Redfern-Keily Park

Management Plan

Draft for Public Review

Disclaimer: This draft management plan contains preliminary proposals that are subject to change and therefore may not necessarily reflect the position of the Ministry of Environment and Climate Change Strategy. At the conclusion of the planning process, a revised management plan will be approved by the Ministry.

June 2018

BRITISH COLUMBIA | BC Parks

Cover Page Photo Credit: Al Hansen, BC Parks Area Supervisor

Foreword by BC Treaty 8 First Nations

WELCOME to our homeland. The Beaver (Dunne-za, Dane-zaa), Cree, Saulteau, Slavey (Dene), and TseK' hene indigenous groups have occupied these lands since time immemorial. Treaty 8 was signed in the spirit of Peace and Friendship on June 21, 1899. British Columbia Treaty 8 Territory is hundreds of thousands of square kilometres in size and includes 8 groups: Blueberry River First Nations, Doig River First Nation, Fort Nelson First Nation, Halfway River First Nation, McLeod Lake Indian Band, Prophet River First Nation, Saulteau First Nations and West Moberly First Nations. Our relationship to the land has and continues to be the spiritual basis for our mode of life. The land has always, and will continue to, provide shelter, food, clothing, and the economic resources for our livelihood. As a First Nation, we have an obligation to implement our inherent rights that are affirmed by the Constitution Act, 1982. This includes sustainability of our resources in order for us to hunt, trap, fish, and continue our mode of life. Prior to the arrival of the Europeans we were actively involved in the management of our territories: the lands understood us and we understood the land. Today, we continue to manage our Territory.

BC Treaty 8 First Nations would like neighbouring First Nations, outdoor enthusiasts and other visitors to our land who are enjoying the bounties of this Park to acknowledge and respect that you are on Treaty 8 Territory. Please act as a steward of Treaty 8 Territory so that together we will maintain its natural beauty, and cultural resources. This maintenance will be respectful to our current use and for future generations. Please conduct yourself in a manner that respects cultural heritage resources and values. Treaty 8 Territory will always be the home of First Nations for as long as the sun shines, the grass grows and the water flows.

Foreword by BC Kaska Dena First Nations

The Kaska traditional territory is 24 million hectares and includes portions of three provinces and territories (British Columbia, Yukon and Northwest Territories). The majestic northern boreal forest regions of interior British Columbia and the Yukon have some of the continent's most expansive and impressive wilderness areas, with a great diversity of terrestrial and aquatic ecosystems. Extensive mountain ranges and wild rivers frame pristine boreal forest watersheds. Large free ranging populations of Caribou, Moose, Dall's Sheep, Stone Sheep, a full suite of large carnivores and hundreds of thousands of migrating neo-tropical songbirds and waterfowl make their home in these diverse boreal landscapes.

Since human beings have inhabited this landscape, we have been here. As long as human beings inhabit this landscape, we will remain here. Our occupancy of this land establishes both our right and our responsibility to ensure this land remains intact and able to support our people and culture. We emphasize it is now time to secure its permanent protection in order to protect a broad diversity of resources and values that are critical to our culture and our economic opportunities within our homeland.

The health of Kaska culture requires large intact landscapes which support healthy populations of traditional plants and animals. Furthermore, a central facet of our identity requires large unfragmented landscapes for our families to be on. This is where our traditional knowledge is passed on from parent to child, from generation to generation. As well, our physical health requires continued access to healthy wildlife populations as a key component of the diet to which we are accustomed and adapted.

Permanently protected areas and parks can play an important role in ensuring the long term health of First Nations cultures, and thus the Kaska are generally supportive of the concept of "parks" as a mechanism to protect our cultural interests. As well, the Kaska are supportive of parks within their traditional territories, with some caveats, as a contribution to the overall richness and core spiritual values of Canadian culture.

Vision Statement

The alpine meadows, forested valley bottoms, serrated peaks, glaciers, waterfalls and large valley lakes that dominate the mountainous Redfern-Keily Park landscape contribute to its appeal; Redfern-Keily Park remains a largely untouched, though relatively accessible, wilderness area.

Its proximity to other provincial protected areas provides habitat connectivity and ensures preservation of intact predator-prey systems and ecosystem functionality.

Redfern-Keily Park plays an important role in providing backcountry recreation opportunities for local, national and international visitors. Development has been kept at a minimum and the few facilities that exist have been maintained with the goal of providing a wilderness experience. Levels of use, both public and commercial, are low, but are monitored to ensure that key park values and wilderness experiences are not negatively impacted.

Recognizing the traditional use of Redfern-Keily Park is important to the area's First Nation communities; Redfern-Keily Park remains a location where First Nations members practice their traditional social, ceremonial and cultural activities.

Table of Contents

Figures

Tables

1.0 Introduction

1.1 Management Plan Purpose

The purpose of this management plan is to guide the management of Redfern-Keily Park. This management plan:

- articulates the key features and values of Redfern-Keily Park;
- identifies appropriate types and levels of management activities;
- determines appropriate levels of use and development;
- establishes a long-term vision and management objectives for the park; and
- responds to current and predicted threats and opportunities by defining a set of management strategies to achieve the management vision and objectives.

1.2 Planning Area

Redfern-Keily Park, established as a Class A park in 1999 and encompassing 80,712 hectares, is located in the Peace area of northeast British Columbia (Figure 1). The two closest large communities are Fort Nelson (approximate population 4,000) and Fort St. John (approximate population 21,000). Fort Nelson is about 150 kilometres northeast of the park and Fort St. John is located about 200 kilometres southeast of the park.

Key features of Redfern-Keily Park include: Redfern Lake (often referred to as the "Lake Louise of the North"), a portion of the Redfern Lake Trail (an important access route), significant ungulate populations and habitats, and important old-growth habitats for mustelids[1] (more commonly known as furbearers).

Redfern-Keily Park is part of the Muskwa-Kechika Management Area[2]. The Muskwa-Kechika Management Area, designated by legislation in 1998 (*Muskwa-Kechika Management Area Act*), is a 6.4 million hectare area recognized globally for its wilderness, wildlife and cultural significance. Its area is zoned into a number of different resource management categories, including protected areas, which are intended to allow for the continuation of the area's wilderness character while allowing for resource development to occur.

The three closest provincial protected areas, also located within the Muskwa-Kechika Management Area, are Northern Rocky Mountains Park, Prophet River Hot Springs Park and Sikanni Chief Ecological Reserve. Northern Rocky Mountains Park, approximately 20 kilometres north of Redfern-Keily Park, is the largest protected area in the Muskwa-Kechika Management Area.

---

[1] A mustelid is a small, carnivorous mammal with a long body and short legs and generally has musky scent glands under the tail (e.g., marten, wolverine, and fisher).

[2] For more information on the Muskwa-Kechika Management Area, visit http://www.muskwa-kechika.com/.

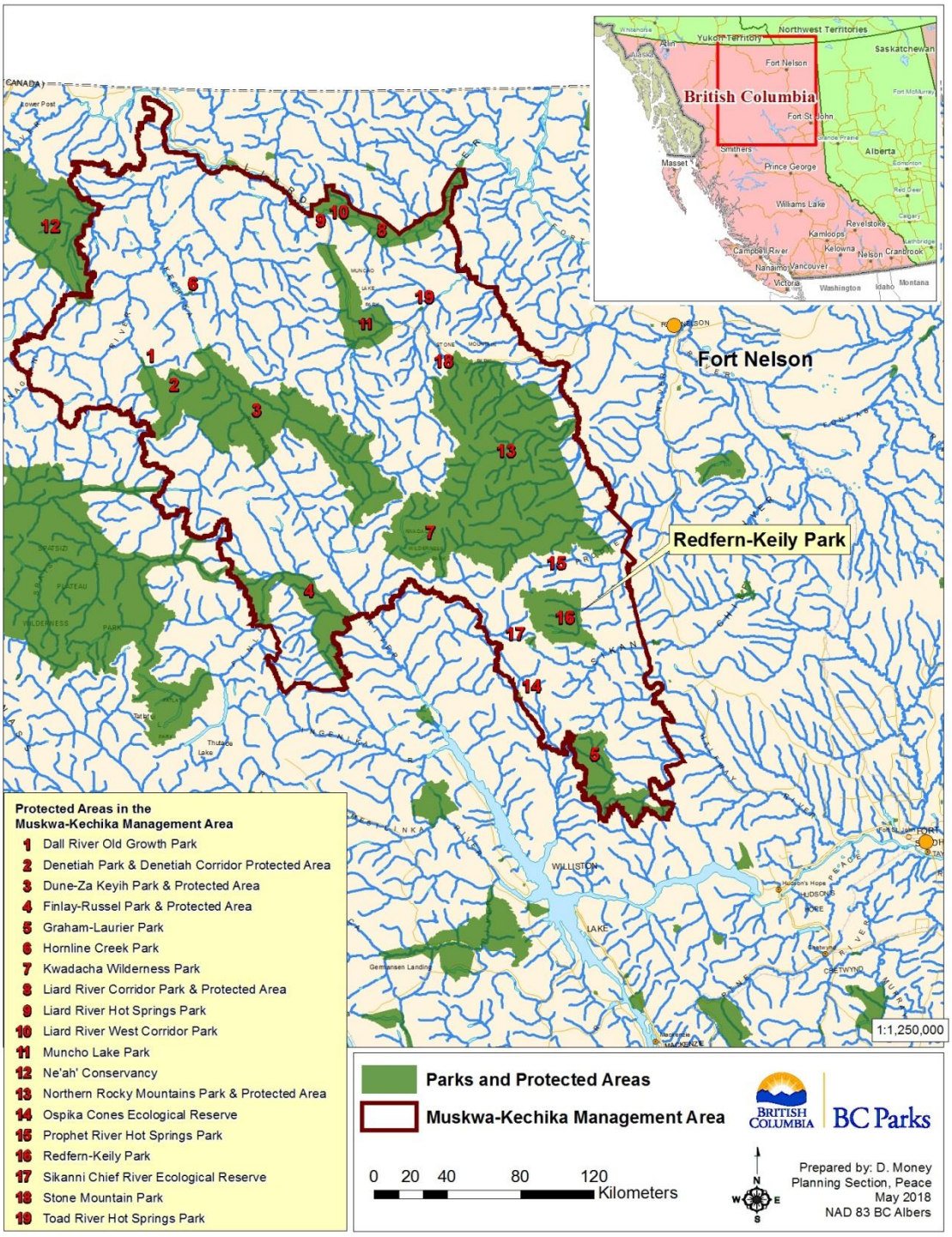


Figure 1: Context Map for Redfern-Keily Park

Prophet River Hot Springs Park is located 13 kilometres to the north between Northern Rocky Mountains and Redfern-Keily parks; Sikanni Chief Ecological Reserve is located approximately three kilometres to the southwest.

1.3 Legislative Framework

The Redfern-Keily area was first recognized for its recreation potential in 1969 when the province placed a recreation reserve around Redfern Lake; the size of this reserve was increased in 1973 and again in 1981. In 1986, conversion of the recreation reserve to a recreation area around Redfern and Fairy lakes was recommended by the provincial Wilderness Advisory Committee (the purpose of the committee was to review land use and make recommendations for the protection of British Columbia's wilderness).

Redfern Lake was identified as an Area of Interest in the province's Protected Areas Strategy in July 1993. The Redfern-Keily area was recommended for designation as a protected area through the Fort St. John Land and Resource Management Plan[3] process in 1999. Redfern-Keily Park was established as a Class A park by the *Park Amendment Act, 1999* on June 29, 1999. The park is presently named and described in Schedule D of the *Protected Areas of British Columbia Act*.

Class A parks are Crown lands dedicated to the preservation of their natural environments for the inspiration, use and enjoyment of the public. Development in Class A parks is limited to that which is necessary to maintain the recreational values of the park. Some activities that existed at the time a park was established (e.g., grazing, hay cutting) may be allowed to continue in certain Class A parks[4] but commercial resource extraction or development activities are not permitted (e.g., logging, mining or hydroelectric development).

