

Priorities for prescribed fire are based upon guidance from the national park management plans. Prescribed fires are used to achieve multiple objectives that range from ecological (e.g. habitat improvement) to operational (e.g. wildfire risk reduction). Prescribed fires are planned very carefully using established methods of fire behaviour prediction as well as experience from fire management specialists.

The planning process is generally considered to take approximately two years. Once prescribed fire has been identified as the primary tool for ecological restoration or wildfire risk reduction, fire managers develop a conceptual plan that is approved by the National Fire Management Division. If there are no major issues with the principles and objectives of the prescribed fire unit, a detailed plan that includes a site description, fire history, prescription, operations, contingency plans and communications is developed. This full plan must be presented to the national park management team, recommended by the National Fire Management Division and the Resource Conservation Manager and finally approved by the Field Unit Superintendent. Concurrent to the development of the prescribed fire plan, a basic impact assessment is also developed. This document details the environmental and socio-economic impacts and subsequent mitigations that are required during implementation of the prescribed fire. While for most prescribed fires, a basic impact assessment is adequate, due to the complex political landscape within which the three national parks exist, more detailed assessments will be developed for prescribed fires that are likely to cause significant socio-economic or

ecological impacts. Throughout the planning process, the public, Indigenous nations and stakeholders will be consulted to ensure that significant concerns are addressed. Recent fires in the province of Alberta (Slave Lake and Fort McMurray wildfires), Waterton Lakes National Park (Kenow wildfire) and Kootenay National Park (Verdant Creek and Wardle wildfires) have raised the awareness for stakeholders, and increased their support and desire to engage in wildfire management strategies such as FireSmart and prescribed fires.

The prescription for each prescribed fire dictates the specific fire and fuel conditions under which a prescribed fire is lit. The main tool for developing the prescription is the Canadian Forest Fire Danger Rating System and the Fire Behaviour Prediction System. Prescriptions are developed in order to define the conditions to achieve the desired fire behaviour to meet prescribed fire objectives.

In addition to the prescription, prescribed fire plans will outline how the fire will be contained within defined boundaries. Wherever possible, natural barriers to fire spread will be used, however in certain circumstances, fuel modification using ground crews or machinery will be necessary. The plan will always include a contingency plan that dictates management actions should the fire spread beyond defined boundaries.

A full operational plan including resources requirements, costs, strategies and tactics is also included in the plan. Both ignition and holding resources should be considered in the operational plan.

Lastly, each prescribed fire plan include an in-depth communications plan complete with stakeholder lists, products and desired outcomes.

Implementation of prescribed fires is carried out by specialized teams of fire management personnel who have been trained in both ignition and fire suppression. Ignition only commences after a Go-No-Go form has been completed, which includes a briefing for the Field Unit Superintendent and consultation with the National Duty Officer to ensure that all necessary steps have been taken and all resources are in place.

Prescribed Fire Implementation Priorities

Prescribed fire priority setting is based on a number of factors, including but not limited to: wildfire preparedness and values at risk protection (e.g. prescribed fire in the wildland urban interface or to serve as landscape fuel breaks); ecological objectives and priorities (e.g., wildlife habitat or grassland restoration); landscape-level fire restoration objectives (50% fire cycle restoration objectives) and management of boundary lands (e.g., capping units adjacent to provincial lands).

At present, there are several prescribed fire plans that are completed and approved or at the conceptual stage (Figures 22, 23 and 24; Tables 14, 15, 16).

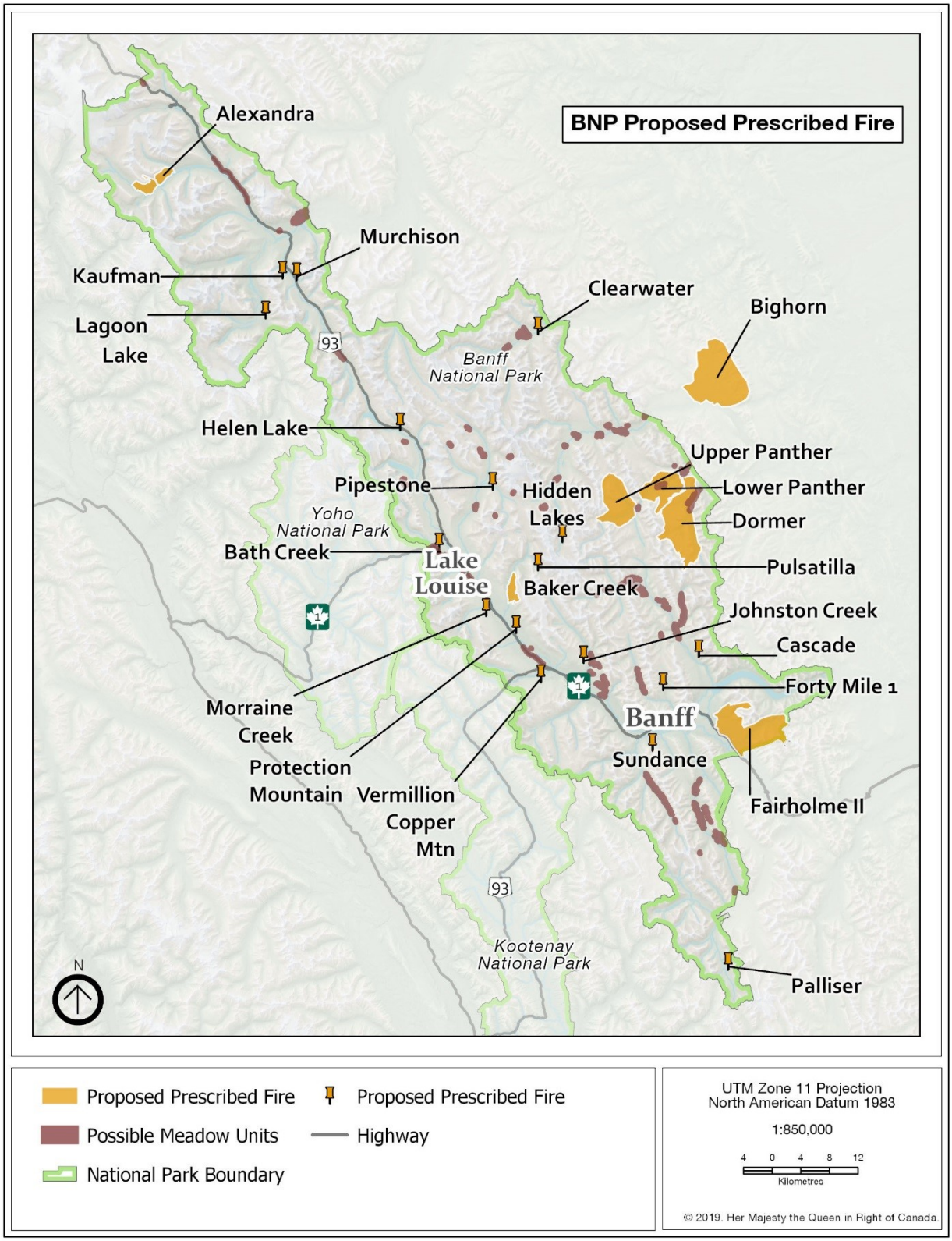


Figure 22: Proposed Prescribed Fires from 2019-2029 in Banff National Park.