1.4 Relationship with First Nations

Redfern-Keily Park falls within Treaty 8 territory. The Treaty 8 First Nations who have territory that overlap with Redfern-Keily Park are Blueberry River, Doig River, Halfway River, Prophet River, and West Moberly.

A portion of the park along the southwest boundary is within the asserted traditional territory of the Tsay Keh Dene First Nation and a portion along the northwest boundary is within the asserted traditional territory of the Kaska Dena Council First Nation community of Kwadacha.

This park management plan and subsequent management actions within Redfern-Keily Park will respect the government–to–government agreements that have been signed with different First Nations (see section 1.7.3) as well as First Nations traditional

[3] To access the Fort St. John Land and Resource Management Plan, visit https://www.for.gov.bc.ca/tasb/slrp/pdf/lrmp/Fort%20Stjohn_LRMP.pdf

[4] Applies only to Class A parks listed in Schedule D of the *Protected Areas of British Columbia Act*.

harvesting, cultural activities, and other aboriginal rights and interests. The management of protected areas can be improved by incorporating First Nations' traditional ecological knowledge and cultural knowledge. BC Parks' goal is to gather, collate and integrate local traditional knowledge with other scientific data to manage the park.

1.5 Relationship with Other Resource Agencies

BC Parks works directly with other land and resource management agencies to address specific management issues in Redfern-Keily Park. These agencies include the ministries responsible for fish and wildlife, wildfire management, range management and Crown land, to manage the fish and wildlife values, wildfires, prescribed fire, pest and disease problems, range for horses, and access. BC Parks also works with the ministries responsible for authorizing industrial activities outside of the park to ensure that resource development applications include consideration of park values.

1.6 Adjacent Land Use

1.6.1 Land and Resource Management Plan Zones

Land and resource management plans delineate resource management zones within their respective planning areas. Activities permitted within the different resource management zones that surround Redfern-Keily Park have the ability to affect park values, particularly when those activities occur in close proximity to the park or are consumptive in nature (adjacent zones areas depicted in Figure 2).

The Besa–Halfway–Chowade Resource Management Zone (415,477 hectares) within the Fort St. John Land and Resource Management Plan borders Redfern-Keily Park to the south and to the east. This Resource Management Zone was identified in the plan as Special Management–Fish and Wildlife Habitat, Wilderness Values and Backcountry Recreation and will be managed with a high biodiversity emphasis. The management objectives and strategies are identified within the Fort St. John Land and Resource Management Plan. The visual quality strategy specifies that areas adjacent to protected areas will be managed to maintain the identified values.

To the north of Redfern-Keily Park is the Prophet Resource Management Zone (157,500 hectares). The management objectives and strategies for this zone are stated in the Fort Nelson Land and Resource Management Plan. This zone has several special features, including the Eastern Rockies High Trail and the Bedaux Trail, and valuable large mammal habitats that require consideration during industrial development and timber management activities.

Adjacent to the western boundary of Redfern-Keily Park is the Upper U kai (Upper Akie) Special Wildland Resource Management Zone within the Mackenzie Land and Resource Management Plan. This zone is identified as having high Grizzly Bear (*Ursus arctos*) wildlife values. The intent of this zone is to manage for ecological conservation as a priority, while also managing for heritage and cultural values, wilderness characteristics,

the provision of recreation opportunities, and oil and gas and mineral exploration opportunities. Timber harvesting is excluded in this zone. The plan also states that as this zone is adjacent to a park, resource development should be sensitive to the intended objectives of the park.

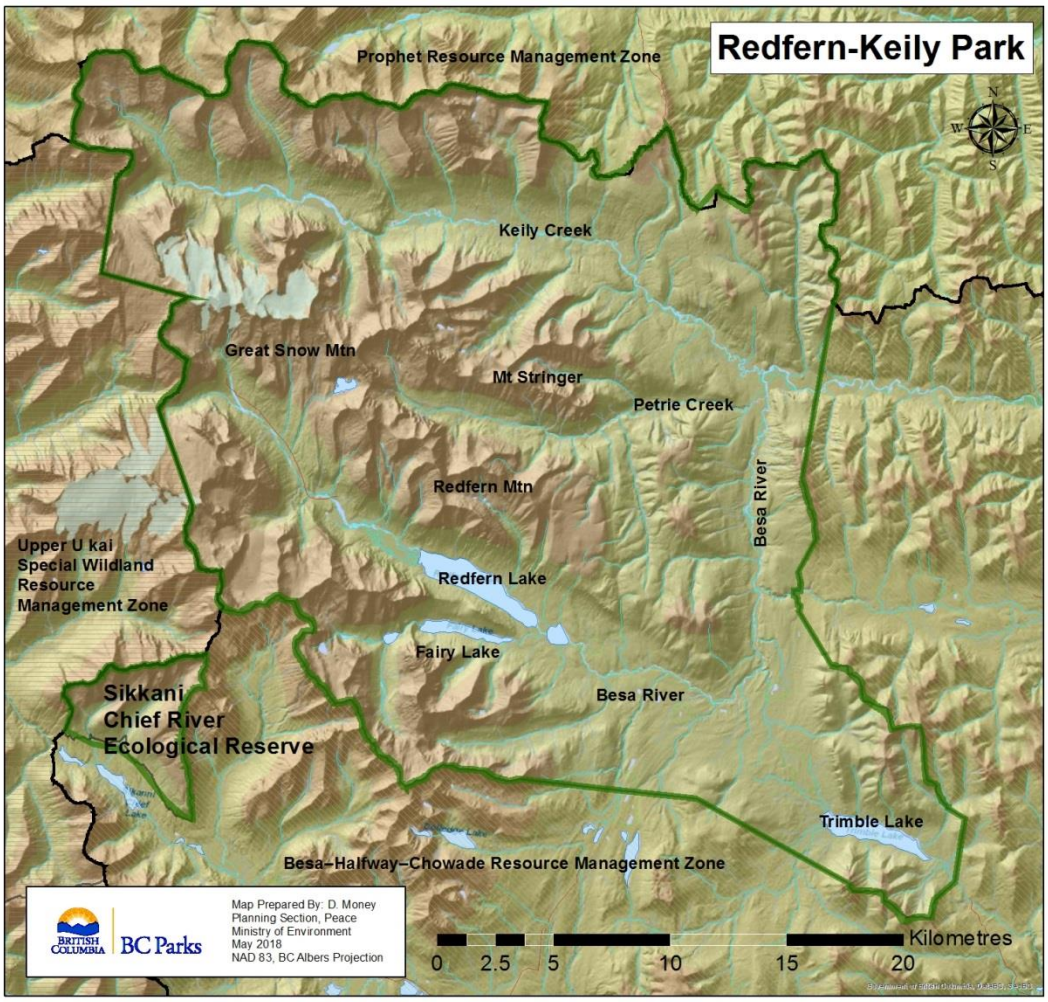


Figure 2: Map of Redfern-Keily Park

1.6.2 Authorizations Within and Adjacent to the Park

Redfern-Keily Park is bordered on all sides by Crown land. This means that, as identified in Section 1.5, BC Parks and the natural resource management ministries coordinate as much as possible to manage at a landscape level, reflective of individual ministry mandates.

- Redfern Lake Trail and Sikanni River Trail are designated Muskwa-Kechika Access Management Area routes and provide important access into the park. Outside the park those trails are designated recreation trails under the *Forest and Range Practices Act* and are under the jurisdiction of the ministry that manages Crown

land recreation. Redfern Lake Trail, outside of the park, is maintained to minimum standards by the Moose ATV and Northland Trail Blazers Snowmobile clubs.

- Redfern-Keily Park overlaps with three guide outfitting territories that hold commercial recreation tenures in the park. Guide-outfitter wildlife harvest levels are set by the agency responsible for wildlife management in BC, while their commercial recreation activities and facilities in the park are managed by BC Parks.

- There are seven commercial recreation tenures in the park offering a variety of services, including angling, hiking, horseback riding, camping, biking and cycling, snowshoeing, cross-country skiing, kayaking, boat tours, wildlife viewing, and canoeing. Three of these tenures are held by guide outfitters that also offer non-hunting recreational services. Five of the tenures include privately owned structures.

- Three range tenures[5] for horse grazing exist within Redfern-Keily Park; they are tenured under the *Range Act*. Range tenures for grazing can occur in parks listed in Schedule D of the *Protected Areas of British Columbia Act* and are managed by the Range Program under the *Range Act*. These tenures are associated with businesses that use horses for their operations, and include guide outfitters.

- Four trapline areas have overlaps with Redfern-Keily Park. Trapping is managed by the ministry responsible for wildlife management. That ministry also manages hunting regulations and harvest allocations, which are managed at the management unit level, with special consideration for parks. Currently, only one of the trapline holders actively traps within the park (authorized by a valid park use permit). This trapper's permit also includes trapline cabins for overnight use.

- There are four active park use permits allowing air transport into the park.

- Wildlife Habitat Areas for Caribou[6] (*Rangifer tarandus*) have been established adjacent to the park under the *Forest and Range Practices Act* and the *Oil and Gas Activities Act* (see Figure 3).

- Ungulate Winter Ranges for Mountain Goat (*Oreamnos americanus*), Caribou (*Rangifer tarandus*) and Stone's Sheep (*Ovis dalli stonei*) have been established adjacent to the park under the *Forest and Range Practices Act* and the *Oil and Gas Activities Act* (see Figure 3).

- There are no forestry or mining authorizations in the immediate vicinity of the park.

[5] One of the tenures is on the periphery of the park.

[6] Caribou (*Rangifer tarandus*) in the park area are part of the Northern Mountain Caribou population or Designatable Unit, and the Pink Mountain subpopulation. The term Caribou will be used throughout the document to refer to the Pink Mountain subpopulation.

- There is one active petroleum and natural gas tenure 1 kilometre south of Redfern-Keily Park.