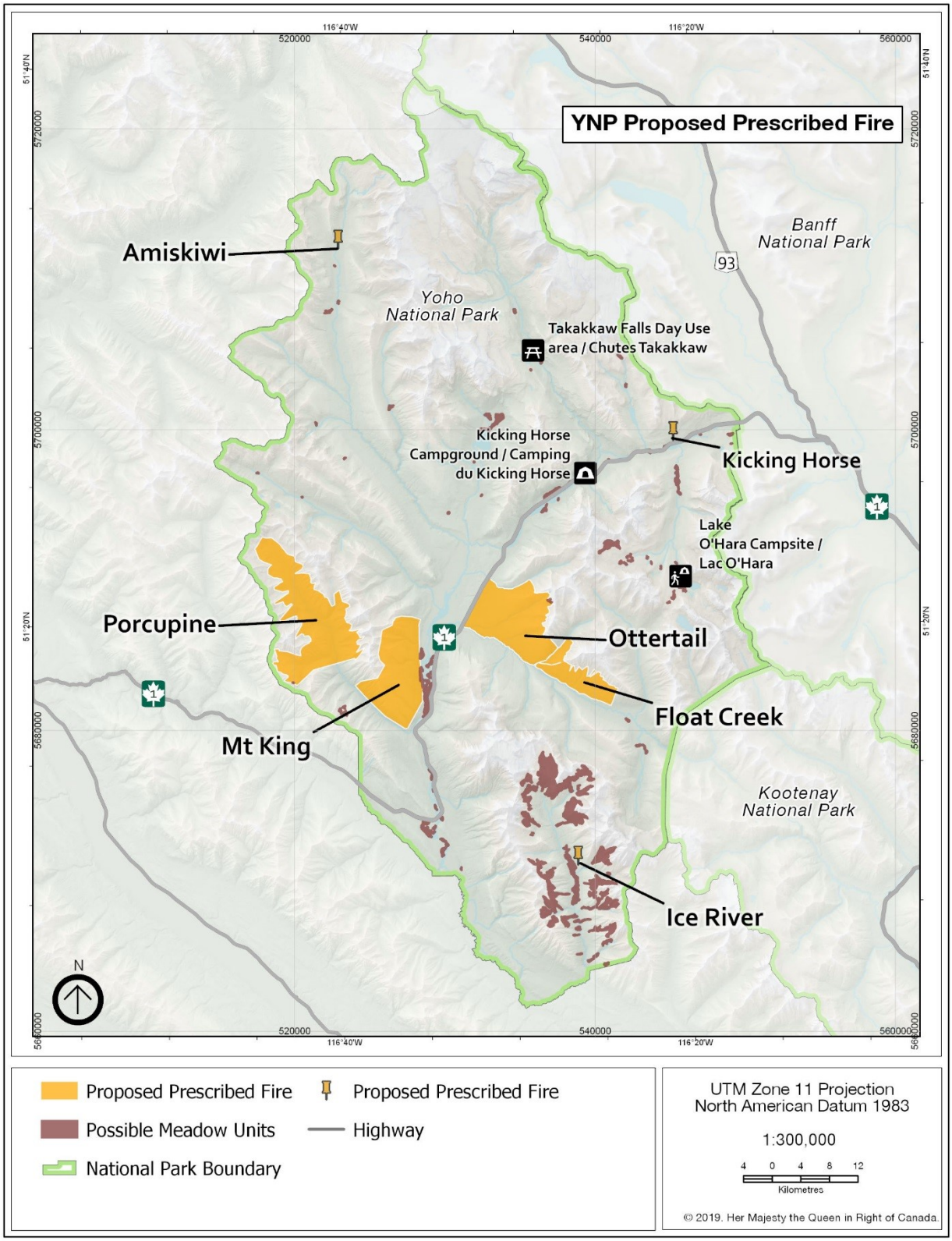


Figure 23: Proposed Prescribed Fires from 2019-2029 in Yoho National Park.

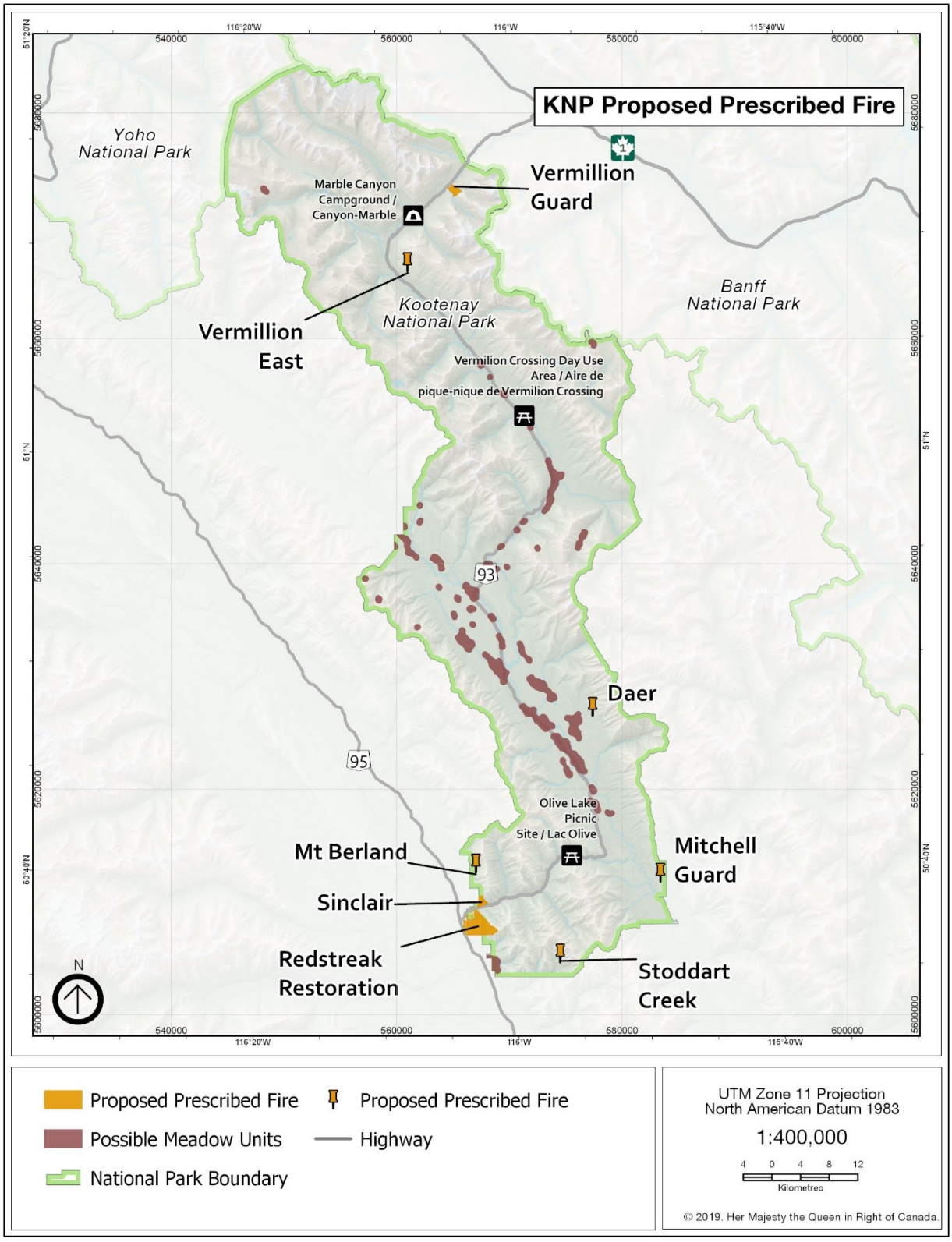


Figure 24: Proposed Prescribed Fires from 2019-2029 in Kootenay National Park.

Table 14. Prescribed Fire priorities for 2019-2029 in Banff National Park

Park	Prescribed Fire Unit	Size	Ecoregion	Status
Banff	Alexandra	1577 ha	Lower/Upper Subalpine	Plan Complete and Approved
	Baker Creek	876 ha	Montane/Subalpine	Plan Complete and Approved
	Bath Creek	1377 ha	Lower Subalpine	Planning Phase
	Brewster Ck	404 ha	Montane/Lower Subalpine	Planning Phase
	Cascade PF	3744 ha	Montane/Lower Subalpine	Planning Phase
	Clearwater PF (Interagency)	3338 ha (1847 ha AB)	Lower/Upper Subalpine	Planning Phase
	Compound Meadows/Airstrip PF	227 ha	Montane	Planning Phase
	Dormer PF	7657 ha	Lower/Upper Subalpine	Plan Complete and Approved; partially implemented
	Fairholme II	8847 ha	Montane/Lower-Upper Subalpine	Planning Phase
	Forty Mile PF	3265 ha	Lower/Upper Subalpine	Planning Phase
	Harrys Hill	32 ha	Montane	Plan Complete and Approved
	Helen Lake	209 ha	Upper Subalpine	Planning Phase
	Hidden Lakes	1875 ha	Lower/Upper Subalpine	Planning Phase
	Johnston Creek	3600 ha	Lower/Upper Subalpine	Planning Phase
	Kaufman	205 ha	Lower/Upper Subalpine	Planning Phase
	Lagoon Lake	958 ha	Lower/Upper Subalpine	Planning Phase
	Lower Panther	3707 ha		
	Meadow Restoration PFs	Various sizes	Montane/Subalpine	Plan Complete and Approved
	Moose Meadows	94 ha	Montane/Subalpine	Plan Complete/Approved – 2 units implemented
	Morraine Creek	236 ha	Lower Subalpine	Planning Phase
	Murchison	1470 ha	Lower/Upper Subalpine	Planning Phase
	Niblock	497 ha	Lower/Upper Subalpine	Planning Phase
	Palliser PF (Interagency)	3100 ha	Lower/Upper Subalpine	Planning Phase
	Pipestone	2200 ha	Lower /Upper Subalpine	Planning Phase
	Pulsatilla	365 ha	Upper Subalpine	Planning Phase
	Sundance	1198	Montane/Subalpine	Planning Phase
	Upper Panther	4664 ha	Lower/Upper Subalpine	Planning Phase
	Vermillion/Copper Mtn	3532 ha	Lower/Upper Subalpine	Planning Phase
Banff Field Unit	Rocky Mountain House National Historic Site PF	100 ha	n/a	Plan Complete and Approved

Ya Ha Tinda Ranch	Bighorn Meadows PF (Interagency)	800 ha PC (7000ha total)	Montane	Planning Complete

Table 15. Prescribed Fire priorities for 2019-2029 in Yoho National Park

Park	Prescribed Fire Unit	Size	Ecoregion	Status
Yoho	Amiskiwi PF	5889 ha	Lower/Upper Subalpine	Planning Phase
	Float Creek	831 ha	Montane/Subalpine	Plan Complete
	Ice River	1250 ha	Lower/Upper Subalpine	Planning Phase
	Kicking Horse PF	610 ha	Lower/Upper Subalpine	Planning Phase
	Mt King	1974 ha	Lower/Upper Subalpine	Plan Complete and Approved
	Ottertail	2148 ha	Montane/Subalpine	Plan Complete and Approved
	Porcupine	2874 ha	Lower/Upper Subalpine	Plan Complete

Table 16. Prescribed Fire priorities for 2019-2029 in Kootenay National Park

Park	Mt.Berland	880 ha	Montane	Planning Phase
Kootenay	Daer	5292 ha	Montane	Planning Phase
	Mitchell Guard	113 ha	Montane	Planning Phase
	Redstreak Restoration	434 ha	Montane	Plan Complete
	Sinclair	61 ha	Montane	Plan Complete and Approved
	Stoddart Benches	130 ha	Montane	Planning Phase
	Stoddart Creek	447 ha	Montane/Subalpine	Planning Phase
	Vermillion Guard	74 ha	Lower Subalpine	Plan Complete and Approved
	Vermillion East	1107ha	Lower/Upper Subalpine	Planning Phase

Training

Parks Canada is a member of the Canadian Interagency Forest Fire Centre (CIFFC), which sets national standards for forest fire certification and training. Parks Canada subscribes to the national certification, standards and education efforts as directed by CIFFC and follows CIFFC training standards when providing or seeking assistance for wildfires requiring major management efforts. A qualification manual (Standard Operating Procedure 2006) has been established by the Parks Canada National Fire Management Division, and the minimum training and experience requirements in this manual will be applied for all fireline personnel including Incident Management Team Member positions.

Type I fire crew personnel will receive the following training and certifications:

- CIFFC Crew Member Course or (S-130 if PC trained)
- ICS 100

- Hover-exit certification
- Parks Canada Arduous Fitness Training (WFX-Fit)
- Workplace Category II Medical
- Transportation of Dangerous Goods and Workplace Hazardous Materials Information System
- Wilderness first aid (40-hour minimum)
- Type I fire crew leaders will also receive ICS 200 and CIFFC Crew Leader Course (Intermediate Wildland Fire Management).

In order for both field units to meet nationally established requirements for NIMT and Type II fire management personnel (to manage a Type III response), training opportunities and certifications will be offered to a range of staff from various functions on a regular basis. The fire and vegetation management section maintains a database of all fireline ready, Type II personnel and potential NIMT members in the field unit and updates this annually.

Type II fire crew and NIMT personnel will receive the following training and certifications:

- Workplace Category III Medicals
- Parks Canada Moderate Fitness Test
- CIFFC Crew Member Course (Basic Wildland Fire Management)
- ICS 100
- Transportation of Dangerous Goods and Workplace Hazardous Materials Information System

Whenever possible, the fire management program will pay for NIMT and Type II crew member training to increase the number of available resources.

In addition to these minimum requirements, the field units will support professional development opportunities (non-mandatory) to individuals whose managers approve additional National Incident Management Team participation or other specialised roles to assist the fire management program. These additional training opportunities may include, but are not limited to:

- ICS 200, 300 and 400
- Intermediate Wildland Fire Management
- Advanced Wildland Fire Behaviour
- Wildland Fire Behaviour Specialist
- Fire Information Officer training
- Position-specific ICS training
- Ignition specialist training

Climate Change and Wildfire

While the timeline for this fire management plan is short (10 years) relative to large scale climate change forecasts and predictions, there will be impacts of climate change on the wildfire regime and that require adaptive fire management within Banff, Kootenay and Yoho national parks.