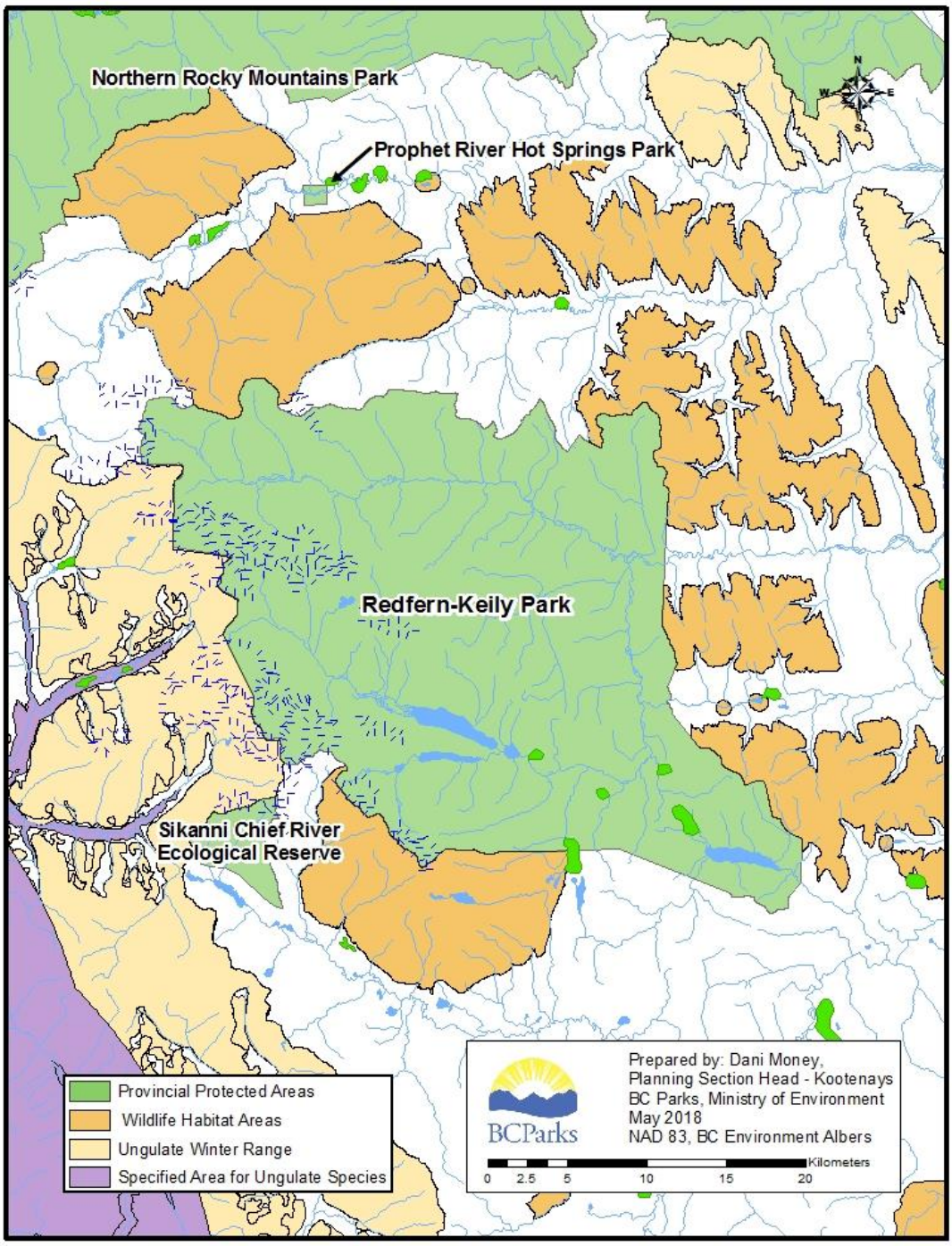


Figure 3: Adjacent Wildlife Habitat Areas and Ungulate Winter Ranges

1.7 Management Commitments/Agreements

1.7.1 Fort St. John Land and Resource Management Plan

In the mid-1990s, the Fort St. John Land and Resource Management Plan Table was directed to recommend 4% of the Fort St. John Forest District be established as protected areas towards the regional goal of 9% for the Prince George Forest Region. Redfern-Keily Park was one of 11 sites that were recommended; and one of three that were identified for protection by local First Nations. For all the protected areas that were recommended, the Fort St. John Land and Resource Management Plan recognized that trapping, hunting, fishing and guide outfitting would be acceptable uses. Additionally, the Fort St. John Land and Resource Management Plan provided a number of specific objectives and strategies to guide the management of values and activities within Redfern-Keily Park for recreation, access, wildlife, biodiversity, fish, water, protected area and visual quality. Where possible, these objectives and strategies are captured within this management plan.

1.7.2 Muskwa-Kechika Management Area

The *Muskwa-Kechika Management Area Act* established the Muskwa-Kechika Management Area in 1998. Redfern-Keily Park is one of 16 parks within the Muskwa-Kechika Management Area. There are also five protected areas and two ecological reserves. The intent of the Muskwa-Kechika Management Area is to achieve a balance between economic development and conservation. The overall goal is to maintain the wilderness quality in perpetuity, along with the diversity and abundance of wildlife and ecosystems, while allowing resource development to occur in appropriately zoned areas (approximately 75% of the area).

To support land management, the *Muskwa-Kechika Management Area Act* specified the creation of an overarching management plan (completed) and five types of local strategic plans: a recreation management plan (completed), a wildlife management plan (completed), oil and gas pre-tenure plans (completed), park management plans and local strategic forestry plans, referred to as landscape unit objectives (which are completed when there is forestry activity). As one of the local strategic plans, the Redfern-Keily Park management plan is consistent with the direction provided by the Muskwa-Kechika management plan; it also considers direction within the other strategic level plans.

Local Strategic Recreation Management Plan for the Muskwa-Kechika Management Area

This plan provides an overview assessment of recreation resources in the Muskwa-Kechika Management Area and provides directives for the general management of recreation activities and facilities for protected areas within the Muskwa-Kechika Management Area.

Muskwa-Kechika Wildlife Management Plan

The wildlife management plan provides comprehensive and long-term direction for the management of wildlife species and their habitats to ensure ecological integrity of the

Muskwa-Kechika Management Area. It contains two documents – the strategic document and the technical manual.

Pre-Tenure Plans for Oil and Gas Development in the Muskwa-Kechika Management Area

The purpose of these plans is to ensure environmentally responsible and timely development of oil and gas resources, by providing results-oriented management guidelines and specific prescriptions, where appropriate. Several of these pre-tenure plans border the park.

Park Management Plans

The park management plans for parks in the Muskwa-Kechika will give direction to the management, conservation, and use of all protected areas within the Muskwa-Kechika Management Area. This management plan for Northern Rocky Mountains Park fulfills this local strategic plan commitment.

Landscape Unit Objectives

The purpose of landscape unit objectives is to provide a statement of desirable future condition for a forest resource or forest resource use, which is attainable through management action. These objectives are completed when there is forestry activity.

1.7.3 First Nation Government to Government Agreements

The Province of British Columbia has entered into, or is negotiating, government-to-government agreements with a number of First Nations whose proven rights or asserted traditional interest areas overlap with Redfern-Keily Park. Where those agreements include commitments with respect to park management, BC Parks is committed to ensuring the implementation of those agreements.

The Strategic Engagement Agreement between the Province of British Columbia and the Kaska Dena Council and the Government-to-Government Agreement between the Province of British Columbia and Halfway River First Nation are examples of those agreements. The support and implementation of the government-to-government agreements by each of the parties are aimed at reducing land and resource sector conflicts, providing greater certainty, fulfilling specific legal obligations, and improving relationships.

1.8 Management Planning Process

This plan will represent the completed product of a process that was initiated prior to 2000. During development of the draft management plan, public, stakeholder and First Nations engagement will occur at various stages. Several years ago opportunities for public involvement were provided through a public mail-out process, consultative meetings and open houses. Additional public involvement opportunities, including open houses, will be provided as part of the ongoing development of the draft management plan. The draft document will also be made available for public review and comment on the BC Parks webpage. Information and feedback received during the development of

the plan will be used to inform and adapt the content of the plan, including the issues and management strategies components.

2.0 Values and Roles of the Park

2.1 Significance in the Protected Areas System

Redfern-Keily Park provides extensive and diversified wildlife habitat for large mammals such as Caribou, Elk (*Cervus elaphus*), Grey Wolf (*Canis lupus*), Grizzly Bear, Moose (*Alces amerianus*), Mountain Goat and Stone's Sheep. Its proximity to Northern Rocky Mountains Park to the north functions to enable habitat connectivity for wide-ranging species.

There are only a small number of backcountry areas in the northern Rocky Mountains that are relatively easy for the general public to access. This park protects several of these areas, which are accessed by two very popular Muskwa-Kechika Access Management Area routes: Redfern Lake Trail and Sikanni River Trail.

Its wilderness character, coupled with its accessibility, make Redfern-Keily Park an important backcountry tourism destination to local, provincial, national and international users. The highly scenic landscape is popular with a wide variety of recreationists, from visitors interested in low-impact nature appreciation to hunters and ATV users. Redfern Lake, one of the most notable features in the park, has been called the "Lake Louise of the North" by visitors because of its turquoise water.

2.2 Biodiversity and Natural Heritage Values

Redfern-Keily Park was identified through the Fort St. John Land and Resource Management Plan process as having significant natural values.

Spectacular geological structures, pristine freshwater values, and a diverse assemblage of vegetation, fish, and wildlife make this area significant in the provincial protected areas system. The brilliant blue colours of Redfern, Fairy and Trimble lakes are among the most outstanding features within the park.

2.2.1 Geology and Landforms

An important part of Redfern-Keily Park is the spectacularly exposed geological structures of the Rocky Mountains area. Thrust faults, rugged castellated peaks, and glacially sculpted U-shaped valleys are a primary component of the area's surface

features. Hanging valleys, natural arches, cirques and horns (or pyramidal peaks) are also common. Stratified and sedimentary rock are predominant in the area with limestone, dolomite and shale being most common. Mountainous regions are composed of Palaeozoic rock, and the foothills are made of slightly younger Triassic rock. There are seven main mountains in the park, and Mount Ulysses (2,990 metres) is recognized as the highest peak in the Muskwa-Kechika Management Area.

The area has been significantly shaped by tectonic activity; folding and faulting can be seen in exposed rock. This is especially evident south of Trimble Lake to the west of Trimble Mountain where a thrust fault emerges. Erosion is a significant force that shapes surface features of the area. This can be seen in structures such as the hoodoos on Besa River below Mount Dopp.

Glaciers have also played an important role in shaping the current landscape (see section 2.2.2). The area was covered with ice during the last glaciation which lasted from 25,000 to 10,000 years ago. As the ice sheets receded, the area was inundated by a glacial lake that covered the lowlands between the Muskwa and Prophet rivers and the lower Sikanni Chief River. Valley bottoms are covered with a thin layer of glacial till.

2.2.3 Biogeoclimatic Zones and Vegetation

Redfern-Keily Park contains mixed spruce and pine forests representative of the high mountain valleys of the eastern flank of the Rocky Mountains, as well as extensive alpine areas. There are three biogeoclimatic (BEC) subzones in the park (Table 1). The moist, cool Spruce-Willow-Birch (SWBmk) and moist, cool scrub Spruce-Willow-Birch (SWBmks) subzones are found along the valley bottoms (below 1,600 metres elevation for SWBmk and between 1,600 metres and 1,800 metres elevation for SWBmks). These subzones are predominantly forested with white spruce (*Picea glauca*) and sub-alpine fir (*Abies lasiocarpa*), with lesser amounts of lodgepole pine (*Pinus contorta* var*. latifolia*), black spruce (*Picea mariana*) and trembling aspen (*Populus tremuloides*). Scrub birch (*Betula nana*) and willow (*Salix* species) are also common. Areas with poor drainage contain white spruce and tall willow swamps, sedge fens, or marshes. Sections of old growth spruce forest can be found along river valley bottoms. There is an especially significant band of this along Keily Creek.

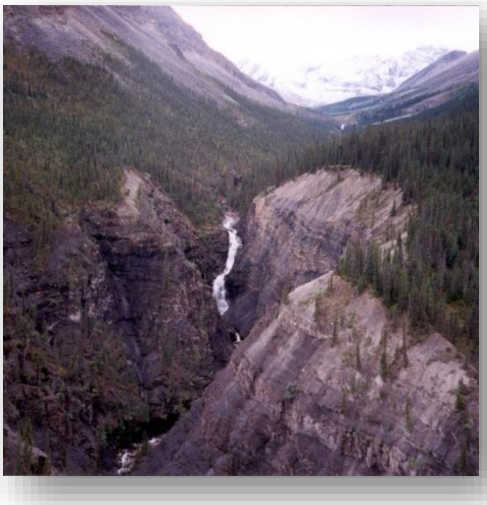
The third zone, the Boreal Altai Fescue Alpine (BAFA), is found at elevations greater than 1,800 metres. Vegetation consists mainly of shrubs, heathers, herbs, mosses, and lichens. White and Engelmann spruce (*Picea engelmannii)* and sub-alpine fir where they occur usually exhibit a stunted growth form due to the harsh environmental conditions.

All three of the BEC subzones are well-represented in the protected areas system (>20% protection), with Redfern-Keily Park protecting only small percentages of each - 2.8%, 4.0% and 2.0%, respectively (Table 1). From a climate change and species migration perspective, however, Redfern-Keily Park's true value is that there is strong connectivity for these three subzones within multiple parks and protected lands that are all in close proximity to each other.

Table 1: Biogeoclimatic Ecosystem Classification (BEC) representation

BEC Zone	BEC Subzone	Area of BEC Subzone in the Park (hectares)	Area of BEC Subzone Protected in the Province (hectares)	Percent of BEC Subzone Protected in the Province that is Contributed by the Park	Percent BEC Subzone Protected in the Province
Spruce-Willow-Birch	SWBmk	30,256	1,085,687	2.8%	26.1%
	SWBmks	15,440	382,153	4.0%	23.5%
Boreal Altai Fescue Alpine	BAFAun	34,023	1,698,463	2.0%	27.8%

Nine species of at-risk vascular plants (2 red-listed and 7 blue-listed[7]) have been documented within the park. In the vicinity of Fairy Lake they include the blue-listed Davis' locoweed (*Oxytropis campestris* var. *davisii*), Hornemann's willowherb (*Epilobium hornemannii* ssp. *behringianum*), Porsild's draba (*Draba porsildii*), marsh felwort (*Lomatogonium rotatum*). East of Redfern Mountain they include the red-listed pink campion (*Silene repens*), and the blue-listed abbreviated bluegrass (*Poa abbreviata* ssp. *Pattersonii*), low sandwort (*Arenaria longipedunculata*) and rock-dwelling sedge (*Carex petricosa*). The red-listed smooth draba (*Draba glabella*) was found in both locations.



Ecosystem mapping has not been completed for the park, so there is no information available on at-risk ecological communities.

2.2.2 Water

The main hydrological features of Redfern-Keily Park are

[7] At-risk species and ecological communities include those that are extirpated, endangered or threatened species (Red List) or of special concern (formerly called vulnerable) (Blue List).

Redfern, Fairy, and Trimble lakes. In addition, several waterfalls with heights from 5 to 50 metres are found on both main and side channels of all the creeks and rivers in the area and tarns are commonly found in the cirques.

Much of the freshwater is relatively pristine. The west side of the park contains several large ice fields and includes both the Ithaca and Achaean glaciers. Meltwater from these glaciers feed Besa River and Keily Creek. The entire watershed of Petrie Creek is also within the park.

The Besa River passes through Redfern Lake, the largest lake in the park (Table 2). There are two other relatively large lakes within the park: Fairy Lake (its tributaries feed into the Besa River drainage system) and Trimble Lake in the southeast corner of the park (its tributaries feed into the Upper Sikanni Chief drainage system). All of the waters in the park eventually drain into the Arctic Ocean. Both of the drainage systems represented in the park, the Besa and the Upper Sikanni Chief, are undeveloped.

Table 2: Surface Area and Average Depth for Lakes in Redfern-Keily Park

Lake	Surface Area (ha)	Average Depth (m)
Redfern	539	43.5
Trimble	314	13.9
Fairy	151	29.9

2.2.4 Wildlife

Redfern-Keily Park, in association with other proximal protected areas and land management measures, protects large mammal predator/prey systems. Ungulates, such as Caribou (Northern Mountain population, specifically the Pink Mountain subpopulation - blue-listed), Elk, Moose, Mountain Goat, Mule Deer (*Odocoileus hemionus*), Stone's Sheep and White-Tailed Deer (*Odocoileus virginianus*), use the area as year-round habitat. Large carnivores, such as American Black Bears (*Ursus americanus*), Grey Wolves and Grizzly Bears (blue-listed), can also be found in the park.

The valleys and south-facing slopes are important winter range for many of the ungulate species. The Pink Mountain Caribou population uses high elevation mountainous areas in the park primarily during calving and summer and the park includes one of three known calving areas for the population. The northeastern portion of the park is also used during winter. Protecting habitat for ungulates is one of the key roles of the park. The ongoing health of those wildlife populations are important from conservation, cultural and recreation perspectives.

The Northern Mountain population of Caribou was assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as a species of special concern in 2002 and was listed as such in Schedule 1 of the *Species at Risk Act* in 2005. COSEWIC reaffirmed special concern status for the Northern Mountain population in 2014.

Redfern-Keily Park covers 8% of the Pink Mountain Caribou subpopulation range with 99% of the park in the Pink Mountain Caribou subpopulation range. Survey results suggest that the Pink Mountain Caribou subpopulation may be declining, but differences in survey methods mean it is not possible to be definitive about the population trend. In 1993, 1,275 caribou were counted and in 2017, 323 animals were counted.

Wide scale Wolf control throughout the region from the 1940s to 1960s, and Wolf control in the area to the north of the Pink Mountain Caribou range in the 1980s may have influenced Caribou numbers during and just after those periods. A plan specific to the Pink Mountain subpopulation is being produced by the provincial ministry responsible for wildlife management in British Columbia. Due to the conservation status of Caribou, they are a management priority for BC Parks.

One of the greatest risks to Caribou is habitat alteration that converts mature forests into early seral vegetation at greater than natural rates. Increases in the amount of early seral vegetation, which is favoured by other ungulates such as Moose and Deer, can lead to increased numbers of these other ungulates. If predator numbers increase in response to increased prey, predation risk to Caribou can also increase. Also, early seral vegetation does not contain lichen forage required by Caribou.

Additionally, Caribou and Mountain Goats are very sensitive to motorized activities, and packed tracks resulting from winter motorized and non-motorized activities can facilitate predator access to their winter range. The calving and early summer seasons are critical for Caribou; most calf mortality occurs during the first few weeks of life. Adult female Caribou often calve at higher elevations where predation risk is lower. Activities that result in displacement of Caribou from preferred habitats into habitats with greater mortality risk could result in increased calf mortality and negative effects on the population. Staff from the ministry responsible for wildlife and wildlife management have identified that there is an imminent threat to Caribou habitat outside the park from industrial land-use activities, particularly at low elevations. This habitat loss is due to gas drilling, natural gas pipelines, mining, and wind power developments.

A wild, free-ranging population of introduced Plains Bison (*Bos bison bison*) occasionally moves into the southeast corner of the park in the Trimble Lake area. Plains Bison are considered to be outside their normal range in Redfern-Keily Park; however they are within the historical range of Wood Bison. Bison find abundant food in the many natural meadows and areas that are in a state of post-fire regeneration. Plains Bison was assessed as Threatened by COSEWIC in 2013, but has not yet been added to Schedule 1 of the *Species at Risk Act*.

Mineral licks are important features in the park. Ungulates congregate in these areas to ingest a variety of chemical components that are concentrated on the surface. Wet mineral licks are formed due to water movement (gravitational or upwelling) that concentrates materials leached from the surrounding rocks and soils. Dry licks are often formed through colluvial or aeolian exposure. Although they differ in their respective

concentrations, wet and dry licks are natural sources of sodium, carbonates, magnesium, and sulfate.

Smaller furbearing mammals known as mustelids (e.g., blue-listed Fisher (*Pekania pennant*) and American Marten (*Martes americana*)) live in the old-growth forests associated with valley bottoms. The blue-listed Wolverine (*Gulo gulo luscus*) can be found throughout the park ranging from lower valley bottoms to alpine meadows.

Redfern-Keily Park also provides important habitat for many species of birds; the avian community changes seasonally as migratory species either nest or pass through the area. A regionally significant resting site for the Pacific Loon (*Gavia pacifica*) is known to exist within the park.

In addition to the above-mentioned wildlife, several species of rodents, reptiles, and amphibians, as well as many species of invertebrates, can also be found in the park.

2.2.5 Fish

Redfern-Keily Park has indigenous fish populations typical of many cold water systems. Redfern Lake contains Lake Trout (*Salvelinus namaycush*), Lake Whitefish (*Coregonus clupeaformis*) and Pygmy Whitefish (*Prosopium coulterii*) (Table 3). The creeks and rivers have indigenous populations of Arctic Grayling (*Thymallus arcticus*), blue-listed Bull Trout (*Salvelinus confluentus*) and Mountain Whitefish (*Prosopium williamsoni)*.

Table 3. Fish species distribution in Redfern-Keily Park

Lake or waterway name	Fish Species							
	Arctic Grayling	Bull Trout	Lake Trout	Lake Whitefish	Mountain Whitefish	Pygmy Whitefish	Rainbow Trout	Slimy Sculpin
Besa River	X	X			X		X	
Fairy Lake							X	X
Keily Creek		X			X			X
Nordling Creek							X	
Petrie Creek	X	X			X			
Redfern Lake			X	X		X	X	
Trimble Lake	X				X		X	

Trimble Lake contains Arctic Grayling and Mountain Whitefish that were illegally stocked into Trimble Lake in 1959. Redfern, Fairy, and Trimble lakes were stocked with Rainbow Trout (*Oncorhynchus mykiss*) in 1984 and are well-known for Rainbow Trout fishing. These fish have spread to the Besa River and at least two of its tributaries: Neves Creek and Nordling Creek.

There are several waterfalls in the park that act as barriers to fish migration. Two sets of falls downstream of Fairy Lake isolate Fairy Lake from the rest of the Besa River system, and Sikanni Falls restricts fish passage to Trimble Lake and parts of the Sikanni Chief River.

Bull Trout require specific spawning habitat, which is found within Redfern-Keily Park. Adult Bull Trout winter in the lower Prophet River mainstem and move to spawning tributaries by

late summer. Petrie Creek has been identified as a potentially important spawning area for Bull Trout, as has Keily Creek to a lesser extent.

Mature Arctic Grayling use several waterways in the park for post-summer refuge and they are especially sensitive to over-harvest at this time. Mountain Whitefish have been known to spawn in the Besa River main stem.

2.3 Ecosystem Dynamics

Ecosystem dynamics in boreal areas such as the northern Rocky Mountains are greatly influenced by fire and forest insects. These disturbance agents are significant agents of renewal or change and play an important role in ecosystem dynamics. Fire can have a variety of effects on ecosystems; in forested areas fires are often considered to be either stand replacing or stand maintaining. In grassland ecosystems fire generally helps to maintain the grasslands through the removal of woody vegetation that cannot withstand repeated burning. The fire return interval for the area that includes Redfern-Keily Park is between 50 and 400 years, with wildfire burning an average of 0.1% of the area per year between 1922 and 2012.

Prescribed fire can be applied to ecosystems for specific purposes that includes ecosystem maintenance or restoration, wildlife habitat enhancement, forage production for domestic animals, and wildfire prevention.

Throughout northeastern British Columbia, prescribed fire has been used by guide outfitters, First Nations and government to enhance wildlife habitat and enhance forage for range purposes. In Redfern-Keily Park, prescribed fire has been used by staff in the ministry responsible for wildlife management to enhance ungulate winter range habitat through the maintenance of high-elevation early seral[8] grassland habitat, in association with escape terrain features, for Stone's Sheep.

Range tenures are held by guide outfitters, these tenures can allow for prescribed burning to maintain forage for horses that are used in their operations. Because the range tenures were in place prior to the park establishment, Redfern-Keily Park is listed in Schedule D the *Protected Areas of British Columbia Act*[9], allowing range tenures to continue in the park. These range tenures are tenured under the *Range Act* by the Range Program and managed under a Memorandum of Understanding (MOU) with BC Parks, which also has a policy and guidance document. The agreement between BC Parks and the Range Program allows for prescribed fires if they are part of a Range Use Plan and are consistent with park values and/or a park management plan.

[8] Vegetation succession can result in less palatable woody vegetation dominating some areas.

[9] The number of Animal Unit Months (AUMs) for each range tenure in the park is capped at that authorized for the range tenure at time of park establishment.

Within Redfern-Keily Park, the north side of Trimble Lake and the north side of Keily Creek, just before the confluence with the Besa River, are two areas that historically have been burned with prescribed fire.

2.4 Climate Change

Research indicates that retreating glaciers are one of the most immediately evident effects of climate change in northern regions. Though the specific impact to glaciers within the park have not been measured, higher elevation glaciers may be more resistant to change than lower elevation glaciers because of lower temperatures at higher elevations. Precipitation and hydrology effects of climate change and smaller glaciers could include reduced summer moisture, reductions in water inputs to wetland areas, reduced late summer stream flows and changed vegetation patterns.