Several studies at the national and international level have indicated that most climate change scenarios will result in significant changes to the fire regime in North America. Climate models have shown that fire seasons will become longer (Albert-Green et al., 2013) and drought and fire spread days will increase (Wang et al., 2017; Wotton et al., 2017; Wang et al., 2015 and Mori and Johnson, 2013). Figure 25 shows the predicted increase in fire season length for Banff, Kootenay and Yoho, showing increases of up to 40 days per season under future climate scenarios (Boulanger and Carr, 2016). Increases in the conditions conducive

to wildfire will result in higher fire frequency (Wotton et al, 2017; Bergeron et al., 2004), and low fuel moisture will contribute to higher fire intensity (Flannigan et al., 2016). Drier, warmer climates also increase the probability of forest insects and diseases contributing to further accumulation of flammable fuels (Price et al., 2013).

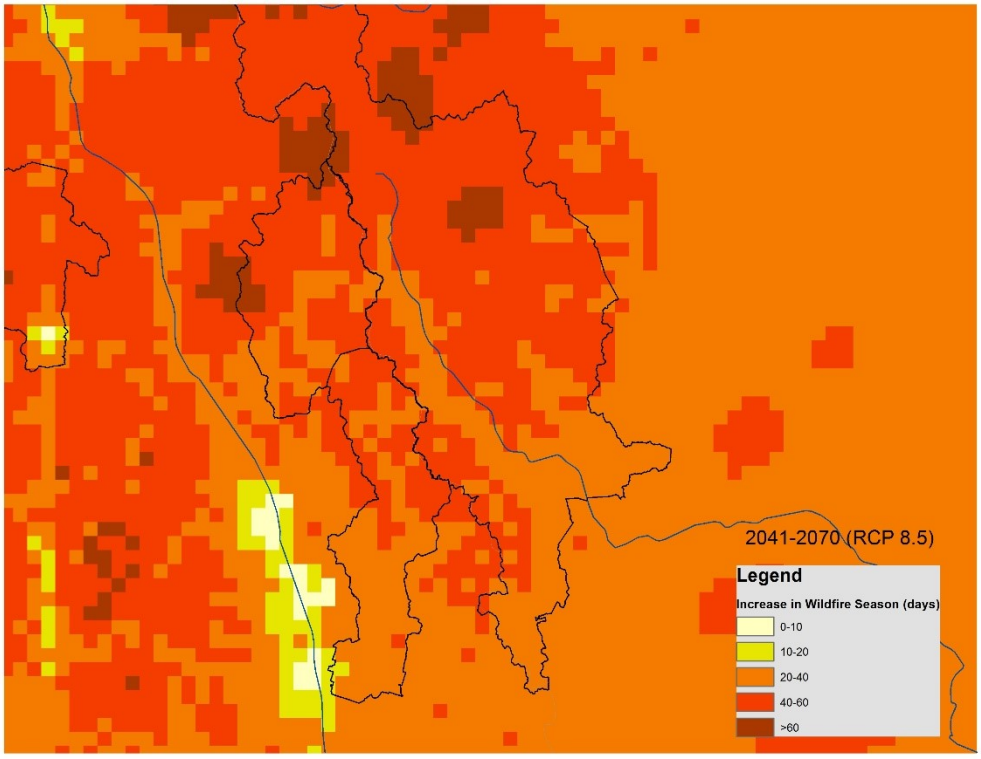


Figure 25. Increase in wildfire season (days) under an intermediate emission scenario (RCP 8.5) Note that in some areas of the mountain parks, the wildfire season may increase in length by over 60 days.

While the impacts of climate change on the frequency and probability of wildfires in Western Canada is more directly linked to climate variables mentioned above (temperature increases and reduction in precipitation), the increase in spatial extent and intensity of wildfires is attributed to both climate (Mori and Johnson, 2013; Flannigan et al., 2005) and a legacy of fire suppression common across most of North America.

Until 1983, Parks Canada had a policy of fire suppression in the mountain national parks, resulting in expansive forests and an accumulation of both live and dead vegetation. The resultant homogeneity of the forested landscape, in combination with climate change is likely to increase spatial extent of wildfires in the mountain national parks (Mori and Johnson, 2013; Gillett et al., 2008; Flannigan et al., 2005). Since ecosystems within the mountain parks are adapted to mixed severity fire regimes with more frequent fire at lower elevations and longer intervals at higher elevations (Rogeau and Armstrong, 2017), the restoration of a range of fire severity, frequency and extent is required to fully mimic this natural process. Maintenance of the natural fire regime over time can lead to diverse forest stand age and species composition as well as increased montane grasslands, and open forest types such as Douglas-fir and aspen grasslands (Chavardes et al., 2018; Chavardes and Daniels, 2016; Rogeau et al., 2016; Stockdale et al., 2016; Dinh, 2014). The lower flammability of these vegetation types, can lead to decreases in fire size and intensity (Stockdale et al., 2019).

Climate change is expected to influence species composition and distribution across the landscape. Climate change models have shown that increases in mean annual temperature will cause shifts in temperature patterns both in latitude and elevation resulting in vegetation composition shifts such as a reduction in alpine vegetation and an increase in coniferous forest cover (Holsinger et al., 2019; Luckman, 1998). These potential shifts in vegetation can further exacerbate the impacts of climate change on the frequency, intensity and extents of wildfires in the future.

Carbon Cycling and Fire Management

Wildfires can have complex impacts on the carbon cycle through direct vegetation mortality and release of carbon and subsequent prevention of carbon sequestration, storage of carbon in the form of charcoal and generation of new vegetation following fire (new carbon). While the amount of carbon dioxide (CO_2) emitted from wildfires varies over time and space with other factors such as vegetation moisture, drought and climate, fires have been estimated to average up to 27 Tg of carbon per year between 1959-1999 in Canada (Amiro et al., 2001). A recent study (Sharma et al., 2019) estimated that between 1990 and 2017, wildfires in national parks in Canada emitted a total of 62 Mt of carbon. With climate change induced impacts such as longer periods drought, higher mean annual temperatures, longer fire seasons and increased wildfire probability, this amount is likely to increase in the future. While carbon cycling is a complex process, many studies have recommended proactive forest management in Canadian forests as a way to mitigate future carbon emissions (Kurz et al., 2008; Amiro et al., 2001;).

Despite wildfires emitting significant quantities of greenhouse gases and contributing to further climate change, strategic use of prescribed fires and fuel management may provide opportunities to help ecosystems sequester more carbon in the long term. Wiedinmyer and Hurteau (2010) showed that widespread prescribed fire applications in western US systems could reduce CO_2 fire emissions significantly by reducing the risk of high severity wildfires, particularly where high severity fires can turn the forest from a carbon sink to a source. Prescribed fires can result in younger successional stages that are more resistant to high severity wildfire reducing mortality and carbon release.

Hurteau and North (2010) also showed that while mechanical thinning and prescribed fire reduce carbon initially, carbon stocks increased relatively quickly once remaining vegetation recovers.

Through both prescribed fire and landscape level fuel management, Parks Canada can contribute to reductions in the emission of CO_2 from large, severe wildfires that may become more common with climate change. Future collaboration with carbon and climate change scientists both within Parks Canada and other agencies will help to inform the direct and indirect impacts of wildfires and prescribed fires on carbon cycling.