The temperature and hydrological changes will also result in ecosystem shifts as ecosystems associated with warmer climates shift geographically northward and/or upward in elevation. More northern latitudes such as those around Redfern-Keily, are experiencing more rapid change than areas further south in British Columbia. Research indicates that generalist species, or those that can more easily adapt, are more likely to survive than species that are slow to adapt or require very specific habitat. Additionally, natural disturbance patterns (e.g., wildfire, drought, insect infestation) may increase in frequency as a result of the above-mentioned environmental changes.

In 2012, the Yellowstone to Yukon Conservation Initiative prepared a document entitled "Muskwa-Kechika Management Area Biodiversity Conservation and Climate Change Assessment" that analyzed the Muskwa-Kechika Management Area using the enduring features approach to identify areas of high physical variety and rarity[10]. This approach uses elevation, bedrock and geology, macro landforms and major aquatic elements, which are the foundations on which ecosystems are built as well as other gauges including productivity and feature rarity. By focussing on variety and connectivity, conservationists are hoping to protect areas that will hold the most biodiversity in the future no matter what the specific ecosystem components are currently. The analysis indicated several areas of high physical variety and rarity within Redfern-Keily Park (i.e., different aspects); those areas are along the eastern edge of the park, around the Besa River and Trimble Lake. These areas appear to be connected to similar areas to the north on the eastern side of the Rocky Mountains.

[10] For more information visit the Yellowstone to Yukon Conservation Initiative's website here: https://y2y.net/publications/technical-reports/MK_MainReport_2pg_web.pdf

2.5 Cultural Values

Redfern-Keily Park has a diverse cultural heritage background. Of the Treaty 8 signatories the park falls within the asserted traditional territory of the Prophet River, Blueberry River, Doig River, Halfway River, and West Moberly First Nations; as well as the Tsay Keh Dene First Nation and the Kaska Dena Council First Nation community of Kwadacha.

Historically and presently, the summer and fall activities include the hunting of large and small game, fishing, plant collecting, and the preparation of food for long-term storage for the upcoming winter months. Some First Nations people traditionally broke up into smaller bush communities during the winter and spring seasons.

The areas around Redfern and Trimble lakes contain many cultural features including a cabin site, a cache, a camp, trails, refuse and lithics. The Besa River-Keily Creek confluence was a high-use camping area for several different groups. The Keily Creek area is of special concern to First Nations because it is considered sacred and a burial site is located there.

Post-contact cultural values are also significant. The area was historically used for hunting and trapping to supply furs to the Hudson's Bay Company trading posts in Fort St. John and Hudson's Hope. In addition, several historic surveying expeditions took place in northeast British Columbia, including the park and surrounding areas. Knox McCusker, a Dominion land surveyor, measured glaciers and snowfields in the Mount Ulysses area in 1932. Another well-known expedition, led by Bedaux, camped at Redfern Lake in 1934 and parts of their trail leading north can still be found within the park.

2.6 Recreation Values

2.6.1 Recreation Opportunities

Due to the existence of established trails within the park, Redfern-Keily is one of the more accessible and frequently used areas in the Muskwa-Kechika Management Area. The park also has some of the most scenic landscapes in the Northern Rocky Mountains. The most popular activities include hunting, fishing, hiking, camping, boating, photography, ATV use, snowmobiling, and wildlife and nature viewing. All of these uses are long-standing and predate park establishment.

The two trail systems into the park (Redfern Lake Trail and Sikanni River Trail) are very important recreational features. Both trails can be accessed on foot or with snowmobiles, horses, mountain bikes or dogsleds. Motorized vehicles (except snowmobiles) can only enter the park using the Redfern Lake Trail; motorized access along the Sikanni River Trail is not allowed past where the trail meets Trimble Creek (for more info on Access, please see Section 2.6.2). Several unmarked trails exist within the park, especially near Redfern Lake, that can be used by hikers, snowshoers and horseback riders.

In winter, snowmobiling into Redfern Lake is by far the most common recreational activity in the area, while in summer the activities are more varied. Cross-country skiing occurs in many locations. One of the better cross-country skiing areas is along the shores of Redfern and Fairy lakes; however, no tracks are set and the trail up to Fairy Lake is steep.

Guide outfitting and trapping are long-standing activities within the Redfern-Keily Park area. The Fort St. John Land and Resource Management Plan recognizes both of those activities as acceptable uses within Redfern-Keily Park.

There are currently three commercial recreation operations that provide guided recreation opportunities in the park. The guided opportunities include angling, canoeing, cycling, horseback riding, hunting, hiking, boating and snowmobiling tours, snowshoeing, cross-country skiing, and nature appreciation. Three grazing tenures exist in and around Redfern-Keily Park to accommodate commercial backcountry recreation horse use. Guide outfitter companies have private client cabins at three different sites within the park. Overnight stays for their clients are accommodated within the terms of the operator's park use permit.

Visitors must keep in mind when planning for their trips that the park is a remote wilderness area. Seven public campsites are located within the park along Redfern Lake Trail (an additional 19 campsites are located along the trail outside of the park boundary). These are very basic and can provide camping opportunities for 5-7 small groups. The park also has two cabins that are operated as first-come-first-served public-use facilities. The cabins can accommodate up to 12 people. The Northland Trail Blazers Snowmobile Club is under a volunteer agreement to help BC Parks maintain the cabins. As the public facilities are limited, it is advisable to come prepared to be self-sufficient; bringing proper camping, cooking, food and water supplies. There are no communication facilities within the park so rescue services are not easily contacted.

Though visitor use statistics are not available, it is known that there are specific areas and times of year when use levels are higher. The main access trails, as well as the areas surrounding the three lakes, have the highest levels of use in the park. The hunting season brings in the greatest number of people, especially during the September long weekend. During that time the public campsites and private guide outfitter cabins see the most use, and based upon public feedback that BC Parks staff receives, it is thought that most of the designated camping areas are being used to their full capacity. June is

another popular time of the year for fishing enthusiasts when the ice melts from the lakes. Winter use by snowmobilers can also be high. During non-peak times, this park can provide a completely solitary wilderness experience.

2.6.2 Access

The park is in a remote area and access to the park is generally by all-terrain vehicle, snowmobile or horse, though many commercial guests fly in by floatplane. The closest major road is Highway 97, approximately 50 kilometres east of the park.

Redfern Lake Trail

The main access into Redfern-Keily Park is along the 80-kilometre long Redfern Lake Trail. Redfern Lake Trail starts at the Alaska Highway, runs along Neves Creek then up the Besa River to Redfern Lake. It is open to both motorized and non-motorized access and is popular for hiking, ATV use, horseback riding and snowmobiling. The first 65 kilometres of the trail are outside of the park with the last 15 kilometres being within the park. There is a bridge over the Besa River along the portion of the trail in the park. The portion of the trail that falls outside of the park is managed by the ministry responsible for recreation and trails on Crown land and it is designated as a user-maintained trail.

This trail is a Muskwa-Kechika Access Management Area route which has restrictions under the *Wildlife Act,* Public Access Prohibition Regulation on motorized vehicle weight and travel proximity from the trail (excluding snowmobiles). Users must familiarize themselves with the Muskwa-Kechika Access Management Area restrictions prior to using the trail. Currently, both inside and outside of the park, Redfern Lake Trail users must use a vehicle that weighs less than 750 kilograms. Outside of the park, Redfern Lake Trail users are restricted to travel within 400 metres of the trail. Within the park, users are restricted to travel within 10 metres of the trail.

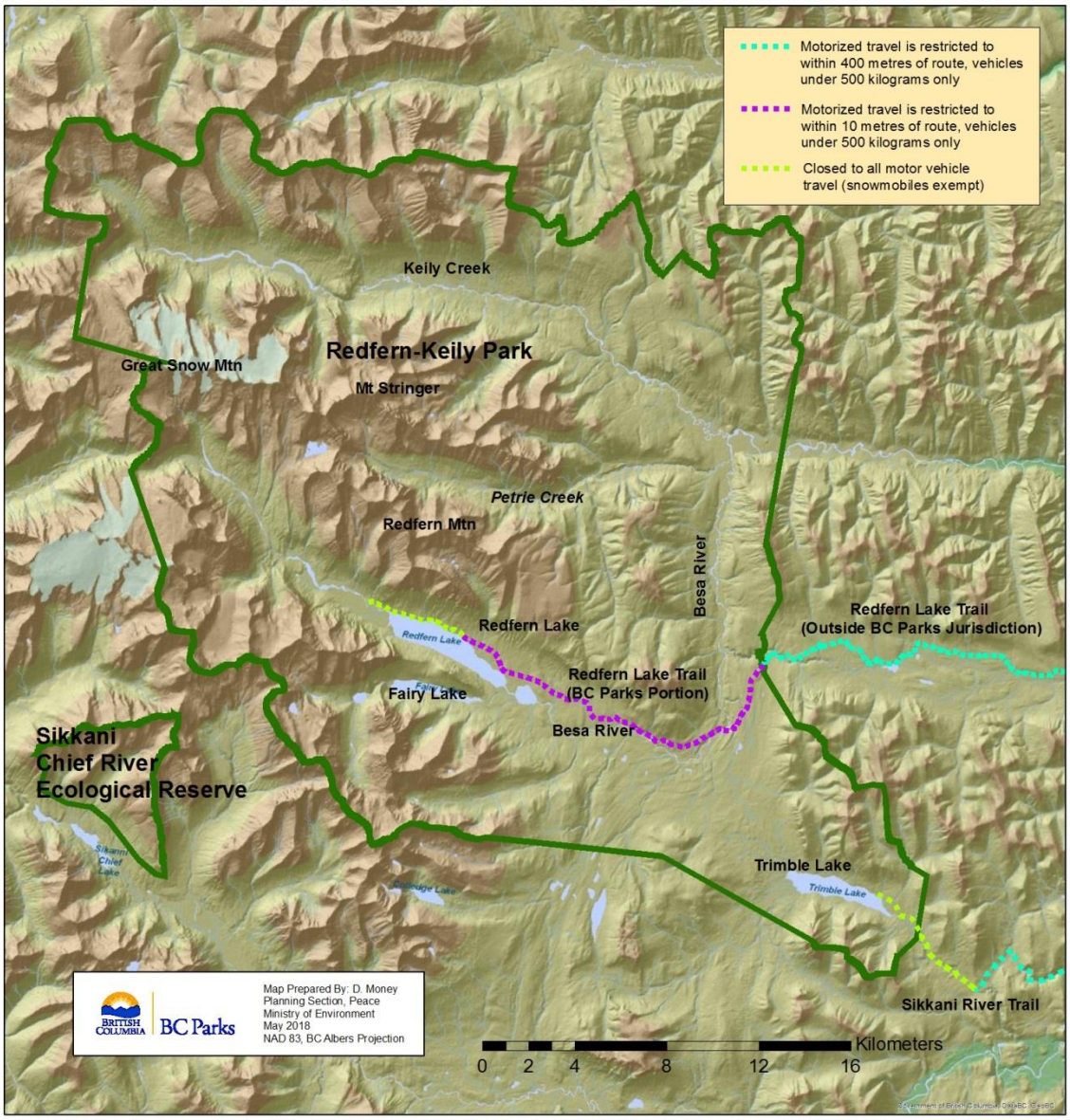


Figure 4: Access map for Redfern-Keily Park

Sikanni River Trail

A second access route into the park is along the Sikanni River Trail. This 32 kilometre long trail starts at the Alaska Highway and runs along Sikanni Chief River to Trimble Lake. The first section of this trail up to Trimble Creek (27 kilometres), is also a Muskwa-Kechika Access Management Area route that is motorized; currently this section has a 750 kilogram legal vehicle weight restriction, and motorized users must travel within 400 metres of the route. From Trimble Creek to Trimble Lake (5 kilometres) the trail is for hiking or horse use only, with the exception of snowmobiles. Only the final two kilometres of the trail is in the park.

Aircraft Access

The park can also be accessed by fixed wing aircraft, both floatplane and wheeled, and helicopters. The commercial operators often use floatplanes to fly in their guests. To prevent impacts to wildlife, helicopter access is recommended to be limited to the Nature Recreation Zone only, unless it is for management purposes (refer to section 3.3–Zoning Plan). Recreational aircraft users are encouraged to provide flight plans to BC Parks.

3.0 Management Direction

3.1 Management Objectives and Strategies

3.1.1 Geology and Landforms

Despite existing protections provided by the *Park Act*, some of the landform features in Redfern-Keily Park (e.g., hoodoos) could be damaged by park users. Impacts to those features would detract from the spectacular scenic beauty of the area and could result in decreased visitation to the park.

Management Objective	Management Strategies
Protect the landform features that contribute to the scenic beauty within the park.	• If/when feature damage is noted, an action plan will be developed and implemented aimed at repairing and/or preventing further damage (this action plan may include access restrictions).

3.1.2 Water

The water values in the park are relatively pristine. Potential threats to water quality include erosion and the introduction of contaminants. If levels of erosion increase in areas where trails cross streams, there may be erosion and sedimentation concerns.

Management Objective	Management Strategies
Maintain the natural quality of the freshwater values.	• Provide the public with information on minimizing impacts to water quality in the backcountry through the Leave No Trace section on the BC Parks website. • Encourage research and assessment activities focused on water quality monitoring to aid in determining impacts from either point source or non-point source contaminants, particularly in higher use recreation areas.

3.1.3 Vegetation

The ecosystems of Redfern-Keily Park have not been mapped; ecosystem mapping would be the basis of increasing the knowledge of at-risk ecosystems and wildlife habitat inventories. In addition, little is known about at-risk plant species in the park.

Areas of Redfern-Keily Park that are more readily accessible to the public are considered to be at greater risk when it comes to potential damage to vegetation.

- During peak visitation seasons (e.g., hunting season) impacts to vegetation from camping occurs in new areas because developed sites are being used to full capacity.
- In the vicinity of camping areas, damage to surrounding vegetation occurs as timber is illegally harvested for firewood[11].
- While not currently a known issue in Redfern-Keily Park, the establishment of invasive plant populations along well-traveled park trails is an increasing risk in northeastern British Columbia.

Additionally, impacts to vegetation from recreation activities in areas that are not easily accessed are unknown. Possible impacts to sensitive areas (i.e., alpine or sub-alpine areas and blue-listed species) are of particular concern.

Management Objective	Management Strategies
Maintain vegetation and plant communities for ecological integrity and visual aesthetics.	• Collect information on the vegetation in the park to better understand how vegetation is changing in response to climate change (e.g., use the BC Parks Long-term Ecological Monitoring Program). • Conduct inspections of camping areas to ensure firewood is being obtained in accordance with park regulations for fires in the backcountry (e.g., only dead wood laying on the ground can be used for fires). Consider educational signage at boundary if needed. • Conduct Backcountry Recreation Impact Monitoring (BRIM) at Redfern Lake (and in other areas on an as needed basis) and adjust management actions to ensure natural and cultural values are not being compromised by recreation use levels, particularly during peak season. The BRIM process will be used to determine the need and location of new backcountry camping areas.
Increase knowledge of ecosystems and protect at-risk plant	• Encourage ecosystem mapping and vegetation research aimed at identifying populations of at-risk plant species and

[11] The Park, Conservancy and Recreation Area Regulation regulates that backcountry park users may only use vegetation that is lying dead on the ground to start fires.

Management Objective	Management Strategies
communities and species.	ecological communities, and wildlife habitat. • Monitor activities occurring in areas containing known at-risk plant species to assess their potential negative impacts, including alpine areas and the areas where blue-listed species are found in the vicinity of Fairy Lake. Limit activities as necessary. • Prevent damage to riparian areas by maintaining the existing bridges at the large water crossing on Redfern Lake Trail. • Prevent damage to riparian vegetation by encouraging horse users to adhere to the horse riders' backcountry ethics that have been developed for the park, which advocates resting horses away from the water's edge[12].
Prevent the establishment or spread of non-native plant species.	• Encourage commercial operators and non-commercial visitors to adhere to BC Parks Invasive Plant Best Management Practices[13]. • Encourage commercial operators and other park visitors to report occurrences invasive plant species. • In the event of invasive plant species establishment, review management actions and explore treatment options[14].

3.1.4 Wildlife

Ensuring the protection of wildlife and wildlife habitats is a key role of Redfern-Keily Park; however, the remoteness of Redfern-Keily Park presents challenges in determining wildlife abundance, key wildlife habitat locations, engaging in regular regulation enforcement and effectiveness monitoring of wildlife management techniques. Habitat mapping for important wildlife species, as recommended in the Fort St. John Land and Resource Management Plan, has not been completed for the park.

The Northern Mountain population of Caribou is blue-listed, and the Pink Mountain subpopulation may be declining in size. Caribou is susceptible to threats such as habitat loss and alteration, altered predator/prey dynamics and disturbance throughout their range.

---

[12] For guidance on Horse Riders Backcountry Ethics, visit http://www.env.gov.bc.ca/bcparks/explore/parkpgs/redfern/trails.html#ethics

[13] Best management practices for invasive plants in Parks and Protected Areas in BC http://www.env.gov.bc.ca/bcparks/conserve/docs/iscbc-bc-parks-bmp-20180412.pdf

[14] The use of herbicides in parks is only considered if there is no alternative treatment that has proven to be successful and if there is a significant threat to the ecological integrity of the park, as well as the surrounding area.

Habitat management activities that reduce old and mature forests, and change predator/prey dynamics[15], can enhance habitat for other ungulate species which may negatively impact Caribou.

The Plains Bison is an introduced species that could become a concern in the park. Bison exhibit highly territorial behaviours and will actively prevent other wildlife species from using an area they are currently occupying. This territorial behaviour serves to limit habitat available for native ungulate populations. There is Limited Entry hunting for Plains Bison in the park.

Many activities that park visitors pursue are integrally tied to the area's abundance and variety of wildlife, such as hunting, trapping and nature appreciation.

Management Objective	Management Strategies
Increase knowledge about wildlife and their habitats.	• Work with First Nations communities, other ministries, community groups and/or educational institutions to encourage wildlife inventories and studies aimed at better understanding species' needs; including how the wildlife composition will evolve in response to environmental changes such as climate change, and natural and prescribed fire. • Identify and map high value ungulate winter range habitat, and investigate the need for measures to maintain this habitat (e.g, thermal and escape cover, sustainability of forage and browse). • Identify and map medium and high value Caribou habitat (e.g.: calving areas and early summer range) and matrix habitat and investigate the need for measures to maintain this habitat. • Identify and map medium and high quality Grizzly Bear habitat and connectivity corridors, and investigate the need for measures to maintain this habitat. • Focus mapping efforts initially on areas that could be potentially negatively impacted by management or recreational activities. • Recommend the use of the BC Conservation Data Centre Data Submission process to collect informal wildlife information from First Nations, commercial operators and other park visitors[16].

[15] The report "Role of Protected Areas in Caribou Management in British Columbia" gives details of the issues surrounding Caribou management, with recommendations for Caribou management in the protected area system.

[16] http://www.env.gov.bc.ca/cdc/contribute.html

Management Objective	Management Strategies
	• Follow the Muskwa-Kechika Management Area wildlife management plan guidelines (two documents)[17]. BC Parks will only deviate from the guidelines when it is deemed necessary for conservation purposes.
Manage habitat values for all species, with a priority on at-risk species	• Consider the impacts of management and recreational activities on all wildlife species and their habitat; should negative impacts to species or their habitat occur, modify or limit activities as necessary.
Prevent impacts of non-native species to native wildlife populations and their habitats.	• Work with the ministry responsible for wildlife management to determine if Plains Bison are significantly impacting native wildlife populations or their habitats. If there are significant negative impacts, review the Limited Entry Hunt to determine if any changes are required. • Ensure management activities do not create additional habitat in the park that Bison could occupy. • Adjust management activities to prevent population establishment in response to evidence of a non-native wildlife occurrence. • To protect native species from competition or disease introductions, llamas and other exotic animals are not permitted within the park; only horses are permitted.
Ensure that all uses are managed to maintain healthy wildlife populations and minimize disturbance to the ecosystem.	• Continue to work with the ministry responsible for wildlife management to ensure appropriate harvest levels. • Work with hunters, guides, First Nations, and special interest groups to monitor use impacts from hunting, collect data, and identify and address concerns. • Limit motorized access to high capability habitat by applying the Wilderness Recreation zoning to 98% of the park. Implement greater spatial or seasonal restrictions as necessary.
Maintain current trapping opportunities subject to conservation objectives.	• Work with trapline holder(s) to continue sustainable trapping practices.

[17] http://www.muskwa-kechika.com/management-area/legislation-planning

3.1.5 Fish and Aquatic Life

Redfern, Fairy and Trimble lakes were stocked with Rainbow Trout prior to park establishment, resulting in the lakes being popular for fishing. There have not been any recent fishery studies or research into other aquatic species in the park.

Management Objective	Management Strategies
Increase knowledge and understanding of aquatic values, and encourage needed research.	• Work with educational institutions and First Nations to plan and implement aquatic species studies in Redfern, Fairy and Trimble lakes and Petrie and Keily creeks. • Collect informal aquatic data from commercial operators and other park visitors.
Protect and maintain the natural diversity and productivity of aquatic ecosystems while maintaining a low intensity high quality fishery in designated areas of the park.	• Identify and map locations of listed or significant species and areas of critical habitat. Focus initially on areas that could be negatively impacted by recreation; and Petrie and Keily creeks (potentially important spawning areas for Bull Trout and a post-summer refugia for mature Arctic Grayling). • Monitor recreational fishing activities; focusing on Redfern, Trimble and Fairy lakes. Collect information regarding species caught, numbers caught, and size of fish. Limit activities as necessary to avoid negative impacts to native fish populations. • Investigate management strategies to stop the spread of introduced non-native Rainbow Trout.

3.1.6 Cultural Values

While First Nations cultural values are known to be present in the park, information on these values is limited. This lack of information increases the risk of unintentional damage to sensitive sites.

Management Objective	Management Strategies
Gain a better understanding of cultural values, archaeological sites, spiritual sites and traditional use locations in order to better ensure protection.	• Encourage First Nation efforts to perform historical and ethnographic research and cultural value field inventories as appropriate. • Identify threats to known cultural values and implement protective measures.
Promote stewardship and awareness of cultural values and First Nations use in the park.	• Retain opportunities for First Nations traditional, sustenance and harvesting activities • Encourage and investigate opportunities to develop cultural

Management Objective	Management Strategies
	interpretive material for the park. • Incorporate traditional knowledge into park management.

3.1.7 Access Management

Because access can have such a substantial impact on a park's conservation, recreation and cultural values, access management is one of the most important strategies that BC Parks can utilize to manage those values. For Redfern-Keily Park, access is managed by having (1) very limited motorized access and a motorized access weight restriction (Redfern Lake Trail only), (2) only a basic system of trails (for both motorized and non-motorized users); and (3) limits on helicopter access. This combination has allowed BC Parks to be able to ensure the wilderness integrity of the park is protected while allowing visitors to enjoy the natural beauty that the park has to offer.