Resilience Based Fire Management

Ecosystem resilience is a concept that indicates the ability for a system to be disturbed by outside processes (i.e. natural disturbance or climate change) but can recover following disturbance to a desired end state. Alternatively, ecosystem resistance is the capacity of an ecosystem to retain its key characteristics in the midst of disturbance such as climate change (Chambers et al., 2014; Walker et al., 2004).

Given the potential impacts of climate change on both the vegetation and fire regimes within the mountain national parks, fire management policies must promote both ecosystem resilience and resistance. Parks Canada's current fire management strategy of restoring fire as a natural process into the ecosystem will help to adapt to changing fire regimes by increasing forest heterogeneity, thereby increasing resilience to wildfire and resistance to other disturbances such as forest insects and disease (Figure 26).

Through prescribed fire and fuel management, Parks Canada aims to restore more open habitats (fescue, Douglas-fir and aspen grasslands). These open habitat types are often associated with warmer, drier conditions and may play a significant role as ecosystems that are more resilient to climate change.

Schoennagel et al. (2017) recommend three key approaches to promote adaptive resilience in fire management: 1) Managing fire; 2) managing fuels, and 3) promoting the ability for communities and agencies to adapt to climate change.

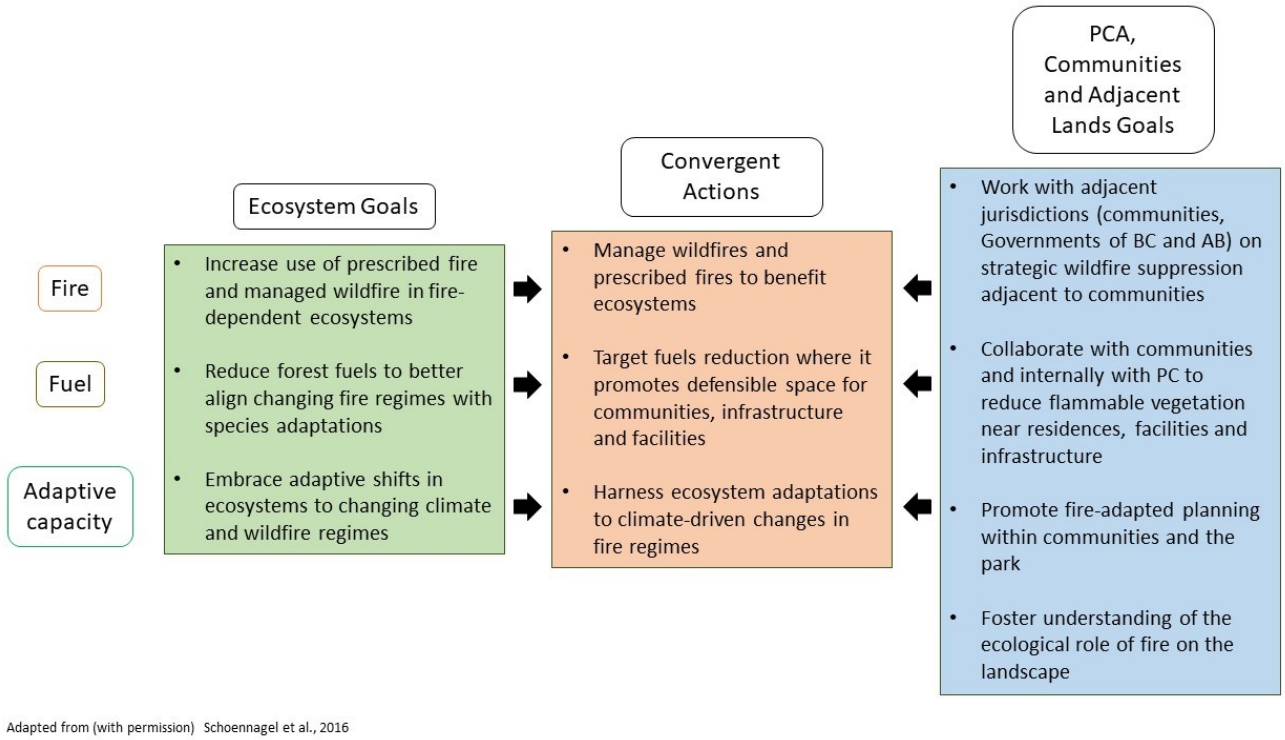


Figure 26 shows how Parks Canada's fire management program in Banff, Kootenay and Yoho national parks fits into this concept of adaptive resilience in fire management.

Managing fire

Through its prescribed fire program, fire management zoning and modified response fires (i.e. fires that are allowed to burn within set guidelines and to promote fire's natural role on the landscape), Parks Canada will continue to promote vegetation diversity and improve landscape wildfire resilience by breaking up continuous tracts of mature forest and increasing and maintaining open vegetation types. These activities, will be balanced by appropriate fire suppression for the safety of the public, communities and infrastructure within the national parks.

While low to moderate severity prescribed fires conducted during periods of less severe fire weather (typically spring and fall) can assist in restoring fire to the landscape, Parks Canada will continue to find ways to restore fires of mixed severity to the landscape to ensure that the full range of fire regimes are restored.

Given that current targets only aim to achieve 50% of the historic fire cycle, there will likely continue to be an overall deficit to the expected annual area burned, unless changes in climate result in larger, more severe fires. Extremely large fires in the future may fall outside of the historic range of variability in size and severity, resulting in negative impacts to the ecosystem. Therefore, fire managers will continue to work with park

management and fire scientists to determine how to appropriately and strategically restore fire to the landscape in an era of climate change.

Managing fuels

The increase in development and human use further into the wildland-urban interface inside national parks has increased the potential for negative impacts of wildfire and the need for fuel management to protect these values. While fires are a natural feature in most ecosystems, the overlap of this keystone process with human use is problematic due to potential negative impacts to public safety, communities and facilities. Furthermore, the majority of fire starts within the national parks are human caused. With more visitation to the parks, the potential for accidental ignitions in close proximity to the public can increase.

Parks Canada will focus on strategic fuel management in areas where the implementation of prescribed fire, or the modified response to wildfire may present undesirable risks to the public. In these areas, directly adjacent to communities, residences, facilities and infrastructure, strategic use of hand thinning, pruning and mechanical logging will be used to mitigate the risk of wildfire and provide fire managers with wildfire mitigation options (i.e. landscape fire guards or breaks) and defensible spaces to protect communities (eg. FireSmart and community fuel breaks).

Parks Canada will continue to work closely with the Town of Banff, ID9 (Lake Louise), Field, commercial facilities, utilities and neighbouring lands to ensure that strategic and effective fuel management will continue on both Parks Canada administered lands and adjacent jurisdictions.

Promoting Adaptive Capacity

Converting closed forest stands to more open, warm and dry forest/vegetation types through prescribed and managed wildfire will help to promote the ability of the ecosystem to withstand climate change impacts. Several authors (Halofsky et al., 2018a; Halofsky et al., 2018b; Gauthier et al., 2014) identify several adaptive strategies that can reduce negative forest ecosystem risks due to climate change including promotion of native species, maintenance of stand age and species diversity, fuel management, prescribed fire and restoration of fire regimes. Parks Canada employs all of these actions through strategic fire management within Banff, Kootenay and Yoho national parks, with the intent to increase resilience to climate change across the landscape.