However, use of the access trails has increased over the past decade and the condition of the access trails continues to deteriorate. One of the primary reasons appears to be that motorized recreation vehicles (e.g., ATV's, side-by-sides, snow bikes) are more readily available to the public and technological advances in those vehicles are resulting in greater numbers – or sometimes less experienced park users – being able to access the park (both Redfern Lake Trail and Sikanni Chief River Trail allow for motorized access outside of the park, whereas only Redfern Lake Trail allows for motorized access within the park[18]). In 2018, changes to the Public Access Prohibition Regulation, under the *Wildlife Act,* changed the weight restrictions of ATVs from 500 kilograms to 750 kilograms. Use of machines that exceed the weight restriction for the trail is not compliant with the Muskwa-Kechika Access Management Area route regulation and can lead to additional trail damage.

The condition of the Redfern Lake Trail, in particular, is of concern. Both BC Parks and the ministry responsible for the portion of the trail outside of the park receive annual complaints regarding the trail's condition. Many members of the public would like to see improvements made along the Redfern Lake Trail, both inside and outside of the park. Only the last 15 kilometres of the trail is within the park. The ability to maintain Redfern Lake Trail (or make improvements) is complicated by terrain instability and accessibility.

Trail/access improvements, particularly those outside of the park, would likely result in increased visitation. For Redfern-Keily, the Fort St. John Land and Resource Management Plan recommended that the majority of the park be managed to maintain

[18] For non-winter only. In winter snowmobile use is permitted in an expanded area of the park, please refer to Figure 5.

its wilderness and wildlife values, and that human use could be restricted to protect and manage these values..

Illegal trail development is a growing concern in Redfern-Keily Park: branching from existing trails within the park and branching off industrial roads that may be developed in the vicinity of the park boundary. In 2013, an unauthorized ATV trail to Fairy Lake was found.

Packed trails on snow can facilitate access by wolves by improving travel conditions. This can lead to increased predation if the trails are close to Caribou and Mountain Goat winter ranges.

Management Objective	Management Strategies
Manage access to protect the natural, cultural and recreational values of the park.	• Work with the agency that manages the access trails outside the park to manage the Redfern Lake and Sikanni River trails. • Continue to enforce access restrictions for the Muskwa-Kechika Management Area identified within the *Wildlife Act* Public Access Prohibition Regulation (see 2.5.2 Access) through compliance and education. • Monitor and maintain the portion of Redfern Lake Trail (including bridges) within the park to minimize environmental and aesthetic degradation. • Encourage industrial users in adjacent Resource Management Zones to develop industrial accesses away from park boundaries to minimize any impacts to the park. Encourage monitoring of any changes to industrial access to determine the effects of those changes on natural, cultural and aesthetic values.
Maintain an adequate level of access for users.	• Allow motorized forms of access to continue in compliance with the Muskwa-Kechika Management Area identified within the *Wildlife Act* Public Access Prohibition Regulation (see 2.5.2 Access). Limitations may be required to support conservation objectives. • Consider limiting helicopter access to the Nature Recreation Zone, unless it is for management purposes; regulatory amendments would be required to enforce this restriction. • New methods of air access will not be allowed. • Allow non-motorized forms of access to continue. Mountain bike access is allowed only on Redfern Lake Trail and Sikanni River Trail. • No major upgrades to Redfern Lake Trail will be considered,

Management Objective	Management Strategies
	but any safety and environmental concerns will be addressed. • Deactivate unauthorized trails. • Maintain bridges at large water crossings on Redfern Lake Trail. Construct new bridges only to maintain access routes or protect park values.

3.1.8 Recreation Management

Redfern-Keily Park provides a wide range of recreational opportunities for park users (from naturalists to hunters). All of the activities are long-standing and pre-date the establishment of the park. Redfern-Keily Park is to be maintained as a wilderness area. This means that visitor use levels need to be kept relatively low. Promotion of the park must therefore be minimal.

The Fort St. John Land and Resource Management Plan identified that the existing variety of recreational activities be retained, and that a range of wilderness recreation opportunities be available in the park. It also recommended that opportunities for the development of backcountry facilities be provided in suitable areas, while maintaining the area in a natural or natural appearing condition.

To ensure enjoyment and safety of the public, users need to be aware of the different allowable uses in the park (and along the multi-use access trails) and respect that other users have different needs. The different use types also result in risks that all users should be aware of (e.g., during hunting seasons, visitors should be aware that areas around hunting kills are higher risk for bear encounters).

Continuation of commercial recreation opportunities is very important as it allows for a different park experience and type of park user. Continuation of existing commercial recreation opportunities was supported by the Fort St. John Land and Resource Management Plan.

Recreational activity can have a negative impact on natural and cultural values. For example, recreational activities can displace wildlife from habitat areas, and have significant impacts to land and vegetation around campsites due to full capacity use during peak periods. Caribou that are displaced from preferred calving areas could be displaced into areas with a greater risk of mortality for both calves and adults. Vegetation degradation has been identified as a concern at campsites along the Redfern Lake Trail.

Management Objective	Management Strategies
Maintain the wilderness quality of	• Educate visitors about minimum impact camping and

Management Objective	Management Strategies
the park and protect the natural and cultural values while providing wilderness recreation opportunities.	backcountry wilderness ethics at all sites in the park to avoid site degradation and minimize human-wildlife conflicts. • Allow continued use of the park for hunting, fishing, snowmobiling, ATVing and horse use; restrictions will be implemented as necessary to protect park values. • Ensure there are no recreational activities in Caribou calving areas during the calving season and early summer (May 15 to July 15 at present). • During the winter, allow snowmobiles in the Nature Recreation Zone only (for the winter timing window, see Figure 3). • Enforce zoning and trail restrictions (e.g., do not allow ATV and snowmobile access to the Wilderness Recreation Zone). • Allow new recreation activities to occur only if compatible with the park vision. • Follow BC Parks guidelines for Unmanned Air Vehicles (UAV) authorization and use. • Support low-impact recreational activities, especially non-motorized, such as nature appreciation. Nature appreciation includes experiencing alpine wildflowers in bloom in July and August and visiting old-growth forests on Keily Creek. • Encourage research aimed at studying the effects of motorized traffic on wildlife populations and other park users to limit or reduce negative impacts. Adopt proven management strategies to address impacts as feasible.
Ensure an acceptable level of safety for park users.	• Educate winter users of the potential avalanche hazard and recommend that individuals have avalanche awareness training to travel in the park. • Provide and promote bear awareness information including the BC Parks brochure[19] to reduce potential for negative bear/human interactions. • Educate users to be aware the trails are multi-use and promote safe use of the trail for all users.
Increase visitor awareness of park values and backcountry etiquette.	• Promote the “leave no trace” wilderness ethic for public lands. An adapted version specifically geared towards horse users is available on the Redfern-Keily Park website[20].

[19] http://www.env.gov.bc.ca/bcparks/conserve/bearsandcougars.pdf?v=1444863686822

Management Objective	Management Strategies
Ensure commercial recreation use levels and management practices protect the natural and cultural values while respecting business needs of the commercial operators in accordance with the Fort St. John Land and Resource Management Plan.	• Continue to collect information from commercial operators regarding use levels, locations and management concerns. • Ensure park use permit holders are aware of park conservation objectives and do not act or condone guests to act contrary to those objectives. • Take advantage of appropriate opportunities to coordinate with park use permit holders to accomplish conservation and recreation objectives (e.g., park use permit holders to monitor Long-term Ecological Monitoring sites).
Minimize the environmental and visual impacts of permitted facilities.	• New commercial facilities/structures will only be permitted in the Nature Recreation Zone of the park. Developments will follow the relevant BC Parks policies, and direction in the Fort St. John Land and Resource Management Plan. • Changes to an existing commercial structure that includes a major extension to the existing footprint are not allowed. • All structures are required to reflect the wilderness character of the park.

3.1.10 Fire Management

Prescribed fire has been used in the park by guide outfitters, First Nations and government to enhance wildlife habitat and to maintain forage for range purposes. The recreation section of the Fort St. John Land and Resource Management Plan recommends that BC Parks "*identify and manage appropriate grazing management activities (e.g., burns)*". While the Land and Resource Management Plan, does not give specific direction regarding prescribed fire for wildlife enhancement, it does have the objective "*maintain high capability ungulate winter habitat*" with the strategy of "*incorporate the maintenance of high capability ungulate wintering habitat (e.g., thermal and escape cover, sustainability of forage and browse*". The Muskwa-Kechika wildlife management plan gives management direction that habitat "*should be managed within the natural range of variability*",[21] while also giving direction that prescribed fire be used in key habitats to maintain early seral grass or shrub areas for Stone's Sheep, Plains Bison, Moose and Elk.

The Fort St. John Land and Resource Management Plan gives the following direction regarding livestock grazing in the park "*identify and manage appropriate grazing management activities (e.g., burns)*". Range tenures in Class A parks listed in Schedule D of the *Protected Areas of British Columbia Act* are managed by the Range Program under the

[20] To view Horse Riders' Backcountry Ethics visit http://www.env.gov.bc.ca/bcparks/explore/parkpgs/redfern/trails.html#ethics.

[21] The Muskwa-Kechika Wildlife Management Plan defines Natural Range of Variability as "the range of variability in ecological conditions that occurred before European settlement".

Range Act. The agreement between BC Parks and the Range Program allows for prescribed fires if they are part of a Range Use Plan and are consistent with park values and/or a park management plan. It is recognized by BC Parks that both wildlife and horses may use burned areas, but plans used to manage prescribed fire need to be clear on the purpose of the burn.

The continuation of prescribed fire to enhance wildlife habitat presents a challenge for BC Parks as generally BC Parks' conservation policies preclude the use of prescribed fire to enhance wildlife habitat[22]. Also, it is difficult to determine the natural range of variability of wildfire and the ecological conditions produced by wildfire, and then manage within this natural range. The use of prescribed fire may push ecosystems outside the natural range of variability for fire. With climate change predictions forecasting warmer drier summers for the park area, wildfire frequency may increase and post-fire vegetation dynamics may also change.

Management Objective	Management Strategies
Use fire as appropriate to manage wildlife habitat considering the impacts and benefits to all wildlife species.	• Work with other agencies, First Nations, relevant stakeholders and local community groups to continue to research the appropriateness of prescribed burning to enhance wildlife habitat. • Do not use fire to create additional early seral habitat for ungulates. • Ensure any proposed prescribed burns for wildlife habitat enhancement are assessed using the BC Parks Impact Assessment process.
Work collaboratively with the Range Program to manage *Range Act* tenures.	• Ensure the Memorandum of Understanding (MOU) for Administering and Managing *Range Act* Agreements in Parks and Protected Areas, and the Policy and Guidance of the MOU are followed. • Work with range tenure holders and ministry staff responsible for range management to ensure range use is in alignment with maintaining healthy ecosystems that have a disturbance regime that closely mimics natural disturbance regimes in terms of frequency and severity of disturbance.
Information on the results of management activities is collected.	• Ensure monitoring is done to determine if management activities are meeting their goals and to determine the effects of management activities on ecosystems and wildlife.

[22] BC Parks conservation policies support the use of prescribed fire to mimic historic natural return intervals within specific ecosystems.

3.1.11 Climate Change

The most consistently recommended approach for adapting to climate change is to maintain natural connectivity across the landscape. Redfern-Keily Park is not large enough to function as a closed ecosystem and so it relies on the movement of species across its borders, particularly during times of rapid change such as we are currently experiencing. Working with adjacent land managers to maintain connectivity across the landscape is one of the most important actions that can be taken.

Management Objective	Management Strategies
Mitigate or lessen the effects of climate change on the park and its values.	• Work with land managers of adjacent areas to maintain connectivity across the landscape to allow for species movement. • Work with First Nations communities, community groups and/or educational institutions to encourage participation in the BC Parks Long-term Ecological Monitoring (LTEM) Program aimed at understanding how the plant communities will evolve in response to environmental changes, focusing on the areas along the eastern edge of the park, around the Besa River and Trimble Lake. • Consider climate change research, including enduring features[23], when making long-term strategic or management decisions. • Work with other agencies, First Nations and local community groups to conduct research aimed at understanding and mitigating the effects of climate change on park ecosystems.

3.2 Zoning Plan

In general terms, a zoning plan divides a park into logical management units within which certain activities/uses are permitted and a particular set of management objectives apply. Zoning is often used to physically separate incompatible activities or uses within the park and provides visitors and managers with a quick visual representation and appreciation of how a particular park is managed. Zones are designed to reflect the physical environment, existing patterns of use, and the desired level of management and development in a given management unit. Appendix A contains an allowable use matrix that covers activities, uses and facilities in each zone.

[23] For more information visit the Yellowstone to Yukon Conservation Initiative's website here: https://y2y.net/publications/technical-reports/MK_MainReport_2pg_web.pdf

3.2.1 Wilderness Recreation Zone

Most of the park is zoned Wilderness Recreation, encompassing approximately 79,260 hectares or 98% of the park (Figure 5). The Wilderness Recreation Zone includes Keily and Petrie creeks, and all of the mountains and ice fields. The main objective of this zone is to protect the natural environment while providing low-impact, wilderness recreation. This area of the park contains important wildlife habitat and spectacular landscape features. Future facility development, other than trapline cabins, is not allowed; this will enable visitors to have a solitary wilderness experience in the park. The only motorized uses permitted in this zone are: fixed wing aircraft, rotary aircraft (recommended for management purposes only), and snowmobiles for trapping purposes.

3.2.2 Nature Recreation Zone

The Nature Recreation Zone is located in the southeast portion of the park, and covers different areas in summer and winter. In summer the zone is approximately 1,455 hectares or 2% of the park. It includes Redfern Lake and the main Muskwa-Kechika Access Management Area route (Redfern Lake Trail). The main goal of this zone is to provide backcountry recreation opportunities while protecting the natural environment. This area of the park is the most easily accessed and provides a staging ground for recreational activities in the rest of the park. Motorized travel is permitted. There has been limited facility development and levels of use are relatively low so the area still retains a feeling of wilderness. During winter months (November through April 15th), the Nature Recreation Zone is increased to approximately 3,800 hectares to allow for enhanced winter recreation activities, mostly snowmobile use (Figure 5). The expanded area includes areas that connects the Sikanni River trail to the Redfern Lake trail, and north along the Besa River. It also allows snowmobile travel to the west end of Redfern Lake along the north side of the lake, and between Redfern Lake and Fairy Lake.

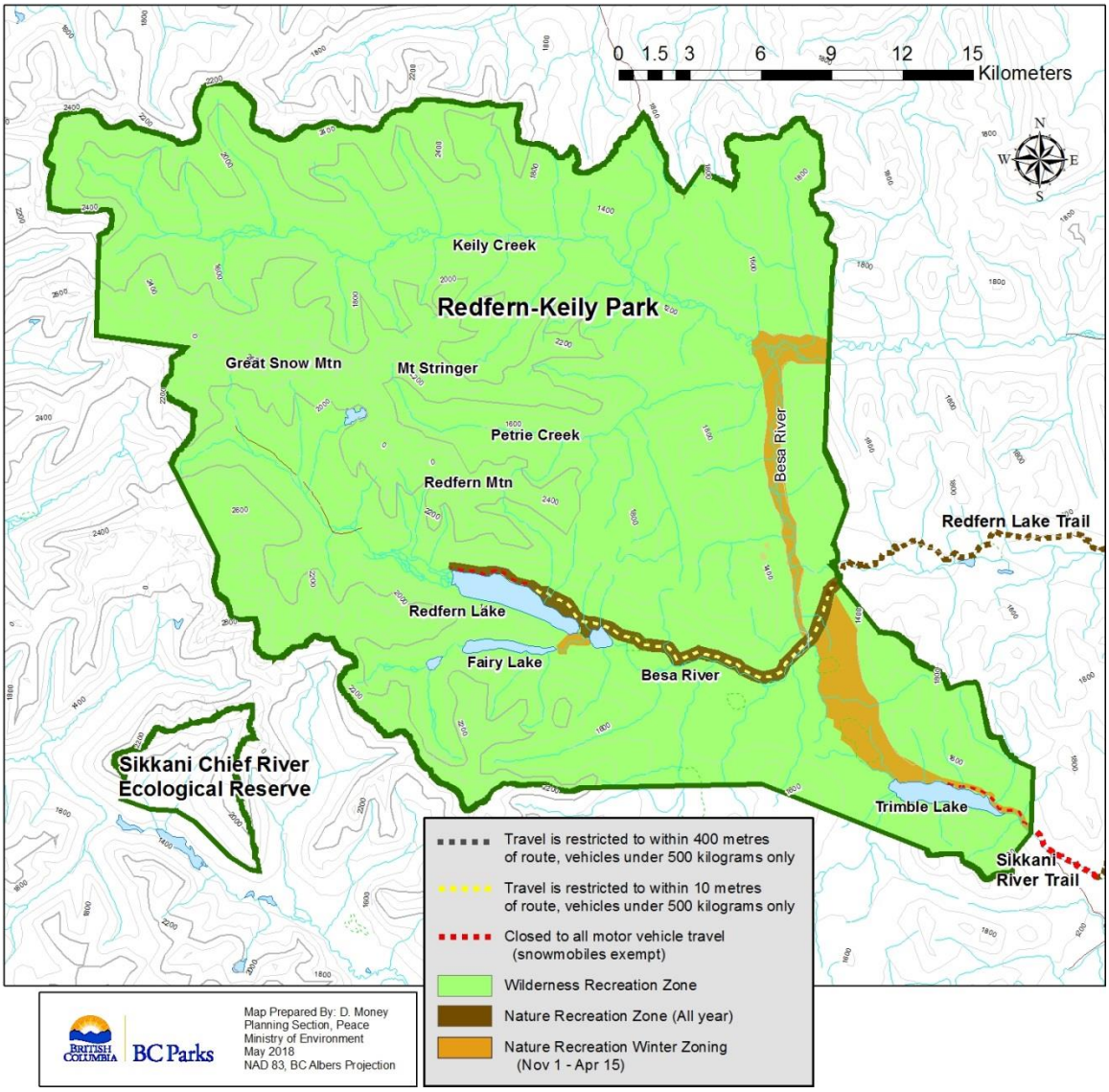


Figure 5: Redfern-Keily Park Zoning

4.0 Plan Implementation

4.1 Implementation Plan

BC Parks will seek project-specific funding and partners to implement high priority strategies. Specific projects will be evaluated for their priority in relation to the overall protected areas system. Many of the initiatives contemplated are not funded as part of core BC Parks activities so jointly seeking funds with outside partners will be a key aspect of the management plan implementation.

BC Parks uses Annual Management Plans to address issues in provincial parks and protected areas on a priority and annual basis. The issues and strategies presented in this plan will form the basis of the Annual Management Planning process for Redfern-Keily Park. BC Parks strives to ensure First Nations' values and inputs are reflected in the development of the Annual Management Plan for the park. Management results will be monitored against stated objectives, and work plans may be revised as part of the collaborative management process. Alternate implementation strategies for priorities not funded as part of core ministry activities may be pursued by BC Parks or its partners.

In addition to any legislation or policies highlighted in the management plan, there are numerous other provincial policies and guidelines which will be considered during management plan implementation. This includes items such as: BC Parks' policies on permitting, conservation, commercial recreation guidelines and policies, and impact assessment processes.

4.2 High Priority Strategies

- *The high priority strategies will be identified after the public review stage has been completed. These strategies will help focus implementation efforts.*

4.3 Plan Assessment

In order to ensure that the management direction for Redfern-Keily Park remains relevant and effective, BC Parks staff will ensure that the management plan is assessed by BC Parks staff on a regular basis (i.e., at least every 5 years). Minor administrative updates may be identified and completed at any time (e.g., correct spelling errors, update protected area details where needed), and will be documented according to BC Parks guidelines.

If an internal assessment reveals that the management plan requires updating or substantial new management direction is needed, a formal review by BC Parks may be initiated to determine whether the management plan requires an amendment or if a new management plan is required.

The management plan amendment process or development of a new management plan includes an opportunity for public input.

Appendix 1: Appropriate Use Table

The following table summarizes existing and potential future uses in Redfern-Keily Park that are and are not appropriate in each zone. This is not intended to be an exhaustive list of all uses that may be considered in this protected area in the future.

Please note that some appropriate uses are geographically restricted (i.e., only allowed in certain areas of Redfern-Keily Park) or are only appropriate at certain times of the year. Please ensure that you are well informed of any use restrictions as indicated in the table. It is important to review relevant sections of the management plan when interpreting the table.

Appropriate Use Table Legend		
N	**Not an appropriate use**	The use is not appropriate in the indicated zone. If the use currently exists but the management planning process has determined that the use is no longer appropriate in all or part of the park, the management plan will include strategies for ending the activity (e.g., phasing out, closing).
Y	**May be an appropriate use**	Some level or extent of this use may be appropriate in the zone indicated. The management plan may provide guidance on the appropriate level of use and may address specific restrictions or planned enhancements (e.g. capacity, designated areas for a particular activity, party size, time of year, etc.). For new or expanded uses, this symbol indicates that the use may be considered for further evaluation. The appropriateness of some activities may not be confirmed until a further assessment (e.g., BC Parks Impact Assessment Process) or evaluation process (e.g., park use permit adjudication) is completed.
Y1	**Appropriate use as per section 30 of the *Park Act***	The use is not normally appropriate in a park but was occurring pursuant to an encumbrance or Crown authorization at the time the park was designated and is allowed to continue.

Activity/Facility	**Nature Recreation Zone**	**Wilderness Recreation Zone**	**Comments**
Recreational Activities/Uses			
Aircraft (fixed wing) – access and landing / takeoff	Y	Y	BC Parks requests submission of a flight plan.
Aircraft (rotary) – access and landing / takeoff	Y	N	Consider implementing helicopter access to Wilderness Recreation Zone for management purposes only.
Boating (human-powered and electric)	Y	Y	
Boating (combustion engine power)	Y	N	
Camping (designated sites)	Y	N	Fire rings allowed in Nature Recreation Zone.
Camping (“no trace”—undesignated sites)	Y	Y	

Activity/Facility	Nature Recreation Zone	Wilderness Recreation Zone	Comments
Fishing	Y	Y	
Hiking/backpacking	Y	Y	
Horse Use	Y	Y	
Hunting	Y	Y	
Land-based Mechanized Activity (e.g., mountain biking, dog sleds, horse sleds)	Y	Y	Designated trails only for mountain biking (i.e., Redfern Lake and Sikanni River trails).
Land-based Motorised Activity (e.g., 4x4, ATV, motorcycle – not snowmobiles)	Y	N	Designated trails only (i.e., Redfern Lake and Sikanni River trails).
Skiing (back-country, cross-country, not track based)	Y	Y	
Skiing (downhill and cross-country track based)	N	N	
Skiing (helicopter or cat-assisted)	N	N	
Snowmobiling	Y	N	
Recreation Facilities/Infrastructure			
Boat Launches	Y	N	Existing only.
Boat Wharves and Docks	N	N	
Cabin, Huts and Shelters (as defined in the Fixed Roof Accommodation Policy)	Y	N	
Lodges (as defined in the Fixed Roof Accommodation Policy)	N	N	
Visitor information buildings	Y	N	Information shelters only.
Trails	Y	Y	Existing trails only.
Other Activities/Infrastructure			
Administrative buildings and compounds	Y	N	
Commercial Filming	Y	Y	
Fire management (prevention and suppression)	Y	Y	Refer to wildfire response plan.
Fire management (ungulate forage enhancement)	Y1	Y1	
Fire management (range forage enhancement)	Y1	Y1	
Fish habitat enhancement	Y	N	Only for native species.
Grazing (horse)	Y1	Y1	Grazing for backcountry recreation purposes only continued under the *Range Act*.
Snowmobiling (trapping)	Y	Y	
Trapping	Y	Y	
Utility corridors	N	N	