At the wildland-urban interface, the implementation of FireSmart principles at the residential, municipal and landscape scale will increase the ability for communities to adapt to living in fire prone ecosystems. Improving communications with the public, residents, business community and neighbouring jurisdictions will help increase support for climate change adaptive strategies for fire management.

Working with agency partners such as Natural Resources Canada/Canadian Forest Service on climate change models that assess wildfire probability and consequence across the landscape will help to provide fire managers information to better plan for future fuel and climate scenarios. Parks Canada will continue to work with multiple levels of government in order to better prepare for wildfire emergencies in populated areas to help fire managers maintain readiness for longer, more intense fire seasons in the future.

Ecological Research and Fire Effects Monitoring

Parks Canada operates a multi-faceted, science-based fire management program. The research and monitoring program helps fire managers assess ecosystem health as well as the effects of management

actions on ecosystem components. While some program elements are based on broadly applied national reporting requirements for the Information Centre on Ecosystems database (ICE), others are designed to answer specific questions relating to environmental challenges or knowledge gaps in fire science. Examples of these more specific research projects in Banff, Kootenay and Yoho national parks have included topics such as:

- Effect of fire on grizzly bear habitat quality;
- Effects of prescribed fire, wildfire and bison grazing on aquatic invertebrates, water quality and fish habitat;
- Effects of fire and various control methods on the spread of orange hawkweed;
- Effects of fire on mountain pine beetle population dynamics;
- Effects of two methods of logging and prescribed fire on fire behaviour and the restoration of native vegetation; and
- Effects of fire and grazing on elk foraging habitat.

Collaboration with universities, other governmental agencies, environmental groups and volunteer Citizen Science programs play a central role in this research program. The information derived from these programs are integral to informed decision making, adaptive management and timely reporting to the Canadian public on the ecological status of their national parks.

External Relations and Visitor Experience (ERVE) Plan

Overview

As leaders in conservation, Parks Canada works with Canadians to develop and implement fire and ecosystem management plans. To do this successfully, the public needs to be well-informed and supportive. To that end, the Banff, Kootenay and Yoho National Parks Fire Management Plan includes a strategy to increase public understanding and support of prescribed fire as well as wildfire prevention, risk reduction, preparedness, management and response.

This strategy outlines how ERVE will support the Fire Management Plan and the National Fire Management Program Communication Strategy. Additional tactical plans will be developed by multi-functional teams to outline key activities to support project objectives, responsibilities, timelines and desired outcomes.

Purpose

- To ensure timely, strategic, coordinated communications that improve awareness, understanding and support for the Banff, Kootenay and Yoho National Parks Fire Management Plan.
- To describe the approach Parks Canada will take to inform, involve and influence key audiences in fire management actions.

Public Environment

- Banff, Kootenay and Yoho national parks receive significant interest and coverage on fire related activities from local, regional, national and international media.

- Parks Canada involved Indigenous nations and stakeholders in formal engagement to develop the Banff, Yoho Kootenay Fire Management Plan including fire management zoning, prescribed fire priorities, resource sharing and operational cooperation.
- Parks Canada has strong partnerships with its provincial neighbours: the Government of Alberta (Department of Agriculture and Forestry and the Department of Environment and Parks) and the Government of British Columbia (BC Wildfire and BC Parks). Demonstrating interagency cooperation is important as the public have encouraged Parks Canada to take a coordinated approach to fire management communications and emergency preparedness.
- For several decades, Parks Canada, communities and leaseholders have joined forces in fire management initiatives including forest thinning at the interface, tactical response planning, interagency training, mutual aid response, public education and awareness, and risk mitigation measures with significant success. These efforts have resulted in local communities that are well informed, supportive of fire as an ecosystem process, and well protected from the adverse impacts of wildfire. Social science has shown that, given the transitory nature of national park communities and their visitors, ongoing education and outreach is needed to maintain support, particularly with regard to prescribed fire.
- This fire management plan supports the strategic goals of community and emergency preparedness plans, including those in Canmore, Banff, Lake Louise, Field and Radium Hot Springs, as well as the interests of commercial tourism operators within and adjacent to the parks. Parks Canada benefits greatly from mutually supportive relationships with local and regional stakeholders.
- Residents and businesses have expressed a desire for targeted communications tailored to their unique needs and locations, particularly during prescribed fire and wildfire incidents.
- Air quality due to smoke is an increasing concern for the public. Parks Canada makes great efforts to mitigate smoke where possible. For example, prescribed fire ignition will only occur on days with good atmospheric venting conditions to disperse smoke.

Key Messages

- The safety of the public, our crews, park infrastructure and neighbouring lands is always our number one priority.
- Parks Canada is a recognized leader in fire management with more than 30 years of experience in using fire to naturally restore and maintain the ecological integrity of national parks and historic sites. Our specialists are experienced professionals whose expertise in fire management is sought provincially, nationally and internationally.
- Parks Canada's fire suppression efforts are focused on human life safety, infrastructure, and on values at risk.
- Fire is part of a healthy ecosystem - it renews forest and grasslands by reducing fuels, releases nutrients back into the soil, and improves habitat for both plants and wildlife such as grizzly bears and whitebark pine.

Indigenous Engagement and Involvement

Historical accounts show that Indigenous peoples in many areas of North America routinely used fire as a tool for many purposes, including drawing wildlife into valleys to facilitate hunting and to sustain open grasslands. Parks Canada has, to a large extent, based its fire management principles on Indigenous understanding of the role of fire in maintaining healthy and diverse ecosystems – the first true fire ecologists.

As stated by the Minister of the Environment and Climate Change in 2017, "Indigenous peoples are the first stewards of our water, air and land, and we must work in partnership to protect our environment". Following

this statement and the Government of Canada's direction on reconciliation, Parks Canada believes that actively engaging and involving Indigenous nations in fire management is essential to ensuring a successful program that not only respects the historical, cultural and ecological connections to fire management but also broader Indigenous connections to the landscape as a whole.

Parks Canada reached out to a number of First Nations in Alberta and British Columbia, as well as the Métis Nations of Alberta and British Columbia, to request input on the draft Fire Management Plan, its implementation and how they wish to be involved. Participants confirmed the importance of Indigenous participation in fire management and highlighted a number of key concepts that should guide the involvement. These include:

- Recognition of the importance of Indigenous knowledge in the fire management program;
- Providing opportunities for early and ongoing engagement;
- Providing opportunities for on-the-ground activities (i.e. surveys, assessments)
- Promoting and facilitating knowledge sharing between Parks Canada and Indigenous nations; and
- Recognition of capacity constraints and working together to address them – including exploring training and employment opportunities.

Some Indigenous groups noted that previous conversations with Parks Canada about Indigenous involvement in the fire management program did not achieve expected results, and the discussions held on this draft plan would only be meaningful if Parks Canada followed through with concrete action(s) in a timely manner. Accordingly, once this plan has been approved, Parks Canada will re-engage with interested Indigenous groups to explore mutually feasible mechanisms for:

- On-going collaboration on areas of interest and topics related to the fire management program;
- Sharing and incorporating Indigenous knowledge, perspectives, input and advice; and
- Opportunities for Indigenous involvement with 'on-the-ground' activities related to the fire management program in Banff, Kootenay or Yoho national parks.

Audiences

Audience	Interests
Canadians in target markets (Bow Valley, Columbi Valley, Calgary, Toronto, Vancouver) • Fledgling Families • Middle-aged Achievers • Singles Scene • Young Metros	• Environmental conservation • Information (role of fire in ecosystems and prescribed fire in restoration) • Responsible management of national parks and sites
Visitors to Banff, Kootenay and Yoho national parks • Young families in campgrounds • Young adults visiting townsites • New Canadians	• Environmental conservation • Opportunities to enhance their experience (education, programs, events, safety, pre-trip planning) • Information (role of fire in ecosystems and prescribed fire in restoration)

Residents, Communities, local businesses The Town of Banff, Hamlet of Harvie Heights, Town of Canmore, MD of Bighorn, Hamlet of Lake Louise, Improvement District 9, community of Field, Village of Radium Hot Springs, Town of Golden, Columbia Valley businesses and outlying commercial tourism operators	• Involvement in planning processes and sharing of information • Information (role of fire in ecosystems and prescribed fire in restoration) • Awareness and understanding of plans • Protection of values at risk • Tourism and visitation • Safety and emergency response communication
Stakeholders and Partners • Banff Lake Louise Tourism and members • Travel Alberta • Tourism Calgary • Tourism Golden • Destination BC • Provincial governments (Government of BC, BC Wildfire Service, BC Parks, AB Environment and Parks, AB Wildfire and AB Agriculture and Forestry)	• Involvement in planning process and sharing of information • Awareness and understanding of plans • Information (role of fire in ecosystems and prescribed fire in restoration) • Ecosystem health • Protection of values at risk • Mutual Aid Sharing Agreements
Youth and educational institutions • Campus clubs • University classes/researchers with a focus on conservation, stewardship and/or fire management	• Education and learning opportunities • Information (role of fire in ecosystems and prescribed fire in restoration)
Parks Canada staff • Banff, Kootenay and Yoho national parks	• Communications • Visitor Experience • Information (role of fire in ecosystems and prescribed fire in restoration) • Integrated/cross functional fire management program; opportunities with National Incident Management Teams (NIMT)
Indigenous First Nations and Métis	Interests to be determined through engagement with Indigenous groups Information (role of fire in ecosystems and prescribed fire in restoration

ERVE Goals, Objectives, Strategies

Goal: Inform • Better inform the public of Parks Canada's fire management program • Showcase Parks Canada's international leadership in conservation • Build confidence in Parks Canada's ability to manage the risks of wildfire	
Objectives	• Increase awareness and understanding of Parks Canada's fire management program in Kootenay, Yoho and Banff national parks with respect to activities, plans and decisions. • Increase opportunities for Canadians to learn about the natural role of fire in ecosystems and the use of prescribed fire in the restoration and improvement of habitat for species at risk and public safety.
Audience	Canadians, park visitors, stakeholders

Strategies	External Relations	• Communications (pre-, post- and during incidents) – Create communication products to ensure public preparedness for prescribed fires, wildland fire incidents and smoke notification (email updates, website and social media content, public notices in newspapers, radio ads, personal communications). • Outreach/education - Develop and launch new public outreach programs, events or initiatives to share stories on fire management through a diversity of innovative learning channels. - Create learning tools for students studying Canada's species at risk, national parks, conservation and fire management. - Create on-site tours within the three parks for dignitary/foreign delegation visits and media to showcase achievements in fire management. • Partnerships - Connect urban Canadians with the fire story through new and existing partnerships. • Media – Share the results of our science and achievements in conservation through proactive pitches and reactive responses to local, regional and national news and specialty media. • Digital communications – Develop and share engaging web and social media content via 12 social media channels and six French and English websites for Kootenay, Yoho and Banff national parks.
	Visitor Experience	▪ Programs (interpretation, picnic patrol, wildlife guardians, mobile information, mobile gate) - Provide opportunities for visitors to learn about and witness fire management in action. ▪ Visitor Facilities (Visitor Centres, campgrounds and entry gates) - Provide visitors with essential information and key messages on fire management incidents, events and public safety. This includes pre-trip information, publications, materials, signage and use of on-site tools (fire information trailers). ▪ Training - Ensure front-line staff are informed on fire management actions to share essential information with the public.
	National Historic Sites	▪ Provide national historic site visitors with essential information and key messages on fire management incidents, events and public safety.
**Results will vary depending on park and the human and financial resources allocated through core funding*		

Goal: Engage		
• Grow and diversify Parks Canada's base of support for fire management actions through a range of engagement activities • Strengthen interagency partnerships with all neighbouring agencies, thereby capitalizing on the substantial ecological gains and operational efficiencies inherent in co-managing fire across agency boundaries • Gain support from key audiences for Parks Canada's ecological integrity and fire management policies and practices		
Objectives	• Ensure communities that are within or surrounding national parks are well informed about fire management and embrace the concept of FireSmart or other applicable wildfire risk reduction activities for communities within healthy ecosystems. • Ensure that Indigenous nations with historic ties to the national park lands are well informed about fire management activities and have opportunities for involvement, based on their respective identified interests. • Employ a variety of tools to engage partners and stakeholders in opportunities that strengthen their understanding and support of fire management • Expand reach and effectiveness of Parks Canada communication efforts in key target market regarding fire management	
Audience	Stakeholders/partners, Indigenous nations, residents/communities and local businesses, youth and educational Institutions	
Strategies	**External Relations**	• Communications - Provide affected stakeholders with a regular flow of information about Parks Canada fire management through a variety of communication tools and approaches that include annual planning forums, open houses and stakeholder presentations. - Seek opportunities with key stakeholders to extend Parks Canada's reach in key target markets through the distribution of messages on fire management. • Partnerships/Collaboration - Collaborate with educational institutions and students in cultural and ecological research and monitoring to seek opportunities to share information on fire management. - Identify opportunities with surrounding communities, municipalities and provincial governments to enhance outreach and education regarding restoration and conservation projects, including fire ecology and species at risk.
	Visitor Experience	▪ Ensure the meetings and incentive market and travel trade are provided with accurate and current messaging re: fire management for inclusion in their communication products.
**Results will vary depending on park and the human and financial resources allocated through core funding*		

GOAL: Improve Internal Communications and Processes	
Objectives	• Ensure staff are well informed regarding the fire management program and that plans are delivered in an integrated manner with other functions and parks. • Strengthen processes through the development of tools and templates to achieve efficiency and consistency.
Audience	Parks Canada staff in Yoho, Kootenay and Banff national parks

Strategies	External Relations	• Develop communications strategy to clarify roles and responsibilities across functions and field units, emphasize priorities, improve co-ordination to avoid duplication. • Enhance risk communications tools in both official languages.

**Results will vary depending on park and the human and financial resources allocated through core funding*

- During a wildfire or prescribed fire, a Fire Information Officer (FIO) is part of the Incident Command structure, reporting to the Incident Commander, and responsible for coordinating communication products pre-, post- and during incidents.

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Appendix I: Acceptable Devices for Use During a Fire Ban

A total fire ban includes ALL open fires, EXCEPT the use of the following, provided they are under direct supervision and certified by the Canadian Standards Association (CSA Group) or Underwriters Laboratories (UL):

- portable propane fire pits (prohibited at overflow campgrounds)
- gas or propane stoves and barbeques designed for cooking or heating
- propane or gas fuelled lanterns (enclosed flame)
- indoor wood burning stove (in fully enclosed buildings and must be CSA or UL certified)
- patio heaters (propane, catalytic or infrared/radiant)

Appendix II: Proposed Fuel Management Areas for Banff, Kootenay and Yoho National Parks

	Location	Area (Ha)	Year
	Priority 1		
Banff	Skoki Lodge	5.8	Scheduled to be Complete 2018
	Fenlands	22	2016/17
	Valleyview	9	2018/19
	Golf Course	13	2019/20
	West Sulphur Mtn	415	2020/21
	Lake Louise townsite	81.3	2018-21
	Carrot Creek-005	21.9	2018-2020
	Carrot Creek-003	5.2	2018-2020
	Carrot Creek-006	9.4	2018-2020
	Carrot Creek-001	107.6	2018-2020
	Carrot Creek-007	8.7	2018-2020
	Carrot Creek-004	17.2	2018-2020
	Carrot Creek-002	275.0	2018-2020
	Carrot Creek-008	17.2	2018-2020
	Priority 2		
	LL Ski Area	42.8	2018-21
	Niblock Guard	10.4	2018-19

	Pipestone Guards	7.4	2019-2021
	Plain of Six Teahouse	3.1	2018-21
	Stanley Mitchell ACC Hut	4.4	2018
	Priority 3		
	Lake Agnes Teahouse	3.1	2018-21
	Sulphur East-007	3.0	2018-2021
	Sulphur East-008	7.8	2018-2021
	Tunnel Mountain-009	2.7	2018-2021
	Tunnel Mountain-006	5.4	2018-2021
	Rundle West-001	11.7	2018-2021
	Sulphur East-001	5.9	2018-2021
	Sulphur East-009	11.2	2018-2021
	Sulphur East-011	4.6	2018-2021
	Sulphur East-010	4.8	2018-2021
	Sulphur East-013	2.2	2018-2021
	Sulphur East-012	8.0	2018-2021
	Middle Springs-003	2.9	2018-2021
	Middle Springs-002	2.4	2018-2021
	Middle Springs-001	4.3	2018-2021
	Banff Ave East-001	4.6	2018-2021
	Tunnel Mountain-001	6.4	2018-2021
	Tunnel Mountain-002	11.4	2018-2021
	Sulphur East-002	16.0	2018-2021
	Sulphur West-006	45.9	2018-2021
	Sulphur West-001	5.0	2018-2021
	Sulphur West-002	10.1	2018-2021
	Sulphur East-003	9.4	2018-2021
	Tunnel Mountain-003	19.2	2018-2021
	Tunnel Mountain-004	3.2	2018-2021
	Sulphur East-004	2.0	2018-2021
	Sulphur East-006	2.8	2018-2021

	Sulphur West-003	12.5	2018-2021
	Middle Springs-006	4.6	2018-2021
	Sulphur West-004	12.1	2018-2021
	Tunnel Mountain-007	4.9	2018-2021
	Middle Springs-005	4.1	2018-2021
	Sulphur West-005	4.1	2018-2021
	Sulphur East-005	11.6	2018-2021
	TOB 40 Mile-002	8.6	2018-2021
	Tunnel Mountain-005	1.5	2018-2021
	Banff Ave East-002	8.6	2018-2021
	Sulphur East-014	8.6	2018-2021
	Rundle West-002	37.8	2018-2021
	Tunnel Mountain-008	13.1	2018-2021
	Spray Valley-001	30.7	2018-2021
	Minnewanka-001	15.8	2018-2021
	Sulphur West-007	57.6	2018-2021
	Middle Springs-004	6.8	2018-2021
	Norquay-001	9.1	2018-2021
	Norquay-002	9.7	2018-2021
	TOB 40 Mile-003	37.4	2018-2021
	Sulphur East-015	9.8	2018-2021
	Middle Springs-007	5.6	2018-2021
	Sulphur East-016	4.0	2018-2021
	TOB 40 Mile-001	6.1	2018-2021
	Sulphur West-008	5.9	2018-2021
	Sulphur West-009	148.1	2018-2021
	Sulphur West-010	75.4	2018-2021
	Sulphur West-011	56.8	2018-2021
	Sulphur West-012	57.0	2018-2021
	Priority 4		
	Barrier Cabin	3.5	2021-26

Banff	Bryant Cabin	3.5	2021-26
	Clearwater Cabin	3.5	2021-26
	Cuthead Cabin	3.5	2021-26
	Divide Cabin	3.5	2021-26
	Dormer Cabin	3.5	2021-26
	Egypt Cabin	3.5	2021-26
	Indianhead Cabin	3.5	2021-26
	Mystic Cabin	3.5	2021-26
	Palliser Cabin	3.5	2021-26
	Redearth Cabin	3.5	2021-26
	Sandhills Cabin	3.5	2021-26
	Scotch Camp	3.5	2021-26
	Stoney Cabin	3.5	2021-26
	Trail Centre Cabin	3.5	2021-26
	Windy Cabin	3.5	2021-26
	Alexandra River Warden Cabin	3.1	2021-26
	Howse River Warden Cabin	3.5	2021-26
	Isabella Lake Warden Cabin	3.5	2021-26
	Little Pipe Warden Cabin	3.1	2021-26
	Mosquito Campground	3.5	2021-26
	Cyclone Warden Cabin	3.1	2021-26
	Fish Lakes Warden Cabin	3.1	2021-26
	Ya Ha Tinda 1	0.8	2021-26
	Ya Ha Tinda 3	0.3	2021-26
	Ya Ha Tinda 4	0.1	2021-26

Kootenay	**Priority 2**		
	Radium Hot Pools	6.7	2018-21
	Priority 3		
	Kootenay Crossing	8.3	2018-21
	McKay Compound	29.2	2018-21

	Priority 4		
	Wolverine Warden Cabin	3.5	2021-26
	Marble Canyon Campground	3.5	2021-26
	McLeod Meadows Campground	3.5	2021-26
	Floe Lake Warden Cabin	3.1	2021-26
	Helmet Warden Cabin	3.5	2021-26

Yoho	**Priority 1**		
	Field village	15.8	2018-21
	Twin Falls Chalet	3.8	Completed 2018
	Priority 2		
	Cathedral Lodge	6.1	2018
	Elizabeth Parker ACC Hut	3.1	2019
	Lake O'Hara Lodge	6.7	2019
	Lake O'Hara Cabin	0.5	2019
	Little Yoho Cabin	0.3	2018
	Priority 3		
	Kicking Horse Campground	3.1	2018-21
	Boulder Compound	11.7	2018-21
	Yoho Ranch	3.1	2018-21
	Priority 4		
	Amiskwi Pass Warden Cabin	3.4	2021-26
	Lower Ice River Warden Cabin	3.1	2021-26
	Otto Creek Warden Cabin	3.1	2021-26
	Upper Ice River Warden Cabin	3.5	2021-26
	Monarch Campground	3.5	2021-26